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LEARNING MANAGEMENT SYSTEMS AND STUDENTS' PERCEPTION OF TEACHER PERFORMANCE: A KUWAIT HIGHER EDUCATION PERSPECTIVE

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ABSTRACT

Aim/Purpose	This study examines how students perceive the impact of Learning Management Systems (LMS) on teachers' performance at Kuwait's higher education institutions.
Background	Learning institutions integrate LMS into their teaching methods to unlock numerous benefits. A performance-based approach is crucial for understanding the complex, multidisciplinary nature of teaching performance in an LMS-based blended learning environment.
Methodology	Cross-sectional data were collected from 473 LMS users at Kuwait's higher education institutions via questionnaires. Partial Least Squares Structural Equation Modelling (PLS-SEM) using SmartPLS was employed to test the hypotheses presented in the research model.
Contribution	This study extends the DeLone and McLean Information Systems Success Model by incorporating social influence, along with LMS quality factors (information quality, system quality, and service quality), to explain students' LMS usage and their perceptions of teaching performance. Additionally, the influence of technology on teaching performance is overlooked compared to student academic performance.

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Findings	This study's findings suggest that, to improve teaching performance through LMS, higher education institutions should actively encourage students to increase their use of the LMS. In addition, the findings support the conclusion that the administration should ensure that students have access to a high-quality LMS with updated, easy-to-use features that align with technological advancements, thereby creating a user-friendly experience.
Recommendations for Practitioners	Kuwait's higher education system should implement LMS features that: facilitate faculty experience and encourage student use; improve communication with technical support to customise plugins and tailor the LMS to specific needs; and invest in networks and infrastructure to ensure reliability, ease of use, and speed.
Recommendations for Researchers	Researchers must apply models and theories across different contexts with caution. Specifically, socio-economic and socio-cultural contexts are key to framing questions or justifying the choice of a theoretical angle.
Impact on Society	Because implementing systems in instructional design requires a considerable investment, research like the current study enables learning institutions to move beyond assumptions and focus on what truly matters.
Future Research	Future researchers should test and evaluate the model across different universities and LMS platforms, as this study focuses solely on Moodle. Researchers interested in LMS usage and teacher performance should broaden their scope to include other educational institutions, helping to overcome the current limitations of teacher performance studies in Kuwait.

Keywords	learning management systems, LMS, e-learning, teaching performance, Delone & McLean IS Success Model, Kuwait higher education

INTRODUCTION

A major university in Kuwait has adopted Moodle as its primary learning management system to foster an interactive learning environment and enhance educational outcomes (Kuwait University, 2026a). Moodle, one of many LMS options, manages and stores information about users, programs, and content, fulfilling the needs of all stakeholders within educational institutions or organisations (Veluvali & Surisetti, 2022). The university incorporates Moodle, among other Information and Communication Technologies (ICTs), as part of a blended learning approach rather than as a substitute for traditional instructional methods. While students typically attend full-time on campus, the university employs e-learning systems, such as Moodle, to maximise the benefits of e-learning (Kuwait University, 2026b). As stated by the university e-learning centre, these advantages include overcoming time and geographical barriers, optimising educational resources, and providing support throughout the educational process (Kuwait University, 2026a).

Blended learning is one e-learning approach that has become a prevalent instructional method globally in recent years. In this context, the instructor's role and the effective application of teaching practices heavily influence how students engage with the system and learning tasks, including their initiation of discussions (Kara & Yildirim, 2022; Rabaa'i et al., 2021). Additionally, improving teaching practices in higher education, as well as the systems that support learning, can affect student performance and help maintain a positive university reputation (Kite et al., 2020; Rabaa'i et al., 2021). A performance-based approach is essential for understanding the complex, multidisciplinary nature of teaching performance in the blended learning environment (Kara & Yildirim, 2022). Hence, in the context of LMS adoption, teaching performance plays a crucial role as it directly impacts the efficiency of the teaching and learning process.

Prior studies have not fully investigated the effectiveness of LMS use in terms of its impact on teaching practices and performance outcomes (Al-Nuaimi & Al-Emran, 2021; Kurnia Prahani et al., 2022). In practice, Kuwait's wealthy economy allows for significant investment in education, with a focus on strategic planning and resource allocation for infrastructure projects, information and communication technologies (ICTs), and educational systems (Ministry of Foreign Affairs, 2017). This is evident in the Kuwait estimate of spending on education of ≈7.8% of the gross domestic product (GDP) in 2021, while it is ≈5.9% in the UK, ≈5.4% in the USA, and ≈2.8% of the GDP in Singapore (Alhashem & Alhouti, 2021; World Bank, 2026). This confirms that the top educational nations allocate less funding to education than Kuwait does, but achieve better educational outcomes.

Despite this, KU's performance evaluation metrics, like the Quacquarelli Symonds World University Rankings (781–790 range in 2026), Times Higher Education Impact Ranking (18th rank in teaching in 2026), and Round University Ranking (2025) system (ranked 746th in 2025), place it in the lower tier of global universities (QS Quacquarelli Symonds, 2026; Round University Ranking, 2025; Times Higher Education, 2026). Global indexes like the Human Development Index (HDI) rank Kuwait 52nd globally and last among the GCC countries in 2024/2025 (United Nations Development Programme, 2020). Furthermore, in 2021, the Technology and Innovation Index ranked Kuwait 58th, placing it in the Upper-middle group, largely due to its high score in the ICT dimension. However, its rankings in the "Skills" and "R&D" dimensions are comparatively lower (United Nations Trade and Development, 2021). This could indicate a potential gap in ICT or systems integration practices in Kuwait. The literature also confirms that access to advanced ICTs and e-learning systems in universities does not necessarily lead to better outcomes (Al-Fraihat et al., 2020; El-Sayad et al., 2021; Rajabalee & Santally, 2021). In the case of Kuwait, if such investments do not contribute to the performance enhancement of a learning institution's stakeholders, then it is worth investigating the problem. Thus, this study aims to investigate the relationship between LMS use (particularly Moodle) and students' perceptions of their teaching performance in Kuwait's higher education.

