American Journal of
Online and Distance Learning
(AJODL)

The Adoption and Use of Moodle Learning Management System in Higher Institutions of Learning: A Systematic Literature Review

Abdallah Ziraba
Godwill Chenyuei Akwene
Atabong nee Alemanjoh Mariana Nkea
Shiynsa Charles Lwanga

American Journal of Online and Distance Learning
ISSN 2957-8027 (Online)
Vol.2, Issue 1 No.1, pp 1 - 21, 2020

www.ajpojournals.org

THE ADOPTION AND USE OF MOODLE LEARNING MANAGEMENT SYSTEM IN HIGHER INSTITUTIONS OF LEARNING: A SYSTEMATIC LITERATURE REVIEW

Abdallah Ziraba[1]
The ICT University Cameroon abdallah.ziraba@ictuniversity.org

Godwill Chenyuei Akwene[2]
University of Yaounde 1, Cameroon akwenegoddy@yahoo.com
(Corresponding Author)

Atabong nee Alemanjoh Mariana Nkea[3]
University of Yaounde 1, Cameroon almanke1@yahoo.fr

Shiynsa Charles Lwanga[4]
CITEC (Higher Institute of Technology and Management)
shiynsacharlesl@yahoo.com

Abstract

Purpose: This study had as purpose to examine the factors influencing instructors and students use of the Moodle Platform in teaching online courses in the ICT University, then the theories used in the use and adoption of Moodle platform.
Methodology: The article focuses on the systematic review of empirical studies in the use and adoption of Moodle Learning Management System (MLMS) in higher institutions. The authors examined 58 publications on the subject from 2010 to 2019, making critical analysis of theories adopted in the study, the research approach, adoption factors, barriers, constructs used and research context.
Findings: Findings from the literature review shown that technological factors, social factors, human factors and reinforcement factors affect the adoption and use of moodle platform. Most publications on this subject are reported using the quantitative research approach. Only a few studies have gained the attention of qualitative approach. Among the technology acceptance models used in the studies, TAM has gained more attention than any other has. The systematic review of literature has brought to the understand that institutes of higher learning in developed as well as developing countries are making remarkable progress in the Moodle Learning Management System (MLMS) as distance-learning tool for knowledge disseminate and acquisition. This practice however, has received more attention in the developed than in the developing countries. The outbreak of CCOVID-19 led to the promotion of social distancing. Institutions of higher learning can only become sustainable in the present dispensation if they promote the use of distance learning tools such as MLSM.

Keywords: *Learning Management System, Moodle platform, Technology adoption, Systematic review.*

Introduction

In this study a systematic review was conducted by the researchers using a research flow chart with six major steps and each step was important for the review process. This was adopted from(Adenuga, Noorminshah, &Miskon, 2015). The Flow Chart is illustrated in figure 1 below.

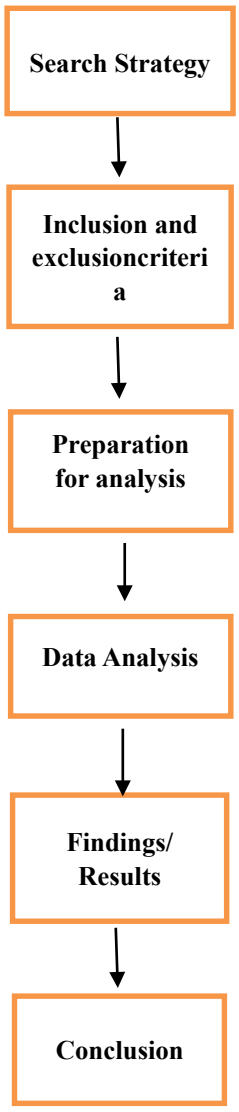

Figure 1: Research flow Chart of the six major steps used in the review Process (adopted from Adenuga et al., 2015)

The Search Process

A manual search of peer reviewed articles from indexed Journals of Scopus, web of science, Science Direct, Springer, and Elsevier. Retrieved full text journal articles were examined to select those to be included in the study. The articles which did not meet the inclusion criteria were excluded. The key words used in the Google Scholar search were “Moodle AND Adoption”, “Moodle AND Acceptance”, “Actual use of Moodle”. The table below shows the summary of the search process.

Table 1: Search process and description

Search Process	Description
Search strategy	Journals in articles mainly downloaded from Google scholar
Search Key Words	"Moodle AND adoption", "Moodle AND Acceptance",,"Actual use of Moodle"
Outcomes	Studies were included if they examined the adoption of Moodle, Actual use of Moodle, Models used in the adoption of learning management platforms and factors influencing the adoption and use of Moodle Platform
Date of Publication	Restricted to studies published from January 2010 to 2020
Language of Publication	The studies included were restricted to those published in English
Study inclusion criteria	Only journal articles published in peer reviewed journal Only articles published from January 2010 to 2020 Only articles examining adoption of Moodle, Actual use of Moodle, Acceptance and Factors that determine acceptance and use of Moodle Learning platform
Study Exclusion Criteria	Articles not Published in journals and studies with only abstracts and not full texts were excluded
Participants	Instructors and learners using Moodle platform in the ICT University.

Flow diagram of the selection process for including articles in review

The flow diagram below depicts the process involved in the selection of articles that met with criteria for inclusion. Six steps were involved in the selection of the final articles examined.

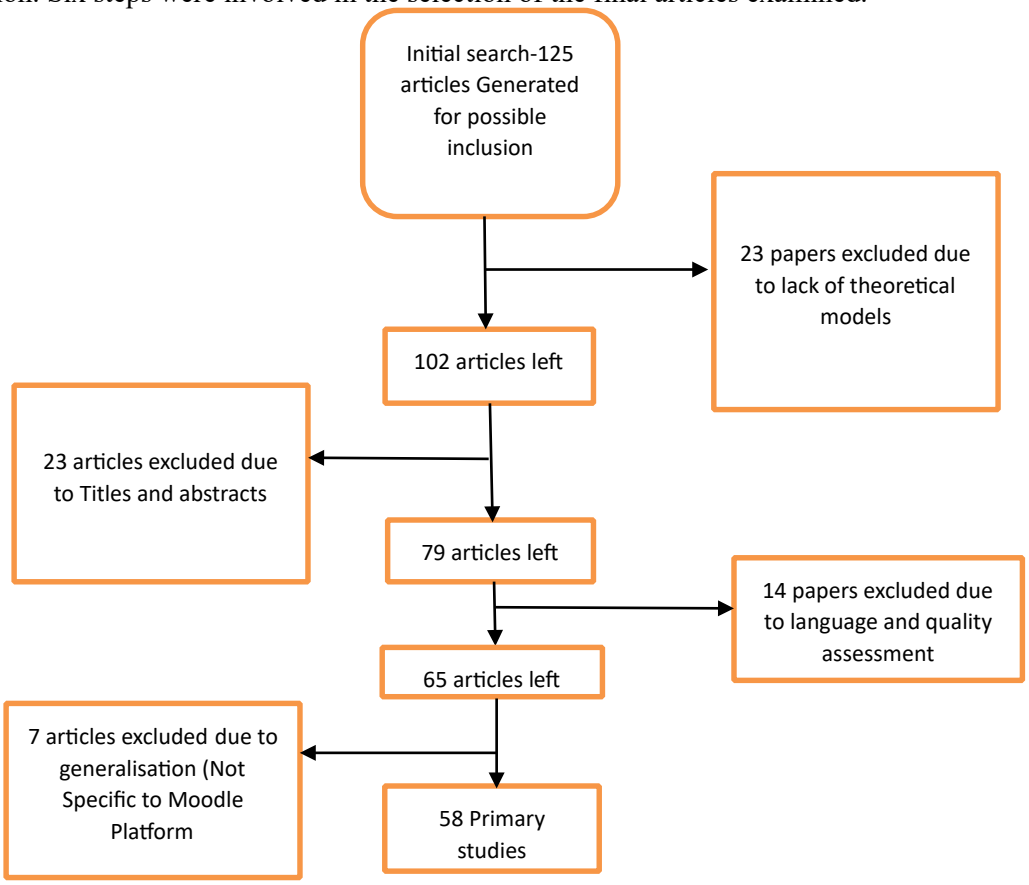

Figure 2: Flow diagram of the selection process for including articles in review.

Data Analysis Preparation

The goal of the study was to examine the factors influencing instructors and students use of the Moodle Platform in teaching online courses in the ICT University and the theories used in the use and adoption of Moodle platform. The data analysis stage involved at identifying several themes as a guideline to capture and report the literature findings. The preparation for data analysis was based on the following themes

I. Authors name
II. Publication year
III. Theory adopted
IV. Research approach
V. Adoption factors/barriers/constructs
VI. Research context

Systematic Literature Review Research Questions

The systematic literature review of the study was based on the following research questions.

