Antecedents of Intent to Reuse Learning Management System in the New Normal: A Structural Equation Analysis

Agnes Jocelyn P. Bandojo*
Research Center for Social Sciences and Education, College of Commerce and Business Administration, University of Santo Tomas, Manila, Philippines

Chin Uy
Research Center for Social Sciences and Education, UST-Graduate School, University of Santo Tomas, Manila, Philippines

Marivic D. Tanedo
Faculty of Arts and Letters-Department of Literature, University of Santo Tomas, University of Perpetual Help System

ABSTRACT

Amidst the global challenges posed by COVID-19, educational institutions worldwide, including the Philippines, have swiftly turned to Learning Management Systems (LMS) usage to ensure the continuity and quality of remote instruction. However, ensuring meaningful engagement of faculty members with LMS remains a critical concern. This study examines the factors influencing LMS adoption and reuse. The respondents comprised 270 faculty from two prominent Philippine universities who actively adopted the LMS during the pandemic to continue its instructional delivery. Employing the Technology Acceptance Model, the study reveals that factors like perceived ease of use and perceived usefulness significantly shape faculty attitudes toward LMS adoption. Notably, a strong correlation emerges between actual LMS usage and instructors' intent to incorporate the system into future teaching endeavors. Moreover, the multigroup analysis reveals that the actual usage of the LMS is significantly affected by perceived usefulness. This research contributes to the broader discourse on digital education transformation by highlighting the intricacies of LMS acceptance within the academic community. The findings underscore the need for proactive strategies to enhance faculty engagement, ultimately fostering effective online learning practices. As educational institutions globally navigate the new normal, these insights offer valuable guidance for promoting successful LMS integration and utilization.

1. INTRODUCTION

The COVID-19 pandemic instigated an unprecedented global shift in the education landscape, compelling educational institutions to swiftly transition to emergency remote teaching as a means of ensuring continuous learning (Bao, 2020; Crawford et al., 2020). This abrupt migration to online teaching methodologies brought challenges, particularly for institutions in developing and underdeveloped nations. While some establishments had

already incorporated online education models before the pandemic, facilitating a smoother adaptation (Bond et al., 2018; Sandkuhl & Lehmann, 2017), others faced intricate hurdles.

In the Philippines, for instance, not all educational institutions were equipped to seamlessly transition to online classes, primarily due to logistical constraints. The repercussions were striking, as evidenced by a report from The Philippine Star on August 20, 2022, indicating the closure of 425 private schools since 2020, affecting over 20,000 students. The Department of Education revealed that approximately 800 private schools suspended operations during the height of the pandemic.

Institutions that effectively continued operations during the pandemic had already embraced learning management systems (LMS) before its onset. This enabled them to navigate the sudden shift in educational paradigms, fostering holistic education beyond traditional classroom confines (Dixit & Chauhan, 2021). The pandemic compelled institutions across the globe to adapt, revealing both challenges and opportunities. While the presence of LMS aided some institutions in achieving their educational objectives, the need for refinement was evident. Furthermore, the LMS introduced a dynamic realm of interactive learning for students, enhancing engagement not only with instructors but also with the subject matter itself (Sweetman, 2021).

The pandemic's impact on faculty members was profound, necessitating the adoption of online teaching via LMS. This transformation altered the landscape of pedagogy. Despite research illustrating the advantages of online course delivery, skepticism regarding its pedagogical value persisted among college faculty (Allen & Seaman, 2013, as cited in Bolsen et al., 2016). Ribeiro (2020) highlighted logistical challenges and attitudinal adjustments accompanying this digital transformation. Moreover, institutions that swiftly embraced emergency remote teaching as a crisis response to the pandemic often compromised the quality of online learning (Hodges et al., 2020; Manfuso, 2020). Branch and Dousay (2015) underscored the importance of meticulous design and development processes in the transition to prevent the unintended emergence of emergency remote teaching rather than effective online education (Bozkurt & Sharma, 2020; Hodges et al., 2020; Vlachopoulos, 2020). Bozkurt and Sharma (2020) cautioned against the vulnerability of the education system to external threats during the COVID-19 pandemic.

Furthermore, as universities are responsible for nurturing future professionals equipped to address crises, inquiries into digital transformation and online learning within higher education assume paramount importance (Bond et al., 2018; Sandkuhl & Lehmann, 2017). University administrators invested significantly in infrastructure, technology, and faculty training to facilitate effective education delivery. This investment, a substantial portion of their budget, demands continued utilization beyond the pandemic's scope. Therefore, this study endeavors to discern the factors influencing teachers' intentions to reuse LMS as education transitions to the "new normal."

The implications of this study extend to multiple stakeholders within the education ecosystem. Faculty members stand to gain insights into the impact of perceived ease of use and perceived usefulness on their attitudes and adoption of online learning at the tertiary level. Departments handling university information technology needs can draw from the results to enhance LMS features and maximize their utilization for online instruction. This study may also guide the design of training programs aimed at helping academic staff harness LMS capabilities even beyond the pandemic.

Moreover, the findings can inform academic policies and procedures to optimize LMS usefulness and efficacy in delivering quality education. University administrations

can employ the results to offer targeted feedback to newly recruited faculty members on LMS usage in online teaching scenarios. By shedding light on potential areas for future research, this study contributes to the ongoing discourse on online education.

2. THEORETICAL BACKGROUND

2.1   Theoretical Framework

This paper was anchored on Davis's Technology Acceptance Model (TAM) (1989), which illuminates why a specific technology is chosen in a work environment. TAM model was based on the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), claiming that both attitudes and subjective norms influence behavioral intention, which, in turn, impacts an individual's actual behavior while using a particular technology (Cheung & Vogel, 2013, as cited in Bolsen et al., 2016). However, TAM did not include subjective norms because of its unclear theoretical and psychometric construct (Davis et al., 1989).

TAM proposes that user acceptance is evaluated by perceived usefulness, ease of use, and behavioral intention factors to determine a system's success (Davis, 1989). It also describes the causal links between usefulness and ease of use to the users' attitudes, intentions, and actual usage of the technology. Hence, TAM proposes that users' perceptions predict their attitudes, behavioral intentions to use, and actual usage of technology.

Several studies analyzed the factors influencing using a LMS in education. Among these factors, perceived ease of use was found to have a more significant effect than perceived usefulness. In this paper, Moakofhi et al.'s (2019) version of TAM analyzing the teaching academic staff's acceptance of the LMS usefulness, perceived ease of use, attitude, and actual usage was adopted and used to analyze the perceptions of teaching academic staff on the LMS.

