

Student Use of Learning Management Systems in the Private Sector of New Zealand Higher Education

Zarqa Shaheen, ICL Graduate Business School, New Zealand*

ABSTRACT

The purpose of this research project was to measure the effects of the perceptions that students hold of the functionality of LMS and students' self-efficacy specific to using LMS in their studies on student LMS acceptance and use. The theoretical framework of the study is based on the technology acceptance model (TAM) into which perceived functionality and LMS self-efficacy were incorporated as external variables. A web-based questionnaire was administered to students in a private higher education institution in Auckland, New Zealand. These responses were analyzed using Pearson's correlation and linear regression. The results indicated that perceived functionality significantly influenced perceived usefulness. Similarly, it was found that LMS self-efficacy significantly influenced perceived ease of use. However, no evidence was found that attitudes towards using LMS predicted behavioural intention to use.

KEYWORDS

Blended Learning, Higher Education, Learning Management System (LMS), New Zealand, Students

INTRODUCTION

The benefits of information and communication technologies (ICTs) have been widely recognized in today's world. The way in which higher education functions has changed significantly due to the utilization of ICTs. Majority of the students tend to learn in a blended environment, which features the integration of ICT components into traditional teaching and learning practices, and believe that learning under "such an environment is beneficial to their academic success" (Pomerantz et al., 2018, p. 4). Increasingly diverse student populations have also contributed to the use of blended learning as a method of course delivery in higher education. Today's students enrolled in higher education are not just secondary school graduates, it is more likely that they are mature students who have to work, those who have children to take care of, or those who are married or in a domestic partnership (Mitchell, 2019). So blended learning emerges as a trend in higher education to better meet individualized needs of diverse student populations (Poon, 2013). In addition, extensive research has shown that blended learning can improve teaching quality and learning outcomes in the field of higher education (Palmer & Holt, 2009; Watson & Watson, 2007; Weng et al., 2018). As a highly recognized ICT tool that supports blended learning, learning management systems (LMSs) have turned out to be an essential

DOI: 10.4018/IJWLTT.298625

*Corresponding Author

This article published as an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>) which permits unrestricted use, distribution, and production in any medium, provided the author of the original work and original publication source are properly credited.

component of both public and private higher education. In a survey conducted by Dahlstrom et al. (2014), 99% of higher education institutions deploy at least one LMS in the United State. Nowadays, LMSs have evolved into a convenient virtual platform widely implemented in higher education, which various functions and tools can be incorporated into in order to facilitate academic and operational functions of higher education institutions.

Compared with public institutions, private sector higher education providers were reported to be at an even greater disadvantage due to diverse student populations and competition for students led by declined student enrolments (Teixeira et al., 2017). It is, therefore, increasingly important for these private institutions to better utilize LMSs as a strategic tool to meet student needs in the processes of value creation and delivery. Unfortunately, the existence of these tools does not necessarily contribute to positive teaching and learning experiences. The underutilization of LMSs has been identified by a large number of higher education institutions as a phenomenon that exists among faculty members and student users (Pomerantz et al., 2018; Sinclair & Aho, 2018). LMS implementation is heavily influenced by the perceptions that these users hold about the LMS regarding its usefulness and ease of use, especially those of student users (Dahlstrom et al., 2014; Horvat et al., 2015; Muilenburg & Berge, 2005). Private higher education institutions may be able to achieve operational and academic benefits due to the successful utilization of LMSs among student users. So far, very little attention has been paid to the acceptance and use of LMSs among student users in the private higher education sector in New Zealand. There is a need for research that investigates the acceptance and use of LMSs from the perspective of student users.

BACKGROUND

LMSs have become an integral component of today's higher education since they were initially introduced in the late 1990s (Davis et al., 2009). However, increased use of LMSs has raised concern as to whether they are being used as an effective learning tool or merely as a repository for electronic documents among students (Adzharuddin & Ling, 2013; Carvalho et al., 2011). This has been established that not all LMS features are equally used by students (Fathema et al., 2015; Jaschik & Lederman, 2014). And many of the features found to be underused among students turn out to "have the potential to enhance student learning and engagement" (Dahlstrom et al., 2014, p. 4).

Higher education institutions of different types and sizes all benefit from taking a strategic view of the LMS. Existing research has recognized the critical role played by the LMS in enhancing the capability of higher education providers to deliver their value propositions created for students by providing engagement with, support for, and monitoring of students in a more efficient and effective way (Adzharuddin & Ling, 2013; Barua et al., 2018; Olson, 2021; Ustun et al., 2021). In addition, due to the consistency demonstrated between the educational and commercial functions fulfilled by these private institutions, the LMS not only serves as a channel used for connecting learners to their studies and institutions but also enables these education businesses to run efficiently (Valentine, 2011). The operational functions enabled by the LMS, such as keeping students informed of important information updated by the institutions, have endowed the system with an administrative role of connecting students and institutions, especially in private higher education providers of relatively smaller scale. Nowadays these institutions have realized the significance of implementing the LMS to facilitate their routine operations

The private provision of higher education, meanwhile, is under pressure to face significant changes, which include increased competition for students and declining student enrolments. In New Zealand, for example, the last few years have witnessed increased competition for international students between private sector and public sector institutions as well as among private providers themselves. According to statistics provided by the Ministry of Education in New Zealand (2018), the number of international students in New Zealand had dropped from 125,425 in the 2016 calendar year to 118,300 in the 2017 calendar year, which represents a fall of 5.7%. However, international students

enrolled in New Zealand universities during the 2017 calendar year increased by 7.4% compared with the previous year. Meanwhile, international student numbers at unfunded and funded private training establishments (PTEs) decreased by 13.6% and 2.5% respectively in the same year. According to the report, universities earned 41% of the total tuition fee revenue from international students, followed by PTEs with 24.5%. However, the international tuition fee revenue earned by PTEs dropped by 13.5% compared with the 2016 calendar year (Ministry of Education, 2018). In addition, this increased competition can be exacerbated by student demographic profiles, which have changed significantly over the last decade (Mitchell, 2019). In New Zealand, for example, the proportion of international students aged above 40 has increased to approximately 9%.

Private higher education is being affected in some way by these changes. At this stage, each private sector institution should rethink its value propositions created for and delivered to its students as customers and come up with a sustainable solution to achieve operational and educational efficiency. To make this work for the private sector of higher education, an enhanced focus should be given to the LMS, which has become an integral part of higher education in both public and private sectors (Pomerantz et al., 2018). In blended learning that the LMS aims to support, students are more likely to take responsibility for their own learning instead of being passive learners (Baragash & Al-Samarraie, 2018; Wang et al., 2009). However, the implementation of the LMS is heavily influenced by the perceptions that student users have about the LMS.

