

Exploring the Nexus of Student Engagement and E-Learning Adoption in Yemeni Universities: Unveiling Behavioral Intentions for Digital Education

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Abstracts: E-learning has transformed higher education by utilizing Information and Communication Technology to provide a more dynamic approach to learning. To effectively implement e-learning in Yemeni public universities, it is vital to identify and address the influences impacting its acceptance. Despite the Yemeni government's efforts to introduce e-learning in both public and private universities, several obstacles must be overcome to ensure the system's success. This study seeks to explore the feasibility of adopting e-learning in Yemen's public universities and examine the influences influencing behavioral intention towards e-learning. To accomplish these aims, the DeLone and McLean Model of Information Systems Success (D&M ISS) and Technology Acceptance Model (TAM) and they were employed as theoretical frameworks. A survey was conducted, and data were collected through a survey from a sample of 250 students across public universities in Yemen. The study models' postulated factors' predictive behavior was examined using structural equation modelling (SEM). The results showed that perceived utility, service quality, information quality, and ICT infrastructure had a substantial impact on students' behavioral intention to engage in e-learning. In addition, attitude and user satisfaction influenced the relationship between these characteristics and behavioral intention.

Keywords: E-learning, DeLone and McLean, TAM Model, Behavioural Intention, Public Universities.

1. INTRODUCTION

In current years, e-learning takes emerged as a revolutionary approach to higher education, leveraging Information and Communication Technology (ICT) to deliver a further dynamic and flexible learning experience. This transformational method of education has the potential to overcome geographical barriers, enhance accessibility, and offer an extensive variety of learning chances to students. In Yemen, a country facing numerous challenges in its educational sector, the receiving of e-learning in public universities holds significant promise for refining the excellence of education and addressing some of the existing limitations. Yemen, a nation located in the Arabian Peninsula, has been grappling with socio-political instability, economic constraints, and limited resources, which have had a detrimental impact on its education system. Public universities, which serve as vital institutions for higher education, have faced numerous challenges in providing quality education to their students. Issues such as limited physical infrastructure, insufficient educational resources, and a shortage of qualified faculty members have hindered the progress of these institutions. Recognizing the need to address these challenges and embrace innovative approaches to education, the Yemeni government has taken initiatives to introduce e-learning in both public and private universities. The aim is to leverage the power of ICT to overcome the existing limitations and provide students with a more accessible and flexible learning environment. However, the effective employment of e-learning in Yemen's public universities requires a thorough understanding of the factors influencing its adoption.

2. LITERATURE REVIEW

2.1. Service Quality

Zeithaml (2002) proposed a model that emphasizes the significance of adhering to regulations in order for service providers to ensure compliance and enhance service quality. Wismantoro et al. (2020) expanded on this model and applied it to the SERQUAL framework, which consists of four dimensions: empathy, reliability, responsiveness, and assurance. In addition to these dimensions, other aspects such as price, time, ease of use,

and usefulness also play a role in evaluating service quality. Parasuraman et al. (2005) introduced a service quality framework that compares the expected service offerings with the actual level of service quality, highlighting two essential information systems for improving serviceability. Data on service performance is gathered via the first information system for management and student motivation. The second information system disseminates valuable information that customers highly appreciate. Ojo (2017), while discussing the DeLone and McLean model, emphasizes the importance of service quality as it pertains to customer satisfaction, considering that current system users are primarily customers rather than just students or internal organizational users.

Indeed, there is evidence to suggest that user satisfaction theatres an intermediating part in the association among service quality and behavioral intention towards e-learning systems. Several studies have shed light on this association, including a study by Henseler, Dijkstra, Sarstedt, Ringle, Diamantopoulos, Straub, and Calantone (2014). In their research, they examined the relationships among service quality, behavioral intention, and user satisfaction. The findings of their study indicated that user satisfaction entertainments as a mediator between service quality and behavioral intention towards e-learning. This implies that when service quality providers enhance the quality of their services, it can lead to increased user satisfaction, which in turn definitely effects students' intention to use the e-learning system.

The research conducted by Al-Shibli and Al-Badi (2021), attitudes were found to mediate the association between service quality and behavioural intentions towards e-learning systems. The study revealed that when students held more positive attitudes towards the quality of services provided by e-learning systems, they were more likely to perceive the systems as high quality and exhibit a greater intention to use them.

Similarly, the study conducted by Hong and Liao (2017) also found that attitudes towards an e-learning system partially mediated the relationship between service quality and behavioral intentions to use the system. The results indicated that when students had a more positive attitude towards an e-learning system, they were more inclined to perceive the services offered by the system as highly beneficial and were more motivated to use it.

Overall, these studies highlight the significance of attitudes in mediating the impact of service quality on behavioral intentions towards e-learning systems. Positive attitudes towards the quality of services providing by e-learning systems can contribute to a higher perception of system quality and an increased intent to use these systems among students.

