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Factors affecting Learning Management Systems Usage in Higher Learning Institutions in Tanzania: A Case of University of Dodoma

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ABSTRACT

The Learning Management System (LMS) facilitates the learning and teaching process in higher learning institutions (HLIs) using the Internet. Despite the advantage of having these LMS in institutions, usage is still a challenging problem. This study investigated the factors influencing the usage of LMS in HLIs. To achieve the objective of the study, the constructs were adopted from TAM, UTAUT2, and the D&M success models. Data were collected using questionnaires followed by interviews with key people at the University of Dodoma (UDOM). A mixed-method sequential explanatory design was used to analyze the data collected from 92 participants. The results revealed that perceived usefulness, instructors' self-efficacy, and intrinsic motivation have an influence on the usage of LMS amongst instructors in HLIs. The findings of this study will help the HLIs and LMS implementers to find the strategies that will assist them in increasing LMS usage to achieve desired results.

Keywords: *learning management system; higher learning institutions; LMS usage*

INTRODUCTION

The rapid change in information and communication technologies (ICT) brings a lot of benefits to higher learning institutions (HLIs) (Al-Emran, & Shaalan, 2017; Al-Emran, Mezhuyev & Kamaludin 2018). One of the beneficial tools facilitated by such technologies is the LMS. The LMS is the enabled web-based system that is used to facilitate the teaching and learning process using the Internet. It offers several features that allow the students and instructors to connect socially and makes it simple for an Instructor to offer electronic information to students at any time. The examples of LMS include Moodle, Chisimba, Sakai, WebCT, Blackboard, and ATutor (Unwin et al. 2010).

In Tanzania, the major higher learning institutions such as the University of Dar es Salaam, Mbeya University of Science and Technology, the Institute of Finance and Management, the University of Dodoma, Mzumbe University, and Sokoine University of Agriculture have installed various kinds of LMS (Mtebe & Raisamo 2014b; Munguatosha, Muyinda & Lubega 2011). Those institutions have invested a significant number of resources to support the use of these systems. Nevertheless, the investment of these resources will not be beneficial if the students and instructors do not use these systems (Bervell & Umar 2018; DeLone & McLean 2016; Yi & Hwang 2003).

Despite the adoption of the LMS in HLIs in Tanzania, studies show that there is low usage of the LMS among the instructors (Bhalalusesa, Lukwaro & Clemence 2013; Lashayo & Johar 2018; Lwoga 2012; Mtebe & Raisamo 2014b; Tedre, Ngumbuke & Kemppainen 2010; Unwin et al. 2010). The low usage of LMS is normally regarded as an information system failure (DeLone & McLean 2016; Venkatesh, Morris, Davis & Davis 2003).

Several studies have been conducted to investigate the adoption and usage of LMS in developing countries (Asiri, Mahmud, Abu Bakar & Mohd Ayub 2012; Motaghian, Hassanzadeh & Moghadam 2013; Mtebe 2015; Šumak, Heričko, Pušnik & Polančič 2011), but most of these studies were focused on the adoption and usage of LMS among the students. However, there are very few studies that were focused on the adoption and usage of LMS among the instructors. Therefore, this study aimed to examine the factors affecting LMS usage in Tanzania.

LITERATURE REVIEW

Related Work

Learning Management Systems have been adopted in HLIs to enhance the effectiveness and efficiency of the teaching and learning process. The LMS, as with educational technology in general, has evolved quickly along with the development of ICTs (Al-Emran & Shaalan 2015, 2017). HLIs and universities have made a huge investment in information systems (Moodle, Sakai, Blackboard) to help in delivery of blended distance as well as face-to-face courses (Tarhini, Hone & Liu 2013). Use of the LMS in HLIs along with well-connected computers facilitates wide access to electronic educational materials to the students through user devices such as desktop and laptop computers, and other digital devices.

Studies have been conducted that are focused on student usage of LMS in HLIs (Asiri et al. 2012; Joo, Kim & Kim 2016; Raman, Don, Khalid & Rizuan 2014; Šumak et al. 2011), and the findings indicate different factors that affect LMS usage based on the students' perceptions. Asiri et al. (2012) examined the factors that influenced the LMS usage among faculty members of public universities in Saudi Arabia and found that the attitude towards utilizing the LMS, competence in utilizing the LMS, and beliefs about the LMS - internal factors; and the technological organizational, social barrier and demographic characteristics (training, workshop, gender as well as computer experience) - external factors, were important in influencing the usage of the LMS. 235 students at the Faculty of Electrical Engineering and Computer Science in Maribor were studied by Šumak et al. (2011) to identify the factors influencing their perception of LMS use and acceptability. The study findings indicate that behavioral intention determines actual system use, with attitude towards the system use perceived usefulness being the most significant predictors.