Student Perceptions of LMSs

Substantial differences exist in students' perception of technologies used to support their studies (Koroghlanian & Brinkerhoff, 2007; Muilenburg & Berge, 2005; Selim, 2007). And the varying attitudes that students hold towards using a particular system during the learning process can affect, to a large extent, the use and effectiveness of the system among students. The significance that students attach to the LMS characteristics varies in accordance with the amount of time they spend on using the LMS and students' perceived usefulness can positively influence their behavioural intention to use LMS (Horvat et al., 2015; Liaw, 2008 Ref). In addition to this, there also exist significant gender-related differences in the importance that students attach to LMS characteristics which have more significance in female than male students (Gonzalez-Gomez et al., 2012; Horvat et al., 2015). Moreover, older students perceive the quality characteristics of the LMS as more important whereas younger students are more likely to accept low quality characteristics. Conversely, Pomerantz et al. (2018) reported no significant difference in perceived usefulness of LMS features between older and younger students. It was found that students attach more importance to the course management functions provided by the LMS than the features that enable self-directed learning. This view is supported by Brown, Dehoney et al. (2015) who assert that LMSs have been "highly successful in enabling the administration of learning but less so in enabling learning itself" (p. 2). The factors that influence students' experience of using the LMS. They found that the factors that facilitate student LMS use include system quality, information quality and external support (Zanjani et al., 2013). In view of the extensive existence of LMSs in the field of higher education, they must be used in a way that effectively promotes student learning practices and experiences "while not being overly arduous for staff to manage" (Holmes & Prieto-Rodriguez, 2018, p 22). Understanding the factors that influence student perception of LMS can help academic administrators to promote student use of this technology (Adzharuddin & Ling, 2013).

Purpose of the Study

To investigate student users' perspectives of LMS use, a survey was conducted through questionnaire. By exploring the perceptions that students have about the use of an LMS in a private sector higher education institution, this study provided a better understanding of the effects of student perceptions about the LMS on the LMS implementation. This study also had implications for how the LMS facilitate the value creation and delivery processes in the private higher education sector.

METHODOLOGY

The problem of interest for this research project was to analyse students LMS acceptance and use in the private higher education sector. The research questions attempted to answer are as follows:

1. To what extent does student perceptions of functionality of LMSs influence the use and acceptance of these systems among students?
2. To what extent does students' LMS self-efficacy influence student LMS acceptance and use?

Theoretical Framework

This study followed a quantitative research design, using an extended TAM, in which LMS self-efficacy and perceived functionality were incorporated as external variables.

Technology Acceptance Model and LMSs

Proposed by Davis, the Technology Acceptance Model (TAM) has proved to be one of the most influential models used to predict and explain user behaviour towards ICTs. The TAM was originated based on the theory of reasoned action (TAR) proposed by Fishbein and Ajzen (1975), which provides an account of the relationship between attitudes and behaviours. Briefly stated, the TAR suggests that the best indicator of how individuals behave are their behavioural intention, which is determined by their attitudes and perceptions towards the expected outcomes produced by performing a particular behaviour (Silverman et al., 2016). The TAM incorporates two factors that determine the intention of individuals to use a particular information system: perceived usefulness and perceived ease of use.

And the TAM acts as a valid and practical theoretical framework, which represents consistency in the findings of numerous studies into potential factors that contribute to LMS use (Binyamin et al., 2019; Holden & Rada, 2011). Alharbi and Drew (2014) investigated academics' behavioural intention to use LMS. They tested the relationships among three core factors of the TAM, which are perceived usefulness, perceived ease of use and attitudes towards using. The collected data support the original findings of Davis (1989). Perceived usefulness and perceived ease of use proved to be effective determinants of faculty members' attitudes towards using the LMS. Academics who found the LMS easy to use were more likely to perceive the usefulness of the LMS and develop positive attitudes towards using it. Furthermore, it was found that job relevance, which refers to the extent to which academics believe that using the LMS for teaching is relevant to their job, has a positive correlation with perceived usefulness.

TAM with its core constructs was used to examine how students use the LMS (Majadlawi et al., 2014). External variables such as GPA, academic year, and faculty were incorporated into the theoretical framework. The results also confirmed Davis's (1989) original findings. However, it was found that GPA and academic year had no relationship with perceived ease of use while they had positive influence on perceived usefulness. Besides, faculty turned out to be an important factor that contribute to perceived usefulness and perceived ease of use. Claar et al. (2014) did a similar research to investigate student acceptance of the LMS. The researchers integrated the TAM with several factors listed in the Unified Theory of Acceptance and Use of Technology (UTAUT) such as age, gender, race and education level. However, this study found no positive correlation between behavioural intention to use and actual use. It was mandatory for students to use the LMS in the setting chosen for this investigation. Furthermore, it was found that only age and education level had positive correlations on perceived usefulness. Technology self-efficacy was found to be a determinant of perceived ease of use (Agarwal & Karahanna, 2000; Grandon et al., 2005). Student acceptance can be a major measure of LMS implementation success. Understanding how students come to accept the LMS is critical to implementing the LMS. However, little research has been conducted in New Zealand to empirically

investigate the factors that influence student LMS use, such as perceived usefulness, perceived ease of use, self-efficacy and so on.

The potential factors found to be influencing student perceptions of using LMSs include gender, age, information quality, system quality and external support. However, very little research has investigated the effects of various LMS functions on student perceptions of using LMSs. In addition, it has been demonstrated that student satisfaction with LMSs acts as a major contributing factor to student LMS acceptance and use (Delone & Mclean, 2003; Liaw, 2008). Even though it is found that functionality of LMSs contributes to student satisfaction, no previous study has investigated the influence of functionality of these system on student LMS acceptance and use. Moreover, the TAM has been proved to be a reliable theoretical framework for investigating the implementation of LMSs in the field of higher education. The effects of these two factors on student LMS acceptance and use were measured via a web-based survey. Based on the results of the survey, the causal relationships were tested in the extended TAM developed for this study, as represented by the following research hypotheses:

Hypothesis One: Perceived functionality has a significant positive influence on perceived usefulness.

Hypothesis Two: Perceived functionality has a significant positive influence on attitudes towards using.

Hypothesis Three: LMS self-efficacy has a significant positive influence on perceived ease of use.

Hypothesis Four: Perceived usefulness has a significant positive influence on attitudes towards using.

Hypothesis Five: Perceived usefulness has a significant positive influence on behavioural intention to use.

Hypothesis Six: Perceived ease of use has a significant positive influence on attitudes towards using.

Hypothesis Seven: Attitudes towards using has a significant positive influence on behavioural intention to use.

The statistical techniques employed for data analysis in this research project included descriptive, correlation and regression analyses.

Participants

The whole research project took place at the chosen PTE, which is situated in Auckland. The programmes provided by this institution range from diploma courses at level 5 to a Master's degree course at level 9 in accordance with the New Zealand Qualification Framework. There was a total of 73 students of the chosen institution who responded to the questionnaire. Potential participants were restricted to those who were accessible, available and willing to participate in this research project. The participants were also selected as they were studying courses of different levels. The sample selected purposively allowed to investigate students' perceptions of LMS use in a PTE, which is typical of local private higher education institutions.

Table 1 illustrates the demographic information of the participants. There were 27 males (37%) and 46 females (63%). The participants consisted of 36 students of level 9 programme, 10 students of level 8 programmes and 37 students of level 7 programmes. Of the participants, 46.6% of the participants has never used any LMS before studying at the chosen institution and 53.4% did have previous experience with an LMS.

