Digital Leadership and Student Acceptance of Intelligent Learning Intervention: A TOE Framework Study of Islamic Studies in Higher Education

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Objective: To examine the impact of academic digital leadership on student behavioral intention to adopt and satisfaction with an intelligent learning intervention.

Methods: A sample of 246 students at the Islamic University of Medina was surveyed. The study used an integrated version of TAM and ISSM, linking digital leadership to technology acceptance through the TOE framework.

Findings:

Digital leadership impacts student intention to adopt the intervention, mediated by perceived usefulness (PU).

Digital leadership impacts student satisfaction with the intervention, mediated by student intention.

PU significantly mediates the impact of digital leadership on student intention to use the intervention.

Student intention significantly mediates the impact of digital leadership on student satisfaction.

Full mediation was not observed, indicating additional mediating factors beyond PU and student intention. This study highlights the complex mediating mechanisms between digital leadership, technology acceptance, and student satisfaction in the context of intelligent learning platforms.

Abstract

The objective of this study is to document the impact of academic digital leadership on student behavioral intention to adopt an intelligent learning intervention and student satisfaction with such intervention. The study employs a sample of employs a sample size of 246 students at the college of Quran and college of Noble Hadith and Islamic studies at the Islamic university in Medina. Where an intelligent Quran reader head tool (Maqraa) defines an optional digital and intelligent learning platform. The study applies an integrated version of TAM and ISSM, and links digital leadership to technology acceptance via the theoretical framework of TOE. The study therefore predicts that: [1] the impact of digital leadership on student intention to adopt the intervention is mediated by PU; and [2] the impact of digital leadership on student satisfaction with the intervention is mediated by student intention. The study results show that student intention to use the intelligent intervention, PU, and student satisfaction with the intervention are all individually replicated in digital leadership. The results also suggest that PU tends to significantly mediates the impact of digital leadership on student intention to use, and student intention to use tends significantly mediate the impact of digital leadership on student satisfaction with the intervention. Full mediation couldn't be reported in neither scenario suggesting that there is more content to the mediating mechanisms than simply PU and student intention to use the intervention.

Keywords: digital leadership; technology acceptance; TAM; ISSM; TOE; User Intention; User Satisfaction

Introduction

Intelligent learning and teaching interventions in higher education typical mimic human cognitive functions of learning, problem-solving, perception, and decision-making (Akgun and Greenhow, 2022). Such interventions take the form of a wide array of subfields and applications including machine learning, expert systems, and robotics (Castro, 2019). Irrespective of the difference in orientation, such individual subfields and applications hinge on designing, conceiving, and utilizing machines equipped with training algorithms, specifically coded programs, and enormous sets of data with the objective of devising intelligent learning patterns and producing predictions with respect to learning objectives and outcomes (Celik et al., 2022). It follows that the implications that intelligent learning and teaching interventions may entail for higher education principally pass through a myriad of contexts constituting, e.g., personalized learning, intelligent tutoring systems, adaptive assessment, institutional & administrative efficiency, data analysis & research, predictive learning analytics, and simulations & virtual reality (Verhoef et al., 2021). Such contexts may immensely provide considerable capabilities not only on the student level but also on faculty and institutional levels (Cotton et al., 2023). For instance, via intelligent learning systems, students of Islamic studies may be endowed with virtual and augmented reality solutions that greatly streamline the process of discovering, locating, tracing, and exploring Islamic sources, literature, heritage and cultural sites (Raja-Yusof et al., 2013). With respect to Islamic faculty, intelligent technologies may intensify both the rigor and breadth of research and formal inquiry through sharing research and teaching interests and resources, accelerating the generation of research ideas, facilitating the formulation of positive research questions, and having these questions answered with adequate testable statements and proper data analysis (Hizam et al., 2021). Intelligent capabilities are thus valuable for the establishment of Islamic scholarly networks, inspiring academic progress, and cultivating a global community of Islamic researchers (Alzouebi, 2019). Along the same lines, intelligent technologies create new institutional capabilities for universities, research centers, and higher education in general in terms of offerings of complete courses online and webcasting of entire programs (Aziz et al., 2016). Such offerings are typically equipped with a latitude of learning tools such as interactive multimedia content, visual aids, video presentations, interactive animation tools, infographics, test banks, instantaneous quizzes and assignments, and discussion forums (Abdulhafeez et al., 2020). This is particularly relevant to the field of Islamic studies where students tend to place value on and have preferences toward personalized engagement with faculty, developing elaborate and exhaustive appreciation of the subject being studied, tailoring the experience of knowledge acquisition, and learning at their own pace (Alzouebi, 2019; Aziz et al., 2016).

