Assessment of Institutional Factors of Faculty Learning Management System Adoption Using Extended Technology Acceptance Model

Josie B. Quiban*

Abstract: Learning Management Systems (LMS) have been proven to encourage a constructive approach to knowledge acquisition and support active learning. One of the keys to successful and efficient use of LMS is how the stakeholders adopt and perceive this learning tool. This paper assesses the institutional factors that influenced the use of LMS among the selected State Universities and Colleges (SUCs) in Leyte and Biliran Provinces using the Extended Technology Acceptance Model (ETAM). The model was used to determine the actual usage of the system. Further, a quantitative non-experimental research design using a cross-sectional survey, purposive sampling, and stratified sampling was applied in the study. A sample of 306 faculty members completed a survey questionnaire via Google Forms. Data were analyzed using the mean and standard deviation, Pearson Product Moment Correlation Coefficient, one-way ANOVA, and Scheffe's Post Hoc test. The study found significant relationships between institutional factors and their perceived ease of use and usefulness of LMS. Moreover, the faculty members' perceived ease of use significantly affected their attitude towards using LMS. Likewise, the faculty members' perceived usefulness of LMS significantly affected their attitude and acceptance of the use of LMS. Also, their attitude towards using the LMS significantly affected their acceptance of the use of the LMS. Furthermore, the results of the study have confirmed the reliability of ETAM in examining the adoption and acceptance of LMS. Thus, the researcher recommends a Google Classroom Guide for Educators website to be used among faculty members to enhance their teaching strategies and capabilities in using the platform.

1. Introduction

Globally, the rapid advances of Information and Communication Technologies (ICT) in education have resulted in an explosion of new hardware and software technologies, network protocols, and the

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* Information Technology Department, Palompon Institute of Technology, Palompon, Leyte, Philippines
  Email: josie.quiban@pit.edu.ph

development of interfaces that allow humans to manipulate these new devices. One important technology that was developed with educators and students in mind is the Learning Management System (LMS)[1]. LMS is a web-based software program designed to support the teaching and learning process and helps in the effective delivery of instruction training and development programs in an educational environment [2].

Recently, there has been substantial growth in the use of LMS platforms in higher education due to the Corona Virus 19 (COVID-19) pandemic. COVID-19 is not just causing a health crisis around the world, but it has brought unprecedented disruptions to the educational system [3][4], including in the Philippines [5]. It came unexpectedly, where no one was ready enough to brace its impact on all sectors, especially in education. While there are universities that have been doing online learning in the past decades, over 100 local universities and colleges in the Philippines are left with traditional instruction and face-to-face learning sessions [6]. The traditional universities have no choice but to become adaptive to the "new normal" as declared by the World Health Organization (WHO) [7].

Furthermore, the Philippine Commission on Higher Education (CHED) has issued a Memorandum Order No. 4 Series of 2020 in accordance with the pertinent provisions of the Republic Act No. 11469 pertaining to the guidelines on the implementation of "Flexible Learning" to be implemented by all public and private Higher Educational Institutions (HEIs). Thus, webinar series were conducted in relation to flexible learning and teaching modalities, including the introduction and applications of LMS to be used among the faculty of SUCs in Region VIII. As a result, most of the SUCs have implemented the different flexible learning modalities that the faculty members may implement in the delivery of instruction to their students.

Based on the literature review conducted, several studies utilized the Technology Acceptance Model (TAM) in assessing the influences of institutional factors on the faculty usage of LMS across countries. In the Philippines, Fearnley and Amora [8] used extended TAM in their study on LMS adoption in higher education, of which they incorporated three external variables such as system quality, perceived self-efficacy, and facilitating conditions. However, the external influences of institutional factors such as ICT infrastructure, administrative support, and resource support have not yet been examined. To address this gap, this study is conducted to assess the institutional factors that influenced the use of the Learning Management System (LMS) utilizing the extended Technology Acceptance Model by Davis [9] to have a clear understanding of the faculty perceptions on it and how it affects their perceived ease of use, perceived usefulness, attitude, and acceptance of the LMS as a learning tool. Thus, this empirical research study assessing LMS utilization among the selected SUCs in Region 8 was essential for ensuring future developments in HEIs.

1.1 Objectives

This study assesses the institutional factors that influenced the use of the Learning Management System (LMS) among the selected State Universities & Colleges (SUC) in Leyte and Biliran Provinces in the Philippines using the Extended Technology Acceptance Model. Specifically, it determines the level of perceptions of the faculty on the institutional factors, perception of the faculty on the ease of use and usefulness of LMS as a learning tool, attitude of the faculty towards the use of LMS, level of acceptance of the faculty on the use of LMS, and significant relationships between institutional factors and each of the following: perceived ease of use; perceived usefulness of LMS; perceived ease of use significantly affects attitude towards LMS use; perceived usefulness of LMS significantly affects

attitude and acceptance of the faculty on the use of LMS; attitude towards the use of LMS significantly affects acceptance on the use of LMS as a learning tool; an intervention program can be proposed for LMS users.

1.2 Hypotheses

1. There are significant relationships between the institutional factors and each of the following: perceived ease of use and perceived usefulness of LMS.

2. Ease of LMS use significantly affects attitude towards LMS use.

3. Perceived usefulness of LMS significantly affects attitude and acceptance of the use of LMS.

4. Attitude towards the use of LMS significantly affects acceptance of the use of LMS as a learning tool.

2. Methodology

2.1 Research Design

A quantitative non-experimental research design utilizing a cross-sectional survey was chosen in this study to examine LMS utilization among SUCs in Region 8 using the extended TAM.

2.2 Research Environment

The research locale of the study was the selected SUCs in Region 8. The region is in the eastern part of the Visayas and is composed of the major islands of Leyte and Biliran.

2.3 Research Respondents

The respondents of the study were the faculty from the identified SUCs in Leyte and Biliran Provinces whose faculty were using different LMS platforms in their respective classes during the school year 2020-2021.

2.4 The Data

A sample of 306 faculty members completed a survey questionnaire via Google Forms. Data were analyzed using the mean and standard deviation, Pearson Product Moment Correlation Coefficient, one-way ANOVA, and Scheffe's Post Hoc test.

2.5 The Extended Technology Acceptance Model

The study was anchored on the Extended Technology Acceptance Model (ETAM)[9], as shown in Figure 1. TAM is a well-known and widely used model to predict user willingness to adopt a new technology and understand factors that affect the use of technology. Davis [9] assumes external variables (EV), such as system design, influence the determinants of perceived usefulness (PU), perceived ease of use (PEOU), and behavioral intention (BI).