Subsequently, the subsequent hypothesis is projected:

H1. Service quality has a positive effect on Behavioural intention.

H1a. User satisfaction mediated the relationship between service quality and behavioural intention.

H1b. Attitude mediated the relationship between service quality and behavioural intention

2.2. Information Quality

System utilization, user happiness, and net benefit are all correlated with information quality (Wismantoro et al., 2020; Xu and Du, 2018; McKnight et al., 2017). Information quality includes characteristics like system-based correctness, relevance, timeliness, and comprehensiveness of the information. According to Doll et al. (1994), Baroudi & Orlikowski (1988), and Ives et al. (1983), information quality is frequently a crucial component of instrument end-user satisfaction. As a result, information quality is frequently assessed as a part of user satisfaction rather than being separated as a separate structure. The magnitude of these dimensions is a problem for the success study of IS. According to models developed by DeLone and McLean (1992) and Seddon (1997), system quality and information quality considerably and favourably influence intention and user satisfaction. Information

quality is the user's insight of the value of info generated by the internet that students use to obtain the required information.

There is evidence to suggest that user satisfaction acts as a mediator in the relationship between information quality and behavioral intention towards e-learning systems. Several studies have provided insights into this relationship, including a study conducted by Liu, Li, and Carlsson (2010). In their research, they examined the influence of information quality on user satisfaction and behavioral intention towards e-learning systems. The findings revealed that user satisfaction played a mediating role in the association between information quality and behavioral intention. This suggests that information quality has both a direct and an indirect impact on students' behavioral intention, with user satisfaction playing a crucial mediating role.

Attitudes may mediate the association between information quality and behavioral intentions in e-learning systems. Users' attitudes towards the quality of information provided by an e-learning system may affect their perception of its overall quality and whether they intend to use it. According to, Aparicio, Bacao, and Oliveira (2016) the authors found that attitudes mediate the relationship between information quality and behavioral intentions toward e-learning systems. They found that when students had a more positive attitude towards the quality of information provided by an e-learning system, they were more likely to perceive it as high quality and had a greater intention to use it. Another study in support of this point is Yaseen (2017) found that attitudes toward an e-learning system partially mediate the association between IQ and BI to use the system. Based on the prior studies, this study develops the succeeding hypotheses:

H2. Information quality has a positive effect on Behavioural intention.

H2a. User satisfaction mediated the relationship between information quality and behavioural intention.

H2b. Attitude mediated the relationship between information quality and behavioural intention.

2.3. Perceived Usefulness

Perceived usefulness has a favourable influence on user pleasure, according to several earlier research. Seddon (1997), for instance, found a substantial correlation between perceived utility and user satisfaction in a study of computer-based user accounting systems. In the realm of information systems, perceived usefulness research has also been proven to have a positive impact on user satisfaction (Xiao Xiong et al., 2016; Hong et al., 2006; Lin et al., 2005 Bhattacharjee, 2001). Perceived usefulness, according to Landrum and Prybutok (2004), has a significant impact on contentment.

In a study conducted by Al-Fraihat, Joy, and Sinclair (2020), they examined the relationship between perceived usefulness, user satisfaction, and behavioural intentions towards online learning during the COVID-19 pandemic. The results of the study demonstrated that user satisfaction dramas a arbitrating role between perceived usefulness and behavioural intention. This suggests when students perceive online learning as useful, it can enhance their satisfaction, which in turn positively influences their behavioral intentions to use the system.

Similarly, a study conducted by Huang, Li, and Wu (2013) investigated the relationship between perceived usefulness, user satisfaction, and behavioral intentions in the context of mobile learning. The findings of the study revealed that user satisfaction acts as a mediator between perceived usefulness and behavioral intentions. This shows that if students perceive mobile learning as valuable, it can increase their satisfaction, which in turn has a positive impact on their behavioral intentions to use the system.

Attitudes can indeed play an arbitrating part in the connection between perceived usefulness and behavioral intentions towards e-learning systems. Perceived usefulness refers to the belief individuals hold regarding the amount to which using an e-learning system will augment their learning results, while attitudes encompass the

positive or negative evaluations individuals have towards an e-learning system. Behavioral intention refers to the level of inclination an individual has to use an e-learning system. Research indicates that attitudes can meaningfully impact the relationship between perceived usefulness and behavioral intentions towards e-learning systems. For instance, a study conducted by Chuttur (2009) revealed that attitude fully mediated the association between perceived usefulness and behavioral intentions towards e-learning systems. This implies that individuals' attitudes towards the e-learning system completely accounted for the effect of perceived usefulness on their intentions to use the system. Likewise, a study by Liaw, Huang, and Chen (2007) demonstrated that attitudes partially mediated the relationship between perceived usefulness and behavioral intentions towards e-learning systems. This suggests that individuals' attitudes towards the system partially explained the influence of perceived usefulness on their intentions to engage with the system. Based on the prior studies, this research develops the following hypotheses:

H3. Perceived usefulness has a positive effect on Behavioural intention.

