OPEN ACCESS

Multidisciplinary Journal of Social Sciences and Humanities | Vol. 1 No. 3 (2025)

Research Article

Factors Influencing Students' Acceptance and Satisfaction with LMS in Blended Learning Environment

Ai-Ling Aileen Koh[1*], Ying-Leh Ling[2]
[1]Faculty of Education, Open University Malaysia, Malaysia
[2]Department of Mathematics, Science and Computer, Polytechnic Kuching Sarawak, Malaysia
Email: [1)] aileenkoh@oum.edu.my, [2)] drylling@poliku.edu.my

Received:	Revised:	Accepted:	Online:
December 08, 2025	December 19, 2025	January 05, 2026	January 07, 2026

Abstract

Blended learning (BL) has become an essential approach in Malaysian Technical and Vocational Education and Training (TVET), with Learning Management Systems (LMS) serving as the core platform for delivering digital instruction and learner support. However, students' acceptance and satisfaction with LMS remain uneven, particularly in competency-based environments where learners depend heavily on practical guidance and technological support. This study examined the extent to which technological experience and knowledge sharing influence students perceived ease of use (PEOU), perceived usefulness (PU), and overall satisfaction with LMS in a blended learning environment at a Malaysian polytechnic. Using a quantitative research design, data were collected from 290 students who had used the LMS for at least one semester. Multiple regression analyses revealed that both technological experience and knowledge sharing significantly predicted PEOU, PU, and satisfaction. Technological experience emerged as the strongest contributor across all models, suggesting that students who are more technologically competent perceive the LMS as easier to use, more beneficial, and more satisfying. Knowledge sharing also played a meaningful role by enhancing students' confidence, engagement, and perceived learning value. These findings highlight the importance of strengthening digital competencies and fostering collaborative learning practices to support effective LMS adoption. The study provides practical implications for educators and administrators seeking to optimize LMS integration in TVET-based blended learning environments.

Keywords: Blended Learning, Learning Management System, Technology Acceptance, Knowledge Sharing, Student Satisfaction.

1. Introduction

Blended learning has been actively encouraged in Malaysian Technical and Vocational Education and Training institutions to enhance the education system in line with the goals set by the Malaysia Education Blueprint (Higher Education) 2015-2025. This approach aims to enhance flexibility, accessibility, and the overall quality of education. Within this transformation, Learning Management Systems (LMS) function as a critical technological backbone that facilitates online content delivery, communication, learner tracking, assessment, and instructional support. In TVET environments, where learning is highly practical, industry-oriented, and competency-driven, LMS platforms theoretically serve as an integrative medium that can align theoretical knowledge with hands-on learning experiences. However, the adoption and effectiveness of LMS in TVET institutions extend beyond mere system availability. Successful implementation requires users particularly students to accept these systems, use them meaningfully, and derive satisfaction from their learning interactions.

Although the adoption of LMS in Malaysian higher education is relatively widespread, research focusing on its usage among TVET learners remains limited. Existing studies tend to emphasize

mainstream university settings, where learners exhibit greater digital readiness and differ in pedagogical needs compared to TVET students. The unique characteristics of TVET learning, including competency-based progression, tactile instruction, guided practice, and skills mastery, require distinct technological and instructional considerations. Yet, most available studies generalize LMS usage within higher education without acknowledging contextual differences in TVET environments. Consequently, the empirical understanding of how TVET learners perceive LMS usefulness, usability, and learning support remains underdeveloped.

Research on technology acceptance often utilizes the Technology Acceptance Model (TAM) to explore the connections between perceived usefulness, perceived ease of use, attitudes, and behavioral intention. While TAM has been widely employed in educational technology research, only a few Malaysian studies have adopted it specifically within TVET contexts, and even fewer have examined satisfaction alongside acceptance. Recent literature suggests that LMS usage patterns in Malaysian TVET institutions remain inconsistent, showing disparities associated with system compatibility, infrastructure challenges, learner readiness, and pedagogical alignment (Ahmad et al., 2023). Research conducted in higher education environments has shown that adoption rates are influenced by factors such as perceived ease of use and availability of technological assistance (Annamalai & Kumar, 2020), while students generally demonstrate positive perceptions of LMS information security (Hilmi & Mustapha, 2022). Yet, these findings cannot be fully extrapolated to TVET learners, who possess different learning priorities and rely heavily on practical demonstration and instructor guidance.