Davis [9] defined the following constructs: PEOU as the degree to which the prospective user expects the target system to be free of effort; PU as the user's subjected probability that using a specific

application system will increase his or her job performance within an organizational context; ATT as an individual's positive or negative feeling about performing the target behavior; TAM postulates that the users' positive or negative attitudes towards using LMS are directly impacted by their perceptions of the usefulness (PU) and ease of use (PEOU) of LMS; and BI as the degree to which a person has formulated a conscious plan to perform, or not perform, some specified future behavior. In other words, this construct measures the end-user's intention, which is directly influenced by ATT, that is, the attitude towards the technology.
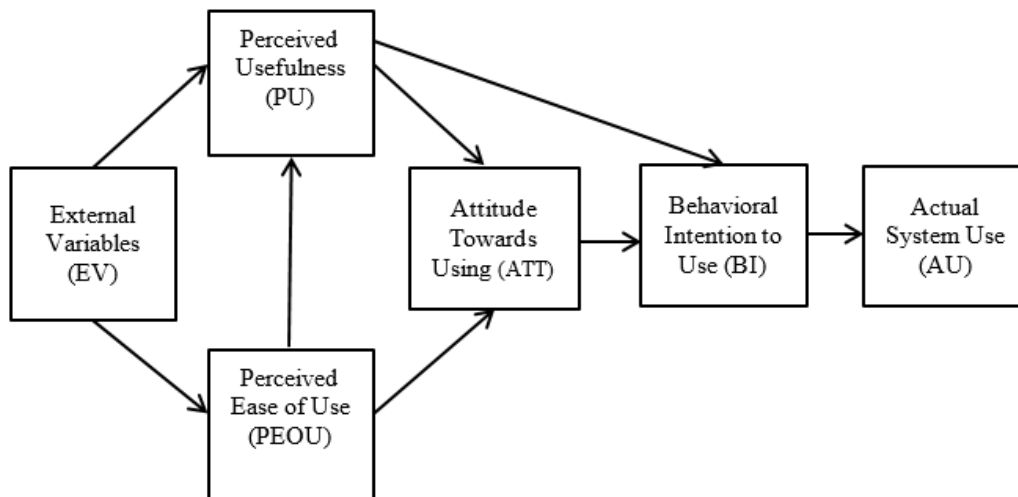

Figure 1. The Extended Technology Acceptance Model (ETAM)

The ETAM was chosen to be used in this study for various reasons. First, the study utilized the five constructs of the model, such as EV, PEOU, PU, ATT, and AU, in examining the faculty usage of LMS. Second, the reliability of the ETAM in determining a user's usage of LMS in a different context with a different application has been proposed and confirmed by many previous studies [10][11]. Moreover, TAM has been a standout amongst the most well-known models in understanding the faculty acceptance of technologies worldwide [12].

The conceptual framework grounding this study links together the theoretical TAM by Davis [9], as shown in Figure 1. Furthermore, there are six constructs formed in this study, as shown in Figure 2, which are stated as follows: (1) Institutional factors such as ICT infrastructure, administrative and resource support; (2) perceived LMS usefulness; (3) perceived ease of LMS use; (4) attitude towards the use of LMS; (5) acceptance of the use of LMS; and (6) proposed intervention program for users. In order to provide a better understanding of the LMS acceptance and usage among faculty members of the participating SUCs in Region 8, the above-mentioned factors in the study were examined to determine their influences and relationships among variables.

According to the TAM presented by Davis [9], the external variables directly influence the PEU and PU. Thus, it was conceptualized in this research that institutional factors such as ICT infrastructure, administrative support, and resource support would significantly affect the perceived LMS usefulness and ease of LMS use among faculty. This means that if the faculty would perceive the LMS as easy and useful, then it might have an effect on their perceived satisfaction from the institution in using the LMS.
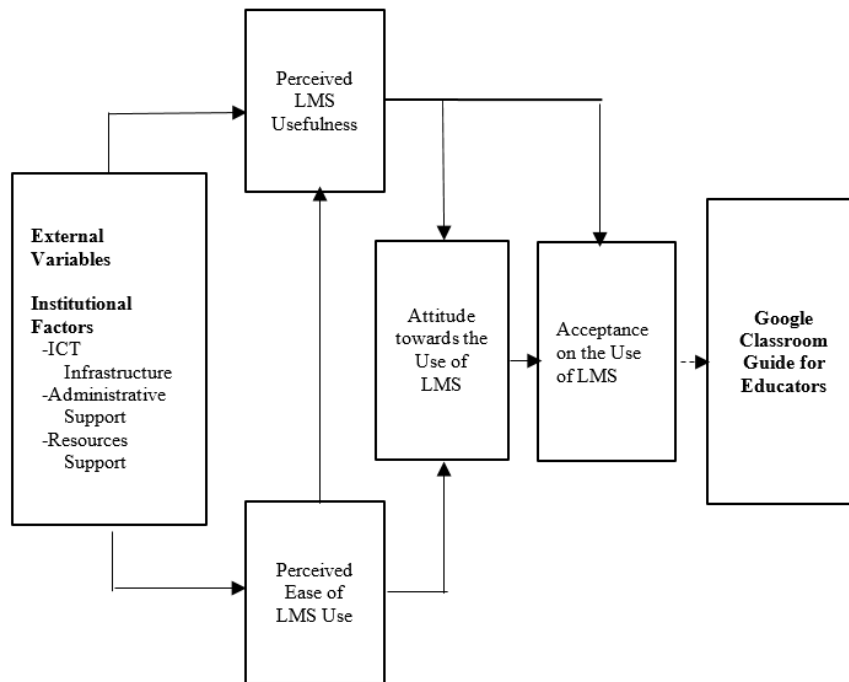
Figure 2. Schematic Diagram of the Conceptual Framework

Further, TAM assumes that PEU influences the PU. Thus, it was conceptualized in this research that the perceived ease of LMS use would positively affect the perceived usefulness of LMS among faculty, which means that if the faculty would consider that the LMS was easy to use, then they would consider the LMS as useful. TAM also claims that both PU and PEU influence the attitude towards the use of technology for individuals. Thus, it was conceptualized in this study that both perceived LMS usefulness and perceived ease of LMS use would positively affect the attitude towards the use of LMS.

This implies that if the faculty would perceive the LMS as easy to use and useful, then they would formulate a positive attitude towards using it. Furthermore, Davis (1989) noticed that both PU and ATT directly influence the actual use of technology. Thus, it was conceptualized in this study that perceived LMS usefulness and attitude towards the use of LMS would positively affect the acceptance of the use of LMS. This implies that if the faculty would find LMS useful and would have a positive attitude towards the use of LMS, then they would accept and use it. Finally, the end results of the study were used as the basis for the proposed intervention program for LMS users.

3.   Results and Discussions

This section deals with the presentation of findings and the analysis and interpretation of data generated from survey responses to assess the institutional factors that influenced the use of learning management systems (LMS) among the selected SUCs in Leyte and Biliran Provinces in the Philippines. Specifically, this study presents the level of perceptions on institutional factors, ease of use and usefulness of LMS, attitude, and acceptance of the faculty on the use of LMS. Moreover, an intervention program was proposed based on the results of the study.