H3a. User satisfaction mediated the relationship between perceived usefulness and behavioural intention.

H3b. Attitude mediated the relationship between perceived usefulness and behavioural intention.

2.4 ICT Infrastructure

The Technology Acceptance Model (TAM), users are further probable to receive and use ICT infrastructure if they perceive it as useful for achieving their goals and easy to use. Therefore, the quality of ICT infrastructure, including its reliability, accessibility, and user-friendliness, can have a positive impact on users' behavioral intention to use it. Another relevant model is the Unified Theory of Acceptance and Use of Technology (UTAUT), which identifies four key factors influencing users' behavioral intention to use ICT infrastructure: presentation expectation, determination anticipation, social influence, and simplifying conditions. Lin and Cheng (2015) emphasized that user intention is the determining factor in the acceptance and usage of technologies, including ICT. Consequently, it is crucial to examine the implications of user acceptance theory and consider theories that focus on individuals' intentions to engage in specific behaviors related to ICT usage.

Study done by, Rahman and Mishra (2017) conducted a study investigating the influence of ICT infrastructure on e-learning implementation. The findings of the study indicated that ICT infrastructure plays a important and positive role in e-learning adoption, which in turn can influence behavioral intention towards the e-learning system. While the study did not directly examine user satisfaction as a mediator in this relationship, it suggests that ICT infrastructure can have a direct impact on behavioral intention towards e-learning systems. Although there may be a gap in research directly investigating the mediating role of user satisfaction, the positive effects of ICT infrastructure on behavioral intention towards e-learning systems imply that user satisfaction could potentially act as a mediating factor.

Similarly, Liaw, Huang, and Chen (2007) conducted a study among primary school teachers in Taiwan and found that attitudes partially mediated the relationship between ICT infrastructure and behavioural intentions towards e-learning systems. The study highlighted that teachers' positive attitudes towards e-learning systems were associated with a greater willingness to use them, independent of the effects of ICT infrastructure. These findings suggest that while ICT infrastructure can serve as an enabler for e-learning system usage, it is not the sole determinant of users' behavioral intentions. Users' attitudes towards e-learning systems play a crucial role in shaping their intentions to use them. Positive attitudes can enhance the likelihood of adopting and utilizing e-learning systems, even in the presence of supportive ICT infrastructure. Taken together, these studies underscore the significance of considering users' attitudes in understanding and promoting the acceptance and utilization of e-learning systems, alongside the importance of providing robust ICT infrastructure. Based on the prior studies, this study develops the following hypotheses:

H4. Perceived usefulness has a positive effect on Behavioural intention.

H4a. User satisfaction mediated the relationship between perceived usefulness and behavioural intention.

H4b. Attitude mediated the relationship between perceived usefulness and behavioural intention.