Although the government has allocated funds for LMS platforms in Malaysian TVET institutions to facilitate BL, there is still a lack of knowledge about the elements that impact students' approval and contentment with these systems. The deficiency is especially noticeable in the realms of system excellence, data reliability, service excellence, perceived helpfulness, and perceived simplicity of use, which are recognized as influences on technology involvement but have not been thoroughly examined in connection to TVET students. Existing Malaysian studies either focus solely on satisfaction, emphasize technical aspects without considering acceptance, or investigate LMS quality without integrating theoretical acceptance models. As a result, the interaction among acceptance, satisfaction, and practical learning effectiveness in TVET settings remains unclear.

The nature of TVET learning intensifies this research need. In skill-based courses, students require platforms that provide meaningful instructional support, clear task requirements, instructional scaffolding, and accessible learning resources that complement physical training. However, many learners in TVET settings continue to exhibit difficulty in fully embracing LMS platforms, possibly due to system usability challenges, limited digital skills, or insufficient institutional support. Without a clear understanding of how students perceive LMS adoption factors, institutions risk implementing systems that fail to enhance learning engagement, skill acquisition, or academic performance.

Furthermore, although LMS usage is increasingly integrated into Malaysian polytechnics, empirical evidence on how students perceive these systems particularly in terms of acceptance and satisfaction is scarce. This lack of data impedes the development of targeted strategies to improve LMS design, teaching practices, and learner support services that align with the competency-based and practice-driven nature of TVET learning. Given that satisfaction influences sustained usage and acceptance affects willingness to adopt, examining these constructs jointly is essential in ensuring meaningful technology integration in TVET environments.

Therefore, this research aims to identify the aspects that contribute to students' approval and contentment with using LMS in blended learning at a polytechnic in Sarawak, Malaysia. The study will use the Technology Acceptance Model to evaluate various factors such as technology, information, and system-related elements, with the goal of providing insights tailored to competency-based learning

environments. The results are anticipated to influence LMS development, enhance implementation tactics, boost user involvement, and offer guidance to policymakers and educators for improving the effectiveness of blended learning in the Malaysian TVET sector.

2. Literature Review

2.1. Blended Learning and LMS Integration in Higher Education

Blended learning (BL) has become a key feature of contemporary higher education as institutions strive to combine the strengths of face-to-face instruction with technology-mediated learning. BL environments offer increased flexibility, varied instructional resources, and greater opportunities for independent learning (Garrison & Kanuka, 2004). Learning Management Systems (LMS) serve as the technological backbone of BL by enabling content delivery, communication, feedback, assessment, and student performance tracking (Al-Azawei et al., 2016). In Malaysia, LMS adoption has been strongly promoted to support digital transformation in teaching and learning, particularly under national initiatives such as the Malaysia Education Blueprint (Higher Education) 2015-2025.

The relevance of LMS integration is particularly significant in vocational and professional education, where platforms must accommodate both theoretical knowledge and competency-based learning activities. However, scholars emphasize that successful LMS implementation relies heavily on students' technological readiness, attitudes, and willingness to engage with online learning environments (Annamalai & Kumar, 2020). Therefore, examining students' perceptions, acceptance, and satisfaction with LMS is essential for ensuring effective BL practices.

2.2. Technology Acceptance Model (TAM) as a Theoretical Framework

Davis (1989) introduced the Technology Acceptance Model (TAM), which continues to be commonly used in studying the factors that influence technology usage in educational settings. According to TAM, users' attitudes towards technology are influenced by their perceptions of usefulness and ease of use, leading to their intentions to use the technology and actual usage of the system.

Studies using real-world data consistently show that the perceived usefulness and ease of use of learning management systems are important factors in predicting their adoption and level of engagement in digital education (Salloum et al., 2019). PU refers to the degree to which students believe that LMS supports learning performance, enhances productivity, or facilitates skill development. PEOU, meanwhile, reflects whether LMS features are easy to learn, navigate, and operate. In BL settings, students tend to adopt LMS more readily when instructional content is easily accessible, and system functions are intuitively designed (Tarhini et al., 2017).