LITERATURE REVIEW

Numerous theories and models are used within the e-learning technology adoption domain, including the Technology Acceptance Model 1 (TAM1), the Technology Acceptance Model 2 (TAM2), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Theory of Reasoned Action (TRA), among others (Choudhury & Pattnaik, 2020). The updated DeLone and McLean Information Systems Success Model (D&MISSM) has been widely used to assess the efficacy of e-learning systems (Rokhman et al., 2022) and is regarded as one of the most appropriate models in this context (Sabeh et al., 2021). This model proposes that information quality, system quality, and service quality influence system usage, which in turn predicts net benefits, such as stakeholder performance (DeLone & McLean, 2003). Most Information Systems (IS) theories examining LMS adoption in education focus on user attitudes and do not adequately explain user performance arising from the technology's actual usage behaviour, as demonstrated by D&MISSM (Al-Nuaimi & Al-Emran, 2021). Investigating usage behaviour rather than attitude would help address this theoretical gap in the literature within this context (Al-Nuaimi & Al-Emran, 2021; S. Wang et al., 2021). Furthermore, the D&MISSM has predominantly been used in research conducted in developed nations, with limited efforts in e-learning in developing countries (Pushparaj et al., 2022), such as Kuwait, where its validation in a significantly different culture would be a valuable contribution.

The primary focus of the e-learning literature has been on student performance (Valverde-Berrocoso et al., 2020; Wong & Li, 2020). However, there is a significant gap in the literature on the assessment of teachers' performance (Alhumaid et al., 2020; Kara & Yildirim, 2022; Wong & Li, 2020), particularly in Kuwaiti higher education institutions (Al-Hunaiyyan et al., 2021). Contemporary Artificial Intelligence (AI) LMS-driven research also dominantly focuses on student learning behaviour and performance. For example, Padhy et al. (2025) argued that AI-powered LMS greatly improves teaching by shifting traditional classroom methods into personalised, adaptable, and analytics-based ones.

However, the evaluation was based on comparisons of students' scores, completion rates, and engagement levels, leaving the effectiveness of teaching practices and performance unexplored in the AI LMS literature. There is still a lack of clarity regarding the factors that influence instructors' teaching performance when using and interacting with LMS (Kite et al., 2020). Another area that lacks sufficient attention is the predominant focus of research on LMS adoption among respondents from specific disciplines within Higher Education Institutions, such as business administration, IS, and educational technologies (Al-Nuaimi & Al-Emran, 2021). As the experience of learning and teaching with LMS may vary across subjects, conducting a study across disciplines, as proposed here, would help address this gap. Consequently, this study makes a significant contribution to the field from multiple perspectives.

The following section provides a more detailed explanation of the proposed research model and the hypotheses for each association. These have been derived from an analysis of relevant scholarly literature.

Social Influence

Hofstede's theoretical framework is among the most commonly used theories for studying cultural impacts in research (Minkov & Kaasa, 2022). Hofstede's cultural dimensions are also useful for examining students' behaviour and attitudes towards e-learning systems (Jan et al., 2024). Drawing on the model, Kuwait can be characterised by relatively high levels of collectivism (60), power distance (80), and uncertainty avoidance (86) (Hofstede, 1986). Together, these cultural dimensions suggest that individuals' behaviour is shaped not only by personal preferences but also by social expectations and the need for structured, predictable learning experiences, highlighting the significance of the teacher role as a formal educational channel.

A successful LMS should integrate a variety of technological, pedagogical, cultural, and social elements (Al-Hunaiyyan et al., 2020). The educational framework in Kuwait reflects a collectivist culture (Alkhadher et al., 2020; Hofstede, 1986) and a high level of uncertainty avoidance, in which teachers are perceived as having all the answers and playing a prominent role in ensuring certainty and structure to students' educational experiences (Hofstede, 1986). The cultural background can significantly shape the social influence and subsequent technology adoption and use (Graf-Vlachy et al., 2018; Nofita et al., 2024), which is primarily relevant in a culture like Kuwait (Aljazzaf, 2020; Almisad & Alsalim, 2020). The impact of social influence as a factor has not been thoroughly examined in terms of its effects on system usage behaviour (Graf-Vlachy et al., 2018; Nofita et al., 2024).

Social influence refers to the impact of instructors, peers, and administrators on learners' use behaviour of LMS (Cavus et al., 2021). In their assessment of the effectiveness of e-learning systems, Al-Fraihat et al. (2020) observed that social elements within the learning environment, such as the social influence of instructors and learners, significantly affect e-learning use behaviour. Additionally, N. Li et al. (2023) investigated the factors influencing the adoption of e-learning systems and found that social and cultural factors, such as social influence, play a role in LMS adoption.

As a result, the following is hypothesised:

H1: Social influence has a significant positive effect on LMS use.

LMS Information Quality

Information quality refers to the characteristics of LMS information, such as its accuracy, presentation, usefulness, and timeliness (Çelik & Ayaz, 2022). In a meta-analysis of e-learning systems, Mehta et al. (2021) found that information quality has a moderate effect on system usage in some studies, but no effect in others. Additionally, e-learning literature indicates that information quality does not significantly affect system usage (Rokhman et al., 2022; Salam & Farooq, 2020). However, Al-Adwan et al.'s (2021) research revealed that when university students perceive the information in e-learning

systems as well-designed, regularly updated, and useful, their usage increases. Furthermore, Rokhim et al. (2022) found that information quality has a significant positive effect on LMS use.

As a result, the following is hypothesised:

H2: LMS information quality has a significant positive effect on students' LMS use.

LMS System Quality

System quality refers to an LMS's performance in terms of functionality, reliability, ease of use, and speed (Cavus et al., 2021). Although Salam and Farooq (2020) did not find a significant impact of system quality on system usage, many other scholars have reached a different conclusion. For example, Al-Fraihat et al. (2020) concluded that various elements of e-learning system quality, such as the availability of communication tools and interactive features, diversity in learning styles, and the provision of assessment features, among others, have a significant impact on e-learning system usage. Additionally, Al-Adwan et al. (2021) concluded that students' perceptions of the quality of e-learning systems, such as LMS, are positively correlated with higher rates of student usage. Furthermore, Almaiah et al.'s (2020) findings emphasise the critical role of LMS system quality characteristics in influencing e-learning system usage, suggesting that universities should consider these factors when developing future plans.

Therefore, the following is hypothesised:

H3: LMS system quality has a significant positive effect on students' LMS use.

LMS Service Quality

LMS service quality can be defined as the quality of support provided by LMS support staff in terms of assurance and responsiveness (Çelik & Ayaz, 2022). This study evaluates service quality based on the speed of technical support, service availability, recognition of user needs, and interest in technical support. Al-Fraihat et al. (2020) and Salam and Farooq (2020) proposed that service quality does not substantially affect students' use of e-learning systems in higher education. In contrast, Al-Adwan et al.'s (2021) research findings indicate a positive correlation between providing high-quality service to support students' needs and the use of e-learning systems. Additionally, Çelik and Ayaz's (2022) study found that service quality has a significant, positive effect on LMS use. Specifically, if the system's service is available, dependable, and fully supports student affairs, it will likely enhance students' usage of LMS (Çelik & Ayaz, 2022).

As a result, the following is hypothesised:

H4: LMS service quality has a significant positive effect on students' LMS use.