2.5 Conceptual Framework

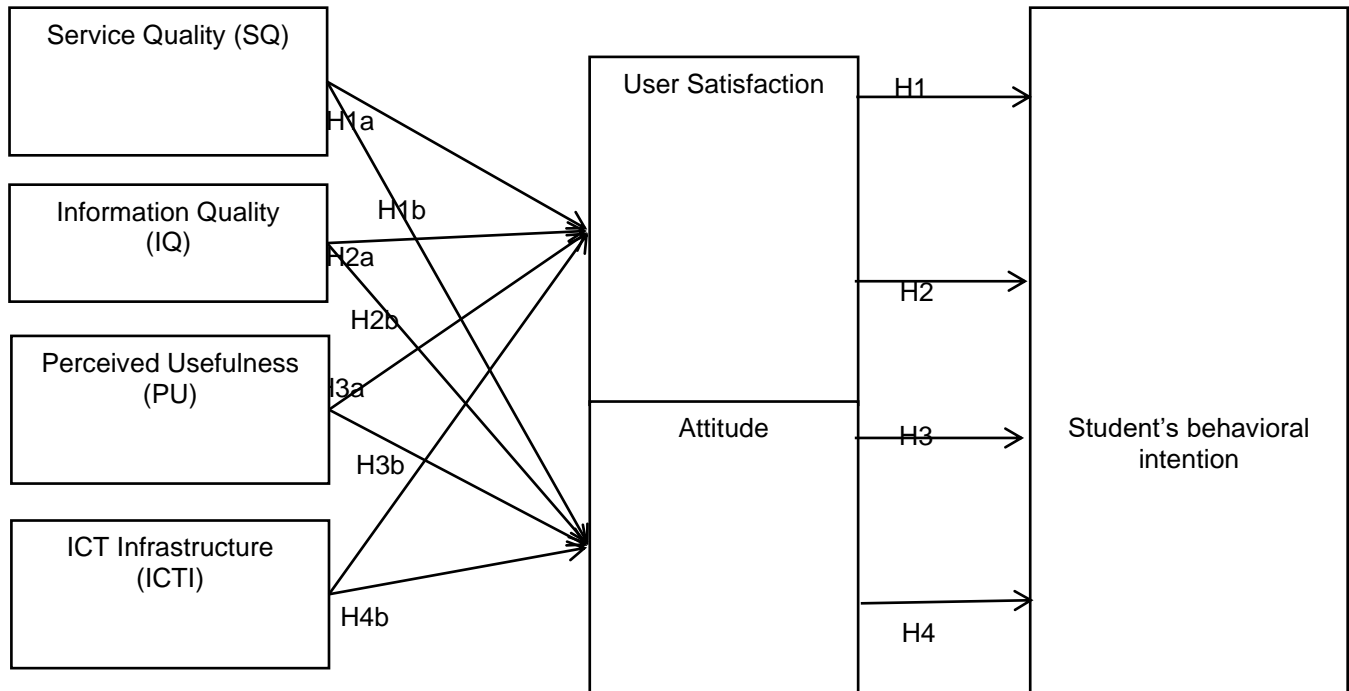


Figure. 1. Proposed Framework Model.

3. Study Model

3.1 Summary of the proposal study model

The proposed model in this research is built on an appraisal of related literature, including existing models and theories. The model includes several variables, such as service quality, Information quality, Perceived usefulness, ICT infrastructure, user satisfaction, attitude and behavioral intention. These variables are thought to be interconnected, with service quality, information quality, perceived usefulness, ICT infrastructure impacting user contentment, which subsequently influences behavioral inclination. The suggested model expands on prior research by investigating the significance of behavioral inclination as a precursor variable to user contentment, and by examining the indirect connection between service quality, information quality, perceived usefulness, ICT infrastructure, and behavioral intention. The study seeks to examine 12 hypotheses based on this model among students who have utilized e-learning in public universities in Yemen.

3.2 Instrument Development

To gather data for this research, a questionnaire comprising 30 items was formulated using a multi-item Likert scale, which is widely employed in the Information Systems field. The Likert scale utilized in this study ranged from 1 (Strongly Disagree) to 5 (Strongly Agree). As the respondents were Arabic speakers, the survey was precisely translated from English to Arabic, employing a back translation technique commonly employed in cross-cultural reviews to ensure translation accuracy. Validated instruments from previous studies were modified to quantify the variables under investigation in this study. In determining the number of items for each hypothesis, the research followed the

recommendation of Littvay and Hayduk (2012) to utilize a select number of optimal items, as including additional redundant items may yield diminishing returns in terms of study benefits.

3.3 Data Collection

Data collection is an essential component of research, and the accuracy of data collection techniques is paramount to ensure reliable results. In this study, quantitative data collection methods were employed to gather data from a representative sample of the population. Quantitative data are well-suited for formal research, as they allow for testing theoretical hypotheses and estimating the magnitude of the phenomenon under investigation. As outlined by Sekaran and Bougie (2016), In quantitative research, the relationships between variables are quantified and expressed using statistical techniques like correlations and frequencies. In this particular research, questionnaire-based data collection methods were utilized as the primary tools for gathering information and data from the respondents. Online surveys were chosen as the mode of data collection due to their ability to reach a large number of participants efficiently, thereby saving time for the researcher. Additionally, Joinson (1999) noted that individuals tend to be more candid and truthful when responding to questionnaires, as their anonymity provides a sense of privacy. Data for this study were utilizing an online survey questionnaire distributed through various online platforms to students who had utilized e-learning in the faculties of public universities in Yemen. A total of 300 responses were received, of which 280 were deemed suitable for analysis. The final sample size was considered tolerable, and the 65% response rate was regarded as very good, surpassing the average response rates reported in similar studies within the relevant literature.

4. ANALYSIS AND RESULTS

In order to analyse the research model, the study used the Partial Least Squares (PLS) approach within the context of structural equation modelling (SEM). The SmartPLS 4.0 programme was used to carry out the analysis. The two-stage approach of analysis was used, as advised by Anderson and Gerbing (1988) and Hair et al. (2017). The first stage's main objective was to examine the measurement model, which required determining the study's constructs' reliability and validity. The data before the analysis were compiled using descriptive statistics. Testing the relationships in the structural model's hypothesised relationships was the second part of the analysis. This stage aimed to examine the interrelationships between the variables and assess the significance of the proposed hypotheses. By employing the PLS method and following these steps, the research aimed to gain insights into the relationships between the variables and provide statistical evidence to sustainance or reject the proposed hypotheses.