TAM has been extended in recent literature to include variables such as system quality, information quality, self-efficacy, and service support, particularly when studying LMS usage (Al-Rahmi et al., 2019). This indicates a growing shift toward multidimensional perspectives that combine usability factors with system design and user experience components.

2.3. Factors Influencing LMS Acceptance

2.3.1. Perceived Usefulness (PU)

PU is consistently found to have a strong positive influence on students' acceptance and long-term LMS usage. When students believe that LMS contributes to improved learning outcomes, they are more likely to engage with system features, participate in online activities, and utilize digital resources (Aparicio et al., 2017). In BL environments, PU includes students' perceptions that LMS supports assignment submission, exam preparation, resource sharing, revision, and communication with instructors.

2.3.2. Perceived Ease of Use (PEOU)

PEOU determines whether students feel comfortable navigating LMS interfaces, accessing materials, and completing online learning tasks. Studies show that PEOU is a critical determinant in the early stage of LMS adoption, influencing initial willingness to use the system (Salloum et al., 2019). LMS platforms with user-friendly interfaces, clear navigation flow, and minimal complexity tend to yield higher acceptance among learners.

2.3.3. System Quality, Information Quality, and Service Quality

Recent research expands TAM by including system quality dimensions from the DeLone and McLean Information System Success Model (Delone & McLean, 2003). System quality encompasses technical performance, dependability, ease of use, and timeliness. The quality of information pertains to precision, utility, structure, and comprehensibility of educational materials. Service quality relates to instructor support, technical assistance, and administrative guidance. Studies show that when LMS systems are reliable, updated, and well-supported, students demonstrate higher acceptance and satisfaction (Cheng & Chau, 2016).

2.4. Student Satisfaction in LMS-Supported Blended Learning

Student satisfaction refers to learners' evaluation of their LMS experience and the extent to which their learning expectations have been fulfilled. Satisfaction is shaped by LMS usability, available support, learning interaction, perceived efficiency, and the quality of instructional materials (Alharbi & Drew, 2014). Research indicates that satisfaction acts as an important predictor of sustained LMS usage and learning persistence.

In the Malaysian context, studies reveal that satisfaction levels vary across institutions depending on LMS design, training opportunities, and quality of digital learning content (Hilmi & Mustapha, 2022). For TVET learners, satisfaction is particularly linked to whether LMS supports practical skill development, step-by-step instructional guidance, and meaningful feedback, features that align with competency-based learning modes.

3. Research Methodology

3.1. Research Design

Quantitative research methods were used to investigate the factors influencing how students at a Malaysian TVET institution feel about and perceive the Learning Management System (LMS) in a blended learning environment. Information was gathered from a survey to maintain uniformity and enable the statistical analysis of the connections between variables. The study was grounded in the Technology Acceptance Model (TAM), focusing on perceived ease of use, perceived usefulness, acceptance, and user satisfaction.

3.2. Research Variables

The primary focus of this study was on two different types of variables: independent variables, which included technology experience and knowledge sharing, and dependent variables, which consisted of students' acceptance of the LMS. Acceptance was determined by perceived usefulness, perceived ease of use, and satisfaction with LMS usage. The operationalization of all variables relied on validated constructs from existing literature to maintain measurement accuracy and consistency in a blended learning setting.

3.3. Population and Sampling

Undergraduate students registered in blended learning classes at a polytechnic in Sarawak were the focus of the study. A purposive sampling technique was used to guarantee that participants had prior experience, as the study exclusively included students who had utilized an LMS for a minimum of one semester. Purposive sampling was justified because the study required participants with direct exposure to technology-supported learning environments in order to provide meaningful and informed responses. A total of 290 students participated in the study, exceeding the recommended minimum sample size for correlation and regression analyses and thereby ensuring sufficient statistical power and generalizability of the findings.