RQ1: What are the factors influencing instructors and students use of Moodle platform in teaching Online Courses in the ICT University?

RQ2: What are the theories used in the adoption and use of learning management platforms in higher institutions of learning?

RQ3: What are the previous studies suggestions about the appropriate theoretical Model to be adopted for use and adoption of learning management systems in higher institutions of learning?

Data Analysis

Data analysis was conducted based on the data collected for review. In this particular study, the year 2015 and 2016 have the highest number of publications as shown in figure 3. The reviewed papers revealed the factors that determine the adoption of learning management systems in developed and developing world; such as lack of technological skills, internet access, lack of incentives and time management, attitudes towards use, self-efficacy, perceived usefulness, (Ansong, Lovia Boateng, & Boateng, 2017; Hanif, Jamal, & Imran, 2018; Ishtaiwa, 2011; Kilic, 2014; Oliveira, Cunha, &Nakayama, 2016). Similarly, the years 2008, 2010 and 2013 have fewest published journal articles on the adoption of moodle learning management platform in the context of this study (See Figure 3).

American Journal of Online and Distance Learning
ISSN 2957-8027 (Online)
Vol.2, Issue 1 No.1, pp 1 - 21, 2020

www.ajpojournals.org

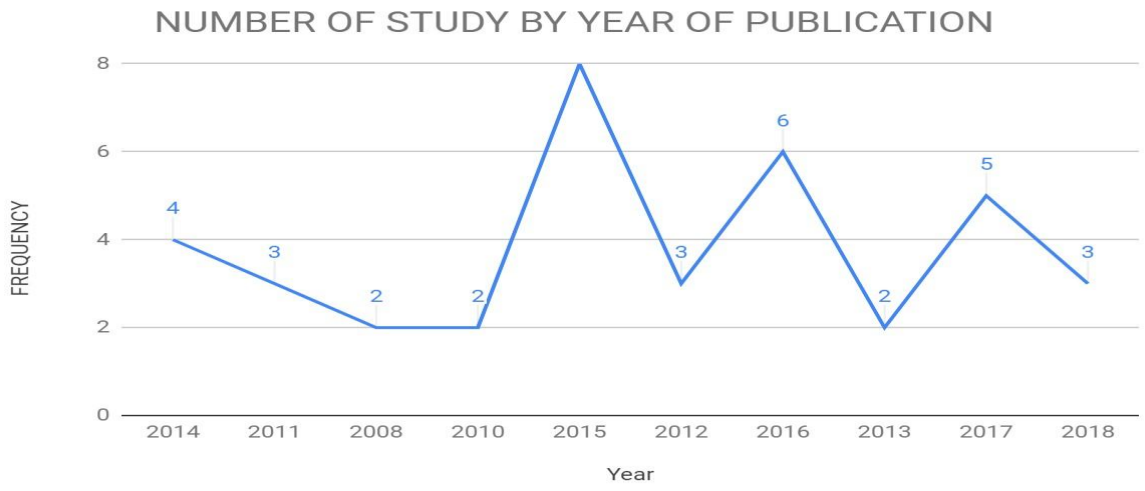

Figure 3: The Number of studies by year of Publication

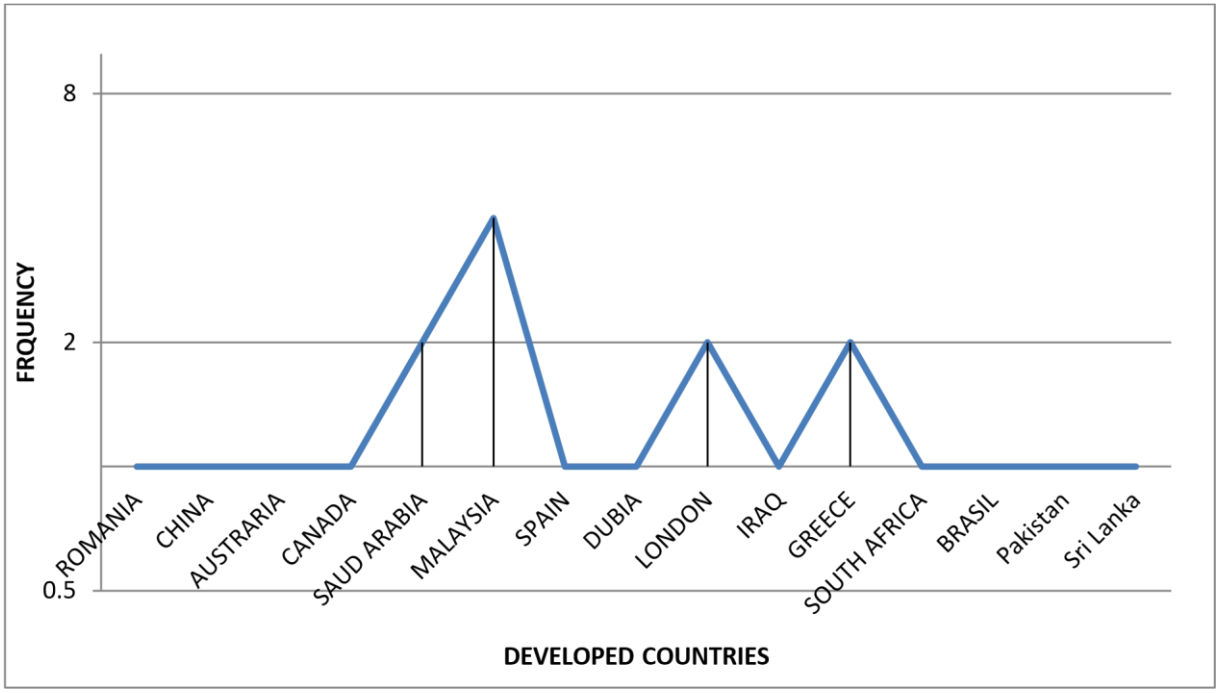

Figure 4: Research Context Distributions of Primary Studies (Developed)

In Figure 4 above, Malaysia had the highest number of research context in the community of developed countries. Issues explaining the factors that determine the adoption and actual use of Moodle platform range from student perceptions, Perceived ease of use, perceived usefulness, attitude towards the use of Moodle, level of computer skills (Bhardwaj, Nagandla, Swe, & Abas, 2015; Kasim & Khalid, 2016; Zakaria &Daud, 2013). Most of the studies were review papers, a few qualitative studies and majority were quantitative as seen in Figure 4. The interest of Scholars in this region and context may be due to the fact that these countries have considerable technological facilities that enable the use and adoption of Moodle learning management platform in the teaching and learning process. Chinese and Canadian authors presented factors concerning digital natives and how this has an influence on technology adoption and use. Wood (2010) revealed that out of the nine digital natives, five could be considered

adaptors and that is why they adapt technology to suit their needs. Up to 97% reported being in varying degrees.Wu and Hua (2008), stated the challenges of using Moodle in collegiate writing environment. The results revealed that Moodle is free and user-friendly content Management System which can greatly help English flexibly manage and edit their teaching materials. However, challenges revealed included lack of technological skills and attitude towards the use of Moodle platform. Brazil and China's emphasis of the challenges to the adoption and use of the Moodle Platform have further proven that even countries that are endowed with abundant technological facilities and human resource still have issues with adoption and use of technology such as the Moodle Platform.

As shown in Figure 5 the developing countries such as Slovenia, Serbia, Tanzania, Nigeria, Ghana, Turkey, Jordan and Kenya, the review revealed that Ghana and Turkey are the countries that have highest number of studies about the adoption and use of Moodle Learning Management Platform. This is low, compared to the number of studies and research conducted in the context of developed countries. Therefore, there is need to examine the factors that are stalling the adoption and use of learning management platforms in developing countries. Issues of adoption and use of learning management system especially Moodle have not received much academic attention compared to developed countries such as Australia, Canada, Brazil and Spain.