In view of the preceding and given the overwhelming potential intelligent learning and teaching technologies have for student of Islamic studies, such technologies can hardly be accepted or adopted absent digitally-oriented academic leadership (Barnes and Gearin, 2022). In this concern, the leadership style of digital leadership may be particularly well-suited for the acceptance and adoption of intelligent learning interventions in higher education (AlAjmi, 2022). A relatively novel style to leadership, digital leadership emphasizes the attributes of digital culture, digital competence and literacy, and digital advocacy. In this fashion, digital leadership embraces digital transformation and implants intelligent capabilities through the medium of technology acceptance and adoption along with the cultural values of innovation, creativity, paradigm shift, and adaptability (Drews, 2021). Toward this end, the objective of this study is to document the impact of academic digital leadership on student behavioral intention to adopt an intelligent learning intervention and student satisfaction with such intervention. The study employs a sample of employs a sample size of 246 students at the college of Quran and college of Noble Hadith and Islamic studies at the Islamic university in Medina. where an intelligent Quran reader head tool (Maqraa) defines an optional

digital learning platform. The study applies an integrated version of the technology acceptance model (TAM) and the information system success model (ISSM) (see, e.g., Chia-Chen and Tsai, 2019). The study links digital leadership to technology acceptance via the theoretical framework of technology-organization-environment (TOE) (see, e.g., Ismail et al., 2016). The study therefore predicts that: [1] the impact of digital leadership on student intention to adopt the intervention is mediated by perceived usefulness (PU); and [2] the impact of digital leadership on student satisfaction with the intervention is mediated by student intention. Along these lines, the study advances the following research questions.

RQ1: What is the impact of digital leadership on student intention to adopt the intervention?

RQ2: What is the extent to which impact of digital leadership on student intention to adopt is mediated by PU?

RQ3: What is the impact of digital leadership on student satisfaction with the intervention?

RQ4: What is the extent to which the impact of digital leadership on student satisfaction with the intervention is mediated by student intention to adopt?

To answer the research questions above, a quantitative study is presented in terms of literature review, research design, data analysis and results, and conclusion.

Literature Review

This literature review section to the study is presented in terms of hypothetical development, technology integration, technology acceptance and adoption, and student satisfaction and performance.

Hypothetical Development

The extant literature addressing technology acceptance and adoption intersects a latitude of scholarly interests including information and communication technology, management, computer engineering, and behavioral sciences (Marikyan and Papagiannidis, 2023). The research tradition underlying such literature is to investigate the subject of technology acceptance and adoption quantitatively and via existing theoretical frameworks (Sabeh, 2021). In this regard, TAM and ISSM define perhaps the most frequently studied theoretical frameworks in the literature (Adeyemi and Issa, 2020). Whereas TAM explains technology acceptance in terms of the perception-oriented variables of PU and perceived ease of use (PEU), ISSM specifies the adoption-related variables of user intention to adopt and user satisfaction in terms of context quality variables such as information quality, system quality, and service quality (Al-shargabi et al., 2021). It follows that, TAM and ISSM are often integrated since ISSM's context variables may serve as exogenous variables to TAM's PU and PEU (Chia-Chen and Tsai, 2019). However, under the umbrella of TOE, internal organizational variables such as leadership can be introduced to technology acceptance and adoption an ISSM variable that is exogenous to PU (Ismail et al., 2016). Assuming that PEU is totally subsumed within PU (see, e.g., Adeyemi and Issa, 2020), this study predicts that digital academic leadership leads to student intention to adopt the learning intervention via the mediating influence of PU, and to student satisfaction with the intervention via the mediating influence of student intention to adopt. The research (Zhan et al., 2024) suggests that students with strong self-efficacy are more likely to leverage their digital leadership skills and intercultural competence to enhance their employability