4.1 Descriptive Analysis

Table1 displays the summary statistics for the variables examined in the study, which includes the average and normal deviation for each variable. The participants rated their agreement levels with various statements regarding e-learning on a 5-point scale, where higher scores indicated stronger agreement. The results indicate that the respondents highly recognized the quality of e-learning, as evidenced by the highest mean score is 4.75 for behavioral intention. The respondents also found e-learning satisfied with score 4.233 to be useful and understand, as indicated by a mean score is 4.56 for perceived usefulness. Furthermore, the respondents expressed appreciation for the attitude content offered by e-learning, as reflected by a mean score of 4.632. For ICT infrastructure and information quality the mean score is 4.532 and 4.347. Additionally, the respondents demonstrated a positive belief that e-learning contributed to their productivity and effectiveness, with a mean score of 4.75 for behavioral intention. Moreover, a significant majority of the respondents agreed that e-learning facilitated the completion of their responsibilities in a faster and easier manner.

Table 1 Summary of Descriptive Analysis.

Constructs	Items	Mean	SD	Loadings	Cronbach's Alpha	CR	AVE
BI	BI1	4.75	1.581	0.882	0.92	0.943	0.806
	BI2			0.909			
	BI3			0.905			
	BI4			0.896			
SEQ	SEQ1	4.564	1.7889	0.841	0.906	0.934	0.778
	SEQ2			0.905			
	SEQ3			0.882			
	SEQ4			0.899			
IQ	IQ1	4.347		0.833	0.885	0.921	0.777
	IQ2			0.877			
	IQ3			0.872			
	IQ4			0.867			
PU	PU1	4.65	1.954	0.862	0.91	0.937	0.788
	PU2			0.875			
	PU3			0.919			
	PU4			0.893			
ICTI	ICTI1	4.532	1.891	0.872	0.905	0.933	0.777
	ICTI2			0.887			
	ICTI3			0.907			
	ICTI4			0.86			
US	US1	4.233	1.810	0.869	0.909	0.936	0.786
	US2			0.904			
	US3			0.887			
	US4			0.886			
ATT	ATT1	4.632	1.710	0.838	0.909	0.936	0.786
	ATT2			0.921			
	ATT3			0.9			
	ATT4			0.885			

Note that M stands for mean, SD for standard deviation, = for Cronbach's alpha, CR for composite reliability, and AVE for average variation extracted. BI=Behavioral intention, SEQ= Service quality, IQ= Information quality, PU= Perceived usefulness, ICTI= ICT Infrastructure, US= User satisfaction, ATT=Attitude.

4.2 Measurement model Assessment

This study looked at concept validity and reliability, including convergent and discriminant validity, to assess the measurement model. Using Cronbach's alpha coefficients, which gauge the constructions' internal consistency or reliability, each key variable in the model had its reliability evaluated. The findings showed that all Cronbach's alpha values were higher than the advised cut-off point of 0.7, indicating strong reliability for every construct.

Additionally, every composite reliability (CR) score was greater than 0.7, indicating the constructs' validity. Factor loadings, a measure of the strength and importance of the association between each item and its related construct, were

used to assess the indicator reliability. In general, a factor loading of more than 0.50 is considered substantial. All items in this research met the suggested cutoff point of 0.50, and the factor loadings for the remaining items in the model fulfilled the specifications. These results show that the measurement model was generally reliable, with acceptable Cronbach's alpha coefficients and construct-level composite reliability values. The factor loadings further supported the robustness of the measurement model by demonstrating the dependability of the indicators.

Table 2 Results of discriminant validity by Fornell-Larcker criterion.

Item	Factors	1	2	3	4	5	6	7
		ATT	BI	ICTI	IQ	PU	SEQ	US
1	ATT	0.887						
2	BI	0.675	0.898					
3	ICTI	0.292	0.562	0.882				
4	IQ	0.395	0.418	0.115	0.862			
5	PU	0.262	0.393	0.256	0.159	0.887		
6	SQ	0.114	0.083	0.033	-0.05	0.045	0.882	
7	US	0.133	0.479	0.41	0.251	0.316	0.138	0.887

Note SEQ= Service quality, IQ=Information quality, PU=Perceived usefulness, ICTI= ICT Infrastructure, US= User satisfaction, ATT=Attitude.

Table 2 presents the discriminant validity using Fornell and Larker Criterion showing the square root of Average Variance Explained (AVE) figures inserted diagonally in the shaded bolded italics, while the other figures (i.e., inserted horizontally and vertically) indicate the correlation among the study's constructs. Based on these results, ATT has the highest square root of AVE as 0.887 above its highest correlation of 0.0395 with other constructs. In ascending order, the square roots of the AVEs of ICTI, PU, SQ, IQ, US and BI are above their respective highest correlation with other constructs as 0.292, 0.262, 0.114, 0.395 and 0.675, respectively. Thus, based on Fornell and Larcker (1981) criterion, discriminant validity is achieved.