3.1 Perception on Institutional Factors

In this study, the perception of faculty on institutional factors comprises ICT infrastructure, administrative, and resource support of the institutions in the use of LMS. The data on these factors are presented in Tables 1 to 3.

Table 1. Faculty Perception on ICT Infrastructure

ICT Infrastructure	WM	SD	Interpretation
There is enough ICT hardware for LMS use.	3.46	0.27	Agree
There is a stable Internet connection in my school.	2.89	0.26	Undecided
There is a steady supply of electricity in the campus.	4.27	0.15	Strongly Agree
There is an existing contingency plan in case of breakdown.	3.42	0.23	Agree
There are enough ICT facilities for maintenance and replacement.	3.33	0.19	Undecided
Overall	**3.47**	**0.22**	**Agree**

ICT Infrastructure. Table 1 presents the ICT infrastructure as perceived by the faculty. Based on the results, the steady supply of electricity in the campus got the highest mean of ($M = 4.27$) among ICT infrastructures. This means that most faculty strongly agreed that their institution had a steady supply of electricity. In addition, the results revealed that most faculty agreed that their institution had good ICT hardware for LMS use ($M = 3.46$) and an existing contingency plan in case of breakdown ($M = 3.42$). However, most of them were undecided about whether their institution had enough ICT facilities for maintenance and replacement ($M = 3.33$). The results suggested that the faculty would be more creative and motivated to create class materials using LMS if the institution had excellent ICT infrastructures. The results were confirmed by the studies of Adhikari [13], Ahmed and Mesonovich [14], and Capacho *et al.* [15], that ICT tools support both teachers and students to search and use different online materials for the teaching and learning process.

Likewise, it also revealed that most of the faculty were undecided whether their institution had a stable internet connection ($M = 2.89$), which means that they somehow experienced unstable internet connection while using the LMS platform. The result was supported by Adhikari [13], who stated that insufficient ICT infrastructures, poor bandwidth of the internet, and limited skill of ICT among teachers and students became obstacles to integrating LMS technology in the education system. Thus, the researcher suggested a need for all schools' stakeholders to address the challenges that hinder the usage of the ICT infrastructures among the faculty for using LMS in teaching.

Moreover, as shown in Table 1, the overall weighted mean for ICT infrastructure was ($M = 3.47$), which means that most faculty agreed that their institution had good ICT infrastructures such as ICT hardware, internet connection, electricity, contingency plans, and ICT facilities for using the LMS. The

result was confirmed in the study of Bariu [16] that using ICT infrastructure in teaching and learning increases access, enhances efficiency, and improves the quality of education. The result suggests that if the institution has high investments in their ICT infrastructures, their faculty will be more effective and efficient in delivering their instructions to the students.

Administrative Support. Table 2 presents the second component of institutional factors, which is the administrative support as perceived by the faculty.

Table 2. Faculty Perception on Administrative Support

Administrative Support	WM	SD	Interpretation
1. The administration accepts LMS as a model for teaching and learning.	4.21	0.30	Strongly Agree
2. The administration has provided most of the necessary help and resources to get us used to LMS quickly.	3.86	0.39	Agree
3. The administration provides teachers with LMS training to assist their online teaching.	4.05	0.39	Agree
4. The administration understands the benefits of using LMS as a learning tool.	4.17	0.29	Agree
5. The administration employs experienced teachers to oversee the implementation of the LMS environment.	3.77	0.28	Agree
6. The administration supports teachers by providing better access to the school network.	3.67	0.38	Agree
7. The administration provides collaborative teaching arrangements among teachers for using LMS.	3.70	0.27	Agree
8. The administration provides a professional support system in place to ensure success in delivering the online course.	3.69	0.25	Agree
9. The administration is committed to a learner-centered instruction.	3.93	0.27	Agree
10. The administration provides workload incentives to the teachers for using LMS.	2.98	0.43	Undecided
Overall	**3.80**	**0.33**	**Agree**

In detail, the results revealed that most faculty strongly agreed that their administration accepted LMS as a model for teaching and learning ($M = 4.21$). It implies that their administration was very good

at accepting and using LMS for the teaching and learning process. The results were confirmed by Macharia and Nyakwende [17], who focused on the top management support as a dominant factor that accelerates the adoption and diffusion of LMS by the academic staff for teaching and learning activities.

However, the results also revealed that most faculty were undecided in terms of workload incentives for using LMS ($M = 2.98$). This implies that most faculty only received fair support from the administration in terms of workload incentives. The results were confirmed by Ujir *et al.* [18], wherein they found that workload affects the quality of teaching, and from the academic perception, a higher workload means lower-quality teaching. Likewise, Inegbedion *et al.* [19] also found that workload balance significantly influences job satisfaction in work organizations.

Furthermore, the results on the remaining items under administrative support revealed that most of the faculty agreed that their administration understood the benefits of LMS as a learning tool ($M = 4.17$), provided LMS training to assist their online teaching ($M = 4.05$), committed to a learner-centered instruction ($M = 3.93$), provided the necessary help and resources ($M = 3.86$,), employed experienced teachers to oversee the implementation LMS ($M = 3.77$), provided collaborative teaching arrangements among teachers for using LMS ($M = 3.70$), provided professional support system in place to ensure success in delivering the online courses ($M = 3.69$), and provided better access to the school network ($M = 3.67$). The above results imply that most of the faculty received good support from the administration. The results were confirmed by Baharuldin *et al.* [20] that school administrators should have transformational leadership and self-efficacy and equip themselves with formal training in technological leadership to integrate ICT into the teaching and learning process of the faculty.

Moreover, the overall weighted mean for administrative support was $M = 3.80$, which means that most of the faculty agreed that they received good support from their school's administration. The results were confirmed by Araneta et al. [21] in their study on administrative support and teaching quality as inputs to professional development programs. They found that school heads were very supportive of their teachers, as indicated by their very high ratings of administrative support.

Resource Support. Table 3 presents the third component of the institutional factors, which is the resource support as perceived by the faculty. As shown in Table 3, the resources support has three subcomponents, namely, financial support, human support, and technical support. In terms of financial support, results showed that most faculty agreed that their institution had enough budget for LMS development ($M = 3.66$), ICT facilities ($M = 3.58$), LMS implementation ($M = 3.51$), and sufficient funding for the LMS scheme by the government ($M = 3.47$). However, in terms of providing financial incentives to teachers for using LMS ($M = 2.99$), the result revealed that most of the faculty were undecided whether they received fair support from the administration. The results were confirmed in the study of Jessani et al. [22] related to the factors affecting engagement between academic faculty and decision-makers, where they found financial support as an important contributor to faculty engagement in using the LMS platform.

Furthermore, in terms of human support, the results revealed that the majority of the faculty agreed that their institution had enough competent IT managers/coordinators ($M = 3.81$) and IT technicians in using LMS ($M = 3.78$), experienced human resources who organized trainings on LMS ($M = 3.69$), adequate human resources to support the faculty and students in using LMS ($M = 2.52$), and enough technicians to support LMS operations ($M = 3.50$). It implies that the institution provided strong human support to the faculty to facilitate them using the LMS platform.

