Digital learning attributes and students academic achievement among Pakistani entrepreneurship students: Mediating role of student engagement

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Abstract

Aim: This research aims to examine the mediating role of student engagement in the connection between student achievement and characteristics of digital learning among Pakistani entrepreneurship students by combining the Social Learning Theory with the Theory of Reasoned Action.

Methodology: Face-to-face survey data were collected from 450 students in Pakistani business and entrepreneurship programs.

Findings: Structural Equation Modeling (SEM) findings indicate that digital competence positively affects student engagement. In addition, the findings revealed the mediating role of student engagement between digital competence, digital readiness, and e-learning attitude and their impact on student's academic achievement in Pakistani business and entrepreneurship programs.

Implications/Novel Contribution: It is possible to extrapolate the methodology used in the current study and apply it to evaluate students from different schools and countries. More investigation should examine how school administrators and teachers rate students' dispositions toward e-learning, both in traditional classroom settings and online.

Keywords: Student Engagement, e-learning, Entrepreneurship, Digital Learning.

INTRODUCTION

Over the past few years, much academic and professional attention has been paid to the study of entrepreneurship (Aslam, Iqbal, & Ahmed, 2022; Hussain & Malik, 2018; Rasool, Shaikh, Shaukat, Almashaqbeh, & Raza, 2022; Soomro & Shah, 2021). A big reason for this is entrepreneurship's role in fostering general economic expansion. Entrepreneurship is a much-needed shot in the arm for stagnant, unproductive businesses. It would be a mistake to understate the contribution of entrepreneurs everywhere in terms of societal and economic development. The importance of entrepreneurs to national economies has been recognized for some time now (Lestari, Rizkalla, & Purnamaningsih, 2022; Zreen, Farrukh, Nazar, & Khalid, 2019). This comprehension is shown by the efforts to create forums and other systems at different national and global levels to teach entrepreneurship in higher education (Guo, Edghiem, Dakhan, & Khan, 2022).

In today's unstable work environment, the dream of many young people is to start their businesses. There has never been a time in Pakistan's history with a more significant proportion of young people than now. Roughly 64 percent of people are younger than 30 years old, and 29 percent are between the ages of 15 and 29 (Aslam et al., 2022; Hussain & Malik, 2018). Most Pakistanis live on less than $1.25 a day, making poverty and joblessness glaringly obvious. Small entrepreneurship ownership is crucial in times of high unemployment (Soomro & Shah, 2021). When the economy falters, it can be difficult for recent graduates to find work, and employers may even be forced to lay off workers.

Digital competence is "the confident and critical use of information society technology for work, leisure, and communication" Núñez-Canal, de Obesso, and Pérez-Rivero (2022); Zhao, Llorente, and Gómez (2021). Information and communication technology fundamentals form the foundation of this field. This includes knowing how to use a computer to find and analyze data, create and share content, and connect with others online to work together. Students need help learning the digital skills necessary for academic success and finding effective ways to

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use digital tools in their schoolwork. Schoolchildren's digital perspectives and interactions may also be influenced by the technology platforms they use before entering the education system (Heidari, Mehrvarz, Marzooghi, & Stoyanov, 2021; Mehrvarz, Heidari, Farrokhnia, & Noroozi, 2021). Students' digital skills and attitudes in the classroom may affect their academic performance, but this relationship has received little attention.

A pro-e-learning stance in education helps students access and use online learning resources, improves teacher-student communication, encourages group projects, and keeps track of academic progress (Fernandez, Al Radaideh, Singh Sisodia, Mathew, & Jimber del Río, 2022; Hamutoğlu, Ünveren Bilgiç, Salar, & Şahin, 2021). The e-learning requirements of students at Pakistani business and entrepreneurial institutions often overlap with learning achievements for long-term improvement in education and career prospects (Kim, Hong, & Song, 2019). The benefits of an e-learning mentality for students and schools include cost savings related to the elimination of the need for expensive classroom and library space, the digitization of course materials that make them easy to share and adapt anywhere, and the incorporation of the global academic environment (Osman, Mohamad, & Mohamad, 2021; Zubkova, Samoylenko, Chernitsova, Podlovilina, & Glotova, 2021).