LMS Use

LMS use refers to the frequency and duration of users' LMS use (Isaac et al., 2017). Çelik and Ayaz's (2022) research findings indicate that the use of e-learning systems in higher education does not improve stakeholder performance. On the other hand, Kara and Yildirim (2022) emphasised the significance of LMS use as a crucial tool in e-learning and its potential to affect faculty performance. Other scholars also confirmed that the use of e-learning systems can predict user performance in higher education e-learning (Al-Adwan et al., 2021; Alamri et al., 2020). Furthermore, Brozina et al.'s (2019) findings supported a positive correlation between students' LMS usage behaviour and stakeholders' performance in an e-learning environment.

Therefore, this study suggested the following hypothesis:

H5: LMS system use has a significant positive effect on students' perception of teaching performance.

TEACHING PERFORMANCE

Student perception of teaching performance is characterised by students' judgments of the instructor's successful execution of teaching practices that facilitate teaching and course management through the LMS (Larbi-Apau et al., 2017). Chickering and Gamson's (1987) framework provided a foundational analysis of essential principles for effective teaching, which was later adapted to include technology as an instructional medium. Accordingly, this study assessed teaching performance through the effective implementation of teaching practices based on these principles, including fostering communication between students and faculty, promoting cooperation among students, employing active learning strategies, providing timely feedback, and acknowledging diverse learning styles and abilities (Chickering & Ehrmann, 1996; J. Wang et al., 2013).

The research discussed largely examines LMS effects on engagement, satisfaction, and acceptance, and often overlooks variations in teaching performance and quality resulting from actual system usage behaviour. An individual's performance is a key factor in evaluating the effectiveness of an IS (DeLone & McLean, 2003). A variety of measures exist for assessing a successful educational experience, but the effectiveness of teaching is particularly crucial in higher education (Kara & Yildirim, 2022). In the context of e-learning, the use of an LMS to evaluate teaching performance is a valuable indicator of success, complementing other benefits, such as improved student academic outcomes (Kite et al., 2020). Figure 1 illustrates the proposed research model for the current study.

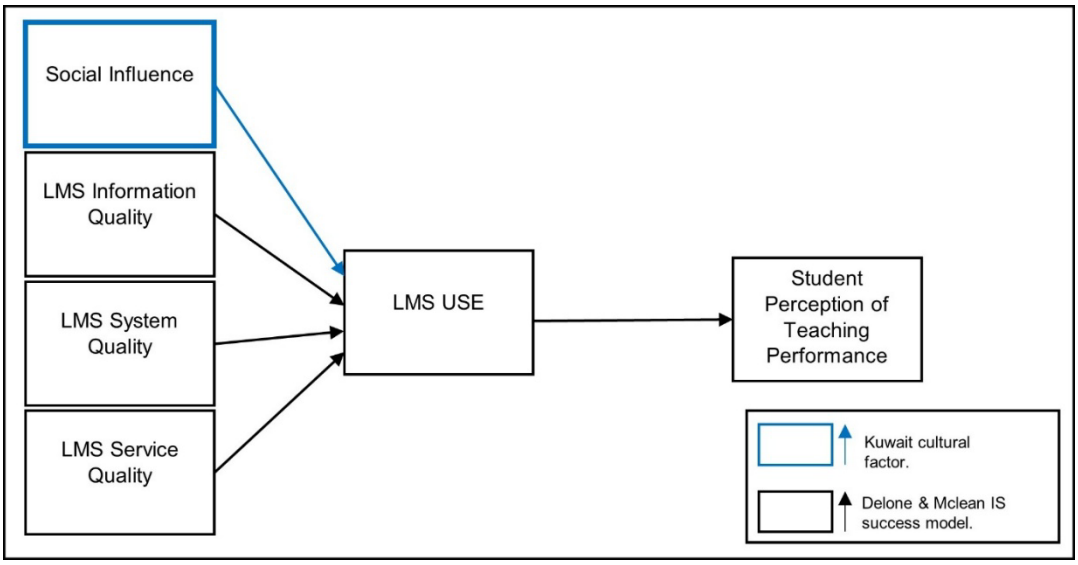

Figure 1. The developed research model

METHODS

DATA COLLECTION

The data for this study were gathered from undergraduate students in Kuwait using non-probability quota sampling to enhance representation of the student population. Although criticised for results that may not fully represent the population, non-probability sampling was used because a sampling frame or population list was unavailable, making probability sampling impossible.

Respondents were targeted to meet the following criteria: (1) the percentage of total LMS student users in each college, and (2) the overall gender distribution percentage at KU. The criteria were informed by institutional data from KU statistics, which include the percentage of LMS users across

colleges and the overall gender distribution of students. These figures helped shape the quota sampling method to ensure the sample reflected the student population.

The electronic questionnaire link, created using SurveyMonkey, was shared with respondents face-to-face in their classrooms. Participation depended on classroom access; the sample might be affected by the presence of specific groups, potentially impacting its representativeness. However, the face-to-face approach enables a higher response rate, ensures the questionnaire is completed, and allows the researcher to offer immediate explanations when respondents experience confusion (Bell et al., 2022). This data collection strategy also allows greater control over the targeted quota sample percentages and distribution based on the required criteria, resulting in balanced percentages across the needed characteristics (e.g., targeted males = 24.5%, obtained = 31.3%; targeted females = 75.5%, obtained = 64.3%, and balanced percentages based on the college's user numbers); however, some imbalance still exists. Thus, among the 35,910 students, 898 questionnaires were distributed, of which 473 were returned and fully completed, yielding a response rate of 52.7%, consistent with previous studies (L. Li et al., 2021). Because the research involves human participants, an application was submitted to the Norwich Business School Research Ethics Committee at the University of East Anglia, and approval was granted to proceed.

Constructs Measuring Instruments

The research instruments employed a 5-point Likert scale, with 1 indicating "strongly disagree" and 5 indicating "strongly agree". The questionnaire was translated from English to Arabic and then back-translated to ensure translation accuracy. The back-translation process involves comparing the two versions to ensure that the meaning is preserved. The study model constructs were measured using multiple items adapted from validated scales in prior research (Al-Adwan et al., 2021; Cavus et al., 2021; Isaac et al., 2017; J. Wang et al., 2013) and modified to fit the study's context. Adaptation included slight wording changes to improve relevance and clarity for the target sample while preserving the constructs' original meaning. Full details of the construct measurement items are available in Appendix A.

Both questionnaire versions (Arabic and English) were reviewed and pretested by a panel of three subject-matter and language experts to assess clarity and contextual appropriateness, resulting in minor refinements. The instruments were then pilot-tested with 66 participants, using Cronbach's alpha and factor loadings to evaluate item clarity and reliability. The pilot study verified the instrument's adequacy, and the final version was retained for the main study. The final questionnaire comprised 22 items measuring social influence, LMS quality factors, LMS usage, and teaching performance.