Table 3. Faculty Perception on Resources Support

Resources Support	WM	SD	Interpretation
Financial Support			
1. The institution has sufficient funding for the LMS scheme by the Government.	3.47	0.26	Agree
2. The institution has a budget for LMS development.	3.66	0.39	Agree
3. The institution has a budget for LMS ICT facilities.	3.58	0.25	Agree
4. The institution has enough budgets for LMS implementation.	3.51	0.30	Agree
5. The institution provides financial incentives to teachers for using LMS.	2.99	0.40	Undecided
	3.44	**0.31**	**Agree**
Human Support			
6. The institution's IT manager/coordinator has sufficient IT competency to support me in using LMS.	3.81	0.14	Agree
7. The institution's IT technicians have enough IT competency to support me in using LMS.	3.78	0.16	Agree
8. The institution has enough technicians to support LMS operations.	3.50	0.16	Agree
9. The institution has experienced human resources that organize training on LMS.	3.69	0.16	Agree
10. The institution has adequate human resources to support the faculty and students in using LMS.	3.52	0.21	Agree
	3.66	*0.17*	*Agree*
Technology Support			
11. A help desk is available to me when I face a technical problem.	3.29	0.24	Undecided
12. I have access to LMS technical support when I need it.	3.45	0.25	Agree
13. The LMS technical support staff are highly qualified to solve technical problems.	3.64	0.13	Agree
14. The LMS technical support offered by the institution improves my teaching.	3.47	0.23	Agree
15. The LMS technical support offered by the institutions increases my productivity.	3.50	0.21	Agree
	3.47	**0.21**	**Agree**
Overall	**3.52**	**0.23**	**Agree**

The results were confirmed in the study of Legowo *et al.* [24] that a high level of human competencies among IT support staff to train the faculty is a significant factor in facilitating the human aspect of LMS implementation. Moreover, in terms of technological support, the results indicated that most faculty agreed that they received good technological support from their institution in terms of providing competent technical staff in solving their technical problems ($M = 3.64$), LMS technical support to increase their productivity ($M = 3.50$), teaching ($M = 3.47$), and access to LMS ($M = 3.45$). However, they were undecided whether they had fair support in terms of the availability of their help desk when they encountered technical problems ($M = 3.29$) in using LMS. This implies that most of the SUCs in the region lack IT help desk professionals to solve technical problems in using LMS. The results were confirmed in the study of Alshammari *et al.* [23], which showed that technology and human support had a significant influence on the usage and acceptance of using LMS among faculty.

Finally, the overall weighted mean for institutional-related factors in terms of resource support was ($M = 3.52$), which means that most faculty agreed that they received good support from their institution in terms of financial, human, and technology support. These supports were significant in effectively utilizing the LMS in the abrupt change in the delivery of instruction. Thus, the faculty needed to get the support from the institution. According to Legowo *et al.* [24], the support of top management is a very significant factor in improving the organizational aspect of LMS.

3.2 Perception on the Ease of Use and Usefulness of LMS as a Learning Tool

Ease of LMS Use. Table 4 presents the ease of LMS use as perceived by the faculty.

Table 4. Perception of Faculty on Ease of LMS Use

Ease of LMS Use	WM	SD	Interpretation
1. Interacting with LMS is clear and understandable.	3.73	0.19	Agree
2. The LMS interface is easy to use.	3.65	0.21	Agree
3. Navigation among LMS tools is not complicated.	3.57	0.22	Agree
4. LMS is flexible to interact with.	3.68	0.24	Agree
5. Overall, I find LMS easy to use.	3.67	0.13	Agree
Overall	**3.66**	**0.20**	**Agree**

Specifically, the results revealed that most of the faculty agreed that interacting with LMS was clear and understandable ($M = 3.73$), flexible to interact with ($M = 3.68$), found LMS easy to use ($M = 3.67$), the interface was easy to use ($M = 3.65$), and navigating among LMS tools was not complicated ($M = 3.57$). Similarly, the overall weighted mean for ease of LMS use was $M = 3.66$, which means that most faculty agreed that using LMS was easy.

The results imply that if the faculty were proficient or experts in ICT, they would find it very easy to use LMS for teaching. The perceived ease of LMS use of the faculty would be directly influenced by their skills in technology and computer self-efficacy. The results were confirmed in previous studies of Amhag *et al.* [25] and Yalcin and Kutlu [26], stating that perceived ease of use is affected by technology skills and computer self-efficacy. It is found that institutional support is significantly associated with perceived ease of use and perceived usefulness and in turn related to the use of the technology.

Usefulness of LMS as a Learning Tool. Table 5 presents the usefulness of LMS as perceived by the faculty.

Table 5. Faculty Perception on the Usefulness of LMS as a Learning Tool

Perceived Usefulness of LMS	WM	SD	Interpretation
1. Using LMS would help me accomplish tasks more quickly.	3.80	0.17	Agree
2. Using LMS would enhance my effectiveness in teaching.	3.76	0.21	Agree
3. Using LMS would increase my productivity in teaching.	3.75	0.20	Agree
4. Using LMS would improve the quality of my teaching.	3.72	0.25	Agree
5. Overall, I find LMS very useful in my teaching.	3.82	0.17	Agree
Overall	**3.77**	**0.2**	**Agree**

Generally, most of the faculty agreed that they found LMS very useful in their teaching ($M = 3.82$), that using LMS would help them accomplish tasks more quickly ($M = 3.80$), enhance their effectiveness in teaching ($M = 3.76$), increase their productivity in teaching ($M = 3.75$), and improve the quality of their teaching ($M = 3.72$). Similarly, the overall mean for the usefulness of LMS as a learning tool was ($M = 3.77$), which means that most faculty considered LMS a useful learning tool for the teaching and learning process. The results imply that the perceived usefulness of LMS by the faculty was greatly affected by how they perceived the ease of LMS use and external factors. The results were confirmed by Davis [9], stating that perceived ease of use may be a causal antecedent to perceived usefulness. Likewise, Matarirano *et al.* [27] suggested that if an LMS is adopted and used, it is considered useful; otherwise, users will be reluctant to use it.

3.3 Attitude of the Faculty toward the Use of LMS

Table 6 reflects the attitude of the faculty on the use of LMS. As shown in Table 6, most of the faculty had a favorable attitude towards the four items.