3.4. Research Instrument

The information gathered for this research was obtained through a formal survey based on the tools created by Ghazal et al. (2018). The research instrument consisted of five distinct sections, including demographic information, technology experience, knowledge sharing, perceived ease of use and perceived usefulness, and student satisfaction. A five-point Likert scale was applied to all items, ranging from strongly disagree (1) to strongly agree (5), such that higher scores denoted greater agreement, broader technology experience, and increased satisfaction. This structure supported consistent data collection and effective assessment of the relevant constructs.

3.5. Pilot Study, Reliability, and Validity

A preliminary examination was carried out with a group of 30 students to evaluate the dependability and coherence of the tool. The Cronbach's alpha scores for each component surpassed the suggested limit of .70, indicating sufficient reliability. Content validity was ensured through review by two lecturers with expertise in educational technology and blended learning, who evaluated the relevance and clarity of the items. Based on their feedback, minor wording revisions were made to enhance clarity and minimize potential ambiguity.

3.6. Data Collection Procedure

Approval to carry out the research was granted by the Research Management Unit of the polytechnic college. Students were briefed on the aim of the study before agreeing to take part, and their consent was obtained. The questionnaire was distributed electronically through Google Forms, assuring participants of their privacy, the confidential nature of their responses, and the optional aspect of their involvement. The gathering of information lasted around three weeks.

3.7. Data Analysis

The information was evaluated using SPSS software to analyze data. The examination included a process of multiple regression to explore the hypotheses regarding the anticipation of ease of use, usefulness, and satisfaction by students. Prior to performing the regression analysis, various aspects such as normal distribution, multicollinearity, and consistent variances were checked to validate the results.

4. Results and Discussion

Although many studies have examined LMS adoption in higher education generally, research within Malaysian TVET institutions remains limited. Existing literature either investigates acceptance without considering satisfaction, explores quality dimensions without integrating the Technology Acceptance Model (TAM), or focuses largely on academic contexts rather than skill-based learning environments. Given TVET's distinctive emphasis on practical, hands-on training, there is a clear need

for empirical research that identifies the factors influencing both acceptance and satisfaction in blended learning environments supported by LMS. A deeper understanding of these determinants will enable institutions to design more responsive LMS systems and support mechanisms that address the specific needs of vocational learners.

4.1. Students' Technology Experience and Knowledge Sharing as Determinants of LMS Perceived Ease of Use in Blended Learning

The regression analysis incorporated both predictor variables technology experiences and knowledge sharing as each demonstrated statistical significance ($p < .05$). Model 1, featuring technology experiences as the sole predictor, yielded an R^2 of .506, indicating this variable accounts for 50.6% of the variance in the criterion variable, perceived ease of use. Model 2, incorporating both predictors, produced an R^2 of .545, accounting for 54.5% of the variance, with a multiple correlation (R) of .738. Both models were statistically significant per ANOVA results (Model 1: $F(1, 288) = 295.37$, $p < .05$; Model 2: $F(2, 287) = 172.06$, $p < .05$). Examination of the standardized coefficients (β) revealed that both technology experiences ($\beta = .445$, $t = 6.66$, $p < .05$) and knowledge sharing ($\beta = .331$, $t = 4.96$, $p < .05$) were significant unique contributors. Diagnostic analyses confirmed the robustness of the models: partial correlations indicated no overly strong bivariate relationships (< .90), tolerance values (< 2.0) indicated an absence of multicollinearity, and the range of standardized residuals (within ±3.3) confirmed no influential outliers, thus satisfying key assumptions for multiple regression.

Based on the results, students' Perceived Ease of Use (PEOU) of the LMS was positively influenced by both predictor variables: technological experience and knowledge sharing. Students with greater technological experience and active engagement in knowledge sharing reported higher levels of PEOU, indicating that they found the LMS easier to use compared to their peers with lower levels of experience or participation. These findings suggest that both technological experience and knowledge sharing play a critical role in shaping students' acceptance of LMS in a blended learning environment. When students possess the skills and opportunities to share knowledge, their confidence and comfort in using the system increase, leading to better learning engagement and outcomes. This aligns with Neufeld and Delcore (2018), who emphasized that learners' technological experience enhances learning outcomes, while knowledge-sharing practices promote creativity and improve performance at both individual and organizational levels.