Digital Leadership and Integration of Intelligent Technologies

AlAjmi (2022) shows that digital leadership in higher education drives the level of intelligent technology integration in learning and teaching. Barnes and Gearin (2022) propose that digital leadership along with the related aspects of digital culture and digital competence is particularly suited for contemporary

institutions of higher education. Albashtawi and Bataineh (2020) report that innovative educational leadership contributes to the effectiveness of intelligent and online learning platforms in higher education. Dinh et al. (2021) highlight that technological innovation in higher education in the form of adopting intelligent learning and teaching interventions is reflected in the culture and leaders of academic institutions. Ertmer et al. (2012) set out that the belief formation process that teaching staff develop with respect to educational leadership is antecedent to the effectiveness of technology integration activities in teaching and learning. On the same subject, Castéra et al. (2020) underline that effective educational leadership is positively associated with higher quality teaching-oriented technological pedagogical content knowledge, which translates into enhancing the magnitude of student learning outcomes. Clausen et al. (2019) maintain that the quality of teaching technological pedagogical content knowledge significantly replicates the extent to which educational leadership is actively sponsoring intelligent and smart learning systems. Larionova et al. (2018) reiterate that digitally oriented higher education leadership is indispensable for the success of institutional efforts targeting the acceptance and adoption of intelligent and online learning interventions. Suartama et al. (2019) expound that the effective design of mobile and blended learning instruction and learning platforms in higher education depends significantly on the degree to which educational leadership is perceived as supportive, dynamic, and innovative. Landa et al. (2023) study educational leadership support when integrating intelligent and innovative technology interventions in learning and teaching. Employing the effect of technological knowledge level as a mitigating mechanism, they indicate that such integration is positively and significantly driven by middle level academic leadership support to instructors and students. Alioon and Delialioğlu (2017) outline that the impact of mobile and intelligent learning interventions on student motivation and engagement is mitigated by the extent to which instructors and middle level academic leadership are perceived as innovation driven. Henderson et al. (2017) stipulate that student-oriented digital academic leadership in is imperative for the successful transformation of the true nature of university teaching and learning through digital and intelligent learning technologies. Türk (2023) associate the focus of digital leadership on operating efficiency and adaptation with the success of digital transformation efforts in terms of followers accepting and adopting intelligent and innovative technologies. Leal Filho et al. (2020) demarcate that university sustainability is a function of a multitude of factors including innovative and intelligent teaching and learning systems and sustainability-driven leadership supporting student and instructor acceptance and adoption of such systems.

The authors (Murthy et al. 2024)) discuss various leadership strategies and best practices that can contribute to the success of global IT operations. They emphasize the role of leadership in driving innovation, ensuring operational efficiency, and fostering collaboration among diverse teams.

Digital Leadership and Acceptance and Adoption of Intelligent Technologies

Alasmari and Zhang (2019) document Saudi empirical evidence that digitally oriented higher educational leadership influences positively the level of student utilization and acceptance of intelligent mobile learning technologies that are virtually accessible at anytime and anywhere using smart devices. Avidov-Ungar and Shamir-Inbal (2017) emphasize the role of educational leadership in the integration, adoption, and access of intelligent and innovative learning and teaching interventions in higher education. Buabeng-Andoh (2012) includes digital culture and digitally competent educational leadership among the factors governing the acceptance, utilization, and synthesis of intelligent and smart technologies in learning and teaching in higher education. John (2015) explains that the adoption of intelligent, mobile, and online learning and teaching interventions in higher education greatly reflects the perceptions and attitudes students and faculty members have toward educational leadership and the degree to which such leadership is committed to enriching a culture of digital competence. Lawrence and Tar (2018) reproduce that educational leadership that embraces organizational innovation and digital transformation is essential for student and instructor

acceptance and utilization of learning and teaching interventions driven by intelligent and information-communication technologies. Besides, Liu et al. (2020) emphasize the role of supportive and digitally-oriented educational leadership in augmenting the levels of student and teacher utilization of intelligent learning and teaching solutions. Machumu et al. (2016) draw that student and teacher acceptance and adoption of blended learning, personalized learning, and intelligent tutoring systems hinges strongly on the extent to which educational leadership is perceived as innovation-driven. Antonopoulou et al. (2020) conclude that digital leadership style in higher education commensurate with student and faculty members acceptance and adherence of intelligent and modern technology enabled learning interventions. Bennis (2013) sketches that digital leadership values of transparency, paradigm shift, and adaptability are all prerequisites for the acceptance and adoption of intelligent technologies and smart interventions by followers. Buller (2014) brings together digital leadership in higher education within the context of change leadership, and underscores that adapting to changing circumstances translates especially into the acceptance and utilization of emerging technologies and intelligent learning systems. Ehlers (2020) clarifies that digital leadership in higher education constitutes a binding factor governing the extent to which intelligent and innovative learning interventions are utilized and accepted by students and faculty members. Eberl and Drews (2021) review that the relationship between digital leadership and follower adoption and acceptance of intellectual and innovative technology interventions hinges on a host of mediating variables including PU, performance expectancy, effort expectancy, and follower satisfaction with such interventions. As well, Englund et al. (2017) point that the acceptance and adoption of intelligent teaching and learning systems in higher education correspond to institutional characteristics of digital culture and digital competence. They demonstrate that such institutional characteristics are essential when alleviating any conception differences between novice and experienced instructors with respect to adaptability and innovation. Hixon et al. (2012) classify faculty members into early adopters or innovators and majority adopters, and suggest that adaptive university leadership may be requisite for turning majority adopters into innovators.