There are positive impacts of perceived usefulness and satisfaction on predicting the intention to adopt and use mobile-LMS (Joo et al. 2016). The sharing of knowledge and collaboration play a vital role in the intention of the students in e-learning systems acceptance and usage (Eid & Al-Jabri 2016; Raman et al. 2014). System quality and service quality were also found to have a positive effect on users' satisfaction with learning systems (Mahmodi 2017; Mtebe & Raisamo 2014a; Mtebe & Raphael 2018). Technical support availability, and service quality are factors affecting usage of the LMS.

Many of the studies have been focused on behavioral intention on LMS usage in HLIs among instructors (Alharbi & Drew 2014; Almarashdeh 2016; Cigdem & Topcu 2015; Motaghian et al. 2013). The studies showed that training, personal innovativeness, perceived ease of use, education instructors (Alharbi & Drew 2014; Coleman & Mtshazi 2017). For example, Alharbi & Drew (2014) conducted a study of the behavior intention to use LMS among 59 academics at the Shaqra University in Saudi Arabia, and the findings indicate that perceived usefulness, attitude towards usage and perceived ease of use had a significant relationship with behavioural intention to use the LMS.

Moreover, perceived usefulness, system quality, information quality, subject norm, application self-efficacy significantly influenced the intention of instructors to use the LMS (Almarashdeh 2016; Cigdem & Topcu 2015). Cigdem & Topcu (2015) explored the factors influencing the behavioral

intention to use the LMS among 115 participants at a Turkish vocational college. The findings revealed that perceived ease of use, perceived usefulness, self-efficacy, technological complexity, and subjective norm all had a positive effect on behavioral intention for LMS usage. Perceived usefulness was the most significant for intention and use of the LMS. Similarly, Almarashdeh (2016) investigated the factors that influence instructor's satisfaction among 110 instructors in four universities in Saudi Arabia. The study found that perceived usefulness, service quality, system quality and information quality had a positive significant effect on instructor satisfaction and hence influenced LMS usage. Nevertheless, the findings cannot persuade the researchers that the identified factors are the only factors that influence instructors' usage of the LMS within higher education institutions.

Theories of system adoption and usage

A survey of the literature found that a variety of frameworks, theories and models have been utilized to research and analyze the factors that influence acceptance and use of electronic learning systems in HLIs. These include the individual focused model, Technology Acceptance Model (TAM) proposed by Davis (1989) and the Unified Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh et al. (2003); and the firm or organizational focused model, Technology Organization Environment (TOE) by Tornatzky & Fleischer (1990) and DeLone and McLean (DeLone & McLean 1992).

TAM is the most widely used model for describing the adoption of technology or information systems adoption. According to this model, users' behavioral intention, attitudes, perceived ease of use, perceived usefulness, and actual use of the system can all be used to forecast adoption of the information system or technology. According to Davis (1989), perceived ease of use is defined in the context of the user belief that using an information system would be effortless; perceived usefulness is defined in the context of the user belief that utilizing a particular information system would enhance his or her performance at a task or tasks and behavioral intention is defined in the context of the plan of a user on whether to perform a specified future behavior.

The UTAUT model has been used in various studies to measure technology adoption and use. The theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), and TAM were used to create the UTAUT model. Performance expectancy, social influence, effort expectancy and facilitating factors were all included in the models. Age, voluntariness, and experiences having moderating effects in influencing the technology acceptance and use are all part of the model. Venkatesh et al. (2003) defined performance expectancy in the context of the individual's belief that a particular information system or technology will accrue professional benefits"; social influence in the context of the belief that other significant persons should adopt a certain technology; effort expectancy in the context of ease associated with using a particular technology or a system; and facilitating conditions is defined in the context of an individual feeling that technical and organizational infrastructure exists to support the use of the technology or system. Later, the model extended to UTAUT2 by adding three new determinants: hedonic motivation, price value, and habit (Venkatesh, Thong & Xu 2012). The authors defined hedonic motivation in the context of the joy or fun derived from use of the technology; price value in the context of expenditure associated with use of the technology; and habit in the context of automatic use resulting from learning to use over time.

Tornatzky and Fleischer (1990) created the TOE to explain the acceptance of ICT innovation or information technology. TOE comprises three contexts (technology, organizational and environmental) that might influence how the technological innovation is implemented and adopted in an organization. The internal and external technologies importance to the organization that influence the adoption are referred to as the technological context. The scope, size, managerial structure, and internal resources of an organization are defined as the organizational context. The

environment in which an organization conducts its business, such as rivals, organizational policy and industry is referred to as the environmental context.

DeLone and McLean (1992) created the initial model in 1992. The model was centered on user's successful utilization of information systems. Information quality, system quality, use, user satisfaction, individual impact, and organizational impact, are the six constructs in the model. System quality refers to how well information systems are designed such as how easy they are to use, obtain, and learn. The information quality metric assesses how well an information system performs in terms of appearance, content, correctness, and usefulness. The term "Use" refers to determining how information systems are used, such as the number of records retrieved or accessed, and the functions performed. The perception of using an information system is measured by User satisfaction measures, and the perceived perception of using an information system. Individual impact assesses users' reaction after using the system followed by the organizational. Later, DeLone and McLean (2003) updated the model by dividing the use factor into an intention to use and using it to assess the success of information systems, where system utilization is both voluntary and mandatory. Also, service quality components were incorporated and used to formulate the six constructs.