In the original TAM, actual use was the last endogenous variable to be tested. However, the researcher expounded this study by adding reuse intention as the endogenous variable. Reuse intention represents the extent to which the potential user will attempt to use the application, even in the New Normal.

2.2   Literature Review

Learning Management System (LMS) is one of the most critical web-based innovations supporting blended learning. Universities spend a lot of resources to implement a learning management system for e-learning. Higher education institutions adopt digital transformation since it provides opportunities to positively apply technologies optimally (Kopp et al., 2019). Usage of a software platform increased among frequent users but did not affect infrequent users (Dutta et al., 2013). Thus, institutions use LMS to complement traditional face-to-face teaching or support distance learning. However, before the COVID-19 pandemic, the use of LMS in universities was optional, making it a significant concern of the administration since many resources were invested in establishing an effective and efficient LMS. The new context of learning introduced by the pandemic (which they call today the "new normal") has prompted higher institutions' administration to oblige their academic teaching staff to maximize the use of the LMS.

In TAM, perceived ease of use and usefulness were the two most important determinants of technology adoption (Chen et al., 2010). Perceive ease of use affects usefulness; if one

feels that it is easy to use, they will find the system useful and be ready to use it. Several empirical studies confirm the causal relationship that exists between these two variables.

Perceived Ease of Use (PEOU)

Perceived ease of use is "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989). It was correlated to how easy it is to access a technology system and its display (Tahar et al., 2020). PEOU was proven to significantly affect the perceived usefulness of higher education students in Busan, Korea (Kim et al., 2021) and has a significant positive effect on video usage (Nagy, 2018). It also affects attitudes toward technology use (Grimaldo & Uy, 2020). In addition, it has a direct influence on users' attitudes and subjective norms toward learning management systems (Kim et al., 2021). The use of e-filing of taxes in Indonesia was significantly affected by the perceived ease of use of the electronic SPT Service Provider (Tahar et al., 2020).

On the contrary, PEOU did not affect the perceived usefulness of technology in the recruitment of job applicants due to the failure to see the benefit to be derived from its use (Grimaldo & Uy, 2020), and it had a negative and significant influence on their intention (Ngabiyanto, 2021). With the results presented in these studies, the following hypotheses are extracted:

H1:   Perceived ease of use affects the perceived usefulness of the LMS.

H2:   Perceived ease of use of the LMS affects the attitude of the teaching personnel.

H4:   Perceived ease of use of the LMS affects its actual usage by the teaching personnel.

Perceived Usefulness (PU)

Perceived usefulness refers to the degree to which a potential user believes using the technology would enhance their job performance (Jones & Kauppi, 2018; Redzuan et al., 2016 as cited in Yap & Ng, 2019). Nagy (2018) confirmed that PU has a direct positive effect on attitudes toward using online videos uploaded on Moodle. It positively influences attitudes toward LMS (Kim et al., 2021) and has a significant positive influence on attitudes toward sustainability labels on apparel products (Ma et al., 2017).

PU is the most important predictor of the intention to use a system (Handoko, 2019). In a boarding school in Indonesia, PU positively and significantly impacted their intention to use online learning (Ngabiyanto, 2021). Similarly, perceived usefulness and satisfaction have positive effects on the intention to adopt and use mobile LMS (Joo et al., 2016, as cited in Mtani & Mbelwa, 2022). In this light, the following is hypothesized:

H3:   Perceived usefulness of the LMS affects the attitude of the teaching personnel.

H5:   Perceived usefulness of the LMS affects its actual usage by the teaching personnel.

Attitude Toward Using (ATU)

Attitude toward using is a potential user's positive or negative feeling associated with performing a specific behavior (Davis, 1989). The elements of a person's attitude consist of cognitive/perspective (cognitive), affective (affective), and components related to behavior (behavioral components) (Islami et al., 2021). In a Saudi Arabian university, faculty members developed a positive attitude towards using technology in teaching if they perceived the LMS as easy to use (Alharbi & Drew, 2014, as cited in Mtani & Mbelwa, 2022). Moreover, the attitude was positively influenced by PU and PEOU in the online tutoring application for high school students in Indonesia (Islami et al., 2021). Attitude

significantly affects the intention of job recruiters and applicants to use e-recruitment tools (Grimaldo et al., 2020). With the foregoing results yielded in these studies, the following hypothesis is formulated:

H6: Attitude towards LMS affects the actual usage by the teaching personnel.

Actual Usage (AU)

Actual usage refers to how a potential user has experienced using the application. Among accountants in micro and small enterprises in China, the actual use of a computerized accounting system has a significant relationship with perceived ease of use and usefulness (Lanlan et al., 2019). Additionally, PEOU, PU, and attitude significantly affect the actual usage of an online tutoring application for high school students (Islami et al., 2021). It was also confirmed that perceived usefulness positively influences the usage of E-learning systems in higher education institutions (Budu et al., 2018). Similarly, the attitude was proven to mediate between PEOU and PU on actual usage (Islami et al., 2021).

Contrariwise, Cabauatan et al. (2021) established that using technology in teaching-learning entails additional time to prepare course materials. Thus, although well-equipped, faculty members are not keen on using technology for blended learning. With the differing results from this study, the following hypothesis is stated:

H7: Actual usage of the LMS affects the intention to reuse the system.

Reuse Intention

Reuse intention of LMS in online learning refers to users' preference to utilize the technology influenced by an individual's subjective condition and behavior (Kim & Park, 2019). Reuse intention was also denoted when users developed confidence in the system and used it repeatedly to the point that they recommended it to their friends and other people (Choi & Sun, 2016). However, by taking into account their current circumstances, Ladkoom and Thanasopon (2020) defined it as something coordinated to personal decisions to reuse from a similar organization constantly.