Digital Leadership and Student Satisfaction and Performance

Al-Samarraie et al. (2017) describe that the satisfaction of both students and instructors with intelligent and e-learning educational interventions may reflect the extent to which educational leadership is supportive and innovative in higher education. Moreover, Khalid et al. (2012) conclude that faculty members job satisfaction resounds well with the educational leadership's commitment toward the acceptance and utilization of intelligent and innovative teaching and learning interventions. Purwanto (2020) relates educational leadership aspects of organizational innovation, organizational learning, and leadership capabilities to the performance of students and instructors in settings of higher education Islamic studies. Carvalho et al. (2022) link digital leadership style in government higher education to the performance of students and instructors via the mediating influence of the adoption of intelligent learning and teaching technologies. Dunn and Kennedy (2019) correlate student motivation and engagement in higher education to the effectiveness of intelligent learning systems via the mitigation mechanism of university digital leadership.

Research Design

This study applies the quantitative paradigm to explain [1] student intention to use Maqraa in terms of digital leadership via the mediating influence of PU, and [2] student satisfaction with Maqraa in terms of digital leadership via the mediating effect of student intention. In this fashion, the study maintains all relevant ontological, epistemological, and axiological assumptions underlying the quantitative paradigm (Creswell, 2003). Ontologically, the holds that the variables of digital leadership, PU, student intention, and student satisfaction are observable and objectively measurable. Epistemologically, the study assumes

that the impact of digital leadership on student intention, PU, and student satisfaction can be objectively measured and tested. Axiologically, the study holds that examining and measuring the effect of digital leadership on student intention, PU, and student satisfaction will inform educational leadership theory and improved designs of future intelligent learning interventions.

Study Sample

The study employs a sample size of 246 students at the college of Quran and college of Noble Hadith and Islamic studies at the Islamic university in Medina.The study applies Cochran's (1977) sample size determination framework to a total student population of 674 at a 95% confidence interval, 5% margin of error, and 50% population proportion as follows: 246 = [(1.96^2) *0.5*(1-0.5) *(0.05^-2)] / [1 + {(1.96^2) *0.5*(1-0.5) *(0.05^-2) *(7163^-1)}].

Variables' Measurement and coding

Digital leadership is measured according to the validated scale measurement of innovative leadership and creative leadership (Buyukbese et al., 2022) (Table 1). Student intention to use the voluntary intelligent learning intervention of Maqraa is measured according to the validated scale measurement of use intention (Teo, 2019) (Table 2). PU is measured according to the original measurement scale reported in Davis (1989) (Table 3). Student satisfaction is measured according to the validated scale measurement of satisfaction (Roca et al., 2006) (Table 4). All items to variable measurements are captured on a five-point Likert-type scale. All variables are measured based on average item score and are coded as 1 for lowest score, 2 for lower score, 3 for average score, 4 for high score, and 5 for highest score.

Table 1: measurement of digital leadership

Innovative leadership

Innovative: Has an innovative vision.

Networking: Has the ability to build and coordinate teams quickly.

Digitally keen: Has up-to-date knowledge and skills about digital technologies and digital transformation. Agile: Acts proactively in the digital transformation process in organization.

Ambidextrous: Balances new and existing business areas, modern trends and past traditions, and innovation and integration.

Headhunter for digital talent: Finds ways to attract new digital talent to organization.

Supportive leadership

Encouraging: Encourages employees when encountering difficulties in the digital transformation process.

Digital idol: Acts as a guide and role model for those who work in the digital transformation process.