Measurement Instrument

In this research project, a web-based survey was administered to investigate the acceptance and use of the LMS among students. The online survey was designed using Google Form. Items illustrated in Table 2 below were used to evaluate the constructs identified in the extended TAM including perceived usefulness, perceived ease of use, perceived functionality, LMS self-efficacy, attitudes

Table 1. Students' Demographics

Measure	Items	Percentage	No.
Gender	Male	37%	27
	Female	63%	46
Programme Level	Level7	39.7%	29
	Level8	13.7%	10
	Level9	46.6%	34
Previous LMS Experience	Yes	53.4%	39
	No	46.6%	34

Table 2. Measures of Constructs

Statements	Items	Construct/Variables
It is useful to use the Canvas in my studies.	PU1	Perceived Usefulness
Using the Canvas enhances my efficiency in my studies.	PU2	
Using the Canvas improves my performance in my studies.	PU3	
I find it easy to use the Canvas.	PEU1	Perceived Ease of Use
It does not require a lot of effort to interact with the Canvas.	PEU2	
The Canvas provides me enough flexibility and convenience in your studies.	AT1	Attitudes towards Using
It is a good idea to use the Canvas.	AT2	
I feel I have confidence in my ability to use the Canvas	SE1	LMS Self-Efficacy
I find it easy to become good at using the Canvas	SE2	
I feel satisfied with the features provided by the Canvas.	PF1	Perceived Functionality
I tend to use the Canvas to support my studies.	BI	Behavioural Intention to Use
I find the learning content and resources uploaded onto the Canvas effective.	IE	Information Effectiveness
I think how my lecturers use the Canvas influence my usage of the Canvas.	IL	Influence of Lecturers

towards using and behavioural intention to use. Most items in the questionnaire were assessed using a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree).

To ensure the validity of the questionnaire used in this research project, the items selected for inclusion in the questionnaire stemmed from the literature and were based on the key variables of the theoretical framework presented in the previous sections. To assure the reliability of the questionnaire, the questionnaire was administered to a small group of students and repeated the questionnaire with the same group at a later point in time. Two questions were asked to the group of students who participated in the pretesting: 1. Do the questions make sense to you? 2. Are they written clearly and understandably? The similar responses yielded at two points in time proved the reliability of this questionnaire.

Procedure

The questionnaires were administered to potential participants during a period of around three weeks. Potential participants could respond to the questionnaire by clicking on the link provided in

the announcement. First participants were presented with a consent page, of which purpose was to make sure that they clearly understood the conditions and terms for participation in the questionnaire. Participants were required to tick “agree” or “disagree” to participation. Participants were not required to put any personal information that could be used to trace and recognize them.

RESULTS

Reliability Analysis

In this research project, Cronbach’s alpha was calculated to assess the internal consistency of constructs evaluated by multiple items. As illustrated in Table 3, apart from perceived functionality and behavioural intention to use, each rest construct was measured through more than one item in the questionnaire. The Cronbach’s alpha coefficients calculated for these multi-item scales were all above 0.7, which indicated acceptable consistency of each measurement.

Hypothesis Testing

The research conducted a Pearson correlation analysis to test the relationships among the constructs. Table 4 represents the results of the correlation analysis. And significant positive correlations were observed among PU, PEU, PF, SE, AT and BI.

The collected data were also analysed using descriptive analysis and regression analysis. The average scores for two of the three items corresponding to perceived usefulness: PU1 and PU2 were higher than 4, which indicated that the participants agreed that it was useful to use the LMS and using the LMS could increase their efficiency as students. However, only 68.5% of the participants believed that using the LMS could increase their performance as students as illustrated in Table 5 (see Annexure 1). The last item related to perceived usefulness, PU3, received a mean value less than 4, which made it a possible domain for improvement. Both of the items for assessing perceived ease of use had mean values higher than 4, which demonstrated that the respondents believed that using the

Table 3. Reliability Analysis

Scale	Mean	Standard deviation	Cronbach’s alpha
Perceived Usefulness (PU)	4.100	.240	0.819
PU1	4.342	.731	
PU2	4.096	.690	
PU3	3.863	.732	
Perceived Ease of Use (PEU)	4.075	.029	0.771
PEU1	4.095	.710	
PEU2	4.054	.705	
LMS Self-Efficacy (SE)	4.116	.048	0.902
SE1	4.082	.702	
SE2	4.151	.701	
Attitudes towards Using (AT)	4.116	.242	0.760
AT1	3.945	.743	
AT2	4.288	.736	
Perceived Functionality (PF)	4.054	.815	
Behavioural Intention to Use (BI)	4.123	.725	

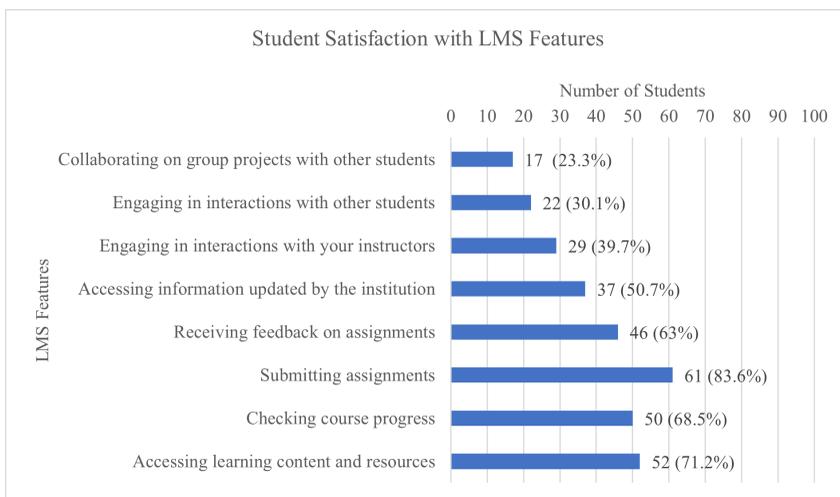
Table 4. Pearson Correlation Matrix

		PU	PEU	PF	SE	AT	BI
PU	r	—					
	p	—					
PEU	r	0.770	—				
	p	< .001	—	—			
PF	r	0.709	0.646	—			
	p	< .001	< .001	—			
SE	r	0.651	0.743	0.612	—		
	p	< .001	< .001	< .001	—		
AT	r	0.849	0.773	0.694	0.719	—	
	p	< .001	< .001	< .001	< .001	—	
BI	r	0.770	0.670	0.740	0.699	0.719	—
	p	< .001	< .001	< .001	< .001	< .001	—

LMS was free of effort. The most frequently observed category of both PEU1 and PEU2 was agree, which was 53.42% and 54.79% respectively as shown in Table 6 (see Annexure 1). As demonstrated in Table 7 (see Annexure 1), 82% of the participants reported that they either agreed or strongly agreed that they felt confident in their abilities to use the LMS and believed it was easy to become good at using the LMS. Although 76% of the respondents reported that they were either satisfied or very satisfied with the LMS features, as illustrated in Table 8 (see Annexure 1), the average student satisfaction level for the LMS features in general was below 4, which demonstrated that there existed some room for improvement in the LMS features provided for student users.