2.3   Conceptual Framework

Figure 1: *Hypothesized Model*
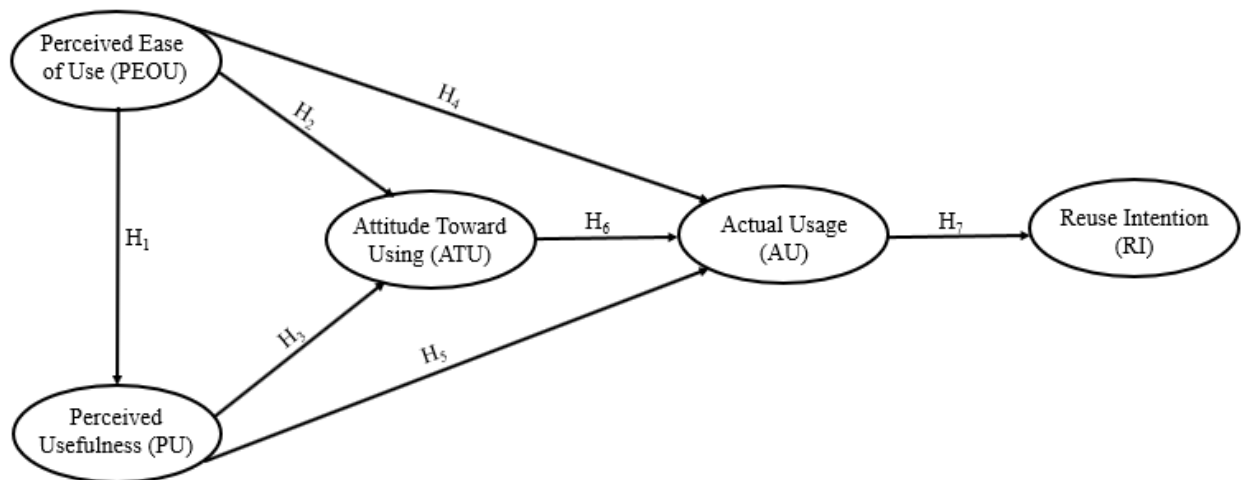
The conceptual framework shows the factors that influence the actual usage of LMS, which leads to its reuse intention in online teaching. The identified factors are perceived ease of use, usefulness, and attitude. It also shows the mediating effect of attitude on perceived ease of use and perceived usefulness on actual usage.

3. METHODS

3.1   Research Design

The researcher utilized a quantitative method using a descriptive-correlational analysis. Descriptive analysis reveals the demographic characteristics of the respondents. It shows the respondent's perception of the LMS factors, their attitude toward using LMS, and its actual usage or adoption. Similarly, the descriptive method reveals the reuse intention of the respondents regarding the LMS. Moreover, correlational analysis was employed to test the cause-and-effect relationship between the study's exogenous and endogenous variables.

3.2   Subjects and Study Site

The researcher requested the faculty members from two universities in Manila who were teaching using the LMS of their universities during the COVID-19 pandemic to be the participants in the study. These two universities have an existing LMS, either in-house developed or licensed, even before the pandemic.

Quota sampling was used to guarantee that enough respondents would represent the two universities. Using the Cochran Formula, with a 5% margin of error and 95% confidence level, the researcher targeted 351 respondents for the study. However, due to the limitations posed by COVID-19 quarantine restrictions, the researchers obtained only 270 participants.

Table 1: *Demographic Characteristics of the Respondents (n = 270)*

Demographic	Category	F	%
Sex	Female	142	52.6
	Male	121	44.8
	Prefer not to say	7	2.6
Age	26 and below	65	24.1
	27 – 41	95	35.2
	42 – 56	78	28.9
	57 and above	32	11.9
Educational Attainment	Bachelor's Degree	60	22.2
	With Master's units	43	15.9
	Master's Degree	81	30.0
	With Doctorate Units	41	15.2
	Doctorate Degree	45	16.7
No. of Years of using LMS	Less than 3 years	163	60.4
	More than 3 years	107	39.6
Device Used for Teaching	Desktop	97	35.9
	Laptop	270	100.0
	Smartphone	156	57.8

	Tablet	51	18.9
Video conferencing platform used for synchronous class	Google Meet	172	63.7
	MS Teams	41	15.2
	Zoom	145	53.7
Internet Provider at home	Converge	60	22.2
	Globe	34	12.6
	PLDT	134	49.6
	Smart	3	1.1
	SKY Broadband	15	5.6
	Others	24	8.9
Rank of the Video Conferencing Tool based on Efficiency in Synchronous Class	GM	96	35.6
	MS	47	17.4
	Zoom	127	47.0

From Table 1, 52.6% of the respondents are female, between 27 to 41 years of age (35.2%), and with master's degrees (30%). Similarly, the Table showed that respondents have been using LMS for less than 3 years (60.4%) and that although 100% of them were using a laptop for their online teaching, some were also using their smartphones (57.8%) and desktops (35.9%). In addition, respondents preferred Google Meet (63.7%) as the video conferencing platform for their synchronous classes; however, they considered Zoom (47%) the most efficient tool among the video conferencing platforms.

3.3   Instrumentation

The study utilized a researcher-developed questionnaire where every variable was adequately represented and supported by the literature. This study measured the following constructs: perceived ease of use (13 items), perceived usefulness (9 items), attitude (9 items), actual use (8 items), and reuse intention (9 items) of the LMS. The questionnaire was subjected to face and content validity by 2 experts and 2 faculty members to examine and evaluate the survey questionnaire. The researcher implemented the necessary instrument modification based on the validators' recommendation before pilot testing. Cronbach Alpha coefficients of 0.911, 0.952, 0.953, 0.925, and 0.923 for perceived ease of use, perceived usefulness, attitude, actual use, and reuse intention of the LMS were obtained in the pilot testing of the instrument.

3.4   Data Gathering Procedure

The questionnaire was uploaded through Google form, and the link was sent through the group chat of the faculty members of the two universities through Snowball. Snowball or referral sampling technique is used since the researcher also requested assistance from the participants to share the link with their friends who were qualified respondents to ensure that the required sample size was achieved.

3.5   Ethical Considerations

The researcher observed ethical practices in conducting research. In addition to the main disclaimer, the researcher incorporated a privacy statement to guarantee that all pertinent data was only utilized for the stated purpose. No personal data, such as name, was gathered. Before downloading the data set, codes were assigned, and the email addresses were deleted. A questionnaire cover letter was also included to explain the extent of the research study and ensure that the participants of the study understood why those questions were asked.

3.6   Data analysis

Data were organized, summarized, and analyzed using descriptive and inferential statistics. Descriptive statistics such as frequency and percentage were used to present the respondent's characteristics. Whereas mean and standard deviation were used to describe the respondent's perception of the factors of the LMS, their attitude toward using LMS, and the actual usage or adoption of LMS. Inferential statistics were utilized to determine the effect of the different factors on attitude, actual usage of technology in teaching, and the intention to reuse in the succeeding school years.

Specifically, Partial Least Square-Structural Equation Modelling (PLS-SEM) was used to test the hypotheses, particularly helpful with limited participants (Knock, 2017). It evaluates case values for the latent variables as part of the method (Hair et al., 2011). Similarly, multigroup analysis was employed to compare the perceptions of those who used the LMS for less than 3 years and those who used it for at least 3 years.