Table 2: measurement of student intention to use

I will use the intelligent Maqraa in the future

I plan to use the intelligent Maqraa often

Table 3: measurement of PU

Using the intelligent Maqraa in my studies would enable me to accomplish tasks more quickly

Using the intelligent Maqraa would improve my performance

Using the intelligent Maqraa in my studies would increase my productivity

Using the intelligent Maqraa would enhance my effectiveness

Using the intelligent Maqraa would make it easier

I would find the intelligent Maqraa useful

Table4: measurement of student satisfaction

I am satisfied with the performance of the Maqraa.

I am pleased with the experience of using the Maqraa.

My decision to use the Maqraa was a wise one.

Data Analysis and Empirical Results

This study employs the mediating influence of PU to explain the impact of digital leadership on student intention to use the intervention, and the mediating influence of student intention to use the intervention to explain the impact of digital leadership on student satisfaction with the intervention. It follows that, to answer RQ1 and RQ2, the study estimates three linear models to explain: [1] student intention to use the intervention in terms of digital leadership (Table 5), [2] PU in terms of digital leadership (Table 6), and [3] student intention to use the intervention in terms of PU (Table 7). The study tests whether PU fully mediates the impact of digital leadership on student intention to use the intervention by regressing student intention to use the intervention on both digital leadership and PU (Table 8).

FF *(1): student intention to use the intervention = f (digital leadership)*

FF (2): PU = f (digital leadership)

FF (3): student intention to use the intervention = f (PU)

FF (4): student intention to use the intervention = f (digital leadership, PU)

The models are specified as follows while assuming that the underlying data generating processes satisfy the Gauss-Markov properties of correct specification and identically and independently distributed error terms with zero mean and constant variance:

*SF (1): student intention to use the intervention (i) = b0 + b1*digital leadership (i) + e (i)*

*SF (2): PU (i) = b0 + b1*digital leadership (i) + e (i)*

*SF (3): student intention to use the intervention (i) = b0 + b1*PU (i) + e (i)*

*SF (4): student intention to use the intervention (i) = b0 + b1*digital leadership (i) + b2*PU (i) + e (i)*

Where (i) is an index for the student included in the dataset and takes discrete values between 1 and 313; b0 is an intercept parameter estimate; b1 and b2 are coefficients or parameter estimates; and e is a Gauss-Markov error term with an average value of zero and constant variance everywhere across the study sample.

The statistical model outputs show that the models have significant explanatory power as measured by adjusted R squared (see Table 5, Table 6, Table 7, and Table 8). In particular, the statistical output shows that student intention to use the intelligent Maqraa and PU are both individually replicated in digital

leadership. Moreover, the results also show that student intention to use the intelligent Maqraa is significantly replicated in PU. This suggests that PU significantly mediates the impact of digital leadership on student intention to use. However, the results don't establish that PU fully mediates the impact of digital leadership on student intention to use since both end up having significant parameter estimates when jointly allowed as explanatory variables (Table 8). This suggests that there exist more mediating mechanisms to the relationship between digital leadership and student intention to use the intervention than simply the content of PU.

Table 5: Regressing student intention on digital leadership

SUMMARY OUTPUT									
Regression Statistics									
Multiple R	0.543115								
R Square	0.294974								
Adjusted R Square	0.292085								
Standard Error	0.931525								
Observations	246								
ANOVA									
	df	*SS*	*MS*	*F*	*Significance F*				
Regression	1	88.58464	88.58464	102.0867	2.82E-20				
Residual	244	211.7284	0.867739						
Total	245	300.313							
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*	
Intercept	1.777733	0.191182	9.298653	8.36E-18	1.401156	2.154311	1.401156	2.154311	
Digital Leadership	0.499091	0.049396	10.1038	2.82E-20	0.401793	0.596389	0.401793	0.596389	

Table 6: Regressing PU on digital leadership

SUMMARY OUTPUT									
Regression Statistics									

Multiple R	0.5465								
R Square	0.298662								
Adjusted R Square	0.295788								
Standard Error	1.013671								
Observations	246								
ANOVA									
	df	*SS*	*MS*	*F*	*Significance F*				
Regression	1	106.7669	106.7669	103.9066	1.48E-20				
Residual	244	250.7168	1.027528						
Total	245	357.4837							
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*	
Intercept	1.476139	0.208041	7.095425	1.39E-11	1.066353	1.885924	1.066353	1.885924	
Digital Leadership	0.547923	0.053752	10.19346	1.48E-20	0.442045	0.6538	0.442045	0.6538	