Figure 1 illustrates student satisfaction with several major functions provided by the LMS. The function that the highest proportion of students felt satisfied with was submitting assignments (83.6%) followed by accessing learning content and resources, of which satisfaction rating was 71.2%. The

Figure 1. Student Satisfaction with the Canvas Features



following three LMS features received the least satisfaction ratings: engaging in interactions with lecturers (39.7%), engaging interactions with other students (30.1%), and collaborating on group projects with other students (23.3%). Approximately 75% of the participants agreed or strongly agreed that the LMS could provide them with enough flexibility and convenience in their studies. And the majority (86%) believed that it was a good idea to use the LMS. Students who reported that they thought the learning content and resources uploaded onto the LMS was effective account for more than 80% of the participants.

A linear regression analysis was adopted to evaluate the relationship between PF and PU. The results of this linear regression model demonstrated that PF significantly predicted PU at $F(1,71) = 71.86, p < .001$ with an R-squared of 0.50, which indicated that approximately 50% of the variance in PU is explainable by PF. Table 5 summarizes the results of this regression model.

A linear regression analysis was employed to measure whether SE significantly predicted PEU. The results of this regression model demonstrate that the relationship between SE and PEU was significant at $F(1,71) = 87.54, p < .001$ with an R-squared of 0.55, which indicated that approximately 55% of the variance in PEU can be explained by SE. Table 6 summarizes the results of this regression model.

The results of this regression analysis indicated that there existed a significant relationship between SE and PEU at $F(1,71) = 87.54, p < .001, R^2 = 0.55$, indicating that approximately 55% of the variance in PEU is explainable by SE. The coefficient is 0.77, which means that a one-unit increase of SE will increase the value of PEU by 0.71 units. Table 7 summarizes the results of this regression model.

A linear regression analysis was conducted to address the influence of PU, PEU and PF on AT. The R-squared for this regression analysis was 0.76, which indicates that PU, PEU and PF had capability of explaining 76% of the variance in ATU. The p-values for PU and PEU were both below 0.05, which indicated that both PU and PEU significantly predict AT. As illustrated in Table 8, perceived usefulness had more influence on attitudes towards using than perceived ease of use. However, PF did not significantly predict AT.

The last regression model showed there existed no significant relationship between AT and BI at $B = 0.255, t(70) = 1.65$ with $p = 0.103$, which indicated that AT did not significantly predict BI.

Table 5. Coefficients of perceived functionality (PF)

Model	Unstandardized Coefficients		Standardized Coefficients	t	p
	B	Std. Error	Beta		
(Intercept)	1.928	0.261		7.379	< .001
PF	0.536	0.063	0.709	8.477	< .001
Dependent variable: PU					

Table 6. Coefficients of LMS self-efficacy (SE)

Model	Unstandardized Coefficients		Standardized Coefficients	t	p
	B	Std. Error	Beta		
(Intercept)	1.158	0.316		3.668	< .001
SE	0.709	0.076	0.743	9.356	< .001
Dependent variable: PEU					

Table 7. Coefficients of Perceived Ease of Use (PEU)

Model	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	<i>p</i>
	B	Std. Error	Beta		
(Intercept)	1.075	0.301		3.571	< .001
PEU	0.742	0.073	0.770	10.174	< .001
Dependent variable: PU					

Table 8. Coefficients for attitudes towards using (AT)

Model	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	<i>p</i>
	B	Std. Error	Beta		
(Intercept)	0.120	0.273		0.439	0.678
PU	0.598	0.100	0.554	5.439	< .001
PEU	0.272	0.098	0.262	2.783	0.007
PF	0.108	0.069	0.132	1.554	0.125
Dependent variable: AT					

The results of this linear regression showed that PU significantly predicted BI. Table 9 summarizes the results of this regression model.

Based on the results of these analyses, while the following hypotheses are not supported (H1, H2, and H7), the rest hypotheses are fully supported, including H3, H4, H5 and H6. Table 10 represents the results of hypotheses testing.

Validity of Research Model

Research question 1 addressed the extent to which student perceived functionality of the LMS influences its acceptance among students. As a consequence, it was evaluated the influence of perceived functionality on perceived usefulness and attitudes towards using. Based on the Pearson correlations represented in Table 4, there existed significant positive correlation between PF and PU and the relationship between PEU and PU ($r=0.770$, $p < .001$) was stronger than the relationship between PF and PU ($r=0.709$, $p < .001$). In accordance with the adjusted R-squared calculated in the regression model, PF explained 50% of the variance in PU. However, as illustrated in Table 14,

Table 9. Coefficients of behavioural intention to use (BI)

Model	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	<i>p</i>
	B	Std. Error	Beta		
(Intercept)	0.307	0.370		0.831	0.409
PU	0.675	0.167	0.572	4.046	< .001
AT	0.255	0.154	0.234	1.652	0.103
Dependent variable: BI					

Table 10. Summary of Hypotheses Testing

Hypotheses	Results
H1: PF has a significant positive influence on PU.	Supported
H2: PF has a significant positive influence on AT.	Not Supported
H3: SE has a significant positive influence on PEU.	Supported
H4: PU has a significant positive influence on AT.	Supported
H5: PU has a significant positive influence on BI.	Supported
H6: PEU has a significant positive influence on AT	Supported
H7: AT has a significant positive influence on BI.	Not Supported

PF did not significantly predict AT at $B = 0.11$, $t(69) = 1.55$, $p = 0.125$, which indicated that PF did not have a significant influence on PU.

Research question 2 addressed the extent to which students' self-efficacy specific to LMS influences student LMS acceptance and use. Consequently, the influence of LMS self-efficacy on perceived ease of use was evaluated. According to the results of Pearson correlations illustrated in Table 4, a significant positive correlation was identified between SE and AT ($r = 0.72$, $p < .001$). The regression analysis model revealed that SE significantly predicted PEU with a R-squared of 0.55 indicating that SE can explain almost 55% of variance in PEU.

Discussion

The LMS has been widely recognized as an integral part of private higher education. Systems of this kind work as an effective tool to support blended learning, which has become as a current trend in higher education to satisfy varying needs of students (Bervell & Arkorful, 2020; Taufiqurrochman et al., 2020; Tubagus, Muslim, & Suriani, 2020). The LMS can improve student satisfaction, enhance student learning experience, and help students to achieve their goals (Adzharuddin & Ling, 2013; Brown et al., 2015; Dahlstrom et al., 2014; Koh & Kan, 2021). In some cases, however, the LMS has been reported underutilized among student users. The implementation of any information system is heavily influenced by user attitudes and behaviours shaped by user perceptions about the system, especially with respect to its usefulness and ease of use which means that student perceptions of the LMS need to be taken into consideration when implementing the system. The goal of this research project was to determine the influence of perceived functionality of the LMS and students' LMS self-efficacy on the acceptance and use of the LMS among students at a private higher education institution. Two research questions were proposed to guide this research project.