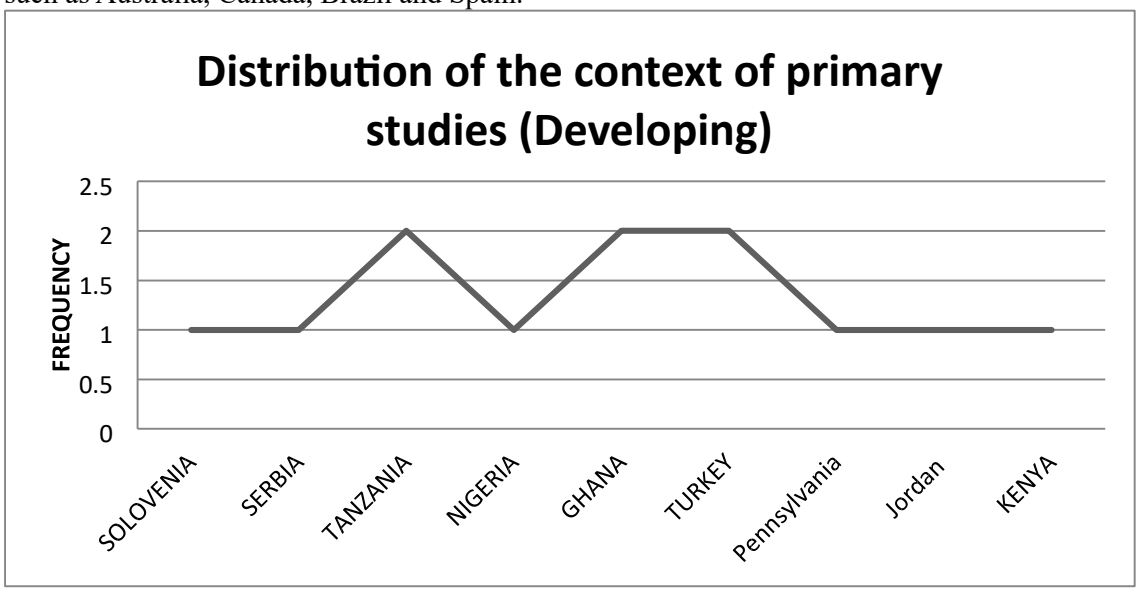

Figure 5: Research context distribution of primary studies (Developing countries)

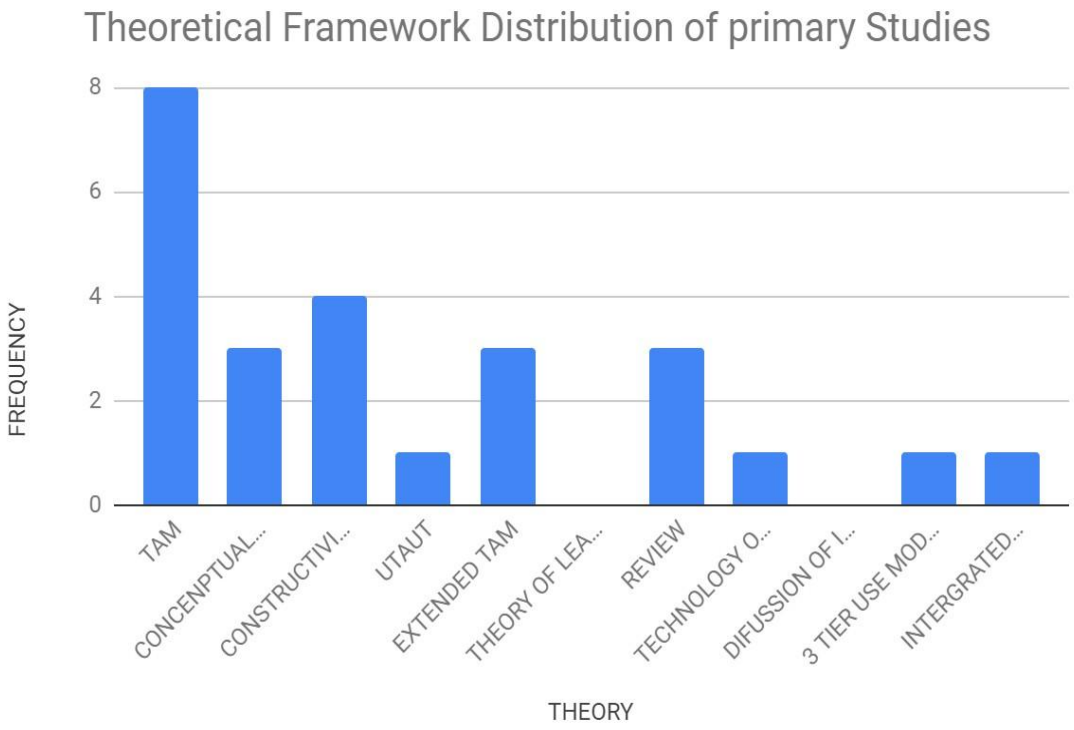

Figure 6: Theoretical Framework Distribution of primary studies

The result of the reviewed studies indicates that a number of theoretical models were used. These include diffusion of innovation theory, Extended TAM, hypothesized conceptual model, Based on the above analysis, Technology Acceptance model (Davis, 1985), has the highest number of frequency in the reviews to explain technology adoption and use. This is followed by Constructivism theory, Extended Technology Acceptance model and Reviews. Despite the fact that Technology Acceptance model registered success as a very useful model to explain Technology acceptance and use, in this particular study, it was not adopted. Hsiao-hui Hsu and Chang (2013) revealed that the use of Technology Acceptance Model is still questioned.

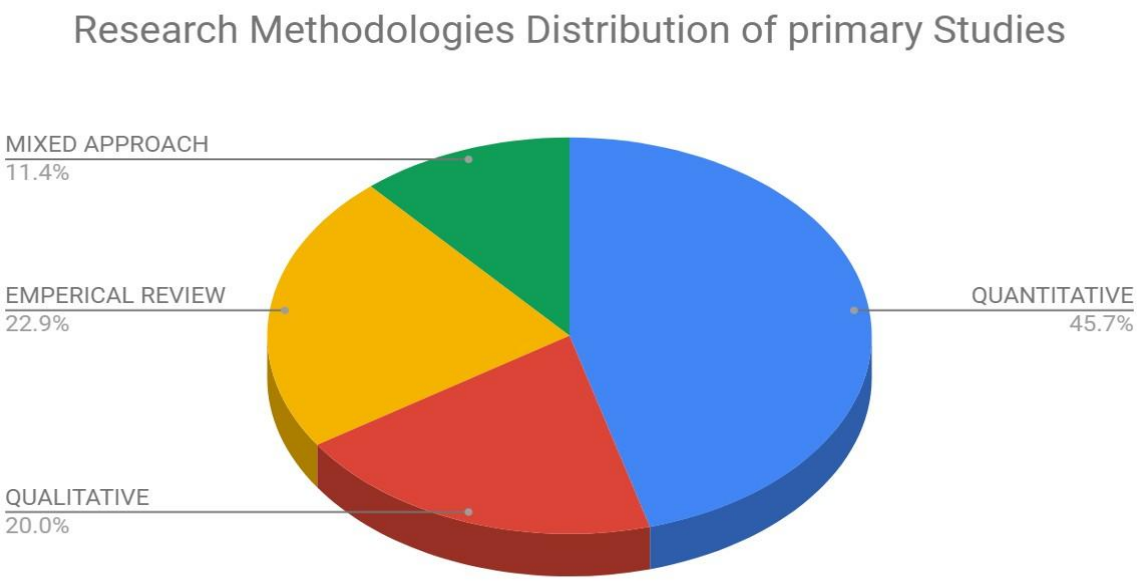

Figure 7: Research Methodologies Distribution of Primary Studies

The review revealed that the majority of the previous studies about the actual use and adoption of Moodle Platform have been done using Quantitative Methodologies. Susana, Juanjo, Eva, and Ana (2015) recommended that quantitative studies help in the continuous investigation, functioning and the knowledge to explain the relationship between the research variables. Nevertheless, the review revealed that some authors recommended using qualitative approach to discover the feelings and perception of Moodle users by using structured interview. Qualitative approach helps the researchers to understand the research problem from the perspective of the users of the Moodle platform (Adenuga et al., 2015; AlQudah, 2014; Duval, Sharples, & Sutherland, 2017; Hsiao-hui Hsu & Chang, 2013; Kiget, Wanyembi, & Peters, 2014; Marks, Maytha, &Rietsema, 2016). Despite the relevance of using qualitative methodologies to explain actual use and adoption of technology, the findings of the systematic review concluded that the Quantitative studies are known to be more reliable and valid statistically (Goyal & Tambe, 2015; Oproiu, 2015; Walker, Brown, Moore, & Hughes, 2011; Wood, 2010).

Table 2 below shows the extracted factors from the reviewed literature, which affects the use and adoption of Moodle Platform in developed and developing countries. The obstacles to the adoption and use of Moodle Platform can be categorised as Organisational, human and Technological issues (Adenuga et al., 2015).