Those who study business and entrepreneurship in Pakistan should be given the tools they need to succeed in a digital world before they head off to college. The term "digital natives" describes a new generation of students who can think creatively about using technology in the classroom to achieve desired results (Gfrerer, Hutter, Füller, & Ströhle, 2021; Osman et al., 2021). Students from schools where most students are expected to be digital natives will be introduced to eLearning environments in elementary school to help them improve their academic performance. They have integrated technology into every aspect of their lives, making it more than just a tool for digital readiness (Abuže & Ļubkina, 2021; Lassnig, Müller, Klieber, Zeisler, & Schirl, 2021).

To what extent does student engagement act as a moderator? What we mean by "student engagement" is that "the amount of energy and effort students put forth in their learning environment can be measured in various ways, including behavioral, cognitive, and affective measures" (Ngoc, 2021). How invested students are in their education determines the caliber of their education and subsequent careers. Researchers have found that fully engaged students in their online courses perform better academically Alvi, Kayani, and Lakhan (2022); Iqbal, Asghar, Ashraf, and Yi (2022).

This research aims to identify the attributes of digital learning, student achievement, and the mediating role of student engagement among Pakistani entrepreneurship students. The current study applies social learning theory and planned behavior theory to understand better the connection between digital learning attributes and student achievement through the mediating role of student engagement. According to social learning theory, people can pick up new habits simply by observing and mimicking those around them (Ata, 2018). The concept of "is a psychological theory that links beliefs to behavior," as planned behavior theory proposes. According to the theory, attitudes, subjective norms, and perceived behavioral control are the "three core components" that shape an individual's behavioral intentions (Mohammed, Abdullah, Ghawanmeh, & Alqaadan, 2020). To do this, we first conduct a thorough literature review to generate hypotheses about the most important aspects of the study. Then, these assumptions are examined using SEM to uncover any potential correlations. To better understand and complete these study goals, the following will be highlighted:

1. Digital competence significantly influences student engagement.
2. e-learning attitude significantly influences student engagement.
3. Digital readiness significantly influences student engagement.
4. Student engagement significantly influences students' academic achievement.
5. Student engagement significantly mediates the effect between digital competence, e-learning attitude, digital readiness, and student academic achievement.

LITERATURE REVIEW

This study aims to understand better how student engagement affects the connections between digital learning practices, student outcomes, and entrepreneurship education in Pakistani universities. In this investigation, social learning and deliberate behavior are used. According to the social learning theory, new behaviors "can be learned by observing and imitating others," according to (Ata, 2018). This theory is called "social learning behavior." (Mohammed et al., 2020) defines planned behavior theory as "relating concepts to behavior in psychology."

According to the theory, behavior intentions are influenced by a person's attitude, subjective norms, and sense of agency. According to the (Ata, 2018; Mohammed et al., 2020), a positive influence reduces the frequency with which learned behaviors are repeated, encourages the performance of prohibited actions, and increases the likelihood that similar behaviors will be learned through reflection. These effects all result in positive feelings being replaced by negative ones.

Digital Competence and Student Engagement

According to (Heidari et al., 2021), "digital competence" in Pakistani business and entrepreneurship programs refers to "innovative education, abilities, and perspectives in using new technologies to achieve educational objectives and goals." It is a part of the modern digital infrastructure of Pakistani academic institutions that teach entrepreneurship and business. Additionally, according to (Mehrvarz et al., 2021), students' ability to learn can be a good indicator of how much technology they will use in the classroom. According to Kim et al. (2019); Núñez-Canal et al. (2022), "the competent and critical use of information society technology for business, pleasure, and communication" defines competencies in the digital sphere. It depends on having a basic understanding of information and communication technology, including how to use a computer for research, data analysis, storage, content creation and presentation, and virtual teamwork. Digitally literate people can communicate with others using various digital tools, such as smartphones and the internet Sandybayev, Mohamed, and Ahmadi (2020); Zubkova et al. (2021). As a result, digital competence is not a one-dimensional skill but may involve technical knowledge, moral character, and improved learning capacity Núñez-Canal et al. (2022). Students must be adept at using various resources and information to identify and organize the digital degree program materials, choose the appropriate technologies for academic assignments, collaborate with others or interact with others in academic settings, and solve problems using online resources, to name just a few to (Heidari et al., 2021; Ngoc, 2021). Student engagement and academic performance improvement can be anticipated as the level of digital competence among Pakistani business and entrepreneurship schools continue to increase (Havik & Westergård, 2020; Palo, Maricuţoiu, & Costea, 2019). Students engage in intellectual, technological, and natural interaction using digital devices and digital information. It is frequently emphasized that digital competence is crucial for employment and living in the modern world. The subsequent research hypotheses were put out after a thorough study and analysis:

H1: Digital competence significantly influences student engagement.

e-learning Attitude and Student Engagement

e-learning mindsets help students become more engaged in their studies and make more significant gains in their academic performance, as referenced by (Fernandez et al., 2022). Whether in a traditional classroom setting, online, or a hybrid of the two (Heidari et al., 2021), student participation is crucial to the success of any educational program. Research on students at Pakistani business and entrepreneurship schools mentions active learning as a strong predictor of learning gains (Um, 2021). Coates (2006), who took a more global view of the educational system, argues that students' active participation in the classroom is the product of a two-way exchange with their educational institutions. (Kim et al., 2019) found that when students interacted with one another in both traditional classroom settings and outside of the classroom, they were more likely to participate actively in the research. The use of technology in the classroom has been shown to increase student engagement with teachers and course materials, which boosts motivation and classroom performance (Zubkova et al., 2021). Among students in Pakistani business and entrepreneurship programs, a positive outlook toward e-learning is mediated by students' levels of involvement in their coursework.

e-learning has the potential to improve the educational experience of students in Pakistani business and entrepreneurship programs, which could have a positive impact on the motivation and performance of those students. Educators' digital learning environments enhance the quality of their instruction by facilitating students' access to materials, tools, and additional content and encouraging interactions with the instructor or other students (Iqbal et al., 2022; Um, 2021). e-growing learning's importance among students from Pakistani business and entrepreneurship schools has helped to expand access to higher education without displacing more conventional methods of instruction (Ata, 2018; Hamutoğlu et al., 2021). The use of e-learning has many benefits for students in school, including increased flexibility in when and where they study, more accessible access to data and information,

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more active participation in the learning process, individualized instruction based on each individual's needs, and a higher level of awareness (Kim et al., 2019; Ngoc, 2021). As a result, we came up with the following theories:

H2: e-learning attitude significantly influences student engagement.

Digital Readiness and Student Engagement

Students at Pakistani business and entrepreneurship schools can benefit from more significant opportunities for collaboration thanks to technological advancements in classroom infrastructure (Lestari et al., 2022). Microsoft Word, student workbooks, PowerPoint, email, Google Search, communicators, classroom monitoring systems, and paraphrasing programs are some digital tools at student's disposal (Kim et al., 2019; Osman et al., 2021). Students in Pakistani business and entrepreneurship programs are considered "digitally ready" when they demonstrate competence in applying technology effectively in pursuit of educational goals and benchmarks (Gfrerer et al., 2021). Students at Pakistani business and entrepreneurship schools tend to be more involved in class when they use digital technologies, especially when used by those who are already technologically savvy due to their proximity to innovation contexts (Abuže & Ļubkina, 2021). Over the last decade, the concept of "student engagement" has been examined from various angles (Hamutoğlu et al., 2021). A positive psychological and social climate was crucial to keep students interested in schoolwork. According to Gfrerer et al. (2021); Osman et al. (2021), students today demonstrate a notable gap between the technological competence they display in the context of their formal education and the competence they demonstrate in other, more casual contexts. Students from Pakistani business and entrepreneurship schools deemed digitally ready will be introduced to the school's e-learning philosophies to improve their academic performance. As (Hussain & Malik, 2018; Lestari et al., 2022) point out, "information is more than just a resource for digital readiness; it is an integral part of their life experience." Findings suggest that students graduating from Pakistani business and entrepreneurial schools are generally well-prepared for e-learning. This study also revealed significant discrepancies between digital readiness and digital learning abilities among those planning to take online courses (Kim et al., 2019; Soomro & Shah, 2021). So, we came up with the following idea:

H3: Digital readiness significantly influences student engagement.

Student Engagement and Students' Academic Achievement

The term "student engagement" is used to describe the level of interest shown by students in their coursework. It appears that this involvement not only helps students who have struggled academically improve their grades, reduces levels of student disenchantment, and raises grades, but also has an immediate impact on educational changes like the personal competence of teaching staff and the positive school climate (Lestari et al., 2022; Ngoc, 2021). This has led to a 20-year-long scholarly fascination with the many benefits of student participation (Núñez-Canal et al., 2022; Rasool et al., 2022; Zreen et al., 2019). Engaged students are more likely to achieve academic success, which has been recognized as an essential outcome of education for some time. Although there has been a lot of empirical research into the connection between the two, the results need to be more consistent. In general, you can split opinions on this link like a sandwich. For instance, one study showed a strong correlation between student participation and academic achievement Salimi, Heidari, Mehrvarz, and Safavi (2022). Student's active participation suits a school's bottom line and reputation. Student's future loyalty and support for their alma mater are strongly correlated with their level of engagement and self-assurance during their time there, as is widely recognized (Fernandez et al., 2022).