Table 6. Attitude of Faculty towards the Use of LMS

Attitude towards the Use of LMS	WM	SD	Interpretation
1. I found that using LMS in teaching and learning arouses my interest and that of the students.	3.58	0.29	Agree
2. I feel that using LMS in instructional delivery increases the ICT skills of the students.	3.87	0.13	Agree
3. I like using LMS to upload lessons, quizzes, assignments, and projects to my students.	3.84	0.13	Agree
4. I experience fulfillment in posting lecture materials on LMS for students.	3.74	0.14	Agree
5. I feel that using LMS in instructional delivery is not a waste of time.	3.04	0.2	Undecided
Overall	**3.61**	**0.18**	**Agree**

Specifically, the results revealed that most faculty had a favorable attitude toward the following statements: that using LMS in instructional delivery increased the ICT skills of the students ($M = 3.87$); they liked LMS to upload lessons, quizzes, assignments, and projects to their students ($M = 3.84$); they experienced fulfillment in posting lecture materials on LMS for students ($M = 3.74$), and they found that using LMS in teaching and learning aroused their interest and that of students ($M = 3.58$). However, they were undecided whether using LMS in instructional delivery was not a waste of time ($M = 3.04$). The results imply that most faculty had different attitudes on the use of LMS. Some of them considered using LMS for delivery instruction easy and useful and perceived that it was not a waste of time. In contrast, some of them also considered LMS as easy and useful but felt that it was indeed a waste of time.

However, regardless of whether using LMS was a waste of time or not, the result did not affect the overall weighted mean of ($M = 3.60$), which means that most faculty had a favorable attitude toward the use of LMS.

3.4 Acceptance of Faculty on the Use of LMS

Table 7 shows the acceptance of faculty on the use of LMS. In detail, the results revealed that most faculty agreed with the use of LMS to upload lessons, quizzes, assignments, and projects to their students (M = 3.84); check the quizzes, assignments, and feedback from their students (M = 3.75); use LMS frequently (M = 3.71); use LMS to expand teaching technique (M = 3.64); and use LMS for virtual discussions (M = 3.52). This implies that most faculty in Region 8 accepted the use of LMS for teaching.

Table 7. Acceptance of Faculty on the Use of LMS

Acceptance of Using the LMS	WM	SD	Interpretation
1. I use LMS for uploading lessons, quizzes, assignments, and projects to my students.	3.84	0.20	Agree
2. I use LMS for checking the quizzes, assignments, and feedback from my students.	3.75	0.15	Agree
3. I use LMS frequently.	3.71	0.12	Agree
4. I use LMS for virtual discussions.	3.52	0.27	Agree
5. I use LMS to expand teaching technique.	3.64	0.21	Agree
Overall	**3.69**	**0.19**	**Agree**

In general, the overall weighted mean for the acceptance of the use of LMS was $M = 3.69$, which means that it is acceptable for the faculty to use LMS as a learning tool for teaching. The results were confirmed by the study of Buabeng-Andoh and Baah [28], related to internal and external factors of teachers' ICT usage. He found that internal and external factors would directly influence the faculty's usage of technology.

3.5 Relationships between Institutional Factors and Each of the Following Perceived Ease of LMS Use and Usefulness of LMS

Institutional Factors and Perceived Ease of Use of LMS. The first hypothesis that this study wanted to investigate was if there were significant relationships between institutional factors and the perceived ease of use and usefulness of LMS in instruction. Table 8 shows the correlation between each institutional factor and perceived LMS use. Generally, the results of the Pearson product-moment correlation analysis revealed that there were significant positive relationships between each component of the institutional factors and perceived ease of LMS, based on the number of faculty r (303) with correlation values ranging from ($r = .36$) to ($r = .40$). These factors were highly significantly correlated since the values were all significant even at the $p < .01$ level of significance. Thus, the first null hypothesis is rejected in favor of the first research hypothesis, which stated that there were significant relationships between the institutional factors and the perceived ease of LMS used by the faculty.

Specifically, the Pearson product-moment correlation analysis among three institutional factors revealed that there were significant, moderate, positive relationships with perceived ease of use. This means that the perceived ease of LMS use was moderately positively correlated with administrative support, r (303) $= .40$, $p = .01$; resource support, r (303) $= .40$, $p = .01$; and ICT infrastructure, r (303) $= .36$, $p = .01$. The results suggest that if the faculty were given enough support by the administration in terms of resources, technology access, and ICT facilities, most likely they would find it easy to use LMS for instruction. The results were confirmed by Buabeng-Andoh and Baah [28], stating that institutional and technological factors encouraged teachers to use computer technology and the learning process. Consequently, he found that the lack of institutional support, limited access to ICT, and rigid structure of traditional education systems are the barriers that affected teachers in using LMS.

Table 8. Correlation between Factors and Perceived Ease of LMS Use

Factors	ICT	Admin Supp	Resource Supp	Ease of Use
ICT	1	.721**	.706**	.357**
Admin Supp		1	.766**	.398**
Resource Supp			1	.398**
Ease of Use				1

**Correlation is significant at .01 level (2-tailed)

Similarly, the Pearson correlation among institutional factors was found to be strongly, moderately, and weakly positively correlated with the perceived usefulness of LMS, with correlation values ranging from ($r = .36$) to ($r = .45$), as shown in Table 9. This means that the first research hypothesis is also accepted in terms of the perceived usefulness of LMS. In other words, there were positive, significant relationships between the institutional factors and the perceived usefulness of LMS. The correlation results indicated that all institutional factors were considered determinants of the perceived usefulness of LMS. The results were confirmed by Alshammari [10], who stated that institutional factors were found to influence teachers' ICT usage.

In examining Table 9, the perceived usefulness of LMS was found to be moderately positively correlated with ICT (r (303) = .36, $p = .01$), administrative support (r (303) = .45, $p = .01$), and resource support (r (303) = .42, $p = .01$). The results were confirmed by Araneta *et al.* [21], stating that the effect of job motivation on teachers in using LMS was realized through perceived administrative support. Likewise, in terms of organizational resources support, Amegavi *et al.* [29] found that human resources were the highest support that affected the faculty in using LMS, followed by ICT and financial resources. Moreover, Amegavi *et al.* [29] confirmed that inadequate financial and human resources, leadership support, low ICT literacy, low ICT equipment, and low Internet connectivity affected the implementation of computer-based technology like LMS.

Table 9. Correlation between External Factors and Perceived Usefulness of LMS

Factors	ICT	Admin Supp	Resource Supp	Usefulness
ICT	1	.721**	.706**	.359**
Admin Supp		1	.766**	.446**
Resource Supp			1	.421**
Usefulness				1

**Correlation is significant at .01 level (2-tailed)

3.6 Effect of Perceived Ease of LMS Use on Attitude

The second hypothesis that this study intended to answer was if there was a significant effect of the faculty's level of perceived ease of LMS use on their attitude towards using LMS for teaching. Table 10 shows the summary ANOVA on the effects of perceived ease of LMS use on attitude. A one-way ANOVA was conducted to compare the effects of faculty's perceived ease of LMS use on their attitude towards using LMS in five conditions: those who evaluated as very easy, easy, undecided, difficult, and very difficult.

Table 10. Summary ANOVA on the Effect of Perceived Ease of LMS Use on Attitude

Attitude	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	89.054	4	22.264	122.860**	.000
Within Groups	54.363	300	.181		
Total	143.418	304			

**ANOVA is significant at .05 level

A one-way ANOVA analysis revealed that there was a statistically significant effect of the faculty's perceived ease of LMS use on their attitude towards using LMS at the $p < .05$ significance level for the five conditions (F (4,300) = 122.860, p = .001). This accepts the second research hypothesis, which states that the ease of LMS use significantly affects attitude towards using LMS.