4. RESULTS

Respondents' Perception of Factors of LMS

From Table 2, respondents, in general, agreed that LMS has ease of use (Mean=5.03, SD=.893) and usefulness (Mean=5.09, SD=.903) for their online teaching. Among the 13 indicators of perceived ease of use, respondents gave the highest rating on the following indicators: "using LMS, it is easy for them to remember how to perform tasks" (Mean=5.18, SD=.826), "I find LMS user-friendly" (Mean=5.17, SD=.844), and "my interaction with LMS is clear and understandable" (Mean=5.16, SD=.808).

Results also showed the top three indicators of perceived usefulness: "LMS makes it easier for me to carry out teaching tasks" (Mean=5.22, SD=.791), "Using LMS enables me to accomplish tasks more quickly." (Mean=5.18, SD=.844), and "LMS made it easy to organize the course resources anytime, anywhere" (Mean=5.16, SD=.889).

Table 2: *Respondent's perception of the factors of Learning Management System (LMS)*

Factors of LMS	Mean	SD
Perceived Ease of Use	**5.03**	**.893**
1. I find it easy to get LMS to do what I want to do.	5.06	.831
2. LMS features are flexible to use.	5.11	.813
3. Using LMS, it is easy for me to remember how to perform tasks.	5.18	.826
4. Interacting with LMS requires minimal effort.	4.90	.913
5. My interaction with LMS is clear and understandable.	5.16	.808
6. I feel that it takes minimal effort to become skillful at using LMS.	5.01	.892
7. I find LMS user-friendly.	5.17	.844
8. I find it easy to track the students' progress using LMS.	5.06	.940
9. It is easy to become skillful at using LMS features in creating different types of assessments.	4.93	.942
10. I find it easy to become skillful in using LMS to monitor my students' progress.	5.03	.891
11. LMS makes me feel that the interface design and information deliveries are easy to understand	5.04	.916
12. I feel the LMS is easy to handle when I encounter a problem	4.66	1.039

	Mean	SD
13. I find giving feedback to my students; tasks easy using the features of LMS.	5.03	.948
Perceived Usefulness	**5.09**	**.903**
1. LMS makes it easier for me to carry out teaching tasks.	5.22	0.791
2. The features in LMS help me to be an efficient teacher.	5.13	0.893
3. LMS improves the quality of my teaching delivery.	5.06	0.873
4. Using LMS enables me to accomplish tasks more quickly.	5.18	0.844
5. Using LMS gives me greater control over my work.	5.07	0.902
6. The built-in analytics of LMS help me to monitor students' performance efficiently.	5.13	0.896
7. The features of LMS allow me to ensure the integrity of the assessment of students' performance.	4.89	1.063
8. LMS allows me to provide engaging activities to students.	4.94	0.975
9. LMS made it easy to organize the course resources anytime, anywhere.	5.16	0.889

*5.17-6.00– Strongly Agree; 4.33-5.16-Agree; 3.50-4.32-Slightly Agree; 2.67-3.49-Slightly Diagree;1,83-2.66-Disagree; 1.0-1.82-Strongly Disagree

Respondents' Attitude and Usage of the LMS

Table 3: *Respondent's attitude and actual usage of Learning Management System (LMS)*

Construct	Mean	SD
Attitude Toward Using LMS	**5.03**	**.893**
1. I prefer to give tasks and assessments using LMS.	5.15	.960
2. I see LMS as a tool to enrich my instructional content.	5.17	.865
3. I think it is worthwhile to use LMS.	5.25	.851
4. I like using LMS.	5.21	.889
5. The use of LMS improves my teaching practice.	5.11	.875
6. The use of LMS makes the teaching practice effective.	5.08	.917
7. Using LMS increases my job productivity.	5.11	.885
8. Using LMS improves my job performance.	5.06	.877
9. I can apply my creativity in giving assessments and tasks using LMS.	4.99	.996
Actual Usage	**5.29**	**.775**
1. I use the Discussion Board of LMS to let my students collaborate with the class.	5.22	.791
2. I use LMS features for individual and/or group submission of requirements of my students.	5.13	.893
3. I use LMS to assess my students.	5.06	.873
4. I use the Announcement functions to remind my students of upcoming activities.	5.18	.844
5. I use the functions and tools of LMS as often as possible.	5.07	.902
6. I use LMS to ensure that learning materials will be accessible to my students.	5.13	.896
7. I use LMS for my online teaching.	4.89	1.063
8. I adjust to changes in the LMS.	4.94	.975

*5.17-6.00– Strongly Agree; 4.33-5.16-Agree; 3.50-4.32-Slightly Agree; 2.67-3.49-Slightly Diagree;1,83-2.66-Disagree; 1.0-1.82-Strongly Disagree

Table 3 shows the respondents' attitudes toward LMS and its actual usage. Results revealed that among the nine indicators of attitude, respondents strongly agreed that "I think it is worthwhile to use LMS" (Mean=5.25, SD=.851), "I like using LMS" (Mean=5.21, SD=.889), and "I see LMS as a tool to enrich my instructional content" (Mean=5.17, SD=.865).

In terms of respondent's actual usage or adoption of LMS, among the eight indicators, the top three indicators are as follows: "I use the Discussion Board of LMS to let their students collaborate with the class" (Mean=5.22, SD=.791), "I use the Announcement functions to remind their students of the upcoming activities." (Mean=5.18, SD=.844), and "I use LMS features for individual and/or group submission of requirements of their students" (Mean=5.13, SD=.893).

Respondents' Reuse Intention of the LMS

Table 4: *Respondent's reuse intention of Learning Management System (LMS)*

Reuse Intention	Mean	SD
1. I will continue using LMS for my students' activities, e.g., examinations, discussions, and requirements submissions.	5.42	.766
2. I will continue to use LMS for my online teaching.	5.51	.694
3. I will continue to use the functions and tools of LMS to assist my academic activities.	5.49	.688
4. I will still use LMS even when face-to-face classes are resumed.	5.31	.903
5. I will continue to use the functions and tools of LMS as often as possible.	5.37	.784
6. I will encourage my colleagues to use LMS.	5.30	.859
7. I am willing to adjust to changes in the LMS.	5.38	.750
8. I understand the LMS may have downtime, but I will still use it.	5.30	.792
9. I will encourage my students to use the LMS for course requirements.	5.39	.733
Overall	5.39	.774

*5.17-6.00– Strongly Agree; 4.33-5.16-Agree; 3.50-4.32-Slightly Agree; 2.67-3.49-Slightly Diagree;1,83-2.66-Disagree; 1.0-1.82-Strongly Disagree

Table 4 shows the respondents' reuse intention of LMS. Results revealed that respondents generally agreed that they would continue to use the LMS (Mean=5.39, SD=.774). The respondents rated the following indicators very high: "I will continue to use LMS for my online teaching" (Mean=5.51, SD=.694), "I will continue to use the functions and tools of LMS to assist my academic activities" (Mean=5.49, SD=.688), and "I will continue to use LMS for my students' activities, e.g., examinations, discussions, submissions of requirements." (Mean=5.42, SD=.766).