Ishtaiwa (2011) stated that there are two aspects to consider when explaining the factors that determine the use and the adoption of the Moodle Platform namely the Motivating factors which includes enhanced communication with the students, improved students' learning and organized instructional resources and the limiting factors which include lack of technological skills, poor internet connectivity and lack of incentives and time management. Other factors that determine and affect the use and adoption of Moodle in general and in developing countries in particular were presented through a review of previous studies. These included, attitudes towards the use of technology, technology skills(Oliveira et al., 2016), Self efficacy, content of E-learning, student satisfaction, and perceived Usefulness(Hanif et al., 2018), subjective norm, Perception of external control, Systems accessibility, enjoyment and Perceived ease of use (Essel& Wilson, 2017). Despite the enormous benefits of using Moodle to teach

online courses in the higher institutions of learning, these factors mentioned may contribute to stalling the use of the Moodle Platform especially in the ICT University. The researchers categorised the above mentioned factors into technological, Social, Human, Organisational and reinforcement factors as adopted by Adenuga et al. (2015).

Table 2: Summarized factors that affect the adoption and use of moodle platform

Author/Year	Technological Factors	Social Factors	Human Factors	Reinforcement Factors
(Ishtaiwa, 2011)	Low technological skills, Poor internet connectivity			Enhanced communication with the students, Improved students learning and organised learning resources, Lack of incentives and time management
(Oliveira et al., 2016)	Technological skills		Attitudes towards the use of Technology	
(Hanif et al., 2018)	Systems accessibility		Students' satisfaction, Perceived usefulness, Perceived Ease of use, Self-Efficacy	Enjoyment, Contents of E-learning,
(Ansong et al., 2017)	Technological factors,	Environmental factors	Organisation factors	The nature of the course
(Jones, 2015)		Encouragement from others	Teachers perception of the LMS, Perceived usefulness, Perceived Ease of Use	
(Abdullah, 2017)	Technical readiness	Cultural acceptance factor	Perceived Ease of use Human Resource readiness Perceived Usefulness	
(Kilic, 2014)	Technical Support		Computer self-efficacy, Attitude Perceived Ease of use Perceived usefulness	
(Venter, Jansen van Rensburg, & Davis, 2012)	Technological infrastructure, high cost of technology,		Lecturers'efforts, graduate competencies, Students' frustration with the web	
(Papadakis, Kalogiannakis, &Sifaki, 2019)	Familiarity and experience with Technology			Better organised content, Powerful and flexible engaging learning experience

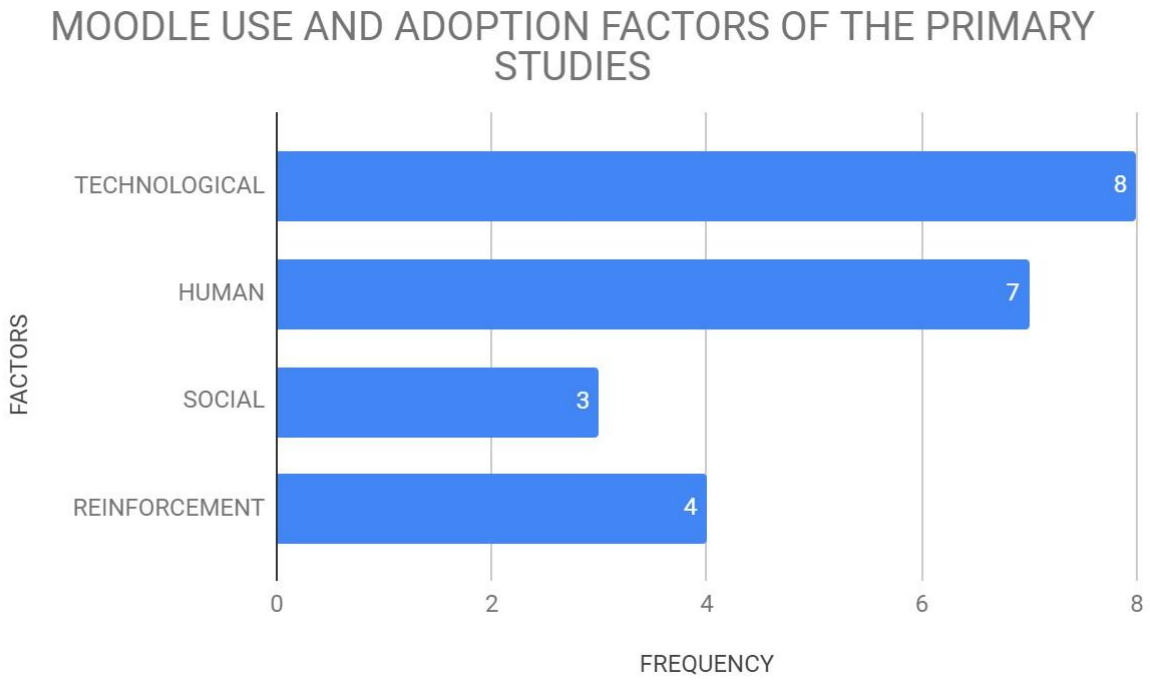

Figure 8: Moodle Use and Adoption Factors/Barriers of the Primary Studies

In this particular review of the previous studies, social and reinforcement factors received less academic attention. Most of these studies reviewed were conducted in developed countries. These studies were a mixture of Qualitative, Quantitative and review papers. Most of the studies conducted in the developing countries such as Ghana, Iraq, Kenya, Nigeria, Slovenia and Pakistan revealed that technological issues are the most challenging in the adoption and use of Moodle platform in the higher institutions of learning(Ahmad, Chinade, Gambaki, Ibrahim, & Ala, 2012; Kiget et al., 2014; Mtebe, 2015; Šumak, Heričko, Pušnik, &Polančič, 2011). This further showed complexity in the adoption and use of Moodle Platform in developing countries. In this particular study the researcher is curious to investigate and find out why social and reinforcement factors received less academic attention in the review of previous studies in the context of both developed and developing countries. In the study to find out the factors that influences e-learning adoption from a multidimensional perspective, Ansong et al. (2017) concluded that technological factors, Environmental factors, and organisational factors were the most evident factors affecting the adoption and use of Technology. Environmental and organisational factors are categorised as social factors, which have received less academic attention in developing countries. The next section elaborates more on the useful insights of the factors affecting the use and adoption of Moodle Platform from the systematic review of literature.

Factors Affecting the Use and Adoption of Moodle Platform in Developing and Developed Countries

Teaching and learning continues to evolve over time and the current trend today in education institutions is the use of Technology as a mediator(Boateng, Mbrokoh, Boateng, Senyo, & Ansong, 2016). The revolutionary change in Distance Education is referred to as e-learning, which refers to the use of information technologies to facilitate access to resources that enhance teaching and learning. Studies have investigated the e-learning and use of Moodle platform from different perspectives, including Technological perspectives (Abdullah, 2017; Adenuga et al., 2015; Ahmad et al., 2012;
Ansong et al., 2017; Boateng et al., 2016; Hanif et al., 2018; Ishtaiwa, 2011; Jones, 2015; Kiget et al., 2014; Mtebe, 2015), Social perspectives(Abdullah, 2017; Ansong et al., 2017; Jones, 2015), Human

Factors (Ahmad et al., 2012; Ansong et al., 2017; Hanif et al., 2018; Mtebe, 2015) and Reinforcement factors such as enjoyment and contents of e-learning, incentives and encouragement from others (Ansong et al., 2017; Jones, 2015; Mtebe, 2015; Papadakis et al., 2019). Some of the studies from developing countries context have revealed that Perceived Ease of use and Perceived usefulness variables of TAM are important factors that influence the adoption and use of Moodle (Boateng et al., 2016; Davis, 1985; Ishtaiwa, 2011; Kilic, 2014; Oliveira et al., 2016; Oproiu, 2015)

Ansong et al. (2017) mentioned in their study that there are three aspects in the adoption and use of Moodle Platform, namely technological factor, Organisational factors, Environmental factors, and human factors. Similarly human and social influence was another attribute (Ansong et al., 2017; Goyal &Tambe, 2015; Hsiao-hui Hsu & Chang, 2013; Kilic, 2014; Minović, Štavljanin, Milovanović, & Starčević, 2008) that was mentioned to have either positive or negative influence on the use and adoption of Moodle in higher institutions of learning. Ahmad et al. (2012) mentioned in their studies the motivating factors to use and adopt Moodle such as enhanced communication with the students, improved students' learning and organised instructional resource materials as major aspect which required future research attention. Despite the numerous benefits of learning management systems such as Moodle have to offer, the mentioned factors may contribute towards the stalling of the use and adoption of Moodle especially in developed countries.