Table 11. Scheffe Test Comparisons for the Mean Difference of Attitude Towards LMS Use in the Dimension of Perceived Ease of Use

Dependent Variable	(i) Ease of use level/group	(j) Ease of use level/group	Mean Difference	Sig
	(1) Very Difficult	(2) Difficult	.039	1.000
		(3) Slightly Difficult	-.477	.653
		(4) Easy	-1.179*	.005
		(5) Very Easy	-1.987*	.000
Attitude towards the use of LMS	(2) Difficult	(3) Slightly Difficult	-.515*	.001
		(4) Easy	-1.218*	.000
		(5) Very Easy	-2.026*	.000
	(3) Slightly Difficult	(4) Easy	-.703*	.000
		(5) Very Easy	-1.510*	.000
	(4) Easy	(5) Very Easy	-.807*	.000

*The mean difference is significant at the 0.05 level

Since it had been found that there was a statistically significant result, a post hoc test was conducted as shown in Table 11.

The researcher selected the Scheffe post hoc test to compare each condition to other conditions. As shown in Table 11, the post hoc test results indicated that the condition groups mentioned above had significant effects on the attitude of the faculty towards using LMS. Thus, it concluded that levels of the perceived ease of LMS use significantly affected the attitude towards using LMS. The results were confirmed by Wichadee [30], who examined the factors related to faculty members' attitudes and adoption of LMS. It revealed that the perceived ease of LMS use had a significant effect on the attitude towards the adoption of LMS.

3.7 Effect of Perceived Usefulness of LMS on Attitude and Acceptance on the use of LMS

This study also investigated if the perceived usefulness of LMS significantly affected attitude and acceptance. This was the third hypothesis of this study. Table 12 shows the data for this aspect.

Table 12. Summary ANOVA on the Effect of Perceived Usefulness of LMS on Attitude and Acceptance

Attitude and Acceptance		Sum of Squares	df	Mean Square	F	Sig.
Attitude	Between Groups	74.881	4	18.720	77.019**	.000
	Within Groups	72.918	300	.243		
	Total	147.799	304			
Acceptance	Between Groups	75.658	4	18.915	43.624**	.000
	Within Groups	130.074	300	.434		
	Total	205.732	304			

**ANOVA is significant at .05 level Perceived Usefulness of LMS

As shown in Table 12, there was a statistically significant difference in the attitude between groups of perceived usefulness of LMS as determined by one-way ANOVA (F (4,300) = 77.02, p = .001). The null hypothesis was rejected because the p-value was less than .05. Thus, there was statistically significant evidence at the $p < .05$ level to show that perceived usefulness of LMS significantly affected the respondents' attitude in using LMS. Taken together, these results suggested that perceived usefulness really did influence the attitude on the use of LMS in instruction. Specifically, the results suggested that if the faculty agreed or strongly agreed on the perceived usefulness of LMS, they would develop a positive attitude to use LMS for instructions. Another aspect of this hypothesis was the effect of perceived usefulness of LMS on the acceptance of the use of LMS. A one-way ANOVA revealed that there was a statistically significant effect between groups of the perceived usefulness on the acceptance of using LMS (F (4,300) = 43.62 (p = .001).

Table 12-A. Scheffe Test Comparisons for the Mean Difference of Attitude Towards LMS Use in the Dimension of Perceived Usefulness

Dependent Variable	(i) Level of Perceived Usefulness	(j) Level of Perceived Usefulness	Mean Difference	Sig
Attitude towards LMS use	(1) Not useful at all	(2) Slightly Useful	-1.074	.087
		(3) Moderately useful	-1.440*	.003
		(4) Useful	-1.979*	.000
		(5) Very Useful	-2.726*	.000
	(2) Slightly Useful	(3) Moderately useful	-.366	.187
		(4) Useful	-.905*	.000
		(5) Very Useful	-1.652*	.000
	(3) Moderately useful	(4) Useful	-.539*	.000
		(5) Very Useful	-1.286*	.000
	(4) Useful	(5) Very Useful	-.747*	.000

. The mean difference is significant at the 0.05 level

As shown in Table 12-A, the post hoc test results indicated that the condition groups mentioned above had significant effects on the attitude of the faculty towards using LMS. Thus, it concluded that levels of the perceived usefulness of LMS significantly affected the attitude towards using LMS. The results were confirmed by Alshammari [10], Wichadee [30], and Azman *et al.* [31], who studied the lecturers' perceived usefulness and attitude, where they found a significant positive and moderate relationship between the perceived usefulness of LMS and lecturers' attitude.

As shown in Table 12-B, the post hoc tests results indicated that the condition groups mentioned above had significant effects on the acceptance of the faculty on LMS use. Thus, it concluded that the levels of the perceived usefulness of LMS significantly affected on the acceptance of faculty on LMS use. The results were confirmed by Alshammari [10], Wichadee [30], and Azman *et al.* [31], who studied on the lecturers' perceived usefulness and acceptance where they found a significant positive and moderate relationship between the perceived usefulness of LMS and lecturers' acceptance of the use of LMS.

Table 12-B. Scheffe Test Comparisons for the Mean Difference of Acceptance of LMS Use in the Dimension of Perceived Usefulness

Dependent Variable	(i) Level of Perceived Usefulness	(j) Level of Perceived Usefulness	Mean Difference	Sig
Acceptance of LMS use	(1) Not useful at all	(2) Slightly Useful	-1.331	.135
		(3) Moderately useful	-1.748[*]	.009
		(4) Useful	-2.341[*]	.000
		(5) Very Useful	-2.988[*]	.000
	(2) Slightly Useful	(3) Moderately useful	-.417	.343
		(4) Useful	-1.010[*]	.000
		(5) Very Useful	-1.657[*]	.000
	(3) Moderately useful	(4) Useful	-.593[*]	.000
		(5) Very Useful	-1.240[*]	.000
	(4) Useful	(5) Very Useful	-.647[*]	.000

*. *The mean difference is significant at the 0.05 level*

3.8 Effect of Attitude on the Acceptance of LMS Use

The fourth hypothesis that this study intended to answer was that the attitude towards the use of LMS significantly affected acceptance of the use of LMS as a learning tool. This can be found in Table 13.

A one-way ANOVA revealed that there was a statistically significant effect on the mean level of acceptance between groups (F (4,300) = 45.46, p = .001). In other words, the null hypothesis was rejected. This means that there was enough evidence to conclude that attitude towards the use of LMS significantly affected acceptance of the use of LMS as a learning tool.