It is also a reliable indicator of academic success and student behavior in classroom settings, and there is strong evidence linking it to improved academic outcomes.

As a multi-faceted concept, student engagement encompasses students' use of not just one, but several types of cognitive, affective, and behavioral abilities (Alvi et al., 2022). Active learning is also known as student motivation, classroom participation, or student engagement (Ata, 2018). All of these terms have to do with being involved in school and learning Ngoc (2021) in some way, whether that's physically (through physical labor), emotionally (through expressions of interest, exhaustion, satisfaction, despair, and anxiety Hussain and Malik (2018)), cognitively (Aslam et al., 2022; Guo et al., 2022) (by wanting to learn more than just the bare minimum), or socially (by interacting with other students and teachers outside of class). We hypothesized that:

H4: Student engagement significantly influences students' academic achievement.

Mediating Role of Student Engagement

Students who use digitalization effectively are more engaged in their studies and have a more positive outlook on learning, as evidenced by their increased participation and grades (Alvi et al., 2022). The success of a school's culture, its students' ability to learn, and its correlation with students' academic accomplishments depend on student involvement in these areas (Zubkova et al., 2021). It's a significant indicator of success in school. According to the study, student engagement is defined as "a commitment to, or active involvement in learning" Havik and Westergård (2020) and as "students' psychological investments in acquiring, comprehending, or mastering the skills, crafts, or information that academic work is meant to foster" (Anggadwita & Dhewanto, 2016; Palo et al., 2019). Assessing students' level of interest is critical in the classroom. To be interested, one must have firsthand experience, acquire relevant knowledge, and take the initiative to (Heidari et al., 2021). According to Osman et al. (2021), student engagement is "the degree to which a student is prepared for, interested in, motivated by, and successful in the educational process." The amount and quality of time students invest in educational activities matter equally for achieving the desired results, as stated by Iqbal et al. (2022). Students' dedication to schoolwork and interest in extracurricular activities are components of what Ngoc (2021) calls "student involvement." Kim et al. (2019) found a correlation between students' active class participation and better academic results. It could be argued that each of these definitions shares some characteristics with the others. When defining student involvement in higher education, it is also essential to consider how students actively participate in lectures and other academic activities. Student engagement is "the quality and quantity of students' psychological, cognitive, emotional, and behavioral reactions to the learning process and to in-class/out-of-class academic and social activities to achieve successful learning outcomes" Havik and Westergård (2020). Learning through skill classroom practice, emotional expression with the course content, class participation and communication with teachers and other students, and achievement levels are just some aspects of student engagement in courses that are being investigated in this study (Alvi et al., 2022; Heidari et al., 2021; Kim et al., 2019; Zubkova et al., 2021). In this way, the students' optimistic outlook makes the educational processes and activities they participate in meaningful.
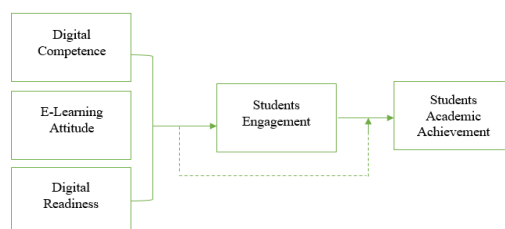

Figure 1. Conceptual framework

H5: Student engagement significantly mediates the effect between digital competence, e-learning attitude, digital readiness, and student academic achievement.

METHODOLOGY

Social learning theory and planned behavior theory provided theoretical grounding for the study's conceptual framework and the development of its hypotheses. This research aims to identify the attributes of digital learning, the achievement of students attending Pakistani business and entrepreneurship schools, and the mediating role of student engagement. They had to adapt to a dynamic environment by acquiring new skills and expanding their horizons to stay competitive and successful. Students in business and entrepreneurship programs in Pakistan are the sole population of interest in this analysis. There has been an increase in appreciation for entrepreneurs' contributions to national economies. The enthusiasm shown toward building universities that instruct students in entrepreneurship, as well as platforms and other organizations on a variety of global scales, is evidence of this knowledge and expertise. Due to the extensive nature of this study, the researchers opted for a non-probabilistic sampling strategy based on a purposive sample. Students at a business and entrepreneurship school in Pakistan

provided the data used in this analysis. To complete the survey, participants were asked to indicate their enthusiasm for (Soomro & Shah, 2021). For this survey, we contacted business and entrepreneurship programs in Pakistan and distributed the questionnaire to their students.