Table 1. The value of the β coefficient

Dependent variable	Independent variable		
	Model 1	Model 2	
	Technology experiences	Technology experiences	Knowledge sharing
Perceived ease of use (β)	.712*	.445*	.331*
R	.712	.738	
R^2	.506	.545	
Adjusted R^2	.505	.542	
F value	295.37*	172.06*	
Durbin Watson	2.04		

* Significant at the level p<.05

Note:

Model 1: Technology experiences

Model 2: Technology experiences and knowledge sharing

4.2. Students' Technology Experience and Knowledge Sharing as Determinants of LMS Perceived Usefulness in Blended Learning

Regression analyses were conducted to evaluate the influence of predictor variables on perceived usefulness. Both predictors were retained in the final model as they met the significance criterion ($p < .05$). Model 1, with technology experiences as the sole predictor, was significant, $F(1, 288) = 446.03$, $p < .05$, accounting for 60.8% of the variance in perceived usefulness ($R^2 = .608$, $R = .780$). Model 2, incorporating both technology experiences and knowledge sharing, was also significant, $F(2, 287) = 264.56$, $p < .05$, explaining 64.8% of the variance ($R^2 = .648$, multiple $R = .805$). Examination of the standardized coefficients indicated that both technology experiences ($\beta = .507$, $t(287) = 8.63$, $p < .05$) and knowledge sharing ($\beta = .339$, $t(287) = 5.76$, $p < .05$) were significant unique contributors, with technology experiences demonstrating a stronger effect. Consequently, the null hypothesis was rejected. Model diagnostics were satisfactory: partial correlations were below .90, tolerance statistics were below 2.0 indicating no multicollinearity, and standardized residuals fell within ±3.3, confirming no influential outliers and that regression assumptions were met.

Table 2. The value of the β coefficient

Dependent variable	Independent variable		
	Model 1	Model 2	
	Technology experiences	Technology experiences	Knowledge sharing
Perceived usefulness (β)	.780*	.507*	.339*
R	.780	.805	
R^2	.608	.648	
Adjusted R^2	.606	.646	
F value	446.03*	264.56*	
Durbin Watson	2.01		

The study results indicate that students' Perceived Usefulness (PU) of the LMS is significantly influenced by both technological experience and knowledge sharing, with each predictor contributing differently to students' acceptance. Specifically, students' perception of the benefits of technology improves after exposure to technological experiences, and further increases when knowledge-sharing interventions are incorporated, highlighting that active engagement with peers enhances the perceived value of the system. Simply put, students are more likely to embrace technology in their education, understand its benefits, and incorporate it into their hybrid learning experiences if they have regular engagement with the LMS and chances to share information. This aligns with Henrie et al. (2015), who noted that digital technologies increasingly connect learners, provide content, and facilitate learning anytime and anywhere. However, realizing the full benefits of technology remains a challenge, as research over the past two decades has highlighted both advantages and limitations of students' continuous technology use (Rashid & Asghar, 2016). Studies suggest that technology enables students to communicate, retrieve and share knowledge, and enhance learning experiences (Balakrishnan & Gan, 2016), while also promoting equitable access to higher education, diverse learning offerings, more effective delivery, and personalized learning processes (Cohen & Baruth, 2017; Cohen & Nachmias, 2006; Goodfellow & Lea, 2013; Luckin et al., 2012).

4.3. Students' Technology Experience and Knowledge Sharing on Students' Satisfaction with LMS In a Blended Learning Environment

Multiple regression was employed to assess predictors of student satisfaction. Both variables met the inclusion criterion ($p < .05$). Model 1, regressing satisfaction on technology experiences alone, was significant, $F(1, 288) = 363.26$, $p < .05$, accounting for 55.8% of the variance ($R^2 = .558$). Model 2, which added knowledge sharing, was also significant, $F(2, 287) = 185.78$, $p < .05$, explaining 56.4% of the variance ($R^2 = .564$, multiple $R = .757$). Examination of standardized coefficients in Model 2 revealed that while both technology experiences ($\beta = .639$, $t(287) = 9.76$, $p < .05$) and knowledge sharing ($\beta = .135$, $t(287) = 2.06$, $p < .05$) were significant unique contributors, technology experiences had a substantially larger effect size. Model diagnostics were within acceptable limits: partial correlations were below .90, tolerance values were below 2.0 indicating no multicollinearity, and standardized residuals were within ±3.3, confirming the absence of influential outliers and the suitability of the data for regression analysis.