Statistical Analysis

The Statistical Package for Social Sciences (SPSS) version 29.0 (IBM SPSS, 2024) was used for data preparation and descriptive analysis. Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS version 4 (Ringle et al., 2024) is used as the statistical tool to examine the measurement (outer model) and structural (inner model) models. This is considered the best choice for several reasons. First, the study model involves multiple dependent variables, each predicted simultaneously by multiple independent variables, as well as latent constructs measured by various indicators; therefore, it is considered a complex model, which aligns with the PLS-SEM method. Second, a review of the literature suggests that PLS-SEM is more appealing for explanatory research that emphasizes cause-and-effect relationship models aimed at predicting or explaining a particular phenomenon (Hair & Alamer, 2022; Ringle et al., 2024). The current study is explanatory, as it extends the updated Delone & McLean Information System Success Model to develop the research model. Therefore, the study focuses on theory development and prediction, aligning with the rules of thumb for PLS-SEM, whereas Covariance-Based SEM (CB-SEM) focuses on theory testing. Last but not least, the current dataset deviates from the assumption of multivariate normal distribution (skewness $\beta = 13.79713$, $p < 0.01$; kurtosis $\beta = 116.09999$, $p < 0.01$), necessitating the use of PLS-SEM, a non-parametric analysis tool.

RESULTS

Table 1 presents the demographic profile of the participants with a sample of 473 individuals. The gender distribution shows a slight majority of female participants (64%), males (31%), and 4% who chose not to disclose their gender. These figures mirror the population's gender composition: 75% female and 25% male. The age distribution shows a large proportion of individuals aged 20-21, making up 47% of the sample, followed by 18-19-year-olds at 23% and 22-23-year-olds at 21%. Regarding marital status, 90% are unmarried, 7% are married, and 3% have not disclosed their status. Regarding academic progression, the majority (67%) were in their first year of study, with 13% in their third year, 11% in their second year, and 9% in their fourth year or beyond. The grade point average (GPA) distribution indicates that 40% of participants had a GPA between 2.99 and 2.33 (C grade), followed closely by 39% with a GPA between 3.66 and 3.00 (B grade), 12% with a GPA between 4.00 and 3.67 (A grade), and 9% with 2.23 or less (D grade or less). The field of study highlights diverse representation, with the College of Education having the highest participation rate at 19%, followed by the College of Art at 16%, and the College of Engineering and Petroleum at 11%, while other colleges have relatively lower representation, each accounting for 10% of the sample or less.

Table 1. Demographic profile of participants (n = 473)

Demographic profile	Frequency	Percent
Gender		
Male	148	31%
Female	304	64%
Prefer not to answer	21	4%
Age		
18-19	107	23%
20-21	223	47%
22-23	99	21%
24 and more	44	9%
Material status		
Married	34	7%
Not married	426	90%
Prefer not to answer	13	3%
Year of study		
First-year	316	67%
Second-year	50	11%
Third-year	63	13%
Fourth-year and above	44	9%
GPA		
4.00 - 3.67	56	12%
3.66 - 3.00	185	39%
2.99 - 2.33	191	40%
2.23 or less	41	9%
Field of study (college)		
College of Art	74	16%
College of Education	91	19%
College of Business Administration	32	7%
College of Medicine	11	2%
College of Pharmacy	5	1%
College of Public Health	3	1%
College of Dentistry	4	1%

Demographic profile	Frequency	Percent
College of Allied Health Sciences	14	3%
College of Engineering and Petroleum	54	11%
College of Architecture	7	1%
College of Science	40	8%
College of Social Science	41	9%
College of Life Sciences	18	4%
College of Shari'a and Islamic Studies	45	10%
College of Law	34	7%

MEASUREMENT MODEL

Table 2 presents the measurement model's reliability and validity metrics for several constructs. In social science studies, indicators with very low outer loadings below 0.40 should be eliminated (Hair & Alamer, 2022; Hulland, 1999; Urbach & Ahlemann, 2010). However, outer loadings of 0.40 to 0.70 should only be considered for removal when the internal consistency reliability (Cronbach's Alpha α and Composite Reliability Index) or convergent validity (AVE) are below the suggested threshold values of 0.7 and 0.5, respectively (Hair & Alamer, 2022; Hulland, 1999; Urbach & Ahlemann, 2010).

As shown in Figure B1 (Appendix B), the item IQ2 had poor loading (0.187) on its constructs, such as "IQ2 - I find Moodle content and information accurate". However, other items exhibit acceptable levels of reliability and validity. Consequently, item IQ2 was removed, and the statistical process of instrument validation was re-run. The results of the second run are shown in Figure B2 (Appendix B).

Table 2. Measurement model

Construct	Item	Indicator reliability	Internal consistency reliability		Convergent validity
		Factor loadings >0.4	Cronbach's alpha >0.7	Composite reliability >0.7	AVE >0.5
Social Influence (Soc)	Soc1	0.74	0.753	0.856	0.665
	Soc2	0.813			
	Soc3	0.887			
LMS Information Quality (IQ)	IQ1	0.683	0.744	0.806	0.594
	IQ3	0.985			
	IQ4	0.586			
LMS Quality (SQ)	SQ1	0.668	0.77	0.854	0.596
	SQ2	0.757			
	SQ3	0.796			
	SQ4	0.856			
LMS Service Quality (SerQ)	SerQ1	0.693	0.77	0.788	0.5
	SerQ2	0.502			
	SerQ3	0.666			
	SerQ4	0.889			
LMS Use (U)	U2	0.875	0.703	0.871	0.771
	U1	0.881			
	TP1	0.783	0.885	0.916	0.685

Construct	Item	Indicator reliability	Internal consistency reliability		Convergent validity
Teaching Performance (TP)	TP2	0.877			
	TP3	0.874			
	TP4	0.825			
	TP5	0.773			

Constructs presented in Table 2, which are Social Influence (Soc), LMS Information Quality (IQ), LMS System Quality (SQ), LMS Service Quality (SerQ), LMS Use (Use), and Teaching Performance (TP), showcase satisfactory reliability and validity. All constructs demonstrate acceptable reliability with a Cronbach's alpha greater than 0.7, composite reliability greater than 0.7, and acceptable convergent validity as evidenced by an average variance extracted (AVE) greater than 0.5 (Fornell & Larcker, 1981; Hair & Alamer, 2022; Urbach & Ahlemann, 2010).