Participants

Students from Pakistani business and entrepreneurship programs are included in this research. Initially, 650 students' contact information was collected from business and entrepreneurship programs in Pakistan. All contacts were invited to participate in this study voluntarily by sending a cover letter and a survey questionnaire. Because English was chosen as the survey's language, the cover letter also asked for information about the respondent's command of the language. It was also ensured that no individual participant's answers would be linked to them in any way and that only the study's aggregate data results would be made public. First-contact language and time constraints disqualified 130 students from Pakistani business and entrepreneurship programs from taking part. Five hundred and twenty respondents who were fluent in the survey's language and willing to participate voluntarily gave their consent to the study's authors. Altogether, 520 students from Pakistani business and entrepreneurship programs were given two weeks to complete the survey and email it back to us. Those who had not responded after two weeks received a reminder email from the authors. It took an entire month, from August 10th, 2022, until September 10th, 2022, to collect all of the necessary data. As soon as 520 surveys were completed, the authors ended the data collection phase.

A total of 650 students from Pakistani business and entrepreneurship schools were surveyed, and 450 usable responses were collected for the study. The researchers used a "purposive convenient sampling" method to select their study's sample. This type of sampling is defined as "a method of collecting samples by capturing samples that are conveniently accessible near a location or Internet service" (Janet, Akinde, & John, 2020; Zubkova et al., 2021). Time constraints benefit from the ease and efficiency of the procedure. Methodologically, this investigation was a cross-sectional quantitative survey. It is therefore expected to improve the generalizability of results compared to random sampling. Data analysis and testing of hypotheses are performed using PLS-SEM Smart PLS 3 for this paper.

Measurement Scale

A 21-item questionnaire was devised to analyze the current research on digital learning attributes and student achievement among students from Pakistani business and entrepreneurship schools and mediating role of student engagement, as well as social learning theory and planned behavior theory involved.

1. A 5-item scale of digital competence was adopted by Kim et al. (2019). Items include "I can share my files with classmates using online software, and I can collaborate with classmates using online software." The responses were collected by a "7-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree".

2. A 3-item scale of e-learning attitude was adopted by Kim et al. (2019). Items include "I feel positive about digital learning and studying with digital learning is a good idea." The responses were collected by a "7-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree".

3. A 4-item scale of digital readiness was adopted by Kim et al. (2019). Items include "I can share my files with classmates using online software, and I can collaborate with classmates using online software." The responses were collected by a "7-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree".

4. A 5-item student engagement scale was adopted by Kim et al. (2019). Items include "Thinking about the course between class meetings and desiring to learn the material." The responses were collected by a "7-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree".

5. A 4-item scale of student academic achievement was adopted by Mehrvarz et al. (2021). Items include "I have learned how to perform my coursework efficiently and successfully, and I have performed academically as well as I anticipated I would." The responses were collected by a "7-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree".

RESULTS

The preliminary analysis of the collected data from the respondents are displayed in Table 1, which includes the demographic characteristics and descriptive statistics of the sample for the current study ($N = 450$). The

measurement and structural models were analyzed using SmartPLS3. Students' qualifications, ages, and genders from Pakistani business and entrepreneurship schools were found in the model assessment of the current study's digital learning attributes and student achievement among Pakistani entrepreneurship students and the mediating role of student engagement.

Table 1: Demographic profile

Demography	Description	No. of Responses %
Gender	Male	280 62
	Female	170 38
Age	20-35	250 56
	Above 35	200 44
Qualification	BS	270 60
	MS/PhD	180 40

In the table above, the age of 20-35 students was 56%, while above 35 was 44%. BS qualified 60% of respondents, while 40% were MS/Ph.D. qualified. The gender of male students is 62%, and the gender of female students is 38% of students from Pakistani business and entrepreneurship schools.