Q1: To what extent does perceived functionality influence LMS acceptance and use among students?

The findings revealed that there existed a positive correlation between perceived functionality and perceived usefulness, and perceived functionality significantly predicted perceived usefulness. Even though more than two-thirds of the participants (76%) reported that they either agreed or strongly agreed that they felt satisfied with the features of the LMS in general. However, there still existed considerable variation in satisfaction levels of students with specific LMS features investigated in this research project. Based on the results of the survey, the satisfaction ratings given for basic features such as submitting assignments and accessing learning content and resources were much higher than those given for advanced features, including collaborating on group projects with other students, interacting with lecturers and interacting other students. Given that perceived functionality significantly predicted perceived usefulness, the extent to which student users find the LMS useful

might be reliant on whether the functions fulfilled by certain LMS features, especially basic one, live up to expectations or not. Considering approximately 88% of the participants either agreed or strongly agreed that it was useful to use the LMS as illustrated in Table 5, the basic LMS features which received higher student satisfaction ratings may contribute to the formation of student perceptions of the usefulness of the LMS.

Moreover, these findings may speak that some LMS functions are reported as being underutilized among students. Student users may have user their own requirements and expectations for the LMS, which turn out to be totally different from those of faculty members and institutions. For example, they may assume that the LMS features which they are not satisfied with do not satisfy their needs for fulfilling educational goals. Student users may consider these features to be counterproductive and ignore them, which partially explains the underutilization of certain LMS features in the context of higher education. Furthermore, it was found that perceived functionality had a significant positive influence on perceived usefulness, which is consistent with the original TAM where perceived usefulness is a strong determinant of behavioural intention to use (Sun et al., 2008). However, based on the results of this research project, it was revealed that attitudes towards using did not predict behavioural intention to use. This finding confirms that of Brown et al. (2002) who found that there existed no significant relationship between user attitudes towards using and behavioural intention to use when the use of an information system is mandated, which means that the perceptions that students have of the LMS cannot directly influence the actual usage of the system among students. This finding may be explained by the fact that whether students are satisfied with the LMS or not, they still need to preserve a certain level of usage of specific LMS features as required by courses. According to Brown et al. (2002), in a setting of mandatory adoption, user satisfaction turns out to be a measure that better represented user attitudes towards using. However, perceived functionality measured by student satisfaction with the LMS features was found to have no significant influence on student attitudes towards using.

Among the LMS features investigated in this research project, accessing learning content and resources was the second most satisfied LMS feature with a student satisfaction rating of 71.2%. In accordance with the results of the survey, almost 80% of the respondents reported that they thought the learning content and resources uploaded onto the LMS were either fairly or very effective. A possible explanation for this might be that student satisfaction level with accessing learning content and resources could be reflected by student attitudes towards these materials. This finding broadly supports that of Freeze et al., (2019) which showed that there existed a correlation between information quality and user satisfaction in the context of the utilization of a system.

Q2: To what extent does students' self-efficacy specific to LMS influence LMS acceptance and use among students?

It was shown that student LMS self-efficacy significantly predicted perceived ease of use. In accordance with the original TAM, perceived ease of use is a strong determinant of behavioural intention to use. LMS self-efficacy was an intrinsic factor which positively influenced students' behavioural intention to use the LMS (Alshammari, 2020; Eom, 2005; Martin et al., 2010; Park, 2009). Confusion, anxiety, frustration and many other similar feelings may emerge, not only during interaction with a certain technology but when thinking of interacting with the technology. These unpleasant emotional states can negatively impact on "not only the interaction, but also productivity, learning, social relationships, and overall well-being" (Saadé & Kira, 2009, p. 179). These emotional states can be considered as psychological issues that negatively influence system use. These emotional states coexist as an antecedent to users' beliefs about usefulness and ease of use, which lead to behavioural intention to use based on the TAM.

According to the results of the survey, most participants reported that even though they had never used the Canvas or any other LMS before, they still perceived the LMS as easy to use. A

possible explanation for this finding was that student LMS self-efficacy played a role in mediating the influence of the negative emotional states on perceived ease of use in the context of student LMS use. Surprisingly, no statistical evidence was found to support that student LMS self-efficacy had an effect on attitudes towards using. Intrinsic motivation can enhance the role of perceived ease of use in increasing behavioural intention to use. Student LMS self-efficacy can be regarded as an intrinsic motivator that increased perceived ease of use (Venkatesh, 1999; Venkatesh & Davis, 1996).

It was found that, while there existed a clear pattern in which the student satisfaction ratings for the basic features were a lot higher than those for the advanced features, students reported that they were satisfied with the features provided by the LMS. The reason for this is not clear but it may have something to do with the neglect of the advanced features among students. The problem is that the instruments used for collecting and analysing the data could not lead to a complete explanation for these findings. In future investigations, it might be possible to use a variety of methods for data collection. For example, qualitative methods can be used to achieve the user context information for explaining the relationships identified among variables through quantitative analysis. Researchers could delve into the factors that influence the relationships.

There is abundant room for further progress in exploring how the TAM could be expanded to more accurately reflect student LMS acceptance and use in the private provision of higher education. Apart from LMS self-efficacy and perceived functionality incorporated into the TAM in this research project, there exist many other factors which can be added into the TAM as external variables. Based on the results of the questionnaire, students reported that the course content and resources provided on the Canvas were effective in their studies. Accessing course content received the second highest student satisfaction rating among the LMS features investigated. It will be necessary to investigate how the quality of the course content uploaded onto the LMS influence student LMS acceptance. Students also reported that their lecturers' use of the LMS impacted their LMS use. Further research should be undertaken to investigate the influence of faculty LMS use on student LMS use.

In addition, it has been demonstrated that students perceived the LMS as useful in their studies, which means that the LMS turned out to be a useful channel for delivering value propositions to students from the perspective of students. However, this research project has not deeply investigated the role that the LMS plays in facilitating customer relationships, which focuses on engaging with students to improve the overall experience of studying at the institution. Based on the results of this survey, a student satisfaction rating of 48.1% was given for accessing information updated by the institution, which is a major feature allowing the institution to engage with its students. LMS develop a viable interaction and engagement with students which help them to understand and gain knowledge (Hamid, Salleh & Laxman, 2020). A further study with more focus on how the LMS benefits the relationship between students and private higher education institutions is therefore suggested.

It was found that perceived functionality was significantly positively correlated with perceived usefulness. Functionality was defined for this research project as the functions fulfilled by features of an information system which enable its users to achieve their expected outcomes. In this regard, the features provided by the LMS need to satisfy the students, providing them with functions expected to effectively achieve their goals. In this research project, perceived functionality was measured using two items adapted from Dahlstrom et al. (2014), which assessed student satisfaction with several features of the LMS. However, the student satisfaction ratings, which partially reflected the way students interact with these features, may be under the influence of the user interface design of the LMS. As the medium of communication between users and the system, an effective user interface may help users to leverage the features more effectively and efficiently and influence users' perceptions about the functionality and ease of use of the system. Therefore, it is also argued that user interface design may positively contribute to perceived ease of use. This is because an effective user interface can allow users to utilize the system more easily and largely decrease the effort put into utilizing the system.