Technological Factors

Advanced academic institutions now use information technology as a mediator in teaching and learning. This shift provides another perspective in education, with emphasis on the use of learning management platforms to facilitate learning and teaching(Boateng et al., 2016). E-learning system technologies enable activities that allow leaners to be active users, actively participating in the online learning process. If online e-learning platforms and services are provided by the academic institutions, it needs to be used and adopted by its users. This can be influenced by different factors (Šumak et al., 2011). Notwithstanding the success of E-learning is dependent on the intensity to which instructors utilise the technology. The instructors will prefer to use a technological system which is user friendly and easy to operate other than a system which is difficult to comprehend.(Adenuga et al., 2015). It is therefore important to investigate how Technological factors influence the use and adoption of E-learning in higher institutions of learning especially in developing context. There are many constructs to the user and such constructs can have a direct or indirect impact on the users' attitudes and intention to use the systems. (Duval et al., 2017)

Adenuga et al. (2015) mentioned in their study that recent technological advancements have made life easy. However, these technology innovations are faced with huge resistance especially when such technology is hard to comprehend. In the Cameroonian Context and other developing Countries such as Nigeria, Zimbabwe and Uganda, the adoption and use of Moodle and learning management Systems is still new and it is important to investigate the technology facilitating constructs such as Perceived Ease of use, Perceived Usefulness, Attitude , Behavioural intentions and actual use (AlQudah, 2014; Boateng et al., 2016; Davis, 1985). In this study the Technology Acceptance Model (TAM) was used as underlying theory. (Šumak et al., 2011) mentioned the constructs were empirically tested using the structural Equation modelling (SEM) approach. TAM has become one of the mostly used models in IS research because of its understandability and simplicity(Hsiao-hui Hsu & Chang, 2013). Abdullah (2017) revealed that Technical readiness and Technical Support are the additional constructs/ factors, which influence attitudes and behavioural intentions to use the Moodle platform in higher institutions of learning. These constructs are used by the researcher to extend the Technology Acceptance Model (TAM).

Human Factors

Technology innovation brings about new methods of doing things, which is often resisted since people are not willing to leave their comfort zones as they are used to their old method of doing things. The human capital resources of an organization are considered to be a very important component of the organisation structure to actualise the vision of an institution (Essel& Wilson, 2017). If new technology such as Moodle for classroom is adopted, the teachers and the students may see the technology as being unfriendly and therefore will disregard it. In the review of the previous studies, authors mentioned human factors such as attitudes towards the use of technology , computer self-efficacy, perceived ease of use, Perceived usefulness, and lecturers' competences to use technology (Abdullah, 2017; Ansong et al., 2017; Hanif et al., 2018; Kilic, 2014; Oliveira et al., 2016; Papadakis et al., 2019; Šumak et al., 2011). Adenuga et al. (2015) revealed that if technology is difficult to manipulate, then the more unlikely that users will embrace it. Human factor is extensively empirically investigated. This is derived from Hanif et al. (2018) who tried to examine the human factor relationship in extending the Technology Acceptance model with subjective norms and behavioural intentions to use and adopt technology in elearning systems by digital learners. The researchers adopted this factor and defined it in the perspective of understanding human characteristics of Perceived ease of use, Perceived usefulness, Attitudes and Behaviour intention, and computer efficacy and how this affects actual use and adoption of technology in higher institutions of learning. This construct is important to be used in this study because this has a direct effect on how Moodle users will react to the adoption and use of Technology

Social Factors

According to several authors reviewed (Abdullah, 2017; Ansong et al., 2017; Jones, 2015), social factors included environmental factors, cultural factors and encouragement from others where by the decision by a lecturer to use Moodle for teaching is influenced by the others. These include opinions from colleagues and fellow staff members, the Chief Technology officer, and Academic officer. Social Influence included three conceptually investigated constructs mapped from previous studies; encouragement from others, cultural acceptance factors and organisational/environmental factors. Social influence was seen as a major determinant factor in the adoption and use of technology(Ansong et al., 2017). It is therefore important to investigate this factor in this study since the researchers are interested in knowing if the opinions of the others are important in determining the actual use and adoption of Moodle in higher institutions of learning.

Reinforcement Factors

The findings of the review revealed and mentioned aspects such as enhanced communication with the students while teaching using Moodle Platform, improved learning and organised learning content and resources used to teach in the Moodle platform, and lack of incentives, enjoyment, the nature of the course which powerful and engaging as motivating reinforcement factors considered to have a strong relationship on instructors and students use and adoption of learning management platforms (Ansong et al., 2017; Ishtaiwa, 2011; Kebritchi, Lipschuetz, & Santiague, 2017; Minović et al., 2008; Papadakis et al., 2019). These motivating factors encouraged the students and instructors to use Moodle especially in circumstances where the use of technology is seen as a burden or extra workload for instructors(Adenuga et al., 2015). Reinforcement factor has been emphasised due to the challenges that instructors and students face in use and adoption of learning management systems. It is therefore important to include this construct to be investigated in the context of developing countries; Cameroon Context in particular.

Review of Previous Studies on Factors Determining the Use and Adoption of Moodle

The essence of the review was to examine factors influencing the use and adoption of Moodle as a learning management platform. In order to do this successfully, there is need to ensure a comprehensive research model. A number of studies on technology use and adoption have investigated a number of variables such as behavioural intention to use Moodle Platform(Ansong et al., 2017; Boateng et al., 2016; Ishtaiwa, 2011; Kebritchi et al., 2017; Kilic, 2014; Minović et al., 2008; Oliveira et al., 2016; Papadakis et al., 2019). In this study the factors reviewed were categorised into five, namely technological factors, human factors, social factors and reinforcement factors. The systematic review was conducted based on the five factors as mentioned. One of the research objectives of this study is to understand the factors which undermine the actual use and adoption of Moodle platform in higher institutions of learning.

Theoretical Models Employed in the Context of Actual use and Adoption of Moodle Platform

The advancement of technology to enhance production efficiency and operation efficacy prompted businesses to introduce new technology equipment in their daily work operations. In a study to compare the three models of technology acceptance behaviours in information systems, Jen, Lu, and Liu (2009) concluded that for the technology equipment to exert the expected effects, the employees should accept and become delighted to use the equipment. It is only when that the users are willing to accept the technology equipment that the performance of the equipment is maximised. Massive investments to introduce new technologies in higher institutions of learning are made by both non-governmental and governmental agencies with the aim of changing the workflow patterns of the prospective users. Adenuga et al. (2015) warned that these initiatives may not be productive if the technologies are not used by the intended users. An example is when the Moodle Platform is underutilised and limited to only online live classes and other management and administrative functionalities of the platform is ignored by the users. Algahtani (2017) recognises the benefits of technology utilisation as enhancement of productivity and also alerts the failure of accepting and adopting technology which may lead to financial loss and dissatisfaction in the organisation. Although technology is advancing, its utilisation is lacking especially in higher institutions of learning (Al-Gahtani, 2006; Algahtani, 2017; Alhothli, 2015; Filippidi, Tselios, &Komis, 2010; Hsiao-Hui Hsu, 2012; Samaradiwakara & Gunawardena, 2014; Sánchez & Hueros, 2010)

Many technology Acceptance theories and models such as the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB), the Technology Acceptance Model (TAM), the Diffusion of Innovation and the Unified Theory of Acceptance and use of Technology (UTAUT) provide set of explanatory variables which can be used to predict a particular phenomenon. This has an implication on how Moodle users (Teachers and students) have appreciated and accepted the use of the Moodle platform in the teaching and learning practices. In this study however, the researcher provides a detailed view of some of these theories that have gained empirical recognitions within the context of this study.

Technology Acceptance Model

The Technology Acceptance Model(Davis et al., 1989) was the first model to mention psychological factors affecting technology acceptance and it was developed from Theory of Reason Action (TRA) by Davis. This Model has been applied in the previous studies to investigate user acceptance and adoption of technology in general and Moodle in particular (Ansong et al., 2017; Duval et al., 2017; Grabowski & Sagan, 2016; Hsiao-hui Hsu & Chang, 2013; Nicholas-Omoregbe et al., 2017; Olushola, Abiola, & Management, 2017; Oproiu, 2015; Picciano, 2017; Raman, Don, Khalid, & Rizuan, 2014; Venter et al., 2012). Adenuga et al.