Table 3. The value of the β coefficient

Dependent variable	Independent variable		
	Model 1	Model 2	
	Technology experiences	Technology experiences	Knowledge sharing
Perceived usefulness (β)	.747*	.639*	.135*
R	.747	.757	
R^2	.558	.564	
Adjusted R^2	.556	.561	
F value	363.26*	185.78*	
Durbin Watson		1.77	

According to the outcomes of the regression analysis mentioned earlier, the researcher concludes that technology experience and sharing of knowledge play a crucial role in the implementation of blended learning in TVET educational institutions. The satisfaction of students with the LMS in a blended learning setting is greatly impacted by factors like experience with technology and the sharing of knowledge. The results indicate that students' satisfaction increases when they engage more extensively with technology and participate actively in knowledge-sharing activities. These findings highlight that both familiarity with technological tools and the ability to exchange knowledge enhance students' positive experiences and satisfaction with the LMS. Consistent with Delone & McLean (2003), the benefits students gain from using the system are directly linked to their satisfaction, serving as an important antecedent. Furthermore, knowledge-sharing interactions play a pivotal role not only in improving course outcomes (Ghadirian et al., 2014) but also in enhancing overall student satisfaction (Liao, 2006).

5. Conclusion

The study reinforces the importance of technological experience and knowledge sharing as influential factors in students' acceptance and satisfaction with LMS in blended learning environments. Institutional support through structured training and guided interaction is essential to enhance students' technological competence, which in turn strengthens perceived ease of use (PEOU) and perceived usefulness (PU), contributing to more positive and meaningful learning experiences.

Additionally, promoting knowledge-sharing activities such as peer discussions, collaborative projects, and online forums can strengthen students' engagement, satisfaction, and perception of the

system's value. Integrating both technological support and opportunities for active knowledge exchange is crucial for maximising LMS effectiveness, enhancing course outcomes, and fostering an interactive learning culture.

In conclusion, students' technological experience and participation in knowledge sharing significantly impact their acceptance and satisfaction with LMS in BL settings. Those with higher technological proficiency and active engagement in knowledge exchange perceive the system as more useful, easier to use, and more satisfying. These findings provide practical guidance for educators and institutions aiming to optimize LMS adoption and enhance student learning outcomes by fostering both digital competence and collaborative learning practices.

6. References

Ahmad, N. A., Elias, N. F., Sahari, N., & Mohamed, H. (2023). Learning Management System Acceptance Factors for Technical and Vocational Education Training (TVET) Institutions. *TEM Journal*, *12*(2), 1156–1165. https://doi.org/10.18421/TEM122-61

Al-Azawei, A., Parslow, P., & Lundqvist, K. (2016). Investigating the effect of learning styles in a blended e-learning system: An extension of the technology acceptance model (TAM). *Australasian Journal of Educational Technology*, *33*(2), 1–23. https://doi.org/10.14742/ajet.2741

Al-Rahmi, W. M., Yahaya, N., Aldraiweesh, A. A., Alamri, M. M., Aljarboa, N. A., Alturki, U., & Aljeraiwi, A. A. (2019). Integrating Technology Acceptance Model With Innovation Diffusion Theory: An Empirical Investigation on Students' Intention to Use E-Learning Systems. *IEEE Access*, *7*, 26797–26809. https://doi.org/10.1109/ACCESS.2019.2899368

Alharbi, S., & Drew, S. (2014). Using the Technology Acceptance Model in Understanding Academics' Behavioural Intention to Use Learning Management Systems. *International Journal of Advanced Computer Science and Applications*, *5*(1), 143–155. https://doi.org/10.14569/IJACSA.2014.050120