Table 7: Regressing student intention on PU

SUMMARY OUTPUT									
Regression Statistics									
Multiple R	0.5465								
R Square	0.298662								
Adjusted R Square	0.295788								
Standard Error	1.013671								
Observations	246								
ANOVA									
	df	*SS*	*MS*	*F*	*Significance F*				
Regression	1	106.7669	106.7669	103.9066	1.48E-20				

Residual	244	250.7168	1.027528						
Total	245	357.4837							
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*	
Intercept	1.476139	0.208041	7.095425	1.39E-11	1.066353	1.885924	1.066353	1.885924	
PU	0.547923	0.053752	10.19346	1.48E-20	0.442045	0.6538	0.442045	0.6538	

Table 8: Regressing student intention on digital leadership and PU

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.617243							
R Square	0.380989							
Adjusted R Square	0.375895							
Standard Error	0.874647							
Observations	246							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	2	114.416	57.20802	74.78092	4.91E-26			
Residual	243	185.897	0.765008					
Total	245	300.313						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	1.303918	0.19716	6.613506	2.37E-10	0.915557	1.692278	0.915557	1.692278
Digital leadership	0.323217	0.055382	5.836125	1.7E-08	0.214127	0.432308	0.214127	0.432308
PU	0.320983	0.055238	5.810866	1.94E-08	0.212176	0.42979	0.212176	0.42979

To answer RQ3 and RQ4, the study estimates three linear models to explain: [1] student satisfaction with the intervention in terms of digital leadership (Table 9), [2] student intention to use the intervention in terms of digital leadership (Table 5), and [3] student satisfaction with the intervention in term student intention to use the intervention (Table 10). The study tests whether student intention to use fully mediates the impact of digital leadership on student satisfaction the intervention by regressing student satisfaction with the intervention on both digital leadership and student intention to use the intervention (Table 11).

FF *(5): student satisfaction with the intervention = f (digital leadership)*

FF (1): student intention to use the intervention = f (digital leadership)

FF (6): student satisfaction with the intervention = f (student intention to use the intervention)

FF (7): student satisfaction with the intervention = f (digital leadership, student intention to use the intervention)

The models are specified as follows while assuming that the underlying data generating processes satisfy the Gauss-Markov properties of correct specification and identically and independently distributed error terms with zero mean and constant variance:

*SF (5): student satisfaction with the intervention (i) = b0 + b1*digital leadership (i) + e (i)*

*SF (1): student intention to use the intervention (i) = b0 + b1*digital leadership (i) + e (i)*

*SF (6): student satisfaction with the intervention (i) = b0 + b1*student intention to use the intervention (i) + e (i)*

*SF (7): student satisfaction with the intervention (i) = b0 + b1*digital leadership (i) + b2*student intention to use the intervention (i) + e (i)*

Where (i) is an index for the student included in the dataset and takes discrete values between 1 and 313; b0 is an intercept parameter estimate; b1 and b2 are coefficients or parameter estimates; and e is a Gauss-Markov error term with an average value of zero and constant variance everywhere across the study sample.

The statistical model outputs show that the models have significant explanatory power as measured by adjusted R squared (see Table 9, Table 5, Table 10, and Table 11). In particular, the statistical output shows that student satisfaction with the intelligent Maqraa and student intention to use Maqraa are both individually replicated in digital leadership. Moreover, the results also show that student satisfaction with the intelligent Maqraa is significantly replicated in student intention to use Maqraa. This suggests that student intention to use Maqraa significantly mediates the impact of digital leadership on student satisfaction with the intervention. However, the results don't establish that student intention to use fully mediates the impact of digital leadership on student satisfaction with the intervention since both end up having significant parameter estimates when jointly allowed as explanatory variables (Table 11). This suggests that there exist more mediating mechanisms to the relationship between digital leadership and student satisfaction with the intervention than simply the content carried through student intention to use.