Evaluation of the Measurement Model and Structural Model

Confirmatory Factor Analysis was used to validate the convergent validity, construct reliability, and discriminant validity of the measurement model.

Table 5: *Latent Variable Coefficients*

Construct	Items	Factor Loading	Cronbach's Alpha	Composite reliability	Ave. Variance Extracted
Perceived Ease of Use	PEOU 1-13	.752- .852	0.959	0.964	0.942
Perceived Usefulness	PU 1-9	.794-.880	0.951	0.959	0.933
Attitude	Attitude 1-9	.767-.925	0.965	0.970	0.941
Actual Usage	Act Usage 1-8	.705-.854	0.883	0.909	0.934
Reuse Intention	Reuse Intention 1 -9	.832-.908	0.961	0.966	0.928

Table 5 showed that the range of Cronbach's alpha reliability coefficients was between .883 to .970, and the composite reliability coefficients were all higher than 0.80, indicating

that the set of constructs has good reliability and internal consistency (Fornell & Larcker, 1981).

Additionally, the factor loadings of the indicators of the constructs were higher than the threshold value of .70, which implies that the latent variables have a good convergent validity (Hair et al., 2011). Similarly, the average variance extracted from the latent variable range from .928 to .942 was higher than the threshold value of .50, indicating that the construct has acceptable validity (Hair et al., 2011).

Table 6: *Square Roots of AVE Coefficients and Correlation Coefficients*

Latent Variables	Perceived Ease of Use	Perceived Usefulness	Attitude	Actual Usage	Reuse Intention
Perceived Ease of Use	**0.888**				
Perceived Usefulness	0.819	**0.870**			
Attitude	0.834	0.849	**0.885**		
Actual Usage	0.674	0.701	0.781	**0.873**	
Reuse Intention	0.798	0.841	0.829	0.815	**0.861**

Diagonal values are the square roots of AVE, and off-diagonals are inter-construct squared correlations

Table 6 shows the latent variable with square roots of AVE coefficients to measure the discriminant validity of the instrument. For each variable, the square root of the AVEs (main diagonal elements) was greater than any of the correlations involving the said variable (off-diagonal elements); hence, the latent variables have acceptable discriminant validity (Fornell & Larcker, 1981).

Structural Model and Hypotheses

Table 7: *Model Fit Indices of the Emerging Model*

Measure	Estimate	Threshold	Interpretation
Average Path Coefficient (APC)	0.480, p <.001	p < .05	Acceptable
Average R-squared (ARS)	0.694, p <.001	p < .05	Acceptable
Average Adjusted R-squared (AARS)	0.691, p <.001	p < .05	Acceptable
Average block VIF (AVIF)	4.117	≤ 5.0	Acceptable
Average Full Collinearity VIF (AFVIF)	4.113	≤ 5.0	Acceptable
Tenenhaus Goodness of Fit (GoF)	0.696	$\geq .36$	Large

Table 7 shows the overall model fit measures of the proposed model. By and large, the primary evaluation criteria for the structural model are the level of significance (the p-value) of the Average Path Coefficients (APC), Average R- squared (ARS), and Average Adjusted R-squared (AARS). Notably, the Average Path Coefficient (APC = .480, p < .001), Average R-squared (ARS = .694 p < .001), and Average Adjusted R-squared (AARS = .691, p < .001), are better than the acceptable range (p < .05). This signifies that the emerging model has a good fit.

Emerging Structural Equation Model

Figure 2: *The emerging model*
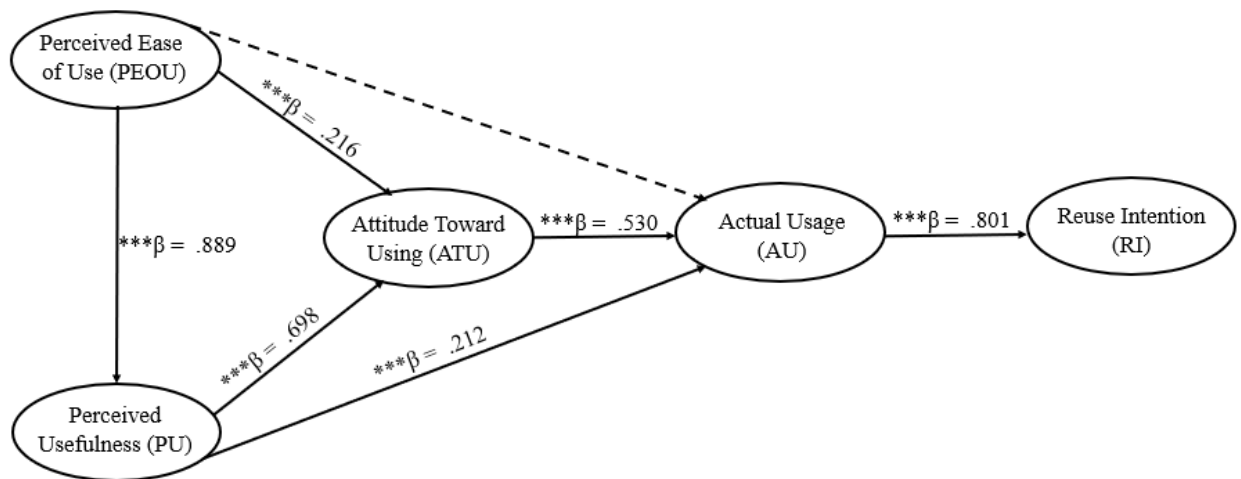
Note: *** significant at <0.001; --► insignificant

Table 8: *Result of the Hypothesis Testing*

Relationship		Path Coefficient (β)	P - values	Effect Sizes (f²)	Effect Size Interpretation (Cohen, 1988)**	Description	Decision
Exogeneous Variable	Endogenous Variable						
PEOU →	PU	0.889	< 0.001	0.790	Large	Significant	H1 is supported
PEOU →	ATU	0.216	< 0.001	0.181	Medium	Significant	H2 is supported
PU →	ATU	0.698	< 0.001	0.622	Large	Significant	H3 is supported
PEOU →	AU	0.013	0.413	0.009	NA	Not Significant	H4 is not supported
PU →	AU	0.212	< 0.001	0.146	Small	Significant	H5 is supported
ATU →	AU	0.530	< 0.001	0.385	Large	Significant	H6 is supported
AU →	RU	0.801	< 0.001	0.642	Large	Significant	H7 is supported

**0.02 – small, 0.15 – medium, 0.35 - large

Table 8 illustrates the path analysis with 1 segment. Results revealed that PEOU has a positive significant effect on PU (β = .889, f^2 = .790, p < 0.001), and ATU (β = .216, f^2 = .181, p < 0.001) of the faculty members, indicating that if faculty members improve their perception of ease of use, their perceived usefulness and attitude toward using LMS will be enhanced. However, PEOU was insignificant in influencing actual LMS usage (f^2 = 0.009). Thus, hypotheses 1 and 2 were supported but not hypothesis 4.