(2015) asserted that "two elements which are Perceived Usefulness and Perceived Ease of Use are known as important determinants of adoption by prospective users"

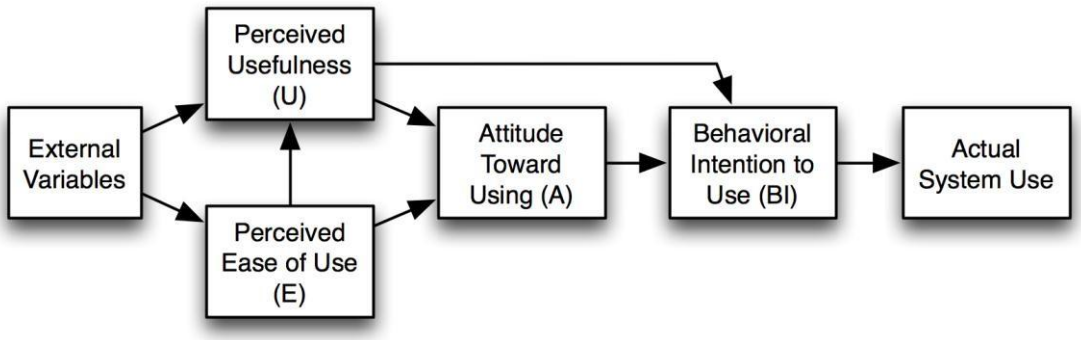

Figure 9: TAM (Source: Davis et al., 1989)

As shown in Figure 9 above, TAM states that perceived usefulness and perceived ease of use determine an individual's intention to use a system with the intention as mediator of actual system use. Perceived usefulness is also seen as being directly impacted by perceived ease of use (Samaradiwakara & Gunawardena, 2014). As far as this study is concerned, perceived usefulness is the impression a teacher has that using Moodle to teach will better their job. Perceived ease of use is the impression a teacher has that Moodle Platform is easy to use. The teacher has an impression that use of Moodle platform to teacher will improve student's grades and will also make learning easy and interesting. Many studies used TAM to predict user acceptance and adoption of technology (Adenuga et al., 2015; Davis, 1985; Hanif et al., 2018; Hsiao-hui Hsu & Chang, 2013; Khan & Woosley, 2011; Olushola & Abiola, 2017; Picciano, 2017; Samaradiwakara& Gunawardena, 2014). The results of their studies showed that Perceived usefulness of Moodle is directly significant to behavioral intentions to use the system, perceived ease of use directly supported both perceived usefulness and the behavioral intentions to use the system. Similarly, the authors of the previous studies extended and added new constructs such as Technological Support, Instructor Online Presence, Moodle Tools and Features, Computer Efficacy and Perceived Incentives which were found to have effects on TAM variables and the teachers' desire to use Moodle platform to teach online courses. Attitude and perceived usefulness jointly determine the behavioral intention and attitude is determined by perceived usefulness and perceived ease of use.

Technology Acceptance Model 2

Venkatesh & Davis (2000) stated that the goal of TAM2 is a theoretical extension of the TAM to include additional key determinants of TAM that explains perceived usefulness and usage intentions in terms of Social influence and cognitive instrumental processes and also to understand how the effects of these determinants change with increasing user experience over time with the target technological system (Samaradiwakara & Gunawardena, 2014). In the extended version of TAM Venkatesh and Davis (2000) found the importance of extending TAM with additional constructs such as image, output quality, subjective norm, job relevance and result

demonstrability to establish the strength of influencing intentions towards the social and cognitive factors (Adenuga et al., 2015). It was found out that PU, PEOU and BI are not determined by attitude and therefore attitude as a variable was taken away from TAM. According to the study of (Venkatesh & Davis, 2000) both social influence processes and cognitive instrumental processes significantly influence user acceptance. TAM2 is shown in Figure 2.

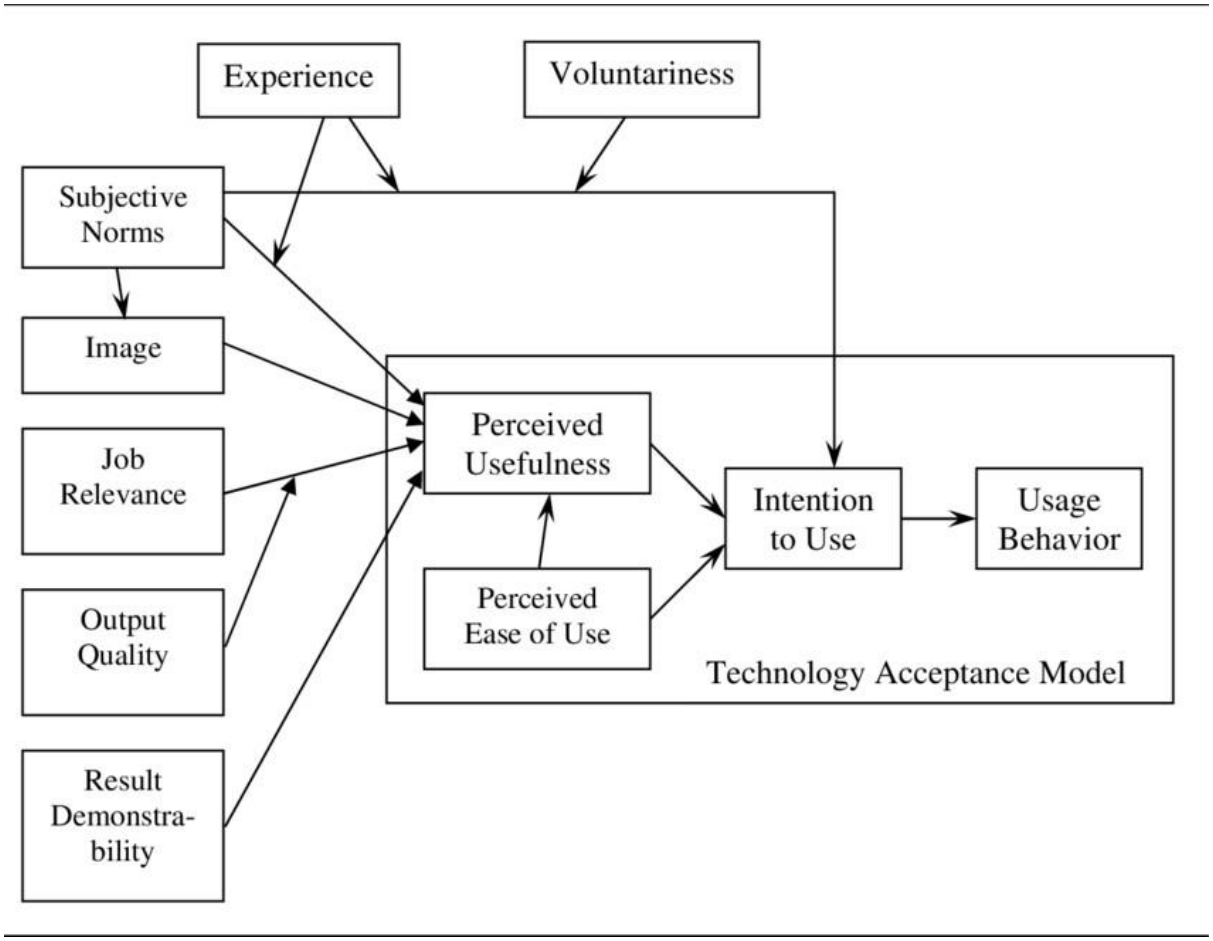

Figure 10: Extended Technology Acceptance Model 2 Source: (Venkatesh & Davis, 2000)

Theory of Reasoned Action

Theory of reasoned Action (Fishbein & Ajzen 1975) was the first theoretical perspective to gain popularity and acceptance in technology acceptance research. This theory models the attitude behaviour relationships. The theory maintains that individuals would use computers if they see that positive benefits (Outcomes) is associated with using them(Saleem, Al-Saqri, & Ahmad, 2016). Summarily, TRA explained that an individual action is represented by his intention to execute that action; nevertheless this intention is controlled by combining the social norms with individual attitude towards the action (Jen et al., 2009). TRA concludes some other external factors will indirectly influence social norms and attitude via a certain action and consequently have effects on the behavioural intention(Adenuga et al., 2015).

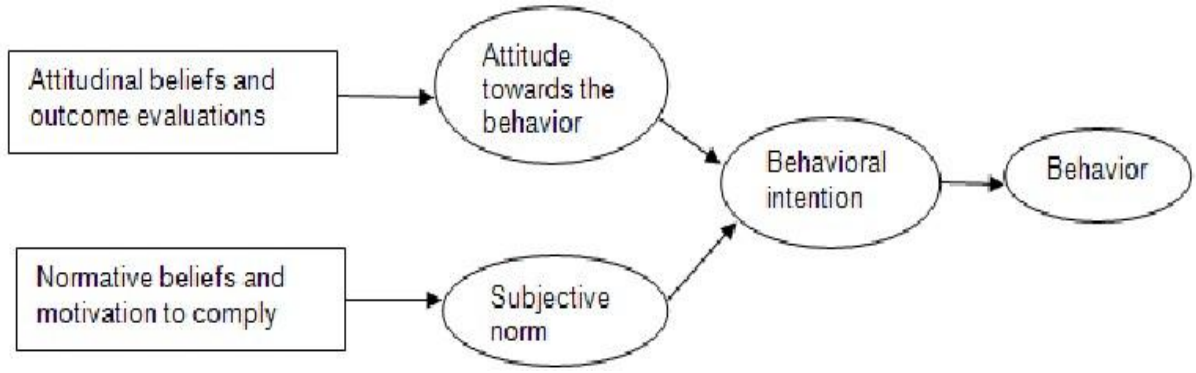

Figure 11: Theory of Reasoned Action. Source (Ismail & Razak, 2011) Theory of Planned Behaviour

"The theory of planned behaviour extended the Theory of Reasoned Action (TRA) by incorporating an additional construct namely Perceived Behavioural Control (PBC) to account for situations in which an individual lacks substantial control over the target behaviour" (Olushola & Abiola, 2017). This is always determined by the availability of skills, resources, and opportunities, as well as the perceived importance of those skills, resources, and opportunities to achieve the outcome. TPB assumed that the actual behaviour of an individual is influenced intention to that behaviour (Adenuga et al., 2015).