Table 3 Results of discriminant validity by HTMT criterion.

Item	Factors	1	2	3	4	5	6	7
		ATT	BI	ICTI	IQ	PU	SEQ	US
1	ATT							
2	BI	0.737						
3	ICTI	0.314	0.609					
4	IQ	0.437	0.463	0.123				
5	PU	0.286	0.43	0.281	0.177			
6	SEQ	0.117	0.086	0.057	0.076	0.049		
7	US	0.147	0.521	0.446	0.277	0.345	0.15	

Note SEQ= Service quality, IQ= Information quality, PU= Perceived usefulness, ICTI= ICT Infrastructure, US= User satisfaction, ATT=Attitude.

Table 3 shows the HTMT ratio Criterion used in assessing the research constructs' discriminant validity. The outcomes show that the highest HTMT ratio among the measurement models is a value of 0.327 and 0.301 between US and ICTI. As supported by Henseler *et al.* (2015), the correlation between any pair of constructs should be < HTMT 0.85 or more liberally < 0.9. Therefore, this indicates that discriminant validity using HTMT ratio criterion in this study is realized because the highest value is below the suggested value of 0.9.

4.3 Assessment of Structural Model

Hair et al. (2017) proposes evaluating the structural model by analyzing the beta coefficients (β), R2 values, and their associated t-values through a bootstrapping method involving 5,000 resamples. They also advocate for

reporting effect sizes (f^2) and predictive relevance (Q^2). In contrast, Sullivan and Feinn (2012) contend that p-values indicate the presence or absence of an effect but do not provide information about the effect's magnitude.

4.3.1 Hypothesis Development (Direct Effect)

The outcomes of the structural model analysis are obtainable in Figure 2 and Table 5. Based on the analysis of the structural model path coefficients, it was revealed that service quality, information quality, perceived usefulness, Behavioural intention (BI) is significantly impacted by ICT infrastructure. Path coefficient (β) values of 0.2142 with t-statistics and p-values of 0.013 for SQ, 0.2686 with t-statistics and 0.005 for IQ, 0.3142 with t-statistics and 0.000 for PU, and 0.4123 with t-statistics and p-values of 0.002 each suggest the outcome. These values are below and above the minimum and maximum recommended thresholds of 1.96 and 0.05. However, service quality, information quality, perceived usefulness, and ICT infrastructure have a significant positive impact on behavioural intention (BI). The results indicate that SQ, IQ, PU and ICTI have the strongest effect on behavioural intention. In conclusion, the results show that all the direct paths have a significant effect on their endogenous constructs to behavioural intention.