Based on the results, perceived usefulness has a positive significant effect on attitude towards using LMS (β = 0.698, f^2 = .622, p < 0.001) and actual usage (β = 0.212, f^2 = .146, p < 0.001) of LMS. However, results also revealed that the respondent's perceived usefulness has a small effect on actual usage (f^2 =0.146). Thus, H3 and H5 were supported.

From the same table, attitude towards using LMS has a positive significant effect on actual usage (β = 0.530, f^2 = .385, p < 0.001) of LMS. This indicates that if the attitude toward using LMS improves, the extent of the respondent's adoption or actual usage of the LMS may increase. Hence, H6 was supported.

Actual usage has a positive significant effect on reuse intention (β = 0.801, f^2 = .642, p < 0.001) of the respondents. Hence, H7 was supported.

Comparative Study of the Effect of Variables based on year of LMS usage

Table 9: *Summary of Comparative Analysis by Years of Usage*

Relationship			Path Coefficient					
Exogeneous Variable		Endogenous Variable	Less than 3 years (n=131)	3 years and more (n=106)	Abs Path Coefficient Difference	Confidence Intervals		p-value	Interpretation
PEOU	→	PU	0.905	0.852	0.052	-0.153	0.257	0.618	Not Supported
PEOU	→	ATU	0.218	0.274	0.056	-0.184	0.296	0.647	Not Supported
PU	→	ATU	0.702	0.655	0.047	-0.169	0.262	0.671	Not Supported
PEOU	→	AU	0.104	0.080	0.184	-0.066	0.433	0.149	Not Supported
PU	→	AU	0.027	0.322	0.294*	0.049	0.539	0.019	Supported
AT	→	AU	0.628	0.546	0.082	-0.138	0.302	0.467	Not Supported
AU	→	RU	0.806	0.787	0.019	-0.190	0.229	0.855	Not Supported

A multi-group analysis was done on the data according to the number of years of LMS usage. Table 9 shows that no significant differences exist between respondents with less than 3 years and those with 3 years or more usage of LMS in terms of the influence of perceived ease of use on usefulness ($\beta_{<3}$= 0.905, $\beta_{\geq3}$ = 0.852, CI = -.153, .257, p = 0.618), on attitude towards using ($\beta_{<3}$= 0.218, $\beta_{\geq3}$ = 0.274, CI = -.184, .296, p = 0.647), and on actual usage ($\beta_{<3}$ = 0.104, $\beta_{\geq3}$ = 0.080, CI = -.066, .433, p = 0.149). Similarly, results revealed that there is no significant difference between the two groups of respondents in terms of the influence of perceived usefulness on attitude towards using LMS ($\beta_{<3}$= 0.702, $\beta_{\geq3}$ = 0.655, CI = -.169, .262, p = 0.671).

However, there is a significant difference in the influence of perceived usefulness on actual usage of LMS ($\beta_{<3}$= 0.027, $\beta_{\geq3}$ = 0.322, CI = .049, .5392, p = 0.019) for the two groups of respondents.

5. DISCUSSION

Following the launch of emergency remote teaching in response to the COVID-19 pandemic, an ongoing evaluation persists concerning faculty members' inclination toward reusing Learning Management Systems (LMS). This study concentrated on elucidating the antecedents underlying the reuse intention of LMS among faculty members within two universities in the Philippines, employing the Technology Acceptance Model (TAM) as a foundational framework.

The study outcomes provide nuanced insights into the relationships between various factors shaping faculty members' engagement with LMS. Supported by the work of Kim et al. (2021), the first hypothesis found empirical validation. Specifically, the study established that perceived ease of use holds a significant influence over the perceived usefulness of LMS, highlighting the crucial role of user-friendly experiences in augmenting perceived utility.

However, the second hypothesis encountered empirical non-confirmation. In contrast to the findings of Grimaldo and Uy (2020), the research did not identify a substantial relationship between perceived ease of use and the attitude of teaching personnel. This implies that faculty members' perception of LMS ease of use might not intrinsically shape their attitude towards its adoption. This notable divergence underscores the intricate interplay of variables influencing technology acceptance.

Conversely, in harmony with the conclusions of Grimaldo and Uy (2020) and Nagy (2018), the study did validate the linkage between perceived usefulness and attitude. The results underscored that an augmentation in the perceived usefulness of LMS positively influenced the attitude of teaching personnel. This aligns with the notion that when educators perceive LMS as a valuable tool, their attitude towards it becomes more favorable, potentially catalyzing adoption and actual usage.

Building on the foundational understanding established by Nagy (2018) and Budu et al. (2018), the research confirmed the salient connection between perceived usefulness and actual usage of LMS. This alignment implies that an escalation in the perceived usefulness of LMS correlates with a heightened likelihood of adoption and actual utilization among faculty members.

Furthermore, as posited by Nagy (2018) and supported by Kim et al. (2021), the study illuminated a two-fold causal relationship: attitude influencing actual LMS usage, and actual usage impacting reuse intention. This suggests that by nurturing a positive attitude towards LMS, the propensity for faculty members' adoption and actual usage of the system could increase. Subsequently, as the actual usage of LMS amplifies, so does the inclination to reuse the system—an intricate synergy echoing the cyclical nature of technology adoption.

Delving into the temporal dimension through multigroup analysis, the research unveiled a notable nuance. Specifically, the influence of perceived usefulness on actual LMS usage was found to be more potent among respondents with 3 years or more of LMS usage. This temporal insight suggests that extended exposure to the LMS catalyzes a deepened recognition of its utility, subsequently fostering heightened actual engagement.