Although many studies adopted the constructs from these already developed models to predict the factors that affect technology acceptance and usage of information technology, it was observed that there is no single model or theory that can predict the usage of learning management systems among students or instructors. Based on the literature, this study formulated a measurement model to determine the factors affecting the usage of the LMS at the UDOM.

While many studies have been focused on LMS usage among instructors, it was also found that very few research studies have been conducted on instructors' usage of LMS in education institutions in developing countries like Tanzania. These studies were found lacking in exploration of the factors that influence the instructors' perceived value in terms of instructor support, perceived cost of LMS, instructor self-efficacy, instructor habit, and instructor attitude toward use of the LMS. Therefore, this study attempts to propose a research model to analyze the factors influencing LMS utilization among instructors in HLIs based on their system characteristics, attitudes, and their perceptions. The description of the research model and hypotheses for the proposed research model follows.

THE RESEARCH MODEL

The proposed research model is applied only to instructors for determining the factors that influence the use of an LMS. According to the study objective, the review of literature and the technological acceptance models or framework, the research model as presented in Figure 1, adopted and incorporated constructs from TAM, UTAUT2 and the DeLone and McLean models.

The model constructs shown in Figure 1 are described below.

System Quality

In this study, system quality refers to how satisfied instructors are with the LMS's ability to perform the necessary functions. Flexibility, availability, fast response, usability, user-friendliness and ease of use are the measures used for the LMS quality function (DeLone & McLean 2003). According to the findings of research in this area, there is a direct link between the system quality and the system use (Alshare, Freeze, Lane & Wen 2011; Mtebe & Raisamo 2014a; Wixom & Watson 2001). As a result, the greater the convenience, use, and user-friendliness of the LMS, the more probable it is that instructors will use it. The hypothesis for this factor is:

Hypothesis 1: The instructor's use of the LMS is influenced by the system's quality.

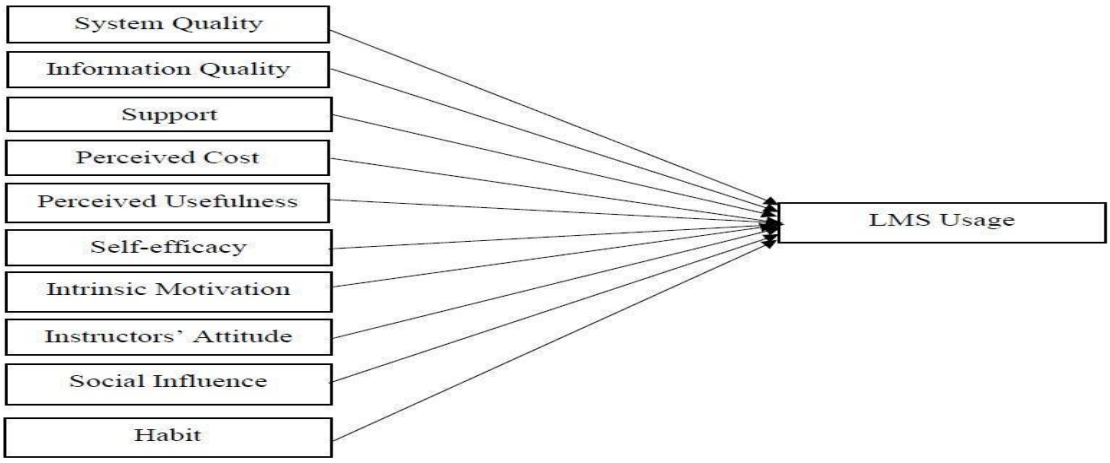

Figure 1: Research Model

Information quality

The quality of the information or report obtained by the instructors using the LMS is referred to as information quality. The attributes of quality of information are measured by accuracy, relevance, completeness, understandability, and timeliness (DeLone & McLean 2003; Swaid & Wigand 2009). It refers to how satisfied instructors are with the reports generated from the LMS. When instructors are assessing students and tracking their progress, the purpose of the LMS is to generate a good report for them. (Coates, James, & Baldwin 2005). Previous research has shown that the quality of information has a direct impact on the use of LMS (Lwoga, 2014; Motaghian et al. 2013). The hypothesis for this factor is:

Hypothesis 2: The instructor's use of the LMS is influenced by the quality of the information.

Support

Instructor support refers to the assistance provided to the instructors who utilize the LMS to teach their students. It is the way by which instructors receive organizational support and technical support to ensure that they use the LMS (Wang & Wang 2009). The support includes availability of ICT facilities, Internet, ICT specialists, and instructional design specialists (Al-Busaidi & Al-Shihi 2010). Responsiveness, dependability, and certainty can all be used to measure it. (DeLone & McLean 2003). The hypothesis for this factor is:

Hypothesis 3: The support of the instructor has a favorable impact on the use of the LMS

Perceived Cost

If the institutions bear the cost of using the technology, it is proposed that instructors will use it for their teaching purposes. For instance, Tarus, Gichoya, and Muumbo (2015), found that budget restrictions prevented Kenyan public university professors from using the LMS. The hypothesis for this factor is:

Hypothesis 4: Perceived cost of LMS has a positive effect on instructors LMS usage.