Table 13. Summary ANOVA on the Effect of Attitude on Acceptance of LMS Use

Attitude	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	77.641	4	19.410	45.460	.000
Within Groups	128.091	300	.427		
Total	205.732	304			

**ANOVA is significant at .05 level*

A one-way ANOVA revealed that there was a statistically significant effect on the mean level of acceptance between groups (F (4,300) = 45.46, p = .001). In other words, the null hypothesis was rejected. This means that there was enough evidence to conclude that attitude towards the use of LMS significantly affected acceptance of the use of LMS as a learning tool.

As shown in Table 14, the result of Scheffe's post hoc test indicated that the condition groups mentioned above had significant effects on the acceptance of faculty on LMS use. Thus, it can be concluded that there was a statistically significant difference in the acceptance of the use of LMS between levels of attitude of the respondents. In other words, the respondents who had a strong positive attitude towards the use of LMS were also those who strongly accepted the use of LMS. Concurrently, behavioral intention to use the e-learning system was strongly related to attitude and perceived usefulness. If faculty had a positive attitude towards the use of LMS, it would be easy for them to use and adopt LMS for teaching and learning.

Table 14. Scheffe Test Comparisons for the Mean Difference of Acceptance of LMS Use in the Dimension of Attitude Towards LMS Use

Dependent Variable	Attitude		Mean Difference	Sig
	(i) Attitude Level	(j) Attitude Level		
Acceptance of LMS use	(1) Very Unfavorable	(2) Unfavorable	-1.188	.071
		(3) Undecided	-1.682*	.001
		(4) Favorable	-2.087*	.000
		(5) Very Favorable	-2.773*	.000
	(2) Unfavorable	(3) Undecided	-.494	.051
		(4) Favorable	-.899*	.000
		(5) Very Favorable	-1.585*	.000
	(3) Undecided	(4) Favorable	-.405*	.002
		(5) Very Favorable	-1.091*	.000
	(4) Favorable	(5) Very Favorable	-.686*	.000

*. The mean difference is significant at the 0.05 level

4.   Conclusion and Recommendations

This study assessed the influence of institutional factors on the adoption and utilization of Learning Management Systems (LMS) among faculty in selected SUCs in Region 8, employing the extended Technology Acceptance Model (ETAM). The findings revealed that while institutions generally provided adequate ICT infrastructures, administrative support, and resources, challenges such as limited Internet connectivity, heavy workloads, and insufficient financial incentives hindered faculty perceptions of LMS ease of use and usefulness. To address these barriers, institutions should enhance ICT infrastructure, improve Internet connectivity, and offer workload adjustments and financial incentives to encourage faculty engagement and improve their efficiency in using LMS.

The study also found that faculty perceived LMS as easy to use and useful, which positively influenced their attitudes and led to its adoption for teaching and learning. Institutional factors were shown to significantly affect these perceptions, with ease of use strongly shaping attitudes and usefulness impacting both attitudes and acceptance. Institutional leaders are encouraged to adapt to technological advancements, foster a culture of acceptance, and support the development of innovative LMS designs tailored to faculty needs.

At the national level, the findings underscore the reliability of ETAM as a framework for evaluating LMS adoption. However, widespread acceptance requires a unified approach. The Commission on Higher Education (CHED) and Higher Education Institutions (HEIs) should collaborate to develop a standardized, user-friendly LMS for nationwide implementation and realign the curriculum to integrate LMS more effectively. Finally, to support faculty empowerment, institutions should promote the use of the proposed Google Classroom Guide for Educators, which includes video tutorials and resource links, to build faculty confidence and enhance their competency in using LMS tools. By addressing these challenges and recommendations, institutions and national agencies can create an environment conducive to the effective adoption and utilization of LMS in higher education.

References

[1]   T. Andersson, D. Randall, P. Jokela, *"Learning Management Systems Case Study on an Implementation of an LMS and Its Perceived Effects on Teachers,"* Master's in Informatics Thesis, Linnaeus University, Sweden, 2019, https://lnu.diva-portal.org/smash/get/diva2:1295236/FULLTEXT01.pdf.

[2]   A. Chaubey, B. Bhattacharya,*"Learnng Manangement System in Higher Education"*, International Journal of Science technology & Engineering, vol. 2, no. 3, September 2015, pp. 158-162, https://www.ijste.org/articles/IJSTEV2I3050.pdf.

[3]   R. Bhaumik, A. Priyadarshini, *"E-readiness of Senior Secondary School Learners to Online Learning Transition Amid COVID-19"*, Asian Journal of Distance Education, vol. 15, no. 1, June 2020, pp. 244-256, https://www.asianjde.com/ojs/index.php/AsianJDE/article/view/456/309.

[4]   P. Biswas, A. K. Debnath, "*Worldwide Scenario of Unpanned Transition to E-Learning in the Time of COVID-19 and Students' Perception: A Review*", Mukt Shabd Journal, vol 9, no. 6, June 2020, pp. 2038-2043, https://drive.google.com/file/d/1bBP4t7VnERcmnraA4IL0OS7seLPazVPn/view.

[5]   C. Toquero, "*Challenges and Opportunities for Higher Education amid the COVID19 Pandemic: The Philippine*", Pedagogical Research*, vol. 5, no. 4, October 2020, pp. 1-5, https://doi.org/10.29333/pr/7947.

[6]   L. A. Alea, M. F. Fabrea, R. D. A. Roldan, A. Z. Farooqi,*"Teachers' COVID-19 Awareness, Distance Learning Education Experiences and Perceptions Towards Institutional Readiness and Challenges"*,

International Journal of Learning Teaching and Educational Research, vol. 19, no. 6, 2020, pp. 127-144, https://doi.org/10.26803/ijlter.19.6.8.

[7] M. B. Abisado. *"A Flexible Learning Framework Implementing Asynchronous Course Delivery for Philippine Local Colleges and Universities"*, International Journal of Advanced Trends in Computer Science and Engineering, vol. 9, no. 13, June 2020, pp. 13-421, https://doi.org/10.30534/ijatcse/2020/6591.32020.

[8] M. R. Fearnley, J. T. Amora, *"Learning Management System Adoption in Higher Education Using the Extended Technology Acceptance Model"*, IAFOR Journal of Education: Technology in Education, vol. 8, no. 2, July 2020, pp. 89-106, https://doi.org/10.22492/ije.8.2.05.

[9] F. D. Davis, *"Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology"* MIS Quarterly: Management Information Systems, vol. 13, no. 3, September 1989, pp. 319- 339, https://doi.org/10.2307/249008.

[10] M. Alshammari, *"Investigating the Faculty Behavioral to Adopt Learning Management Systems (LMSs) in a Higher Education in Saudi Arabia",* Ph. D. Thesis, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, United States, October 2020, https://vtechworks.lib.vt.edu/server/api/core/bitstreams/de907f52-c59a-41e3-ab93-aa59286e80c5/content.

[11] N. Fathema, D. Shannon, M. Ross, *"Expanding the Technology Acceptance Model (TAM) to Examine Faculty Use of Learning Management Systems (LMSs) In Higher Education Institutions",* MERLOT Journal of Online Learning and Teaching, vol. 11, no. 2, June 2015, pp. 210-232, https://jolt.merlot.org/Vol11no2/Fathema_0615.pdf.