Unified Theory of Acceptance and Use of Technology

Unified theory of Acceptance and use of Technology (UTAUT) was a very important model Proposed by Venkatesh, Davis and Davis 2003). The model proposed four core determinants of intention and usage and up to four moderators of relationships(Boateng et al., 2016). "Four constructs of performance expectancy, effort expectance, social influence and facilitating conditions have been theorised in formulating UTAUT" (Olushola et al., 2017). All this is with the aim of determining user acceptance and usage behaviour of technology as depicted in Figure 12. Age, gender, voluntariness and experience are the key moderators in the model (Venkatesh & Davis, 2000). "Performance Expectancy (PE) is the perception a user has that using a technology is beneficial; Effort Expectancy (EE) is the perception a user has that a particular technology can be easily operated; Facilitating Condition (FC) is the perception a user has that sound technical facilities exist to enhance technology use; and Social Influence (SI) is the influence of superiors on others towards using a particular technology" (Adenuga et al., 2015). The model originated as an extension of TAM to overcome the limitations of the earlier versions of TAM

American Journal of Online and Distance Learning
ISSN 2957-8027 (Online)
Vol.2, Issue 1 No.1, pp 1 - 21, 2020

www.ajpojournals.org

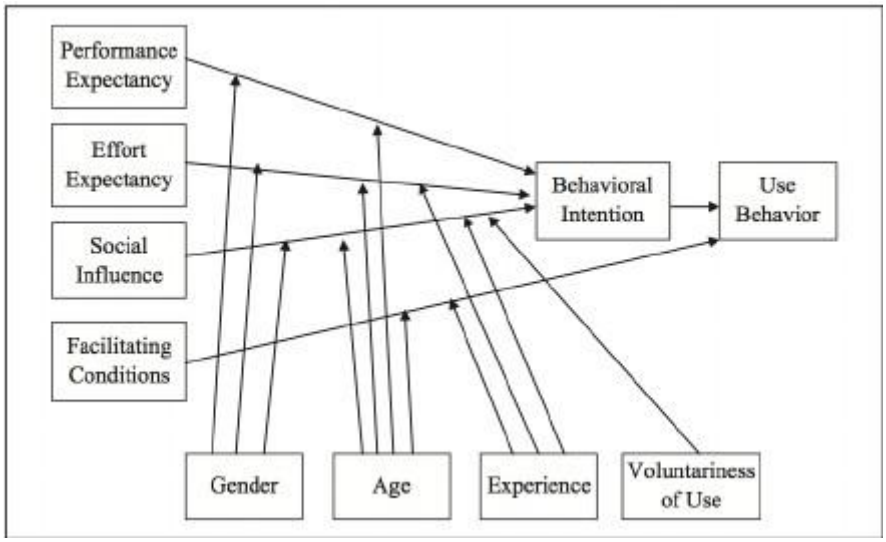

Figure 12:Unified Theory of Acceptance and Use of Technology Model (Source: Mejía,2015)

Discussions and conclusions

The findings from the literature review revealed that the factors which determine the adoption and use of learning management systems in the developed and developing contexts differ. Aspects such as 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. (Ansong, Lovia Boateng, & Boateng, 2017; Hanif, Jamal, & Imran, 2018; Ishtaiwa, 2011; Kilic, 2014; Oliveira, Cunha, &Nakayama, 2016). In contrast to the developed countries, the previous studies revealed that there is considerable technological facilities that enable the use and adoption of learning management platforms. However, despite all this, Brazil and china's emphasis of the challenges to the adoption and us of the learning management platforms have further proven that even countries that are endowed with abundant technological facilities and human resource still have issues with adoption and use of technology such as the technologies in the teaching and learning process. It is also revealed in the literature review that Technological factors received more academic attention, whereas social and reinforcement factors received less academic attention by the scholars. This is confirmed with (Filippidi, Tselios, & Komis, 2010) who concluded that institutions face technological challenges in the adoption of learning management platforms. Most of the studies conducted in the developing countries such as Ghana, Iraq, Kenya, Nigeria, Slovenia and Pakistan revealed that technological issues are the most challenging in the adoption and use of Moodle platform in the higher institutions of learning (Ahmad, Chinade, Gambaki, Ibrahim, & Ala, 2012; Kiget et al., 2014; Mtebe, 2015; Šumak, Heričko, Pušnik, & Polančič, 2011).

The results of the reviewed studies indicates that a number of theoretical models were used. These include diffusion of innovation theory, Extended TAM, hypothesized conceptual model, Based on the above analysis, Technology Acceptance model (Davis, 1985), has the highest number of frequency in the reviews to explain technology adoption and use. (Armentano et al., 2015; Davis, 1985; Davis et al., 1989; Hanif et al., 2018; Hsiao-hui Hsu & Chang, 2013; Madden et al., 1992; Mejía; NicholasOmoregbe et al., 2017; Olushola & Abiola, 2017; Picciano, 2017; Venkatesh & Davis, 2000). This is followed by Constructivism theory, Extended Technology Acceptance model and Reviews. Despite the fact that Technology Acceptance model registered success as a very useful model to explain Technology Acceptance and use, in other studies, it was not adopted. Hsiao-hui Hsu and Chang (2013) revealed that the use of Technology Acceptance Model is still questioned. The review revealed that the majority of the previous studies about the actual use and adoption of Moodle Platform have been done using

quantitative methodologies. Susana, Juanjo, Eva, and Ana (2015) recommended that quantitative studies help in the continuous investigation, functioning and the knowledge to explain the relationship between the research variables. Despite the relevance of using qualitative methodologies to explain actual use and adoption of technology, the findings of the systematic review concluded that the quantitative studies are known to be more reliable and valid statistically (Goyal & Tambe, 2015; Oproiu, 2015; Walker, Brown, Moore, & Hughes, 2011; Wood, 2010)

Recommendations

Given the results and conclusions drawn from the review of previous studies, the researchers recommend the following;

1. The administrators and education policy makers in the developing countries should implement institutional policy encouraging faculty members and students to use LMS especially Moodle.
2. The education institutions of learning should conduct training on how to use Moodle and integrate it in the classroom instruction. In this review, the researchers identified human factors such as attitude, perceived usefulness and perceived ease of use as factors affecting the adoption and use of Moodle. It is recommended, that with the necessary training, human and technological challenges can be minimized.
3. Internet connectivity and access should be available for both students and faculty in institutions of higher learning so that everyone can make use of the Moodle platform.
4. For further research, a quantitative and qualitative studies should be carried out to investigate the impact of LMS especially moodle on learning and the users' perceptions.

References

Abdullah, M. S. (2017). Analysis of the Factors for the Successful E-Learning Services Adoption from Education Providers' and Students' Perspectives: A case study of Private Universities in Northern Iraq. *EURASIA Journal of Mathematics, Science and Technology Education, 143*, 1097-1109.

Adenuga, K., Noorminshah, A., &Miskon, S. (2015). An Initial Model for Telemedicine Adoption in Developing Countries. *ARPN Journal of Engineering and Applied Sciences, 10*(23), 1761417619.

Ahmad, S. A., Chinade, U. B., Gambaki, A. M., Ibrahim, S., & Ala, N. A. (2012). The need for moodle as a learning management system in Nigerian universities: Digesting university Utara Malaysia learning zone as a case study. *Academic Research International, 2*(3), 444.

Al-Gahtani, S. S. (2006). *Information technology adoption, the roadmap to sustainable development: Examining three models.* Paper presented at the 18th Saudi National Computer Conference.

Algahtani, M. (2017). Factors influencing the adoption of learning management systems in the Kingdom of Saudi Arabian universities by female academic staff. RMIT University.

Alhothli, N. I. (2015). Investigating the impact of using Moodle as an e-learning tool for students in an English language institute. *Psychology.*

AlQudah, A. A. (2014). Accepting Moodle by academic staff at the University of Jordan: Applying and extending TAM in technical support factors. *European Scientific Journal, ESJ, 10*(18).