Perceived Usefulness

The degree to which an instructor believes that employing an LMS will ease his or her teaching activities is referred to as perceived usefulness. Instructors are more inclined to use the LMS if they think it more useful. According to the research, there is a direct link between perceived usefulness and LMS utilization. (Chang & Tung 2008; Motaghian et al. 2013). The hypothesis for this factor is:

Hypothesis 5: Perceived usefulness of LMS has a positive effect on instructors LMS usage.

Intrinsic Motivation

Intrinsic motivation refers to the perceived interest and enjoyment that an instructor feels when using the system. This motivation is crucial in determining whether the LMS is used (Davis 1989). In East China, it was also discovered that intrinsic motivation had a significant impact on students' behavioral intentions to use mobile-assisted language learning (MALL) (Sun & Gao 2019). If instructors are not motivated to use the LMS, the consequence is that they won't use it, and the LMS will become unworkable for them. The following hypothesis was formulated:

Hypothesis 6: The use of the LMS by instructors is influenced by intrinsic motivation.

Instructors' Attitude

This is a set of emotions that influence an instructor's decision to use the system. These emotions can be either favorable or unpleasant depending on how the system is used (Davis 1989). Instructors who have a good attitude toward utilizing the LMS are more likely to use it and have a greater influence over the system's use. (Asiri et al. 2012; Yang & Yoo 2004). Studies have shown instructor's attitude to have a positive effect on LMS usage in various contexts (Asiri et al. 2012; Šumak et al. 2011). The hypothesis for this factor is:

Hypothesis 7: Instructor's attitude towards the use of LMS is influenced by LMS usage.

Social Influence

The extent to which an instructor believes that other significant and influential instructors should use the LMS is referred to as social influence (Venkatesh et al. 2012). Previous research has found that social factors have a substantial impact on the use of various information systems (Raman & Don 2013). The hypothesis for this factor is:

Hypothesis 8: Social influence has an effect on instructor's LMS usage.

Habit

The term "Instructors' habit" refers to the automatic actions that instructors have when utilizing an LMS. Habit has been found to be an essential variable in determining behavioral intention to utilize technology in previous studies (Venkatesh et al. 2012). Raman and Don (2013) found that habit had a positive influence on student's intention to use the Moodle system at the University Utara Malaysia. Therefore, the hypothesis for this factor is:

Hypothesis 9: The use of the LMS by instructors is influenced by habit.

Self-efficacy

In the context of this study, instructor self-efficacy refers to the ability to integrate technology such as LMS into teaching and hence it has an important effect on use (Lee & Lee 2014). Instructor self-efficacy is a perception of an instructor's capacity to use the LMS to track students' progress, communicate with students via chats and discussion forums, complete assessments, and present information. According to Coleman and Mtshazi (2017), self-efficacy is influenced by the instructor's decision to use the Moodle system. The hypothesis was proposed as follows:

Hypothesis 10: The use of the LMS by instructors is influenced by their self-efficacy usage.

METHODOLOGY

Research Design

This study adopted a mixed-method sequential explanatory design aimed at determining the factors affecting the use of LMS in HLIs among instructors, using the following constructs*: Information Quality, System Quality, Instructor Support, Perceived Usefulness, Perceived Cost, Instructors' attitude toward the use of LMS, Social Influence, Intrinsic Motivation, Instructors' habit,* and *Instructor's self-efficacy*. The constructs were determined using the existing literature and data were collected from the University of Dodoma in Tanzania. In this study, the quantitative approach used to collect data was a self-administered questionnaire, and thereafter the data collected were analyzed using statistical software. The qualitative approach was employed to gather the data through interviews with key participants.

Data Collection – Quantitative Approach

A five-point Likert scale (Strongly Disagree; Disagree; Neutral; Agree, and Strongly Agree) with items consisting of demographic items, background items, TAM, UTAUT2 and DeLone and McLean variables was used for data collection. The items in the questionnaire were modified from the standard questionnaires of the technological acceptance framework or models, in the context of this study and based on the literature. The items on the questionnaire are shown in Table 1 below.

Table 1*: Data Collection Instrument*

Factor	Code	Item
System quality	SYQ1	The LMS is simple to use.
	SYQ2	The LMS is very user-friendly
	SYQ3	The LMS is easy to use.
	SYQ4	The LMS is accessible all the time
	SYQ5	Overall, the LMS is quite dependable, with very little downtime.
	SYQ6	The response time of LMS is very good.
Information quality	INF1	The LMS delivers information that is useful in the classroom
	INF2	The LMS provides sufficient information for instruction.
	INF3	In general, the information I receive from the LMS is simple to understand.
	INF4	The LMS provides the up-to-date information.