Discriminant validity measures how well a construct is genuinely distinct from others. Table 3 presents the results of the Heterotrait-Monotrait Ratio (HTMT) used to assess discriminant validity among constructs in the measurement model. The HTMT ratios compare correlations between different constructs (heterotrait) to correlations within the same construct. In this analysis, all HTMT ratios are notably below the conservative threshold limit of 0.9 (Franke & Sarstedt, 2019; Henseler et al., 2015), indicating that correlations between constructs are generally lower than correlations within constructs, supporting discriminant validity. This indicates that the study fulfils both reliability and validity standards. The data can now be analysed further to extract structural measurements.

Table 3. Heterotrait-monotrait ratio (HTMT)

	IQ	SQ	SerQ	Soc	TP	Use
IQ						
SQ	0.183					
SerQ	0.089	0.09				
Soc	0.239	0.879	0.103			
TP	0.174	0.753	0.078	0.77		
Use	0.149	0.874	0.095	0.771	0.738	

STRUCTURAL MODEL

After the measurement model is evaluated, the next step is to assess the structural model, which is also called the inner model in PLS-SEM. There are four main steps involved in assessing the structural model: Step 1, assessment of structural model potential collinearity issues; Step 2, assessment of the significance and relevance of the structural model relationships; Step 3, assessment of coefficient of determination (R^2); and Step 4, assessment of the effect size (f^2) (Hair & Alamer, 2022; S. Wang et al., 2023). Table 4 presents the results of PLS bootstrapping, including beta values, t-values, p-values, confidence intervals (5% and 95%), f^2, and variance inflation factor (VIF) scores.

Based on recent recommendations in the literature, bootstrapping is set at a 0.05 significance level for a one-tailed test with 10,000 sub-samples (Becker et al., 2023; Hair & Alamer, 2022). In social science, researchers usually assume a significance level of 5%, which is applied in this study (Hair & Alamer, 2022). Figure C1 in Appendix C summarises the results of the structural model.

Table 4. Summary of structural model (PLS bootstrapping)

H	Paths	β	Std. error	T statis-tics	P values	CI LL 5%	CI LL 95%	f^2	Effect size	VIF	Decision
H1	Soc -> LMS U	0.174	0.044	3.967	0.000*	0.102	0.247	0.364	Substantial	1.895	Supported
H2	LMS IQ -> LMS U	0.034	0.034	1.002	0.158	-0.064	0.073	0.002	No effect	1.053	Not supported
H3	LMS SQ -> LMS U	0.589	0.044	13.509	0.000*	0.516	0.658	0.401	Substantial	1.884	Supported
H4	LMS SerQ -> LMS U	-0.060	0.046	1.324	0.093	-0.099	0.079	0.008	No effect	1.009	Not supported
H5	LMS U -> TP	0.587	0.033	17.531	0.000*	0.527	0.637	0.525	Substantial	1	Supported

Note: (Soc) = social influence, (U) = LMS usage, (IQ) = information quality, (SQ) = system quality, (SerQ) = service quality, (TP) = teaching performance, *P<0.001, (VIF) = variance inflation factor

Assess the structural model for collinearity

Multicollinearity arises when two highly correlated variables exist (Hair et al., 2019). Table 4 provides insights into the assessment of collinearity among predictor variables using VIF values. VIF values below 3.3 indicate acceptable levels of multicollinearity (Diamantopoulos & Siguaw, 2006). All inner VIF values are below this threshold, indicating that collinearity is not a concern in this study.

Assess the significance and relevance of structural model relationships

A bootstrapping procedure is employed to produce results for each path relationship in the model to test the hypotheses, as shown in Table 4. For this study, five hypotheses are developed. To test the significance level, t-statistics for all paths are computed using SmartPLS 4 bootstrapping, a nonparametric method that replaces the original sample with bootstrap samples. This method helps obtain bootstrap standard errors, which, in turn, allow the computation of t-values and p-values for all structural path coefficients (Becker et al., 2023; Hair & Alamer, 2022). Critical values for a one-tailed test are 1.28 (significance level = 10%), 1.65 (significance level = 5%), and 2.33 (significance level = 1%). Additionally, path coefficients are standardised to approximately -1 to +1, with values close to +1 indicating a strong positive relationship, and values closer to 0 indicating a weaker relationship (Hair & Alamer, 2022).

Table 4 presents the effects of the model's paths, explaining the relationships among constructs. For the t-test, relationships are found to have t-values ≥1.645, thus significant at 0.05 for H1 (β=0.174, t=3.967, p<.001), H3 (β=0.589, t=13.509, p<.001), and H5 (β=0.587, t=17.531, p<.001), and they are found to be all positive. However, H2 and H4 are not supported, indicating no significant effects of LMS Information Quality and LMS Service Quality on LMS Use, respectively, given their non-significant t-values (1.002 and 1.324).

Assessment of the coefficient of determination (R^2)

A model's explanatory power (or in-sample predictive power) is related to its ability to fit the data, estimate parameters, and predict observations. The most commonly used measure to evaluate the explanatory power of the structural model is the coefficient of determination (R^2), which indicates the proportion of variance in each variable that is explained by the model's predictor variables. The R^2 values range from 0 to 1. A higher value indicates a greater level of predictive accuracy. A. Cohen

(1989) detailed three levels of R^2: 0.02, 0.13, and 0.26, representing weak, moderate, and substantial predictive accuracy.

Table 5 presents the R^2 values for the variables LMS use and student perception of teaching performance. These values indicate that for LMS use, the predictors account for approximately 53.8% of the variance. The model explains approximately 34.4% of the variance in students' perceptions of teaching performance.

Table 5. Coefficient of determination R^2

Construct	R^2
LMS use	0.538
Student perception of teaching performance	0.344

The R^2 values observed in this study are consistent with those reported in the literature. For instance, Heo and Han (2021) reported an R^2 value of 31% in their study. This indicates that the current study model can accurately predict 31% of the factors influencing teaching performance, a rate considered acceptable within social science research.

Assessment of effect size (f^2)

Another commonly used metric to assess a model's explanatory power is the effect size (f^2). This measure indicates the extent to which the R^2 value changes when a specific construct is removed from the model (J. Cohen, 1988; Hair & Alamer, 2022). The f^2 assesses the relative impact of a predictor construct on endogenous constructs. In social science research, scholars generally follow J. Cohen's (1988) guidelines for interpreting effect sizes (Hair et al., 2017). According to J. Cohen, effect sizes of 0.02, 0.15, and 0.35 indicate small, medium, and substantial effects, respectively.

Therefore, following J. Cohen's (1988) rule of thumb, Table 4 shows that both Social Influence (Soc) and LMS System Quality (LMS SQ) have substantial effects on the R^2 for LMS Use (LMS U), with values of 0.364 and 0.401, respectively. In addition, the LMS Use (LMS U) effect size is 0.525, showing a substantial effect on students' perception of Teaching Performance (TP). On the other hand, neither LMS Information Quality (LMS IQ) nor LMS Service Quality (LMS SerQ) affects the production of the R^2 for LMS Use (LMS U).