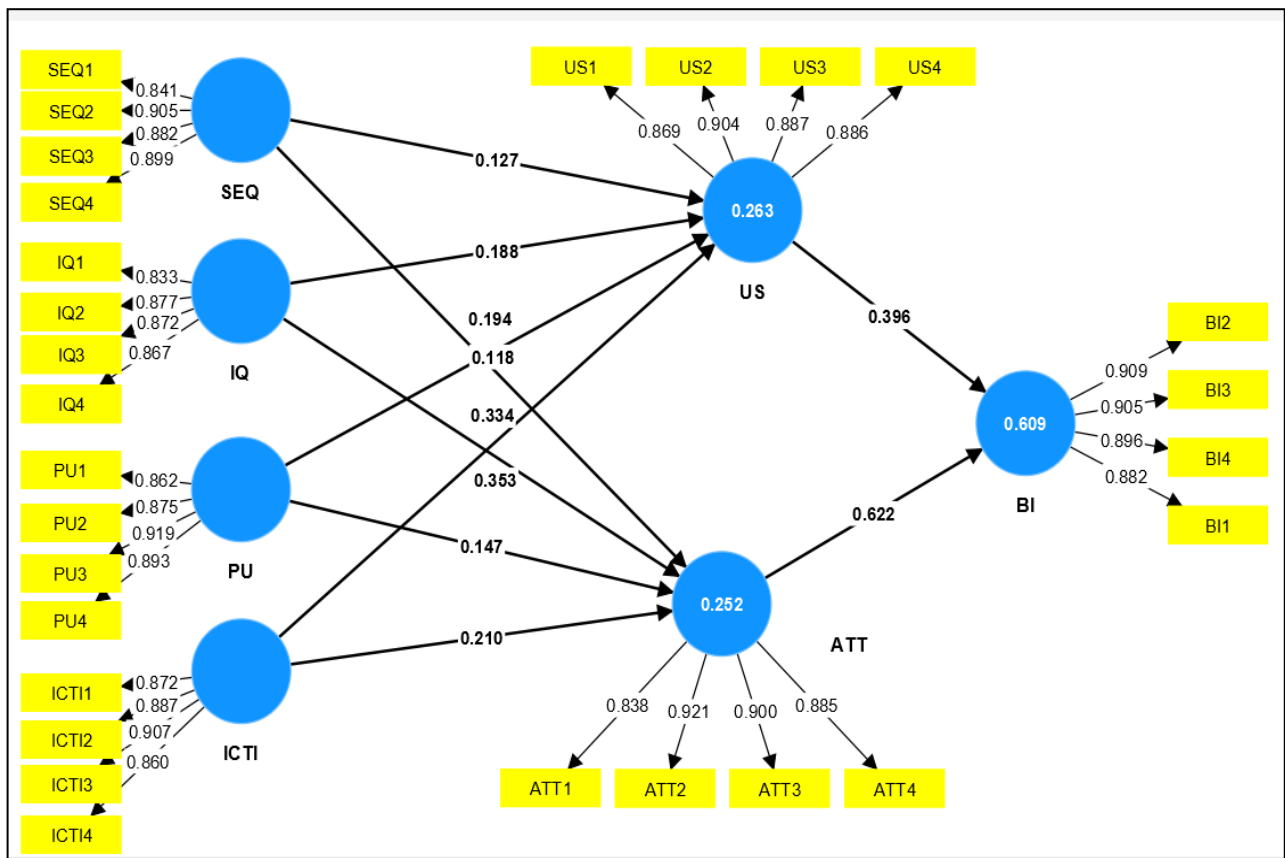


Figure 2. The Research Structural Model

Table 4 Path Coefficient Hypothesis Testing (Direct Effect)

Hypothesis	Relationship	Std Beta	Std Error	T- Value	P-Value	Decision
H1	SQ -> BI	0.138	0.044	2.142	0.013	Significant
H2	IQ-> BI	0.126	0.064	2.686	0.005	Significant
H3	PU-> BI	0.140	0.058	3.142	0.000	Significant
H4	ICTI-> BI	0.131	0.058	4.123	0.002	Significant

Note BI=Behavioral intention, SYQ= System quality, PEOU= Perceived ease of use and ICTI= ICT Infrastructure. Sig. p-value <0.05.

4.3.1 Hypothesis Development (Indirect Effect)

The mediation assessment was conducted constructed on Preacher and Hayes (2004; 2008) using 280 samples of basic bootstrapping Bias-Corrected and accelerated (BCA) bootstrapping.

Table 6 Path Coefficient Hypothesis Testing (Indirect Effect)

Hypothesis	Relationship	Std Beta	Std Error	T- Value	P- Value	Decision
H1a	SEQ -> US -> BI	0.343	0.060	2.553	0.002	Significant
H2a	IQ -> US -> BI	0.035	0.070	2.378	0.004	Significant
H3a	PU -> US -> BI	0.048	0.048	0.904	0.077	Not Significant
H4a	ICTI -> US -> BI	0.048	0.048	0.904	0.132	Not Significant
H1b	SEQ -> ATT -> BI	0.048	0.048	0.904	0.004	Significant
H2b	IQ -> ATT -> BI	0.048	0.048	0.904	0.009	Significant
H3b	PU -> ATT -> BI	0.048	0.048	0.904	0.001	Significant
H3b	ICTI -> ATT -> BI	0.048	0.048	0.904	0.013	Not Significant

Note BI=Behavioral intention, SEQ= Service quality, IQ= Information Quality, PU= Perceived usefulness, ICTI= ICT Infrastructure and US= User satisfaction, ATT=Attitude. Sig. p-value <0.05.

5. RESEARCH DISCUSSION

This research investigated the implementation and use of e-learning among undergraduate students from seven public universities in Yemen and identified crucial factors influencing their intention to engage with e-learning. The results revealed that the quality of service, information, perceived usefulness, and ICT infrastructure of e-learning significantly and positively impact behavioural intention. Furthermore, behavioural intention was found to have a direct effect on user satisfaction with e-learning. These results imply that university educators should prioritize ensuring that e-learning systems are user-friendly, flexible, up-to-date, accurate, comprehensive, responsive, functional, and interactive to motivate student usage. Additionally, this research suggests that user satisfaction and attitude mediate the association between service quality, information quality, perceived usefulness, ICT infrastructure, and behavioural intention towards e-learning. A significant positive effect was observed, indicating that as students utilize e-learning more frequently and for longer periods and as they experience higher satisfaction with the platform, their intention to engage with e-learning is enhanced, leading to benefits such as improved efficiency, knowledge acquisition, productivity, and competence. Based on these findings, the study offers

recommendations for university educators and policymakers to ensure high-quality e-learning systems that cater to student needs and preferences. Encouraging and motivating students to use e-learning and acknowledging their efforts can increase usage and satisfaction. Providing support and training to enhance students' e-learning skills and ensuring effective system utilization are also crucial steps. In contrast to the findings of Khayun and Ractham (2011) and Cho et al. (2015), who reported no correlation or predictive relationship between user satisfaction and behavioural intention, this study presents different outcomes. These discrepancies may arise from variations in research settings and the specific variables used to measure behavioral intention.