Table 2: Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
DC	450	1	5	3.87	0.84
ELA	450	1	5	3.79	0.79
DR	450	1	5	3.68	0.76
SE	450	1	5	3.89	0.80
SA	450	1	5	3.88	0.81

The term "Descriptive Analysis" was coined to describe the process of "describing, showing, or constructively summarising data points so that patterns might emerge that fulfill every condition of the data" in the table mentioned above. The averages, standard deviations, and highest and lowest values for five variables are presented in the current study's descriptive analysis.

Measurement Model

PLS-SEM was first used to assess the factor loadings, validity, and reliability of data gathered from 450 students. Table 3 displays the results of the factor loading, validity, and reliability of the items tested by the PLS measurement model. As a general rule, Cronbach's alpha test value, which measures the internal consistency of items, must be 0.70 or higher (Fornell & Larcker, 1981). For the variables examined, Cronbach's Alpha and CR values exceeded 0.70. Convergent validity was shown, and it was shown that the reliability was high because the Average Variance Extracted (AVE) values for discriminant validity were higher than 0.50 (Fornell & Larcker, 1981). The values of CR were from 0.894 to 0.797, exceeding the threshold value of 0.70.

Table 3: Composite reliability, Cronbach's alpha, and AVE values

Constructs/Items	CA	Rho-A	CR	AVE
Digital competence	0.826	0.830	0.878	0.591
Digital readiness	0.795	0.726	0.812	0.524
e-learning attitude	0.707	0.725	0.836	0.630
Student engagement	0.733	0.765	0.758	0.508
Students' academic achievement	0.868	0.905	0.903	0.652

"Note: CR = Composite Reliability; AVE = Average Variance Extracted; CA = Cronbach's Alpha"

Additionally, the discriminant validity of any research methodology must be established. Discriminant validity was defined by Fornell and Larcker (1981) as "the degree to which a given latent variable varies from other

latent variables". We did an additional study for structural path analysis after determining that the criteria for the reliability and validity of all variables had been met. Additionally, the HTMT values were below 1, which supports the discriminant validity (Zubkova et al., 2021). Table 4 demonstrates the value of HTMT.

Table 4: Discriminant validity

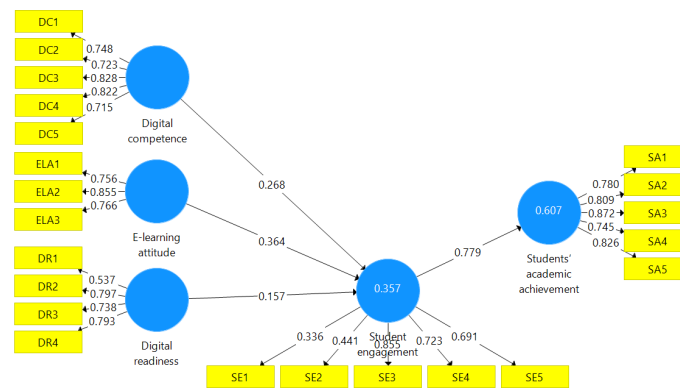|	DC	DR	ELA	SE	SA
Digital competence	0.769				
Digital readiness	0.322	0.724			
e-learning attitude	0.396	0.212	0.794		
Student engagement	0.462	0.320	0.504	0.739	
Students' academic achievement	0.588	0.208	0.506	0.779	0.808

Figure 2. Assessment of algorithm

R^2 has a value between zero and one. In addition, Chin (1988) suggested that values of 0.13 be regarded as poor, 0.33 as moderate, and 0.67 as strong. The table provides the endogenous constructs' coefficient of determination. Student engagement R square value of 0.357 indicates moderate, and students' academic achievement R square value of 0.607 indicates strong relation, according to the table below.

Table 5: Assessment of R square

	R^2
Student engagement	0.357
Students' academic achievement	0.607

SEM

Statistical determinations of the structural model route coefficients that reflected the hypothesized correlations were made using the PLS-SEM bootstrapping method. The PLS-SEM analysis of the relationship between digital competence, digital readiness, and e-learning attitude and their effect on student's academic achievement and the mediating role of student engagement in Pakistani business and entrepreneurship schools demonstrates the interconnections between the potential avenues for testing the hypotheses. The data demonstrates a strong correlation between digital fluency and academic motivation (β = 0.268, t = 4.452, p = 0.000). Hence H1 is accepted. The results show a significant relationship between digital readiness and student engagement (β = 0.157 t = 2.592, p = 0.010). Hence H2 is accepted. The results show a significant relationship between e-learning attitude and student engagement (β = 0.364, t = 6.510, p = 0.000). Hence H3 is accepted. The results show a significant relationship between student engagement and dent's academic achievement (β = 0.779, t = 46.606, p = 0.000). Hence H4 is accepted.