	INF5	The LMS provides instructor with information that they need.
Support	SP1	The training given by the IT section has improved my ability to use LMS.
	SP2	The IT staff provides assistance through various channels, including as telephones, chart, and emails.
	SP3	The LMS support staff provides me with rapid service by replying to requests for assistance.
	SP4	When needed, the LMS support team has the knowledge to assist me with my requests.
Perceived cost	PC1	The cost of using the LMS is reasonable for me.
	PC2	For LMS access, the university provides a free internet service.
	PC3	When using LMS at home, internet bandwidth is expensive
Perceived usefulness	PU1	Using a learning management system (LMS) enable me to complete teaching tasks more quickly.
	PU2	Using the LMS in my job increase my productivity.
	PU3	It is easier for me to do my job when I use the LMS.
	PU4	In my job, I found the LMS to be quite valuable.
Self-efficacy	SF1	I possess the skills required to use an LMS.
	SF2	I am confident in my ability to locate and find material in the LMS.
	SF3	I am very confident with my use of LMS features.
	SF4	I am capable of using the LMS without the assistance of others.
Intrinsic Motivation	INM1	Using the LMS is a very.enjoyable.for me.
	INM2	Using an LMS is very entertained
	INM3	It's a lot of fun to use the LMS system.
	INM4	Using LMS is a pleasurable process and experience.
Instructors' attitude	IAT1	Using an LMS for teaching is a good idea.
	IAT2	I believe that using LMS is beneficial.
	IAT3	The use of a learning management system (LMS) for academic purposes is, in my opinion, highly desirable.
	IAT4	The use of a learning management system (LMS) to teach is a good idea.
	IAT5	I'm very interested with the idea of teaching using LMS.
	IAT6	I'm feeling very well toward the use of LMS.
Social influence	SIF1	People who are more influential in my life believe that I should use LMS..
	SIF2	People who are very close with me believe that I should use LMS.
	SIF3	LMS is used by the majority of people surround me.
	SIF4	People who influence my behavior believe I should LMS.
Habit	HB1	For me, using LMS has become my habit
	HB2	The LMS has become an addiction for me.
	HB3	Using the LMS has become natural to me.

	HB4	I have to use LMS.
LMS usage	LU1	In the future, I plan to continue utilizing the LMS.
	LU2	I will make every effort to include LMS into my regular routine.
	LU3	I intend to continue to use LMS on a regular basis.

Sample

This study adopted the formula proposed by Green (1991) to obtain the minimum sample size. The formula states that N > 50+8k where k is the number of independent variables. The study had 10 factors, therefore the minimum sample size required for this research was 50 + (8*10) = 130. The sample for this study consisted of 173 instructors (lecturers, assistant lecturers, and tutorial assistants) from the Humanities and Social Sciences, Natural Science, Applied Sciences, Medical and Health Sciences, Education, and the Environmental Science colleges. 92 of these instructors were experienced LMS users. The questionnaire was distributed to 173 respondents across the six colleges. The questionnaire was self-administered, and respondents were guaranteed confidentiality. A total of 92 respondents completed questionnaires out of 173 potential respondents.

Interviews – Qualitative Approach

The qualitative data were collected through interviews conducted with 15 of the selected respondents in 3 groups. The interview participants were selected based on the experience and level of using the LMS. The interviews were carried out to understand the issues raised in the questionnaire and to obtain additional information regarding the identified factors.

Data analysis

The quantitative data were analyzed to determine the causal relationship between the independent variables: System Quality, Information Quality, Intrinsic Motivation, Instructors Support, Perceived Usefulness of LMS, Instructors' attitude toward the use of LMS, Perceived Cost of LMS, Social Influence, Instructors' habit, and Instructor's self-efficacy. The Statistical Package for the Social Sciences (SPSS) and Excel were used to conduct the analysis. The qualitative data obtained from interviews were analyzed using content analysis to understand user perceptions on the identified factors and to note the trends on the responses.

Demographic information

The demographic information shows that males represented a majority (83.7%) of the total respondents as shown in Table 2. The data shows that most of the respondents who had experience in using LMS are assistant lecturers (68.5%). The lowest percentage of respondents were tutorial assistants (14.1%). In terms of teaching experience, 46.2% of the respondents had 7 to 9 years in teaching while 1% had less than one year experience in teaching. Moreover, the results show that 75.3% of the instructors received formal training before they started using the LMS while 24.7% of the respondents learnt to use the LMS through non-formal means.

Sampling adequacy

Kaiser-Meyer-Olkin (KMO) sampling adequacy and the Bartlett test were used to test a structural model on 35 items. According to Kaiser (1974), a KMO below 0.5 is inadequate. In this study, the KMO was 0.727 which indicated that the sample was adequate and factor analysis could be

performed. Furthermore, the Bartlett test of Sphericity was conducted, and the result $p<0.05$ indicated that there was a statistically significant relationship between the variables and hence it was sufficient to perform principal component analysis.