DISCUSSION

The research hypothesis H1 (social influence has a significant positive effect on students' use of the LMS) is supported. This suggests that, in a culture such as Kuwait, the influence of instructors, peers, and the administration of learning institutions should be considered to accelerate students' LMS usage behaviour. This result is supported by the findings of Al-Fraihat et al. (2020), N. Li et al. (2023), Maisha and Shetu (2023), and Nofita et al. (2024), who consensually conclude that social influence is key in determining students' LMS usage behaviour in higher education.

The research hypothesis H2 (information quality has a significant influence on the use of LMS) is not supported. Despite this finding contradicting the standard view that information quality will encourage students to use the LMS, it aligns with some research findings (Rokhman et al., 2022; Salam & Farooq, 2020). For several reasons, characteristics of the LMS information, such as accuracy, presentation, usefulness, and timeliness, may not be relevant in this context. For instance, students may prioritise using LMS for purposes other than accessing information, such as communicating with instructors and peers or submitting assignments. Another reason that may explain this trend is that, in the context of higher education, students may rely on more reliable sources of information, such as course textbooks or lecture notes. This reliance is particularly prevalent in cultures with high uncertainty avoidance, such as Kuwait (Aljazzaf, 2020; Almisad & Alsalim, 2020).

The research hypothesis H3 (system quality influences LMS use) was supported. This finding aligns with the study by Al-Adwan et al. (2021) and Al-Fraihat et al. (2020), which states that system quality is essential for LMS use. This indicates that when an LMS demonstrates qualities such as reliability, speed, and user-friendliness, it can enhance students' engagement and usage behaviour. Therefore, higher education institutions need to implement an LMS with high system quality characteristics.

The research hypothesis H4 (service quality has no significant effect on LMS students) is also not supported. Despite contradicting the trend of research (Al-Adwan et al., 2021; Çelik & Ayaz, 2022), this finding is consistent with Al-Fraihat et al. (2020) and Salam and Farooq (2020), who find that the quality of service does not substantially affect students' use of e-learning systems in higher education. This suggests that LMS support staff service quality, as measured by responsiveness, availability, recognition of user needs, and interest in providing support, may not be a primary determinant of student LMS usage, unlike other factors. While these factors are undoubtedly important, they could explain several views. Adult students may tend to lean on peers or the instructor for technical issues consultations. Additionally, students in higher education are generally more familiar with technology and e-learning systems, particularly following the COVID-19 pandemic, during which they relied entirely on these systems. As a result, they may require less support to learn to use the LMS.

Finally, the research hypothesis H5 (LMS use significantly influences user performance) is supported. This aligns with the studies by Al-Adwan et al. (2021), Alamri et al. (2020), and Kara and Yildirim (2022) that assess this relationship. This indicates that the more extended students' use of the LMS, in terms of frequency and duration, the better they will perceive teachers' performance. According to Al-Adwan et al. (2021), students' actual use of LMSs indicates their recognition of LMS usability in meeting their learning needs and supporting them in achieving their goals. Encouraging student LMS use would enable a more flexible learning process that better fits their needs in higher education. For example, given their busy schedules, LMS offers several unlimited electronic contact options rather than limited face-to-face opportunities. Also, LMS use offers a variety of active learning techniques that can be tailored to the needs of specific disciplines. LMSs can offer many benefits to all stakeholders in learning institutions, but these benefits will not be realised unless proper use is implemented for such an investment.

CONCLUSION

This study examined the relationship between LMS use (particularly Moodle) and students' perceptions of their teaching performance in Kuwait's higher education. This study contributes to understanding teaching performance, a relatively overlooked research area, by extending the DeLone and McLean Information Systems Success Model to include social influence. Based on a quantitative approach and survey data, the results indicate that social influence and system quality are key factors influencing students' LMS use. However, information quality and service quality were not significant predictors of student LMS use. LMS use was found to play a significant role in shaping students' perceptions of their teaching performance.

THEORETICAL IMPLICATIONS

Theoretically, this research has implications for the IS field. Most IS theories examining LMS adoption in education predict user performance based on user attitudes, such as intention (Al-Nuaimi & Al-Emran, 2021). Thus, the choice of D&MISSM in this research, which explains user performance based on the technology's actual usage behaviour, would have significant theoretical implications for the field. Another theoretical implication is the validation of the D&MISSM across diverse cultures, such as Kuwait. By incorporating the cultural factor of social influence and building upon the D&MISSM, this research enhances the existing model and explores new relationships in the context of LMS system usage and user performance. Additionally, the current study emphasises teaching performance as a relatively underexplored outcome in prior research, expanding the field beyond the usual focus on student-related outcomes.

Practical Implications

The findings of this study suggest that, to achieve better teaching performance via LMS in practice, higher education institutions should effectively encourage students to increase their use of LMS. According to Graf-Vlachy et al. (2018), cultural diversity influences LMS adoption socially, necessitating that institutions ensure the LMS is tailored to students' needs. In Kuwait's culture, where social influence plays a significant role in LMS utilisation, students are likely to be influenced by faculty members to use the LMS. Kuwait's higher education institutions should adopt LMS features that enhance faculty experience to encourage student engagement. For example, they could enable the development of a collaborative course page that consolidates all courses, allowing faculty to easily share resources effectively. Additionally, improve communication channels with technical support to customise or add plugins, thereby tailoring the LMS page to meet specific learning needs.

The study findings imply that the Kuwait higher education administration should ensure that students have access to a high-quality LMS with up-to-date features aligned with technological advancements, thereby creating a user-friendly experience. Kuwait's higher education should prioritise investing in qualified, reliable, and responsive LMSs with continuous maintenance to ensure a smoother experience. Given the cultural factors that significantly influence contexts such as Kuwait, adopting an open-source LMS would be advantageous, as it would enable customisation to local cultural needs.

Given that service quality was not significant and system quality exerted a strong influence, LMS designers may allocate their resources more effectively to improving the user experience rather than addressing post-use issues. Additionally, AI-driven guidance and support tools provide quicker, more effective assistance compared to external services. By enhancing usability and pedagogy, integrating AI into LMS platforms offers an uninterrupted user experience, which can improve usage rate without increasing dependence on reactive support.