6. RESEARCH IMPLICATION

This study offers an exclusive and valuable involvement to the corpus of knowledge already available on the acceptance and use of e-learning. The Technology Acceptance Model (TAM) and the Delone and Mclean information success model are collective. this research covers the considerate of e-learning in the specific context of Yemen. The proposed model, which includes service quality (SQ), information quality (IQ), perceived usefulness (PU), ICT infrastructure (ICTI), behavioral intention, user satisfaction, and attitude as a mediating variable, was validated in this study. The results of this research demonstrate that the proposed model has a higher predictive capacity for explaining the impact on behavioral intention compared to earlier models used in similar studies. This is evident from the high percentage of variance explained in behavioral impact. These findings provide valuable insights for researchers, university lecturers, and policymakers interested in enhancing e-learning in the Yemeni context. Yemen faces significant challenges in its education sector, including low employment rates in tertiary education and a gender gap in enrollment in public universities. However, e-learning presents a potential solution to these challenges by expanding access to education and promoting equity, even in the face of limited resources and low internet penetration in the country. The key results of this study highlight the possibility of e-learning to improve learning performance, knowledge acquisition, academic effectiveness, and innovation among students. These benefits can contribute to the overall development of the country. The Yemeni Centre for Information Technology in higher education can leverage these findings to support the implementation of the Yemeni higher education. University lecturers can also play a vital role in motivating and encouraging students to increase their usage of e-learning. Overall, e-learning has the possible to enhance teaching quality, cost-efficiency, and address the challenges faced by Yemen's education sector.

7. RESEARCH LIMITATIONS

The study provides valuable insights for both practical and academic purposes. However, it is important to acknowledge and consider certain limitations. Firstly, the research focused solely on students from seven public universities in Yemen, excluding other stakeholders such as academics, managerial staff, and lecturers. This limited scope may restrict the generalizability of the findings to other contexts, and caution should be trained when smearing the results more broadly. Secondly, the study working a cross-sectional design, which may not fully capture the dynamic nature of attitudes towards e-learning. Learning to use e-learning platforms can influence student attitudes, and a longitudinal study would offer a more accurate understanding of these changes over time. Thirdly, the research relied on self-reported data collected through online surveys due to privacy concerns and the unavailability of objective behavioural data. While online surveys provide a convenient and efficient means of data collection, they are subject to potential biases and limitations inherent in self-report measures. To address these limitations, future research could consider expanding the participant pool to include a more diverse range of stakeholders, such as academics, managerial staff, and lecturers. Additionally, exploring the moderating role of cultural factors, such as collectivism/individualism, could provide further perceptions into the adoption and usage of e-learning in dissimilar cultural contexts. As technology continues to advance rapidly, it would also be valuable for forthcoming studies to validate the findings in longitudinal settings. This would enable researchers to examine how technological innovations and evolving e-learning platforms influence user behavior and attitudes over an extended period. By talking these restrictions and increasing the investigate scope, upcoming research can improve our understanding of e-learning adoption and usage, and provide more robust and generalizable findings.

CONCLUSION

The combination of e-learning in the Yemeni education system has emerged as a valuable solution to the challenges faced by public universities in the country. This study intended to investigate the part of user fulfilment and attitude as mediators in the association between SQ, IQ, PU, ICTI, and student BI towards e-learning. The results of the study revealed that service quality, information quality, perceived usefulness, and ICT infrastructure significantly influenced user satisfaction and attitude towards e-learning. Furthermore, user satisfaction and attitude played a mediating role in the association between these factors and student behavioral intention. These results emphasize the importance of focusing on behavioral intention to enhance student performance and engagement in e-learning platforms. The implications of this study are particularly relevant for the Yemeni government's initiatives in higher education, as they provide valuable insights that can contribute to improving the quality of education for students. However, it is crucial to acknowledge the presence of limitations in this research. Future studies could explore the potential moderating role of cultural factors and validate the findings through longitudinal investigations. Additionally, investigating the impact of technological advancements on the use of e-learning platforms would further enhance our understanding of online learning practices. By addressing these limitations and conducting further research, policymakers and educational institutions can effectively leverage e-learning to overcome the challenges faced by Yemen's public universities, ultimately enhancing the educational experience and outcomes for students in the country.

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DOI: <https://doi.org/10.15379/ijmst.v10i4.2093>

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