Implications for Practice

Some practical implications can be achieved for the implementation of the LMS in the private provision of higher education based on the finding of this research project:

- To guarantee the successful implementation of the LMS among students in the private higher education sector, positive student attitudes towards using the LMS need to be developed via increasing student LMS efficacy and boosting the overall perceptions that students hold of the functionality of the LMS.
- To increase the quality in the LMS functions with a focus of increasing fulfilling students' efficiency and effectiveness in fulfilling their educational goals.
- LMS functions which remain underutilized and neglected among student users do not contribute to the formation of student perceptions of the usefulness of the LMS. If students need to utilize these functions as required by courses, it is important for their lecturers to justify the use of these functions and give clear instructions on how to use them properly. Otherwise, utilizing these underutilized functions may contribute to negative student perceptions of the usefulness of the LMS.
- Since student LMS self-efficacy turns out to be an important construct on which positive student perceptions about the ease of use of the LMS can be developed. Therefore, the level of student LMS self-efficacy needs to be improved in appropriate ways.
- It is important for lecturers to have a good understanding of what LMS functions student value more and which LMS functions may have negative influence on student acceptance of the LMS.
- The learning materials that students consider effective in achieving course success should clearly indicate topics to be covered, requirements for assignments and so forth. In addition, the materials uploaded onto the LMS need to be organized in a logical and understandable way so that students can track them easily.

Limitations

This research project has the following limitations that may cause biases. This research project only investigated how LMS self-efficacy and perceived functionality contribute to student LMS acceptance and use. Perceived functionality can explain almost 50% of variance in perceived usefulness. LMS self-efficacy can explain approximately 55% of variance in perceived ease of use. However, there exist many other factors which may influence the perceptions that students have of using the LMS regarding its usefulness and ease of use, such as system quality and information quality. Further studies should examine other potential factors along with perceived functionality and LMS self-efficacy to achieve a relatively comprehensive understanding of student LMS use.

Another major limitation of this research project was the sample chosen for data collection. The sample of student LMS users was drawn from a single PTE rather than several different institutions in the private provision of higher education. Differences may exist with respect to LMS usage among students across different institutions. Therefore, caution must be applied when generalizing these findings to other private higher education institutions. A further study should investigate student LMS acceptance and use in different settings of private higher education.

CONCLUSION

Several conclusions can be made based on the results of this research project. First, it was revealed that the perceptions that students have of the functionality of the LMS have positive influence on their perception of the usefulness of the LMS in the private higher education sector. The implication of this finding is that the extent to which students accept the LMS as a useful tool in their studies depends on the extent to which the functions fulfilled by LMS meet students' needs and expectations. On the

other hand, the LMS features for which students gave least satisfaction ratings need to be enhanced to live up to their expectations. It is important to develop an awareness that in an environment of mandatory adoption, the implementation of the LMS among students heavily influenced by student perceptions of the LMS can be reflected better by student attitudes towards the LMS than by student LMS usage. Private higher education institution may seek recommendations on enhancements and additions to the features provided by the LMS from students in order to facilitate student LMS use.

Second, it was revealed that student perception of ease of use about the LMS was positively influenced by student LMS self-efficacy, and therefore, it is more likely that students with high self-efficacy specific to the LMS perceive the system as easy to use. Currently, in the private provision of higher education, students may often learn how to use the LMS on their own by trial and error. Private higher education institutions may consider providing students systematic training in the LMS to enhance their LMS self-efficacy. Considering the finding that most student participants believed that their LMS usage was influenced by the way their lecturers use the LMS, it is necessary for faculty to receive training in the LMS. The LMS can be well implemented among students who perceive the LMS as useful and easy to use. When using the LMS students may benefit from increased LMS self-efficacy. However, a student who undervalues the LMS would not recognize the ease of use of the LMS as a reason for using the LMS. The training designed to enhance student LMS efficacy should not only familiarize students with the features and tools of the system, but also allow them to understand how to utilize these functions properly to enhance their effectiveness and efficiency as students. It is not a coincidence that students rated accessing course content and resources as the second most satisfied LMS feature and found these materials effective in their studies. Student satisfaction with accessing course content and resources may heavily depend on the quality of these materials. Students will be well served by the LMS, onto which their lecturers upload learning content and resources effective for their studies.

FUNDING AGENCY

Open Access Funding for this article has been provided by the ICL Graduate Business School.

REFERENCES

- Adzharuddin, N. A., & Ling, L. H. (2013). Learning management system (LMS) among university students: Does it work. *International Journal of e-Education, e-Business, e- Management Learning*, 3(3), 248–252. doi:10.7763/IJEEEE.2013.V3.233
- Agarwal, R., & Karahanna, E. (2000). Time flies when you're having fun: Cognitive absorption and beliefs about information technology usage. *Management Information Systems Quarterly*, 24(4), 665. doi:10.2307/3250951
- Alshammari, S. H. (2020). The influence of technical support, perceived self-efficacy, and instructional design on students' use of learning management systems. *Turkish Online Journal of Distance Education*, 21(3), 112–141. doi:10.17718/tojde.762034
- Baragash, R. S., & Al-Samarraie, H. (2018). Blended learning: Investigating the influence of engagement in multiple learning delivery modes on students' performance. *Telematics and Informatics*, 35(7), 2082–2098. doi:10.1016/j.tele.2018.07.010
- Barua, P. D., Zhou, X., Gururajan, R., & Chan, K. C. (2018, December). Determination of factors influencing student engagement using a learning management system in a tertiary setting. In *2018 IEEE/WIC/ACM International Conference on Web Intelligence (WI)* (pp. 604–609). IEEE. doi:10.1109/WI.2018.00-30
- Bervell, B., & Arkorful, V. (2020). LMS-enabled blended learning utilization in distance tertiary education: Establishing the relationships among facilitating conditions, voluntariness of use and use behaviour. *International Journal of Educational Technology in Higher Education*, 17(1), 1–16. doi:10.1186/s41239-020-0183-9
- Binyamin, S. S., Rutter, M. J., & Smith, S. (2019). Extending the Technology Acceptance Model to Understand Students' use of Learning Management Systems in Saudi Higher Education. *International Journal of Emerging Technologies in Learning*, 14(3), 4. doi:10.3991/ijet.v14i03.9732
- Brown, M., Dehoney, J., & Millichap, N. (2015). *The Next Generation Digital Learning Environment: A Report on Research*. Educause. Retrieved from <https://library.educause.edu/-/media/files/library/2015/4/eli3035-pdf.pdf>
- Brown, S. A., Massey, A. P., Montoya-Weiss, M. M., & Burkman, J. R. (2002). Do I really have to? User acceptance of mandated technology. *European Journal of Information Systems*, 11(4), 283–295. doi:10.1057/palgrave.ejis.3000438
- Carvalho, A., Areal, N., & Silva, J. (2011). Students' perceptions of Blackboard and Moodle in a Portuguese university. *British Journal of Educational Technology*, 42(5), 824–841. doi:10.1111/j.1467-8535.2010.01097.x
- Claar, C., Portolese Dias, L., & Shields, R. (2014). Student Acceptance of Learning Management Systems: A Study on Demographics. *Issues in Information Systems*, 15(1), 409–417. https://iacis.org/iis/2014/77_iis_2014_409-417.pdf
- Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Sage.
- Dahlstrom, E., Brooks, D. C., & Bichsel, J. (2014). *The Current Ecosystem of Learning Management Systems in Higher Education: Student, Faculty, and IT Perspectives*. Louisville, CO: ECAR. https://www.researchgate.net/profile/Jacqueline_Bichsel/publication/281111565_The_Current_Ecosystem_of_Learning_Management_Systems_in_Higher_Education_Student_Faculty_and_IT_Perspectives/links/55d62fc108ae9d65948bcb4.pdf
- Dahlstrom, E., Walker, J. D., & Dziuban, C. (2013). *ECAR study of undergraduate students and information technology*. Louisville, CO: ECAR. Retrieved from <https://www.ferris.edu/it/central-office/pdfs-docs/StudentandInformationTechnology2014.pdf>
- Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *Management Information Systems Quarterly*, 13(3), 319–340. doi:10.2307/249008
- 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. doi:10.1287/mnsc.35.8.982
- Eom, S. (2015, August). *Effects of Self-Efficacy and Self-regulated Learning on LMS User Satisfaction and LMS Effectiveness*. Paper presented at the 21st Americas Conference on Information Systems, Puerto Rico. <https://pdfs.semanticscholar.org/fd90/5d7f22eb9bc41c9d71c491df3e8326818c6d.pdf>