Table 2: *Demographic information*

Demographic variable	Frequency	Percentage
Gender		
Male	77	83.7
Female	15	16.3
	92	
Academic Ranks		
Lecturers	16	17.4
Assistant Lecturers	63	68.5
Tutorial Assistants	13	14.1
	92	
Teaching Experience in Years		
0 to 1	1	1
2 to 3	12	13
4 to 6	30	32.3
7 to 9	42	46.2
10 to 12	7	7.5
	92	
LMS Training		
Formal training	69	75.3
Non-formal training	23	24.7
	92	

Reliability and validity

Reliability analysis was conducted to determine the internal consistency and inter-relation of the items or scale. Cronbach's alpha was used to analyze the reliability of the 47 items. According to George & Mallery (2003), Cronbach's alpha values of over 0.5 are good. Based on the suggested value, the Cronbach's alpha values of seven variables were above 0.5 indicating that those items had a good consistency. The items with values below 0.5 were removed. Table 3 presents the reliability analysis of the 11 constructs.

Table 3: *Cronbach's Alpha of items*

Variable	No. of Items	Cronbach's Alpha
System quality	6	0.332
Information quality	5	0.105
Support	4	0.266
Perceived cost	3	0.311

Perceived usefulness	4	0.767
Self-efficacy	4	0.858
Intrinsic motivation	4	0.783
Instructors' attitude	6	0.852
Social influence	4	0.741
Habit	4	0.752
LMS usage	3	0.602
	47	

Identifying the factor structure

Principal Component Analysis was employed to perform factor analysis on 35 items using Varimax rotation and Kaiser Normalization. The factor analysis was employed to determine whether the related items grouped under the same construct. According to Hair, Black, Babin, Anderson, and Tatham (2006), the factor loading value should be greater than 0.5. Therefore, the items which have the factor loading values less than 0.5 were removed. Table 4 presents the factor loading value per each item.

Table 4: *Factor loading per each item with Varmax rotation and Kaiser Normalization*

Factor	Item with Varmax rotation	Loadings
System quality	SYQ2	0.699
Information quality	INF2	0.719
Support	SP2	0.811
	SP3	0.761
Perceived cost	PC1	0.791
Perceived usefulness	PU1	0.593
	PU2	0.674
	PU3	0.604
	PU4	0.64
Self-efficacy	SF1	0.631
	SF2	0.682
	SF3	0.738
	SF4	0.771
Intrinsic Motivation	INM1	0.556
	INM2	0.763
	INM3	0.643
	INM4	0.677
IAT3	0.667	0.607
	IAT2	0.666

	IAT4	0.775
	IAT5	0.787
	IAT6	0.634
Social influence	SIF1	0.634
	SIF2	0.807
	SIF3	0.751
	SIF4	0.682
Habit	HB1	0.774
	HB2	0.826
	HB3	0.692
LMS usage	LU1	0.621
	LU2	0.707
	LU3	0.817

FINDINGS

Model Summary

Ten factors were subjected to multiple linear regression to measure the success of the structural model and predict the factors that contribute to the instructors' LMS usage. The results show that the variance (adjusted R2=0.196) indicates 19.6% of on instructor's LMS usage is influenced by the factors from this research model. Table 5 presents a summary of the statistical test results for the research model.

Table 5*: Research model summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.533[a]	.284	.196	.54794

Hypothesis Testing

Multiple regression was used to assess the statistical significance of each hypothesis and determine the factors that affect the LMS usage among LMS instructors. The study findings indicate that three hypotheses (H5, H6 and H7) were statistically significant in LMS usage at p-value $p< 0.05$. Therefore, H5, H5 and H7 are accepted. Table 6 provides a summary of the hypothesis test results.

Based on the results obtained in Table 5, interviews were conducted to understand the factors that influence the usage of LMS among instructors. These interviews were mainly focused on the three factors that were found to be statistically significant namely perceived usefulness of LMS, self-efficacy and intrinsic motivation.

Table 6: *Summary of the results of the test of hypotheses*

Hypothesis		Results	Conclusion
H1	The instructor's use of the LMS is influenced by the system's quality.	p=.787 >0.05, β =-.028	Not recommended
H2	The instructor's use of the LMS is influenced by the quality of the information.	p=.990> 0.05, β = .001	Not recommended
H3	The support of the instructor has a favorable impact on the use of the LMS	p=.318<0.05, β =-.102	Not recommended
H4	Perceived cost of LMS has a positive effect on instructor's LMS usage.	p=.406 >0.05, β = .086	Not recommended
H5	**The perceived usefulness of the LMS has a positive impact on the utilization of the LMS by instructors**.	p=.021 <0.05, β =.329	Recommended
H6	**The use of the LMS by instructors is influenced by their self-efficacy.**	p=.010<0.05, β =-.391	Recommended
H7	**The use of the LMS by instructors is influenced by intrinsic motivation.**	p=.002<0.05, β =.415	Recommended
H8	Instructor's attitude towards the use of LMS has an effect on LMS usage.	p=.224>0.05, β =0.100	Not recommended
H9	The use of the LMS by instructors is influenced by social factors.	p=.229> 0.05, β =-.129	Not recommended
H10	The use of the LMS by instructors is influenced by habit.	p=.425>0.05, β =-.087	Not recommended