[12] S. S. Binyamin, M. J. Rutter, S. Smith, *"Extending the Technology Acceptance Model to Understand Students' Use of Learning Management Systems in Saudi Higher Education",* International Journal of Emergency Technologies in Learning, vol. 14, no. 3, February 2019, pp. 4-21, https://doi.org/10.3991/ijet.v14i03.9732.

[13] Y. N. Adhikari, *"Integrating Technology into English Language Teaching in Nepal: Student and Teacher Perspectives"*, Prithvi Academic Journal, vol. 4, May 2021, pp. 107-120, https://doi.org/10.3126/paj.v4i0.37052.

[14] K. Ahmed, M. Mesonovich, *"Learning Management Systems and Student Performance"*, International Journal of Sustainable Energy Development, vol. 7, no. 1, June 2019, pp. 582-591, https://infonomics-society.org/wp-content/uploads/Learning-Management-Systems-and-Student-Performance.pdf.

[15] J. Capacho, M. Jimeno, A. Salazar, *"Operational Indicators of the Learning Management System in Virtual Spaces Supported by ICT,"* Turkish Online Journal of Distance Education, vol. 20, no. 3, July 2019, pp. 103-118, https://doi.org/10.17718/tojde.601907.

[16] T. N. Bariu, *"Status of ICT Infrastructure Used in Teaching and Learning in Secondary Schools in Meru County, Kenya,"* Europian Journal of Interactive Multimedia and Education, vol. 1, no. 1, May 2020, pp. 1-8, https://doi.org/10.30935/ejimed/8283.

[17] J. Macharia, E. Nyakwende, *"Vice-Chancellors Anfluence on Academic Staff Intentions to Use Learning Management Systems (LMS) for Teaching and Learning,"* Journal of Language, Technology & Entrepreneurship in Africa, vol. 2, no. 1, 2010, pp. 220-2030, https://doi.org/10.4314/jolte.v2i1.52000.

[18] H. Ujir, S. F. Salleh, A. S. W. Marzuki, H. F. Hashim, A. A. Alias, *"Teaching Workload in 21st Century Higher Education Learning Setting"*, International Journal of Evaluation and Research in Education, vol. 9, no. 1, March 2020, pp. 221-227, https://doi.org/10.11591/ijere.v9i1.20419.

[19] H. Inegbedion, E. Inegbedion, A. Peter, L. Harry, *"Perception of Workload Balance and Employee Job Satisfaction in Work Organisations"*, Heliyon, vol. 6, no. 1, January 2020, https://doi.org/10.1016/j.heliyon.2020.e03160.

[20] Z. Baharuldin, S. Jamaluddin, M. Shaharom, "*The Role of School Administrative Support and Primary Sxhool Teachers' ICT Literacy to Integrate ICT into the Classrooms in Pahang, Malaysia*", International Online Journal of Educational Leadership, vol. 3, no. 1, June 2019, pp. 26-42, https://doi.org/10.22452/iojel.vol3no1.3.

[21] M. L. R. Araneta, R. D. Catalan, E. M. Martir, "*Administrative Support and Teaching Quality: Inputs to Professional Development Program*", Journal of Higher Education Theory and Practice, vol. 20, no. 6, October 2020, https://doi.org/10.33423/jhetp.v20i6.3134.

[22] N. S. Jessani, S. M. Siddiqi, C. Babcock, M. Davey-Rothwell, S. Ho, D. R. Holtgrave, "*Factors affecting Engagement Between Academic Faculty and Decision-Makers: Learnings and Priorities for a School of Public Health*", Health Research Policy and Systems, vol. 16, no. 1, December 2018, pp. 1-15, https://doi.org/10.1186/s12961-018-0342-9.

[23] S. H. Alshammari, M. B. Ali, M. S. Rosli, "*The Influences of Technical Support, Self-efficacy and Instructional Design on the Usage and Acceptance of LMS: A Comprehensive Review*", Turkish Online Journal of Educational Technology, vol. 15, no. 2, April 2016, pp. 116-125, https://files.eric.ed.gov/fulltext/EJ1096463.pdf.

[24] N. Legowo, E. Abdurahman, K. Iman Herwidiana, D. Budiastuti, "*The Influence of Instructor Readiness, Its Capability, Support of LMS Content, and Their Implications on e-Learning Effectiveness in a Corporate University of BUMN*", International Journal of Recent Technology and Engineering, vol. 8, no. 3, 2019, pp. 54-59, https://doi.org/10.35940/ijrte.C3875.098319.

[25] L. Amhag, L. Hellstorm, M. Stigmar, "*Teacher Educators' Use of Digital Tools and Needs for Digital Competence in Higher Education*", Journal of Digital Learning in Teacher Education, vol. 35, no. 4, August 2019, pp. 1-18, https://doi.org/10.1080/21532974.2019.1646169.

[26] M. Eraslan Yalcin, B. Kutlu, "*Examination of Students' Acceptance of and Intention to Use Learning Management Systems Using Extended TAM*", British Journal of Educational Technology, vol. 50, no. 5, September 2019, pp. 2414-2432, https://doi.org/10.1111/bjet.12798.

[27] O. Matarirano, N. R. Jere, H. S. Sibanda, M. Panicker, "*Antecedents of Blackboard Adoption by Lecturers at a South African Higher Education Institution-Extending GETAMEL*", International Journal of Emerging Technologies in Learning, vol. 16, no. 1, January 2021, https://doi.org/10.3991/ijet.v16i01.16821.

[28] C. Buabeng-Andoh, C. Baah, "*Investigating the Actual Usage of Learning Management System: From Perspectives of University*", In Proc. 2019 International Conference on Computing Computational Modelling and Application (ICCMA), Cape Coast, Ghana, March 27-29, 2019, pp. 1-7, https://doi.org/10.1109/ICCMA.2019.00008.

[29] G.B. Amegavi, J. N. Bawole, T. Buabeng, "*The Dynamics of e-Government Enactment in a Developing Country Public Sector Organization: Evidence from Ghana*", International Journal of Electonic Governance, vol. 10, no. 1, 2018, pp. 74-92, https://doi.org/10.1504/IJEG.2018.091267.

[30] S. Wichadee, "*Factors Related to Faculty Members' Attitude and Adoption of a Learning Management System*", Turkish Online Journal of Educational Technology, vol. 14, no. 4, October 2015, pp. 53-61, https://files.eric.ed.gov/fulltext/EJ1077631.pdf.

[31] M. Azman, A. Kamis, C. Kob, A. Abdulla, M. Jerusalem, K. Komariah, E. Budiastuti, "*How is my Guru: The Lecturers' Perceived Usefulness and Attitude*". Cakrawala Pendidikan, vol 39, no. 2, June 2020, https://doi.org/10.21831/cp.v39i2.30790.