Annamalai, N., & Kumar, J. A. (2020). Understanding Smartphone use Behavior among Distance Education Students in Completing their Coursework in English: A Mixed-Method Approach. *The Reference Librarian*, *61*(3–4), 199–215. https://doi.org/10.1080/02763877.2020.1815630

Aparicio, M., Bacao, F., & Oliveira, T. (2017). Grit in the path to e-learning success. *Computers in Human Behavior*, *66*, 388–399. https://doi.org/10.1016/j.chb.2016.10.009

Balakrishnan, V., & Gan, C. L. (2016). Students' learning styles and their effects on the use of social media technology for learning. *Telematics and Informatics*, *33*(3), 808–821. https://doi.org/10.1016/j.tele.2015.12.004

Cheng, G., & Chau, J. (2016). Exploring the relationships between learning styles, online participation, learning achievement and course satisfaction: An empirical study of a blended learning course. *British Journal of Educational Technology*, *47*(2), 257–278. https://doi.org/10.1111/bjet.12243

Cohen, A., & Baruth, O. (2017). Personality, learning, and satisfaction in fully online academic courses. *Computers in Human Behavior*, *72*, 1–12. https://doi.org/10.1016/j.chb.2017.02.030

Cohen, A., & Nachmias, R. (2006). A quantitative cost effectiveness model for Web-supported academic instruction. *The Internet and Higher Education*, *9*(2), 81–90. https://doi.org/10.1016/j.iheduc.2006.03.007

Delone, W., & McLean, E. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems*, *19*(4), 9–30. https://doi.org/10.1080/07421222.2003.11045748

Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education*, *7*(2), 95–105. https://doi.org/10.1016/j.iheduc.2004.02.001

Ghadirian, H., Fauzi Mohd Ayub, A., Daud Silong, A., Binti Abu Bakar, K., & Mohammad Hossein Zadeh, A. (2014). Knowledge Sharing Behaviour among Students in Learning Environments: A Review of Literature. *Asian Social Science*, *10*(4), 38. https://doi.org/10.5539/ass.v10n4p38

Ghazal, S., Aldowah, H., & Umar, I. (2018). Critical Factors to Learning Management System Acceptance and Satisfaction in a Blended Learning Environment. In *Recent Trends in Information and Communication Technology* (pp. 688–698). Springer. https://doi.org/10.1007/978-3-319-59427-9_71

Goodfellow, R., & Lea, M. R. (2013). *Literacy in the digital university*. Taylor & Francis London, UK.

Henrie, C. R., Halverson, L. R., & Graham, C. R. (2015). Measuring student engagement in technology-mediated learning: A review. *Computers & Education*, *90*, 36–53. https://doi.org/10.1016/j.compedu.2015.09.005

Hilmi, M. F., & Mustapha, Y. (2022). *Perceived Security of E-Learning Portal*. http://arxiv.org/abs/2209.11196

Liao, L.-F. (2006). The impact of teacher's powers to knowledge sharing behavior and learning satisfaction in distance-learning environment. *Journal of Information, Technology and Society*, *2*(3), 1–14.

Luckin, R., Bligh, B., Manches, A., Ainsworth, S., Crook, C., & Noss, R. (2012). *Decoding Learning: The Proof Promise and Potential of Digital Education*. NESTA.

Rashid, T., & Asghar, H. M. (2016). Technology use, self-directed learning, student engagement and academic performance: Examining the interrelations. *Computers in Human Behavior*, *63*, 604–612. https://doi.org/10.1016/j.chb.2016.05.084

Salloum, S. A., Qasim Mohammad Alhamad, A., Al-Emran, M., Abdel Monem, A., & Shaalan, K. (2019). Exploring Students' Acceptance of E-Learning Through the Development of a Comprehensive Technology Acceptance Model. *IEEE Access*, *7*, 128445–128462. https://doi.org/10.1109/ACCESS.2019.2939467

Tarhini, A., Hone, K., Liu, X., & Tarhini, T. (2017). Examining the moderating effect of individual-level cultural values on users' acceptance of E-learning in developing countries: a structural equation modeling of an extended technology acceptance model. *Interactive Learning Environments*, *25*(3), 306–328. https://doi.org/10.1080/10494820.2015.1122635