Table 6: Direct relation

	Original Sample	t Statistics	p Values	Decision
Digital competence -> Student Engagement	0.268	4.452	0.000	Supported
Digital readiness -> Student Engagement	0.157	2.592	0.010	Supported
e-learning attitude -> Student Engagement	0.364	6.510	0.000	Supported
Student engagement -> Students' academic achievement	0.779	46.606	0.000	Supported

Mediating Effect

The link between digital competence and students' academic achievement remained significant after adding student engagement as a mediating variable ($\beta = 0.212$, $t = 2.388$, $p < 0.006$), respectively. The link between e-learning competence and students' academic achievement remained significant after adding student engagement as a mediating variable ($\beta = 0.095$, $t = 2.367$, $p < 0.018$), respectively. The link between digital readiness and students' academic achievement remained significant after adding student engagement as a mediating variable ($\beta = 0.212$, $t = 4.541$, $p < 0.000$), respectively. Mediation refers to "the parties meeting with a mutually selected impartial and neutral person who assists them in negotiating their differences".

Table 7: Mediating Effect

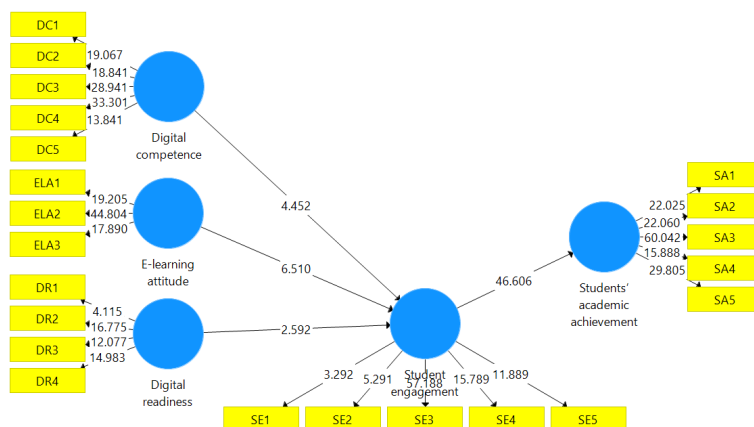|	Original Sample (O)	t Statistics	p Values
Digital competence -> Student engagement -> Students' academic achievement	0.208	4.302	0.000
e-learning attitude -> Student engagement -> Students' academic achievement	0.284	6.328	0.000
Digital readiness -> Student engagement -> Students' academic achievement	0.122	2.627	0.009

Figure 3. Assessment of bootstrapping

DISCUSSION

This study aimed to investigate the relationship between digital learning attributes and student achievement among Pakistani entrepreneurship students, focusing on the mediating role of student engagement, drawing on the social learning theory and a planned behavior theory. All of the evidence pointed in the same direction.

The results show a significant relationship between digital competence and student engagement ($\beta = 0.268$, $t = 4.452$, $p = 0.000$). Several findings inadvertently support this hypothesis. Heidari et al. (2021), for instance, made the case that any in-depth instruction in digital competence should give instructors knowledge and expertise in supervision and guidance, using online technologies, instructing, and having to learn. Núñez-Canal et al. (2022) also discovered a strong link between students' engagement in technology-based education and their technological

literacy. Students will struggle to maintain their psychological, intellectual, and physical involvement in their education without school motivation, and their excitement for learning will eventually wane ((Mehrvarz et al., 2021; Zubkova et al., 2021).

The results show a significant relationship between digital readiness and student engagement ($\beta = 0.157$ $t = 2.592$, $p = 0.010$). Information is more than just a resource for digital readiness because it has become an integral part of their life experience (Hussain & Malik, 2018; Lestari et al., 2022). The results show a significant relationship between e-learning attitude and student engagement ($\beta = 0.364$, $t = 6.510$, $p = 0.000$). Enhancing students' significant student learning may help them achieve higher academic performance while using a school e-learning attitude (Hamutoğlu et al., 2021; Ngoc, 2021). Making students more involved in the educational procedure through continuous engagement that encourages intellectual skills for success is among the most crucial aims of schools using e-learning platforms (Thapa, Bhandari, & Pathak, 2021).