Table 9: Regressing student satisfaction with the intervention on digital leadership

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.855725							
R Square	0.732266							
Adjusted R Square	0.731169							
Standard Error	0.587195							
Observations	246							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	230.1011	230.1011	667.3515	9.01E-72			
Residual	244	84.13058	0.344797					
Total	245	314.2317						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.687146	0.120513	5.701843	3.41E-08	0.449768	0.924525	0.449768	0.924525
Digital leadership	0.804378	0.031137	25.83315	9.01E-72	0.743045	0.86571	0.743045	0.86571

Table 10: Regressing student satisfaction with the intervention on student intention to use the intervention

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.645855							
R Square	0.417129							
Adjusted R Square	0.41474							
Standard Error	0.866396							
Observations	246							

ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	131.075	131.075	174.6171	1.97E-30			
Residual	244	183.1567	0.750642					
Total	245	314.2317						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	1.258863	0.18893	6.663117	1.77E-10	0.886721	1.631005	0.886721	1.631005
Student intention to use	0.660652	0.049995	13.21428	1.97E-30	0.562175	0.75913	0.562175	0.75913

Table 11: Regressing student satisfaction with the intervention on digital leadership and student intention to use the intervention

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.882487							
R Square	0.778784							
Adjusted R Square	0.776963							
Standard Error	0.534848							
Observations	246							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	2	244.7185	122.3592	427.7358	2.48E-80			
Residual	243	69.51323	0.286063					
Total	245	314.2317						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*

Intercept	0.220045	0.127747	1.722505	0.08625	-0.03159	0.471677	-0.031599	0.471677
Digital leadership	0.673241	0.033778	19.93158	4.89E-53	0.606707	0.739775	0.606707	0.739775
Student intention to use	0.262751	0.036757	7.148317	1.02E-11	0.190348	0.335154	0.190348	0.335154

This study introduces a novel integration of TAM and ISSM within the TOE framework to explore the mediating role of digital leadership in technology acceptance.The findings suggest that while PU and student intention are significant mediators, there are additional factors influencing the relationship between digital leadership and technology adoption, warranting further investigation.

Conclusion

This study introduces a novel integration of TAM and ISSM within the TOE framework to explore the mediating role of digital leadership in technology acceptance. The objective of this study is to document the impact of academic digital leadership on student behavioral intention to adopt an intelligent learning intervention and student satisfaction with such intervention. The study employs a sample of employs a sample size of 246 students at the college of Quran and college of Noble Hadith and Islamic studies at the Islamic university in Medina.where an intelligent Quran reader head tool (Maqraa) defines an optional digital learning platform. The study applies an integrated version of TAM and ISSM, and links digital leadership to technology acceptance via the theoretical framework of TOE. The study therefore predicts that: [1] the impact of digital leadership on student intention to adopt the intervention is mediated by PU; and [2] the impact of digital leadership on student satisfaction with the intervention is mediated by student intention. The study results show that student intention to use the intelligent intervention, PU, and student satisfaction with the intervention are all individually replicated in digital leadership. The results also suggest that PU tends to significantly mediates the impact of digital leadership on student intention to use, and student intention to use tends significantly mediate the impact of digital leadership on student satisfaction with the intervention. Full mediation couldn't be reported in neither scenario suggesting that there is more content to the mediating mechanisms than simply PU and student intention to use the intervention. Future research may explore such mechanisms and employ different theoretical frameworks (e.g., technology-task fit and unified theory of acceptance and use of technology). Future research may also address the variable of digital leadership as an internalized organizational challenge for purposes of technology integration, acceptance, and adoption. Toward this end, Cunha et al. (2020) establish that the acceptance and adoption of intelligent, digital, and innovative learning and teaching interventions define major opportunities and challenges for the leadership of universities and institutions of higher education. Özdemir (2017) delineates that lack of supportive or innovation-oriented educational leadership defines a major challenge facing student adoption of customized learning interventions and intelligent tutoring systems. Mercader (2020) states that lack of digital or innovation-oriented leadership spells out a major barrier to successful integration, acceptance, and adoption of intelligent learning and teaching technological interventions in higher education. Fareen (2022) holds that digital leadership in higher education tends to assume a pivot position when synchronized institutional efforts are exerted to assure that students and instructors are technically prepared for utilizing intelligent educational interventions and e-learning systems. To Conclude, Habib et al. (2021) argue that supportive and digitally oriented university leadership circumscribes a critical institutional success factor for the adoption of intelligent learning and teaching

systems for students and faculty members, and the introduction of automated institutional infrastructures and digital platforms to a latitude of stakeholder groups. Student intention significantly mediates the impact of digital leadership on student satisfaction.

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