Perceived usefulness of the LMS on the utilization of the LMS by instructors

The results from Table 5 shows that the perceived usefulness of LMS has a significant impact on instructors' behavioral intention to use LMS with a Beta value of 0.329 and a p-value of 0.021. During the interviews, the following were the comments from respondents about the perceived usefulness of LMS influencing the usage of LMS in HLIs among instructors.

> "*Tracking students' progress gets easier with the usage of an LMS since I can always manage the vast groups of students that I have without any difficulty.*" (Respondent 2, Group 1)

> "*Students find that using a learning management system (LMS) to access learning materials, self-learn, and participate in discussions is quite beneficial.*" (Respondent 5, Group 2)

> "*The student's works and assignments are delivered and graded on time though the use of LMS and also facilitates the students' interaction and communication.*"(Respondent 4, Group 3)

However, the findings show that poor Internet and lack of good ICT facilities are still challenging problems that affect the proper usage of LMS in the learning and teaching process. The participants recommended that HLIs invest in ICT facilities and increase Internet bandwidth.

LMS use and self-efficacy

The results in Table 5 show that self-efficacy is a good predictor for instructor use of the LMS with

a beta value of 0.391 and p-value of 0.10. During the interviews, the participants confirmed that computer efficacy determines LMS usage. Some of their views are illustrated below.

> "*I feel confident in my ability to use the LMS; I can complete a variety of tasks without requiring assistance.*" (Respondent 1, Group 1)

> "*For me, using the LMS is really simple because I have the necessary technical abilities.*" (Respondent 3, Group 2)

> "*I found it impossible to create an automatic tracking system for student reports using the LMS, therefore I stopped using it.*" (Respondent 5, Group 3)

> "W*hen I run into a problem, I occasionally seek assistance from a colleague on how to use various capabilities within the LMS.*" (Respondent 4, Group 1)

> "*I don't know how to use all of the capabilities in the LMS; I only use it to upload courses and assignments, and I have to spend some of my personal time learning how to create forums in Moodle.*" (Respondent 5, Group 2)

However, the study found that time-spent in learning the LMS features and difficulties in using the LMS may affect the LMS usage among instructors in HLIs. The participants suggested that the HLIs provide enough training and support for use of the LMS.

Use of the LMS and intrinsic motivation

Intrinsic motivation was found to have a significant effect on the behavioral intention to use LMS with a beta value of 0.417 and p-value of 0.01 as shown in Table 5. The results of the interviews with the participants indicate that the enjoyment and fun gained from using the LMS influences the instructor's decision to use the LMS. Some of the comments from the participants are illustrated as follows.

> *"The usage of a learning management system (LMS) to provide and manage assignments is the most convenient method for me, and I enjoy using it.*" (Respondent 3, Group 1)

> "*I'm excited to have a discussion with my fellow participants and see how we can challenge each other through the usage of a chat room and a discussion forum.*" (Respondent 1, Group 2)

> "*I enjoy using the LMS because it allows me to communicate with my pupils even when I am not in their immediate vicinity.*" (Respondent 2, Group 3)

Although intrinsic motivation was significant on the LMS usage, some of the respondents indicated that poor network, unavailability of the reliable network or Internet and lack of the knowledge to use the LMS, decreases enthusiasm for LMS usage and hence reduces the enjoyment. The participants suggested that HLIs should provide free training, ensure a reliable network or availability of the Internet and increase access and availability of the LMS.

Final Research Model

Based on the results of the hypothesis testing and the significance level, the final proposed research model was reviewed by dropping the rejected hypotheses which were not significant and retaining the factors supported by hypotheses that were accepted. These factors were *instructor*

self-efficacy, perceived LMS usefulness, and intrinsic motivation. The revised proposed model for investigating the factors affecting the use of LMS among instructors is presented in Figure 2.