Fathema, N., Shannon, D., & Ross, M. (2015). Expanding the Technology Acceptance Model (TAM) to examine faculty use of Learning Management Systems (LMSs) in higher education institutions. *Journal of Online Learning and Teaching*, 11(2), 210–232. https://jolt.merlot.org/Vol11no2/Fathema_0615.pdf

Gonzalez-Gomez, F., Guardiola, J., Rodríguez, O. M., & Montero-Alonso, M. A. (2012). Gender differences in e-learning satisfaction. *Computers & Education*, 58(1), 283–290. doi:10.1016/j.compedu.2011.08.017

Hamid, M. A., Salleh, S., & Laxman, K. (2020). A Study on the Factors Influencing Students' Acceptance of Learning Management Systems (LMS): A Brunei Case Study. *International Journal of Technology in Education and Science*, 4(3), 203–217. doi:10.46328/ijtes.v4i3.101

Holden, H., & Rada, R. (2011). Understanding the influence of perceived usability and technology self-efficacy on teachers' technology acceptance. *Journal of Research on Technology in Education*, 43(4), 343–367. doi:10.1080/15391523.2011.10782576

Holmes, K. A., & Prieto-Rodriguez, E. (2018). Student and Staff Perceptions of a Learning Management System for Blended Learning in Teacher Education. *The Australian Journal of Teacher Education*, 43(3), 21–34. doi:10.14221/ajte.2018v43n3.2

Horvat, A., Dobrota, M., Krsmanovic, M., & Cudanov, M. (2015). Student perception of Moodle learning management system: A satisfaction and significance analysis. *Interactive Learning Environments*, 23(4), 515–527. doi:10.1080/10494820.2013.788033

Jaschik, S., & Lederman, D. (2014). *The 2014 Inside Higher Ed Survey of faculty Attitudes on Technology: A Study by Gallup and Inside Higher Ed*. <https://www.insidehighered.com/news/survey/online-ed-skepticism-and-self-sufficiency-surveyfaculty-views-technology>

Koh, J. H. L., & Kan, R. Y. P. (2021). Students' use of learning management systems and desired e-learning experiences: Are they ready for next generation digital learning environments? *Higher Education Research & Development*, 40(5), 995–1010. doi:10.1080/07294360.2020.1799949

Koroghlian, C. M., & Brinkerhoff, J. (2007). Online Students' Technology Skills and Attitudes toward Online Instruction. *Journal of Educational Technology Systems*, 36(2), 219–244. doi:10.2190/ET.36.2.i

Lee, M. C. (2009). Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. *Electronic Commerce Research and Applications*, 8(3), 130–141. doi:10.1016/j.elerap.2008.11.006

Liaw, S. (2008). Investigating students' perceived satisfaction, behavioral intention, and effectiveness of e-learning: A case study of the Blackboard system. *Computers & Education*, 51(2), 864–873. doi:10.1016/j.compedu.2007.09.005

Majadlawi, Y., Almarabeh, T., & Mohammad, H. (2014). Factors affecting students' usage of learning management system at The University of Jordan. *Life Science Journal*, 11(6), 666–671. https://www.researchgate.net/profile/Tamara_Almarabeh/publication/271674280_Factors_Affecting_Students%27_Usage_of_Learning_Management_System_at_the_University_of_Jordan/links/54cf332e0cf29ca810fdb408/Factors-Affecting-Students-Usage-of-Learning-Management-System-at-the-University-of-Jordan.pdf

Martin, F., Tutty, J. I., & Su, Y. (2010). Influence of Learning Management Systems Self-efficacy on E-Learning Performance. *Journal of Science Education and Technology*, 5(3), 26–35. <http://www.imanagerpublications.com/Archives.aspx>

Muilenburg, L. Y., & Berge, Z. L. (2005). Student barriers to online learning: A factor analytic study. *Distance Education*, 26(1), 29–48. doi:10.1080/01587910500081269

Olson, L. (2021). *How Can Learning Management Systems Be Used Effectively to Improve Student Engagement?* Center on Reinventing Public Education.

Palmer, S., & Holt, D. (2009). Staff and student perceptions of an online learning environment: Difference and development. *Australasian Journal of Educational Technology*, 25(3). Advance online publication. doi:10.14742/ajet.1140

Park, S. Y. (2009). An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning. *Journal of Educational Technology & Society*, 12(3), 150–162. <http://citeserx.ist.psu.edu/viewdoc/download?doi=10.1.1.634.7488&rep=rep1&type=pdf>