Limitation and Future Suggestion

This research scope focuses exclusively on Kuwait's higher education. This may limit the findings of this research to this particular context. Differences in economic and cultural factors may lead to varying findings, with several variables omitted from the factors influencing the use of LMS. Future research should use probability or more systematic sampling to ensure broader student representation, as participation was affected by classroom access and group availability. Also, scholars conducting future research should evaluate the model across multiple LMSs, as this study is limited to Moodle. Scholars conducting research on LMS usage and teachers' performance should expand their scope to include other learning institutions to address the limitations of teacher performance studies in Kuwait (Al-Hunaiyyan et al., 2021). In addition, this study is cross-sectional, which may limit the understanding of LMS user behaviour and performance over time. Longitudinal research is suggested to provide a deeper understanding of the dynamic nature of LMS user behaviour and its impact on stakeholders' performance in Kuwait HEIs. Finally, further studies could leverage learning analytics and AI-driven LMS environments to provide deeper insights into teacher digital pedagogy and teaching effectiveness.

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APPENDIX A: CONSTRUCT MEASUREMENT ITEMS

Construct	Item	Rating scale	Adapted from
Social Influence (Soc)	My faculty member encourages me to use Moodle (e.g., utilising Moodle features).	5-point Likert scale	Cavus et al. (2021)
	My peers and I encourage each other to use Moodle (e.g., share important information).		
	The university encourages me to use Moodle (e.g., Moodle training and advertising).		
LMS Information Quality (IQ)	I find Moodle content and information timely.	5-point Likert scale	Al-Adwan et al. (2021)
	I find Moodle content and information useful.		
	I find Moodle content and information reliable for my learning.		
	I find Moodle content and information accurate.		

Construct	Item	Rating scale	Adapted from
LMS Quality (SQ)	The functions of Moodle allow me to complete my learning tasks effectively.	5-point Likert scale	Cavus et al. (2021)
	Overall, Moodle is highly reliable with minimal down-time.		
	I find it easy to use Moodle.		
	I think that Moodle speed is convenient.		
LMS Service Quality (SerQ)	I think that Moodle's technical support staff at the university responds quickly.	5-point Likert scale	Al-Adwan et al. (2021)
	I think that Moodle's technical support staff at the university is available when I need help.		
	I think that Moodle's technical support staff at the university understands my specific needs.		
	I think that Moodle's technical support staff at the university shows a sincere interest in solving problems.		
LMS Use (Use)	How often do you use Moodle?	5-point Likert scale	Isaac et al. (2017)
	How long do you use Moodle each time?		
Teaching Performance (TP)	My faculty member encourages electronic communication (e.g., messages, notifications, answering questions) with students via Moodle more than face-to-face learning.	5-point Likert scale	J. Wang et al. (2013)
	My faculty member utilises Moodle to develop collaboration (e.g., group activities) between students more than face-to-face learning.		
	My faculty member utilises active learning techniques (e.g., presentations and projects) on Moodle more than face-to-face learning.		
	My faculty member provides more and faster feedback to students via Moodle than in face-to-face learning.		
	My faculty member utilises Moodle in a variety of ways, including teaching, assessing, evaluating, and motivating students.		

APPENDIX B: INSTRUMENT VALIDATION

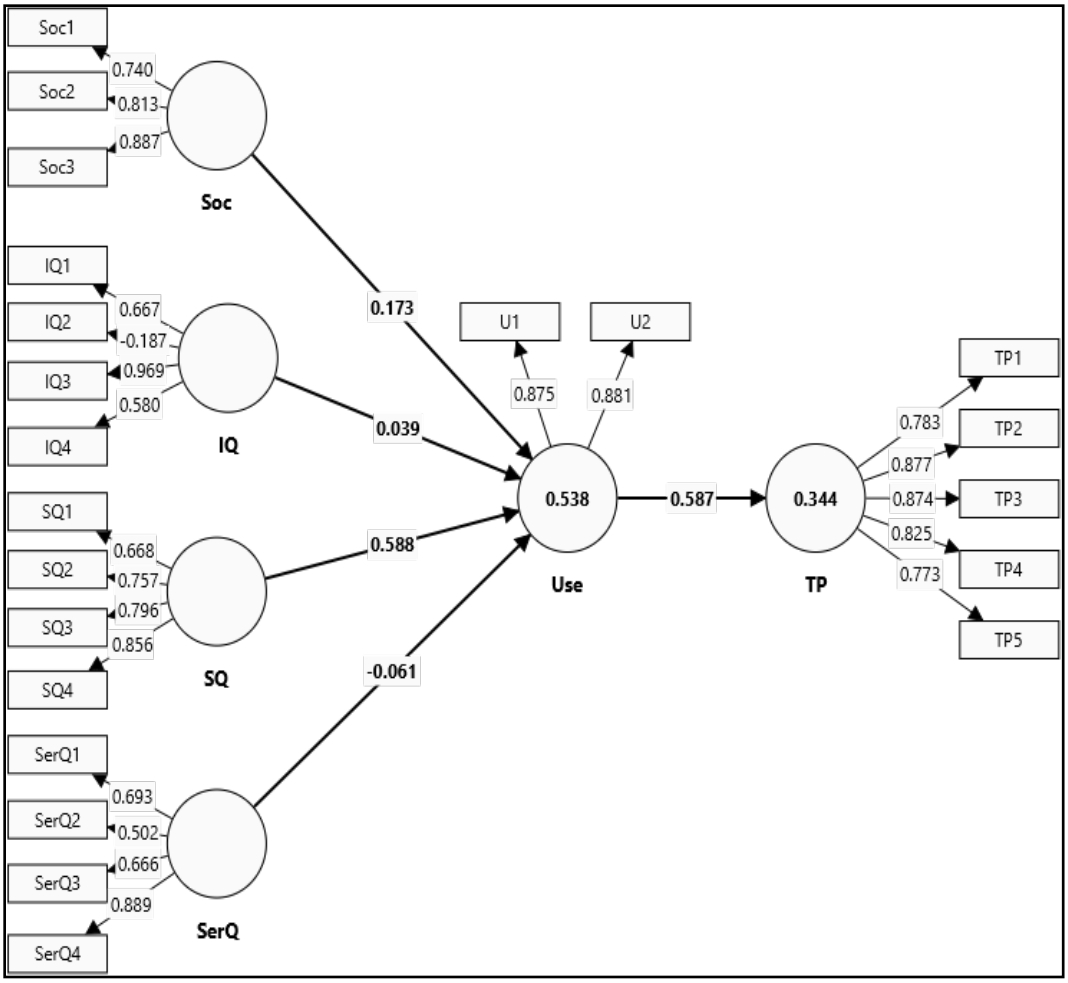

Figure B1. Instrument validation (initial run)