6. CONCLUSION

The policy implications drawn from the findings of this research hold substantial potential to contribute to the enhancement of educational practices and the effective utilization of Learning Management Systems (LMS) within the realm of online teaching. To fortify the applicability of the findings to actual policy practices, it is imperative to elaborate on specific scenarios where these insights can be directly applied. Real-world examples help bridge the gap between theoretical findings and actionable policies.

Considering the study's outcomes, several policy recommendations emerge that can be integrated into educational institutions' practices, particularly within the context of the Philippines and potentially beyond:

(1) Tailored Faculty Training Programs: Recognizing the critical role of perceived ease of use and perceived usefulness in influencing faculty members' attitudes and subsequent LMS adoption, educational institutions can implement targeted training programs. These programs should aim to familiarize faculty members with LMS functionalities, emphasizing hands-on experiences that showcase the practical advantages of the platform. For instance, workshops could showcase how LMS can streamline course materials distribution, communication, and assessment processes.

(2) Long-Term LMS Engagement Incentives: Given the correlation between prolonged LMS usage and increased perceived usefulness, institutions could implement incentive structures to reward faculty members who consistently engage with the LMS. This could involve acknowledging and rewarding academic staff who actively

incorporate LMS features into their teaching methodologies over an extended period. For instance, institutions could recognize and celebrate faculty members who demonstrate innovative use of LMS tools to enhance student engagement and learning outcomes.

(3) Guidelines for Pedagogical Integration: Policy frameworks could be developed to provide educators with clear guidelines on effectively integrating LMS into pedagogical strategies. Actual examples of successful pedagogical integration, such as case studies where faculty members effectively blended online resources with traditional teaching methods, can inspire. These examples can be accompanied by practical recommendations on structuring online learning activities to complement in-person interactions.

(4) Support for Diverse Learning Styles: Building on the connection between attitude and actual LMS usage, institutions can formulate policies that encourage diverse approaches to LMS usage to accommodate varying teaching styles. By showcasing instances where educators with different teaching philosophies successfully leveraged LMS tools to cater to diverse learning preferences, policies can promote flexibility in instructional practices.

(5) User-Centric LMS Design: The study's findings emphasize the influence of attitude on actual LMS usage and reuse intention. Institutions can collaborate with LMS providers to ensure platforms are user-centric, intuitive, and aligned with educators' needs. Examples of LMS platforms that have been customized to meet specific educational requirements can illustrate how design choices impact user attitudes and engagement.

(6) Faculty Development on Data-Driven Decision-Making: Given the correlation between LMS usage length and perceived usefulness, institutions could focus on fostering a data-driven culture among educators. Policies can encourage workshops and training sessions demonstrating how educators can leverage LMS data analytics to make informed instructional decisions. For instance, showcasing instances where faculty members used LMS data to identify students' learning gaps and tailor interventions can highlight the practical benefits of data-driven teaching.

By incorporating these concrete examples into the policy implications section, the study's findings can be more effectively translated into actionable recommendations for educational institutions. These recommendations not only align with the study's outcomes but also resonate with the realities of educational settings, ultimately promoting more effective and efficient utilization of LMS in online teaching practices.

In the context of an evolving educational landscape, characterized by the growing reliance on LMS platforms, the study accentuates the imperative of investigating diverse variables. Policymakers can heed the study's call to consider not only academic achievements but also gender and age differences in technology adoption to ensure equitable e-learning efficacy.

Given the pivotal role of LMS in modern instructional delivery, policies can be designed to promote continuous advanced training for faculty members. This training should encompass not only the technical aspects of LMS usage but also practical implementation, management, and the sustainable enhancement of learning quality.

In essence, the research's findings extend far beyond the confines of academia, reaching into the domain of policy formulation and implementation. By anchoring policy recommendations in real-world examples, the study's implications are fortified, offering actionable insights that can significantly influence the effective integration of LMS in the contemporary educational landscape.

ACKNOWLEDGEMENT

REFERENCES

[1] Bao, W. (2020). COVID-19 and online teaching in higher education: A case study of Peking University. *Human Behavior and Emerging Technologies, 2*(2)*,* 113–115. DOI:10.1002/hbe2.191

[2] Bolsen, T, Evan, M., & McCaghren, F. (2016). A comparison of online and face-to-case approaches to teaching: Introduction to American Government. *A Journal of Political Science Education*, *12*(3), 1-15. DOI:10.1080/15512169.2015.1090905

[3] Bond, M., Marín, V. I., Dolch, C., Bedenlier, S., & Zawacki-Richter, O. (2018). Digital transformation in German higher education: Student and teacher perceptions and usage of digital media. *International Journal of Educational Technology in Higher Education*, *15*(1), 48. DOI :10.1186/s41239-018-0130-1

[4] Bozkurt A., & Sharma, R.C. (2020). Emergency remote teaching in a time of global crisis due to the CoranaVirus pandemic. *Asian Journal of Distance Education, 15*(1), 1- 6. https://doi.org/10.5281/zenodo.3778083

[5] Branch, R.M. & Dousay, T.A. (2015). *Survey of Instructional Design Models*. 5th Edition. Association for Educational Communications and Technology, Bloomington.

[6] Budu, K. W. A., Yinping, M., & Mireku, K. K. (2018). Investigating the effect of behavioral intention on E-learning systems usage: Empirical study on tertiary education institutions in Ghana. *Mediterranean Journal of Social Sciences*, *9*(3), 201–216. DOI:10.2478/mjss-2018-0062

[7] Cabauatan, R., Uy, C., Manalo, R., & de Castro, B. (2021). Factors affecting intention to use blended learning approach in the tertiary level: A quantitative approach. *Higher Education for the Future*, *8*(2), 239-255. DOI: 10.1177/23476311211011934 journals.sagepub.com/home/hef

[8] Chen, C. J., Huang, J. W., & Hsiao, Y. C. (2010). Knowledge management and innovativeness. *International Journal of Manpower*, *31*(8), 848–870. DOI:10.1108/01437721011088548

[9] Choi, Y., & Sun, L. (2016). Reuse intention of third-party online payments: A focus on the sustainable factors of Alipay. *Sustainability*, *8*(2), 147. DOI :/10.3390/su8020147

[10] Crawford, J.; Butler-Henderson, K.; Rudolph, J.; Malkawi, B.; Glowatz, M.; Burton, R.; Magni, P.A.; & Lam, S. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning and Teaching*, *3*(1), 9–28. DOI:10.37074/jalt.2020.3.1.7

[11] Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340. DOI:10.2307/249008

[12] Davis, F.D., Bagozzi, R.P., & Warshaw, P.R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, *35*(8), 982–1003. https://doi.org/10.1287/mnsc.35.8.982

[13] Dixit, B. & Chauhan, A. (2021). Importance of holistic education during COVID-19: Challenges and efforts. *Towards excellence*, *13*(4), 306-313. DOI: 10.37867/TE130430.