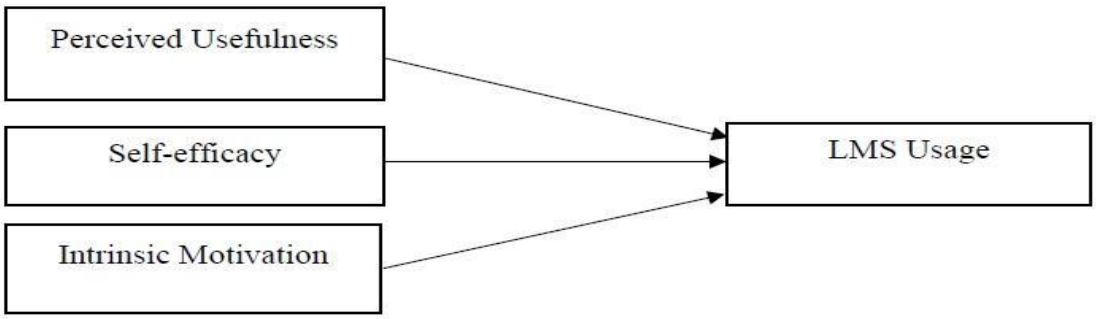

Figure 2: Revised Research Model

DISCUSSION

The study sought to examine the factors affecting the usage of the LMS in HLIs among instructors at the University of Dodoma in Tanzania. Based on the literature review, the adapted constructs of TAM, UTAUT2 and DeLone and McLean were used to accomplish the objective of this study. The outcomes of this study revealed that of a total of ten hypotheses which were tested, only three hypotheses were supported.

Perceived usefulness of LMS was found to be a statistically significant factor for predicting instructors' behavioral intention to use the LMS. The finding was consistent with that of previous studies (Chang & Tung 2008; Cigdem & Topcu 2015; Motaghian et al. 2013). Instructors will be more likely to use the LMS if they find it beneficial and useful in helping them to improve their teaching. However, it is critical for HLIs to think about the requirements for teaching among instructors as they create and implement the LMS (Wang & Wang 2009). HLIs should provide instructors with the opportunity to build awareness of the benefits provided by the LMS in teaching activities and invest in ICT facilities. In addition, HLIs should encourage the instructors to use the LMS for them to recognize its potential.

Instructors' self-efficacy was also a significant factor in instructors' behavioral intention to use the LMS. The finding was consistent with previous studies that revealed that LMS plays a vital role in the instructor's decision to use the LMS (Alshare et al. 2011; Coleman & Mtshazi 2017). Thus, if the instructors have the necessary skills in using the LMS, it will likely improve confidence in the intention to use the LMS. When the instructors lack training, they will not be able to use LMS features efficiently. Therefore, HLIs should provide continuous training on LMS usage to their instructors. This is also supported by Mtebe (2015) who suggested that support services such as training are important for instructors to continue using the LMS in HLIs. Opportunities for training must be available to instructors for them to improve their skills, confidence, and ability to use the LMS for teaching and learning purposes. However, the self-efficacy level sometimes depends on a previous experience that the instructors have. Providing regular training and support to instructors will potentially increase self-efficacy on LMS usage. Intrinsic motivation was also found to influence instructors' intention to use LMS. This result was consistent with Cigdem & Topcu (2015). If the instructors do not have the motivation to use the LMS, they would not use it, and the system becomes inoperable. In addition, if instructors feel happy and enjoy using the LMS, they will continue to use it for teaching and learning purposes. Therefore, HLIs should look to a mechanism that integrates the existing social networking forums and games with the LMS to increase instructors' enjoyment during the use of the LMS.

Perceived cost was found to have an insignificant effect on the behavioral intention to use the LMS at UDOM. Instructors' support was also not found to influence instructors' intention to use LMS. Further, the findings in Table 6 confirmed that Instructors' habits had no significant effect on their behavioral intention to use the LMS. Only 2.2% of the instructors were using it simply because using it in teaching was their habit. Therefore, the likelihood of using or not using the system is always influenced by the usefulness of the system and not otherwise.

We noted that quality of information was not significant for use of the LMS, and the implication of this factor is that instructors may not be satisfied with the relevance and sufficiency of information that is obtained through use of the LMS. Further, it sometimes happens that a peer or social group may have an influence on the usage of technology among users but the findings in Table 6 show that social influence did not have a significant effect on instructors' intention to use the LMS.

Limitations

Although the findings provide a good insight into LMS use from the instructors' perspectives at UDOM, the study used a single university as the unit of study, which has affected the generalizability of the findings. The influence of technology, organizational and individual instructors' differences factors were also not considered in this study . The proposed framework adopted constructs from the various models, but although the results are significant, it is important to validate the framework in other HLIs in further studies. Furthermore, factors like price value, hedonic motivation and service quality should be considered and hence further research is needed to determine their impact on instructor's intention to use the LMS.

CONCLUSION

The purpose of this paper was to investigate the factors that affect HLIs instructors on LMS usage. The study proposed a model to determine the factors that influence the usage of LMS in HLIs. A mixed-methods sequential explanatory design was used in this study to examine the data collected from 92 respondents at the UDOM, using a questionnaire and was followed by interviews among 15 participants. Out of ten hypotheses, the results indicated that three hypotheses were supported. The outcome of this study indicates that perceived usefulness of the LMS, instructors' self-efficacy and intrinsic motivation has a positive effect on LMS usage among instructors in HLIs. However, it was observed that poor ICT infrastructure, poor training, unreliable network or Internet access and lack of knowledge affect instructors' use of the LMS. Therefore, the HLIs management and LMS implementors should consider the aspect of training, motivation and HLIs network infrastructure to improve LMS usage among instructors.

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