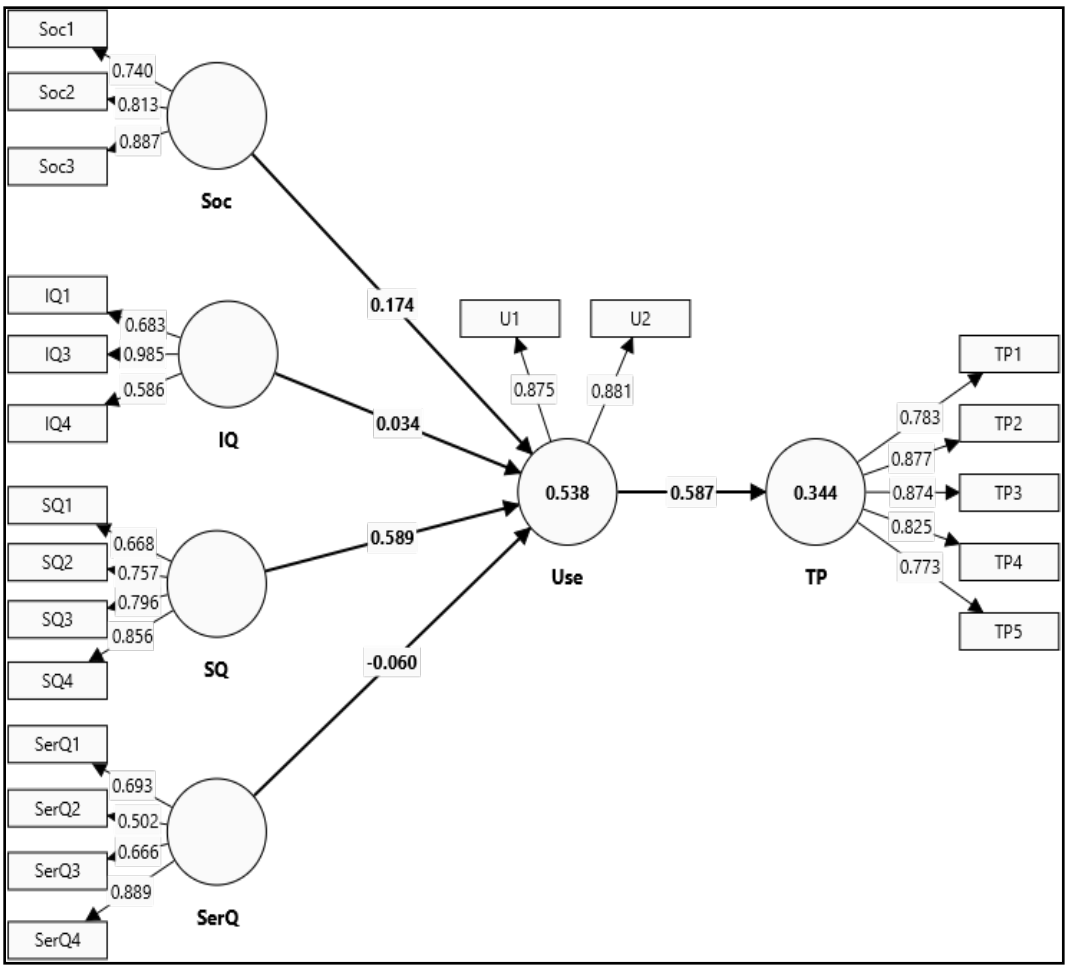

Figure B2. Instrument validation (second run)

APPENDIX C: RESULTS OF THE STRUCTURAL MODEL

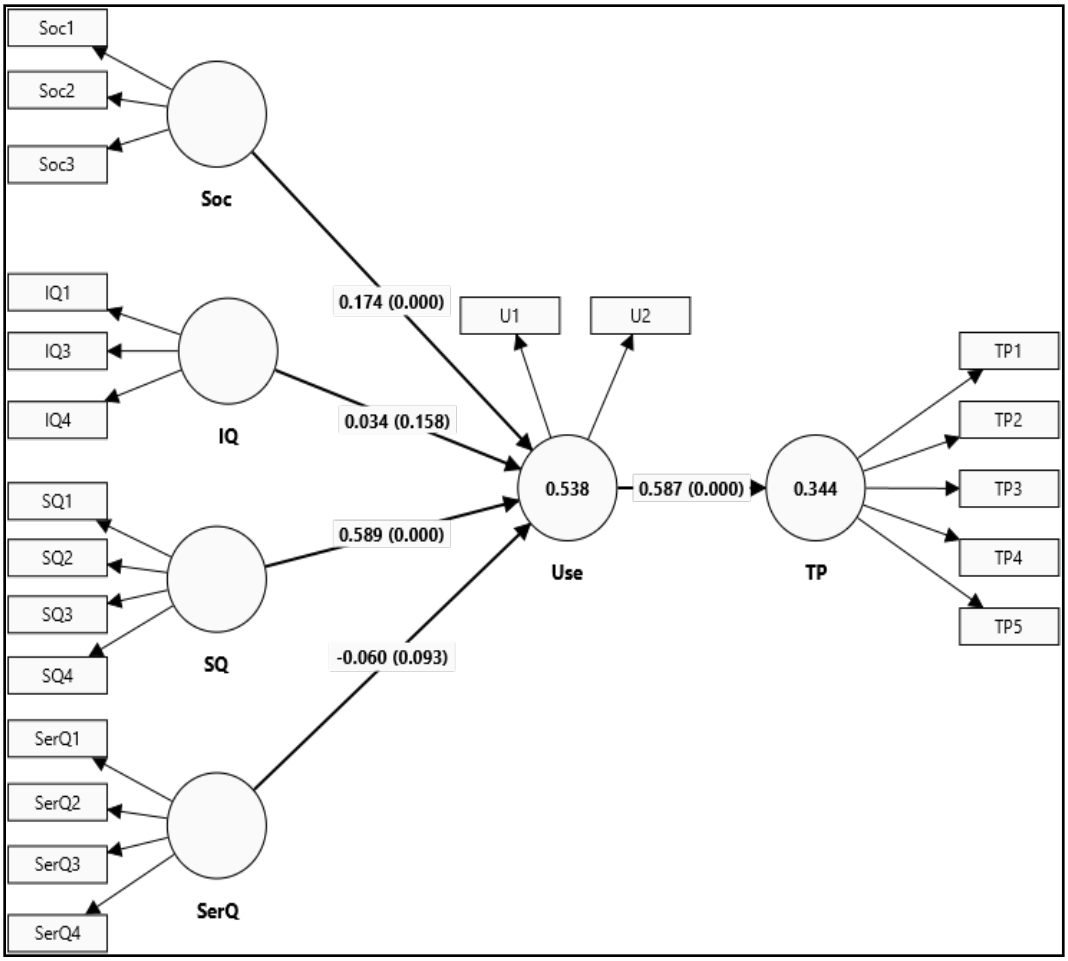

Figure C1. Testing of the research/conceptual model

AUTHORS

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