- Pikkarainen, T., Pikkarainen, K., Karjaluoto, H., & Pahnla, S. (2004). Consumer acceptance of online banking: An extension of the technology acceptance model. *Internet Research*, 14(3), 224–235. doi:10.1108/10662240410542652
- Pomerantz, J., Brown, M., & Brooks, D. C. (2018). *Foundations for a next generation digital learning environment: faculty, students, and the LMS*. Educause. <https://library.educause.edu/-/media/files/library/2018/1/ers1801.pdf>
- Poon, J. (2013). Blended learning: An institutional approach for enhancing students' learning experiences. *Journal of Online Learning and Teaching*, 9(2), 271–288. <https://dro.deakin.edu.au/eserv/DU:30057995/poon-blendedlearning-2013.pdf>
- Saadé, R. G., & Kira, D. (2009). Computer anxiety in e-learning: The effect of computer self-efficacy. *Journal of Information Technology Education*, 8(1), 177–191. doi:10.28945/166
- Saunders, M. N., Lewis, P., & Thornhill, A. (2015). *Research Methods for Business Students* (7th ed.). Academic Press.
- Selim, H. M. (2007). Critical success factors for e-learning acceptance: Confirmatory factor models. *Computers & Education*, 49(2), 396–413. doi:10.1016/j.compedu.2005.09.004
- Silverman, B. G., Hanrahan, N., Huang, L., Rabinowitz, E. F., & Lim, S. (2016). Artificial intelligence and human behavior modeling and simulation for mental health conditions. In D. D. Luxton (Ed.), *Artificial Intelligence in Behavioral and Mental Health Care* (pp. 163–183). doi:10.1016/B978-0-12-420248-1.00007-6
- Sinclair, J., & Aho, A. M. (2018). Experts on super innovators: Understanding staff adoption of learning management systems. *Higher Education Research & Development*, 37(1), 158–172. doi:10.1080/07294360.2017.1342609
- Sun, P. C., Tsai, R. J., Finger, G., Chen, Y. Y., & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education*, 50(4), 1183–1202. doi:10.1016/j.compedu.2006.11.007
- Taufiqurrochman, R., Muslimin, I., Rofiki, I., & Abah, J. (2020). Students' Perceptions on Learning Management Systems of Arabic Learning through Blended Learning Model. *Jurnal Al Bayan: Jurnal Jurusan Pendidikan Bahasa Arab*, 12(1), 22–36. doi:10.24042/albayan.v12i1.5276
- Teixeira, P., Kim, S., Landoni, P., & Gilani, Z. (2017). *Rethinking the Public-Private Mix in Higher Education: Global Trends and National Policy Challenges*. Sense Publishers. doi:10.1007/978-94-6300-911-9
- Tubagus, M., Muslim, S., & Suriani, S. (2020). *Development of learning management system-based blended learning model using claroline in higher education*. Academic Press.
- Ustun, A. B., Yilmaz, F. G. K., & Yilmaz, R. (2021). Investigating the role of accepting learning management system on students' engagement and sense of community in blended learning. *Education and Information Technologies*, 26(4), 1–19. doi:10.1007/s10639-021-10500-8
- Valentine, E. (2011). *ICT in vocational education and training: a view of information and communication technology in vocational education in New Zealand*. Wellington, New Zealand: Tertiary Education Commission and Service Industry Training Alliance. http://eprints.qut.edu.au/58834/1/ICTinVocationalEducation%26Trainingfinal_revised_300313.pdf
- Venkatesh, V. (1999). Creation of favorable user perceptions: Exploring the role of intrinsic motivation. *Management Information Systems Quarterly*, 23(2), 239–260. doi:10.2307/249753
- Venkatesh, V., & Davis, F. D. (1996). A Model of the Antecedents of Perceived Ease of Use: Development and Test. *Decision Sciences*, 27(3), 451–481. doi:10.1111/j.1540-5915.1996.tb01822.x
- Wang, M., Shen, R., Novak, D., & Pan, X. (2009). The impact of mobile learning on students' learning behaviours and performance: Report from a large blended classroom. *British Journal of Educational Technology*, 40(4), 673–695. doi:10.1111/j.1467-8535.2008.00846.x
- Watson, W. R., & Watson, S. L. (2007). An Argument for Clarity: What Are Learning Management Systems, What Are They Not, and What Should They Become. *TechTrends*, 51(2), 28–34. doi:10.1007/s11528-007-0023-y
- Weng, F., Yang, R. J., Ho, H. J., & Su, H. M. (2018). A TAM-based study of the attitude towards use intention of multimedia among school teachers. *Applied System Innovation*, 1(3), 36. doi:10.3390/asi1030036

APPENDIX

Table 11. Frequency Table for Perceived Usefulness

Variable	<i>n</i>	%
PU1: It is useful to use the Canvas in my studies.		
Strongly disagree (1)	0	0
Disagree (2)	1	1.37
Neutral (3)	8	10.96
Agree (4)	29	39.73
Strongly agree (5)	35	47.95
PU2: Using the Canvas enhances my efficiency as a student.		
Strongly disagree (1)	0	0
Disagree (2)	2	2.74
Neutral (3)	8	10.96
Agree (4)	44	60.27
Strongly agree (5)	19	26.03
PU3: Using the Canvas improves my performance as a student.		
Strongly disagree (1)	0	0
Disagree (2)	1	1.37
Neutral (3)	22	30.14
Agree (4)	36	49.32
Strongly agree (5)	14	19.18

Table 12. Frequency Table for Perceived Ease of Use

Variable	<i>n</i>	%
PEU1: I think it is easy for me to use the Canvas.		
Strongly disagree (1)	0	0
Disagree (2)	1	1.37
Neutral (3)	12	16.44
Agree (4)	39	53.42
Strongly agree (5)	21	28.77
PEU2: It does not require a lot of effort to interact with the Canvas.		
Strongly disagree (1)	0	0
Disagree (2)	1	1.37
Neutral (3)	13	17.81
Agree (4)	40	54.79
Strongly agree (5)	19	26.03

Table 13. Frequency Table for LMS Self-Efficacy

Variable	n	%
SE1: I feel confident about using the Canvas.		
Strongly disagree (1)	0	0
Disagree (2)	1	1.37
Neutral (3)	12	16.44
Agree (4)	40	54.79
Strongly agree (5)	20	27.40
SE2: It is easy to become good at using the Canvas.		
Strongly disagree (1)	0	0
Disagree (2)	0	0
Neutral (3)	13	17.81
Agree (4)	36	49.32
Strongly agree (5)	24	32.88

Table 14. Frequency Table for Perceived Functionality

Variable	n	%
SF: I feel satisfied with the features provided by the Canvas in general.		
Strongly disagree (1)	0	0
Disagree (2)	4	5.5
Neutral (3)	10	13.7
Agree (4)	37	50.7
Strongly agree (5)	22	30.1

Table 15. Frequency Table for Attitudes towards Using

Variable	n	%
AT1: The Canvas provides me enough flexibility and convenience in my studies		
Strongly disagree (1)	0	0
Disagree (2)	2	2.74
Neutral (3)	16	21.92
Agree (4)	39	53.42
Strongly agree (5)	16	21.92
AT2: It is a good idea to use the Canvas.		
Strongly disagree (1)	0	0
Disagree (2)	1	1.37
Neutral (3)	9	12.33
Agree (4)	31	42.47
Strongly agree (5)	32	43.84

Table 16. Frequency Table for Information Effectiveness and Lecturers' Influence

Variable	<i>n</i>	%
The extent to which I think the learning content and resources on the Canvas is effective for my studies		
Not at all effective (1)	0	0
Not very effective (2)	4	5.48
Neither effective or ineffective (3)	10	13.70
Fair effective (4)	37	50.68
Very effective (5)	22	30.14
The extent to which I think my lecturers' use of the Canvas influence on my use of the Canvas		
Major impact	41	56.16
Minor impact	25	34.25
No impact at all	7	9.59