[14] Dutta, A., Roy, R.K., & Seetharaman, P. (2013). Course management system adoption and usage: A process theoretic perspective. *Computers in Human Behavior*, *29*(6), 2535–2545. DOI: 10.1016/j.chb.2013.06.010

[15] Fornell C., & Larcker, D. F. (1981). Evaluating structural equation models with unobserved variables and measurement error. *Journal of Marketing Research*, *18*(1), 39–50. DOI: 10.2307/3151312

[16] Grimaldo, J., & Uy, C. (2020). Factors affecting recruitment officers' intention to use online tools. *Review of Integrative Business and Economics Research, 9*(S1), 194-208.

[17] Grimaldo, J., Uy, C., & Manalo, R. (2020). Utilization of e-recruitment tools as perceived by recruiters and job applicants. *Luz y Saber*, *14*(1&2), 53-64.

[18] Hair, J. F., Ringle, C. M. & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice, 19*(2), 139 – 151. DOI:10.2753/MTP1069-6679190202

[19] Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *Educause Review Online*. https://er.educause.edu/articles/ 2020/3/the-difference-between-emergency-remote-teaching-and-online-learning

[20] Islami, M., Asdar, M., & Baumassepe, A. (2021). Analysis of perceived usefulness and ease of use to the actual system usage through attitude using online guidance application. *Hasanuddin Journal of Business Strategy, 3*(1), 52-64. DOI:10.26487/hjbs.v3i1.410

[21] Jones, A., & Kauppi, K. (2018). Examining the antecedents of the Technology Acceptance Model within e-procurement. *International Journal of Operations & Production Management*, *38*(1), 22-42. DOI: 10.1108/IJOPM-06-20(19)15-0346

[22] Kim, JH. & Park, JW. (2019). The effect of airport self-service characteristics on passengers' perceived value, satisfaction, and behavioral intention: Based on the SOR Model. *Sustainability, 11*(19), *5352*. DOI: 10.3390/su11195352

[23] Kim, E., Kim, J. & Han, S. (2021). Understanding student acceptance of Online Learning Systems in higher education: Application of social psychology theories with consideration of user innovativeness. *Sustainability, 13*(2), 896. DOI:10.3390/su13020896

[24] Knock, N. (2017). *WarpPLS user manual: Version 6.0*. ScriptWarp Systems: Laredo, TX, USA, 141.

[25] Kopp, M., Gröblinger, O., & Adams, S. (2019). Five common assumptions that prevent digital transformation at higher education institutions. *INTED2019 Proceedings* (pp. 1448–1457). DOI:10.21125/inted.2019

[26] Ladkoom, K. & Thanasopon, B. (2020). Factors influencing reuse intention of e-payment in Thailand: A case study of PromptPay. *Proceedings of the 22nd International Conference on Enterprise Systems*, 1, 743-750. DOI: 10.5220/0009410407430750

[27] Lanlan, Z., Ahmi, A., & Oluwatoyin, M. (2019). Perceived ease of use, perceived usefulness and the usage of computerized accounting systems: A performance of

micro and small enterprises in China. *International Journal of Recent Technology and Engineering, 8*(2S2), 324-331. DOI:10.35940/ijrte.B1056.0782S219

[28] Ma,Y., Gam, H., & Banning, J. (2017). Perceived ease of use and usefulness of sustainability labels on apparel products: Application of the technology acceptance model. *Fashion and Textiles*, *4*(3), 2-20. DOI:10.1186/s40691-017-0093-1

[29] Manfuso, L.G. (2020, April 15). How the remote learning pivot could shape Higher Ed IT. *EdTech Magazine*. https:// edtechmagazine.com/higher/article/2020/04/how-remote-learning-pivot-could-shape-higher-ed

[30] Moakofhi, M.K., Phiri, T.V., Leteane, O., & Bangomwa, E. (2019). Using Technology Acceptance Model to predict lecturers' acceptance of Moodle: Case of Botswana University of Agriculture and Natural Resources. *Literacy Information and Computer Education Journal, 10*(1), 3103- 3113. DOI:10.20533/licej.2040.2589.2019.0407

[31] Mtani, H, & Mbelwa, J. (2022). Factors affecting Learning Management Systems usage in higher learning institutions in Tanzania: A case of University of Dodoma. *International Journal of Education and Development using Information and Communication Technology, 18*(1), 7-26.

[32] Nagy, J.T. (2018). Evaluation of online video usage and learning satisfaction: An extension of the Technology Acceptance Model. *The International Review of Research in Open and Distributed Learning*, *19*(1), 160-185. DOI:10.19173/irrodl.v19i1.2886

[33] Ngabiyanto, Nurkhin, A., Widiyanto, N.A., Saputro, I.H., & Kholid, A.M. (2021). Teacher's intention to use online learning: An Extended Technology Acceptance Model (TAM). *Journal of Physics Conference Series*, *1783* (1) :012123. DOI: 10.1088/1742-6596/1783/1/012123

[34] Ribeiro, R. (2020, October 20). *How university faculty embraced the remote learning shift.* EdTech Magazine. https://edtechmagazine.com/higher/article/2020/04/how-university-faculty-embraced-remote-learning-shift

[35] Sandkuhl, K., & Lehmann, H. (2017). Digital transformation in higher education – the role of enterprise architectures and portals. *Digital Enterprise Computing* (DEC 2017).

[36] Sweetman, D.S. (2021). Making virtual learning engaging and interactive. *FASEB BioAdvances*, *3*(1), 11-19. DOI: 10.1096/fba.2020-00084

[37] Tahar, A., Riyadh H., Sofani, H., & Purnomo, W.E (2020). Perceived ease of use, perceived usefulness, perceived security, and intention to use e-filing: The role of technology readiness. *Journal of Asian Finance, Economics, and Business, 7*(9), 537-547. DOI:10.13106/jafeb.2020.Vol.7,.No 9, 537

[38] Vlachopoulos, D. (2020). COVID-19: Threat or opportunity for online education? *Higher Learning Research Communications, 10*(1), 16–19. DOI:10.18870/hirc.v10i1.1179

[39] Yap, C. M. & Ng, B.A. (2019). Factors influencing consumers' perceived usefulness of m-wallet in Klang Valley, Malaysia. *Review of Integrative Business and Economics Research*, *8*(S4), 1-23.