Ansong, E., Lovia Boateng, S., & Boateng, R. (2017). Determinants of e-learning adoption in universities: Evidence from a developing country. *E. Ansong, S. L. Boateng, R. Boateng and J. Effah, "Determinants of E-Learning Adoption in Universities: Evidence from a Developing Country. 49th Hawaii International Conference on System Sciences (HICSS), Koloa, HI, 2016, pp. 21-30.*

Armentano, M. G., Christensen, I., &Schiaffino, S. (2015). Applying the technology acceptance model to evaluation of recommender systems. (51), 73-79.

Bhardwaj, A., Nagandla, K., Swe, K., & Abas, A. (2015). Academic Staff Perspectives Towards Adoption of E-learning at Melaka Manipal Medical College: Has E-learning Redefined our Teaching Model? *Kathmandu University medical journal, 13*(1), 12-18.

Boateng, R., Mbrokoh, A. S., Boateng, L., Senyo, P. K., &Ansong, E. (2016). Determinants of elearning adoption among students of developing countries. *33*(4), 248-262.

Davis, F. D. (1985). *A technology acceptance model for empirically testing new end-user information systems: Theory and results.* Massachusetts Institute of Technology,

Davis, F. D., Bagozzi, R. P., &Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *35*(8), 982-1003.

Duval, E., Sharples, M., & Sutherland, R. (2017). Research themes in technology enhanced learning. In *Technology Enhanced Learning* (pp. 1-10): Springer.

Essel, D. D., & Wilson, O. A. (2017). Factors affecting university students' use of Moodle: An empirical study based on TAM. *International Journal of Information and Communication Technology Education.* 13(1), 14-26.

Filippidi, A., Tselios, N., & Komis, V. (2010). Impact of Moodle usage practices on students' performance in the context of a blended learning environment. 2-7.

Goyal, E., & Tambe, S. (2015). Effectiveness of Moodle-enabled blended learning in private Indian Business School teaching NICHE programs. *The Online Journal of New Horizons in Education, 5*(2), 14-22.

Grabowski, M., & Sagan, A. (2016). Attitudes Towards a Moodle-based E-Learning Platform: A User Segmentation Perspective.

Hanif, A., Jamal, F. Q., & Imran, M. (2018). Extending the Technology Acceptance Model for Use of e-Learning Systems by Digital Learners. *6*, 73395-73404.

Hsu, H.-H. (2012). The acceptance of Moodle: An empirical study based on UTAUT. *Creative Education. Vol.3, Supplement*, 44-46.

Hsu, H.-h., & Chang, Y.-y. (2013). Extended TAM model: Impacts of convenience on acceptance and use of Moodle. *Online Submission, 3*(4), 211-218.

Ishtaiwa, F. (2011). Faculty attitudes and use of Moodle course management system as a supplement to face-toface Instruction: A Jordanian Case Study. *Journal of Educational and Psychological Sciences, 12*(1), 11- 44.

Ismail, M., & Razak, R. C. (2011). The determinant factors influencing young consumers acceptance of mobile marketing in Malaysia. *5*(32), 12531-12542.

Jen, W., Lu, T., & Liu, P.-T. (2009). An integrated analysis of technology acceptance behaviour models: Comparison of three major models. *15*(1), 89-121.

Jones, D. S. (2015). Analysis of Factors That Influence Use of Learning Management Systems by Pennsylvania Rural School Districts.

Kasim, N. N. M., & Khalid, F. (2016). Choosing the right learning management system (LMS) for the higher education institution context: a systematic review. *International Journal of Emerging Technologies in Learning (iJET), 11*(06), 55-61.

Kebritchi, M., Lipschuetz, A., &Santiague, L. (2017). Issues and challenges for teaching successful online courses in higher education: A literature review. *Journal of Educational Technology Systems, 46*(1), 4-29.

Khan, A., &Woosley, J. M. (2011). Comparison of contemporary technology acceptance models and evaluation of the best fit for health industry organizations. International Journal of Computer Science Engineering & Technology, *1*(11), 709-717.

Kiget, N. K., Wanyembi, G., & Peters, A. I. (2014). Evaluating usability of e-learning systems in universities. *International Journal of Advanced Computer Science and Applications, 5*(8), 97102.

Kilic, E. (2014). Determining the factors of affecting the Moodle use by using TAM. The story of a university after a destructive earthquake. *H. U. Journal of Education. 29*(29-1), 169-179.

Madden, T. J., Ellen, P. S., &Ajzen, I. (1992). A comparison of the theory of planned behavior and the theory of reasoned action. *Personality and Social Psychology Bulletin. 18*(1), 3-9.

Marks, A., Maytha, A.-A., &Rietsema, K. (2016). Learning Management Systems: A Shift Toward Learning and Academic Analytics. *International Journal of Emerging Technologies in Learning (iJET), 11*(04), 77-82.

Mejía, N. A. (2015). *Smart Working Environments, possible future scenarios, and technology adoption implications.* TY- Book.

Minović, M., Štavljanin, V., Milovanović, M., &Starčević, D. (2008). *Usability issues of e-learning systems: Case-study for Moodle learning management system.* Paper presented at the OTM Confederated International Conferences" On the Move to Meaningful Internet Systems".

Mtebe, J. (2015). Learning management system success: Increasing learning management system usage in higher education in sub-Saharan Africa. *International Journal of Education and Development using ICT, 11*(2).

Nicholas-Omoregbe, O. S., Azeta, A. A., Chiazor, I. A., &Omoregbe, N. (2017). Predicting the adoption of e-learning management system: A case of selected private universities in Nigeria. Turkish Online Journal of Distance Education-TOJDE *18*(2), 106-121.

Oliveira, P. C. d., Cunha, C. J. C. d. A., & Nakayama, M. K. (2016). Learning Management Systems (LMS) and e-learning management: an integrative review and research agenda. *13*(2), 157180.

Olushola, T., & Abiola, J. (2017). The efficacy of technology acceptance model: A review of applicable theoretical models in information technology researches. *Journal of Research in Business and Management. 4*(11), 70-83.

Oproiu, G. C. (2015). A study about using e-learning platform (Moodle) in university teaching process. *Procedia-Social and Behavioral Sciences, 180*, 426-432.

Papadakis, S., Kalogiannakis, M., &Sifaki, E. (2019). Evaluating Moodle use via Smart Mobile Phones. A case study in a Greek University.

Picciano, A. G. (2017). Theories and Frameworks for Online Education: Seeking an Integrated Model. *Online Learning, 21*(3), 166-190.

Raman, A., Don, Y., Khalid, R., &Rizuan, M. J. A. S. S. (2014). Usage of learning management system (Moodle) among postgraduate students: UTAUT model. *10*(14), 186.

Saleem, N. E., Al-Saqri, M. N., & Ahmad, S. E. (2016). Acceptance of Moodle as a teaching/learning tool by the faculty of the department of information studies at Sultan Qaboos University, Oman based on UTAUT. *6*(2), 5-27.

Samaradiwakara, G., & Gunawardena, C. (2014). Comparison of existing technology acceptance theories and models to suggest a well improved theory/model. *International Technical Sciences Journal (ITSJ). 1*(1), 21-36.

Sánchez, R. A., &Hueros, A. D. (2010). Motivational factors that influence the acceptance of Moodle using TAM. *26*(6), 1632-1640.

Šumak, B., Heričko, M., Pušnik, M., &Polančič, G. (2011). Factors affecting acceptance and use of Moodle: An empirical study based on TAM. *Informatica, 35*(1).

Susana, O., Juanjo, M., Eva, T., & Ana, I. (2015). Improving graduate students learning through the use of Moodle. *10*(5), 604-614.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *46*(2), 186-204.

Venter, P., Jansen van Rensburg, M., & Davis, A. (2012). Drivers of learning management system use in a South African open and distance learning institution. Australasian Journal of Educational Technology,28(2):183-198.

Walker, R., Brown, M., Moore, C., & Hughes, H. (2011). The move to Moodle: Perspective of academics in a College of Business. *Changing Demands, Changing Directions. Proceedings asci lite Hobart*, 1275-1280.

Wood, S. L. (2010). Technology for teaching and learning: Moodle as a tool for higher education. *International journal of teaching and learning in higher education, 22*(3), 299-307.

Wu, W.-S., & Hua, C. (2008). The application of Moodle on an EFL collegiate writing environment. *Journal of education and foreign languages and literature, 7*(1), 45-56.

Zakaria, E., & Daud, M. Y. (2013). The role of technology: Moodle as a teaching tool in a graduate Mathematics Education course. *Asian Journal of management sciences & education, 2*(4).