The results show that the relationship between student engagement and dent's academic achievement is significant ($\beta = 0.779$, $t = 46.606$, $p = 0.000$). Students' academic achievement is frequently used to forecast a school system's progress, evaluate schools' effectiveness, judge instructors' classroom management skills, and track progress in each student's degree of success (Iqbal et al., 2022). The relationship between digital competence and students' academic achievement remained significant after adding student engagement as a mediating variable ($\beta = 0.212$, $t = 2.388$, $p < 0.006$), respectively. The relationship between e-learning competence and students' academic achievement remained significant after adding student engagement as a mediating variable ($\beta = 0.095$, $t = 2.367$, $p < 0.018$), respectively. The relationship between digital readiness and students' academic achievement remained significant after adding student engagement as a mediating variable ($\beta = 0.212$, $t = 4.541$, $p < 0.000$), respectively. In other terms, without participating in classroom achievements, students' e-learning attitudes, readiness, and competence do not significantly predict their success. Furthermore, several personal and academic elements, such as age, gender and qualification, study time, and the educational atmosphere, impact student accomplishment (Havik & Westergård, 2020; Kim et al., 2019; Osman et al., 2021).

CONCLUSION

Study findings suggest that to improve students' academic performance in the modern digital age, educational reform and administration should emphasize developing and strengthening students' digital competencies. Since students have more leeway and influence over their e-learning attitudes, policymakers in business and entrepreneurial schools should prioritize these attitudes. Promoting digital readiness is essential if new platforms are to be integrated to help students succeed academically rather than just for personal gain. Students should be taught to use digital tools for research, analysis, creation, and dissemination as part of a comprehensive digital literacy curriculum. It is then appropriate to apply this assumption to issues in the classroom. Moreover, educators in business and entrepreneurial programs should encourage their students to use technology in meaningful ways and provide them with opportunities to use digital resources inside and outside the classroom to help them succeed.

Practical Implication

Policymakers, administrators, and decision-makers can learn much from this study. Unknown contributing effects can be reduced by exploring alternative determinants. This research has practical implications for the administration of business and entrepreneurial schools by guiding how to develop a cohesive e-learning mindset and technology readiness strategy. The findings of this research highlight the importance of providing students with opportunities to become familiar with and use various e-learning tools and facilities to boost their academic performance. Regarding student motivation and performance in the classroom, business and entrepreneurship programs need to tailor their teaching strategies and support services to each student's unique profile, resulting from a consistent assessment of students' prior accomplishments and their level of comfort with online education. For instance, in recent years, business and entrepreneurship programs have used complex algorithms that consider each student's profile to predict their future success better and identify any obstacles to their education. With this setup, the school can recommend readings and other assignments.

Theoretical Implications

Students in Pakistani business and entrepreneurship programs and policymakers can learn a great deal from this entrepreneurship. The authors suggest expanding their focus to include the effects of students' digital readiness, e-learning attitudes, and digital competence on students' academic performance and the mediating role of students' engagement. Another significant contribution is the study's use of social learning and planned behavior theories. The study begins by gathering information from Pakistan to analyze the feminist perspective of developing countries like Pakistan in books written by academics at entrepreneurial schools. As a bonus, this research adds to our understanding of the factors that help students in emerging economies become digitally literate and successful learners. In addition, the study's findings suggest that e-learning attitudes and school readiness variables are strong predictors of admission to schools that emphasize business and entrepreneurship. Finally, the study investigates the mediating function of student engagement since there can only be a performance with student engagement.

Limitations and Future Research

Despite this, the study had significant limitations and suggestions for the future. Student's academic performance is influenced by their level of digital readiness, e-learning attitude, and digital competence, with student engagement playing the moderating role. Another limitation was that data was gathered through a quantitative, closed-ended questionnaire. These problems can be fixed by conducting qualitative research and engaging in dialogue with students to gain insight into how concepts are applied in the classroom and determine whether efficient systems have been implemented to store these suggestions for future use and adaptability. In conclusion, the moderating effect can be used to improve the outcomes of future studies. Future research could compare students' engagement and performance with school administrators' and teachers' assessments of students' attitudes toward e-learning in face-to-face and online courses to generalize the approach.

REFERENCES

Abuže, A., & Ļubkina, V. (2021). Transversal competencies for digital readiness and development of human capital in engineering education. In *Proceedings of the International Scientific and Practical Conference on Enviroment, Technology, Resources,* Rezekne, Latvia.

Alvi, A. K., Kayani, U. S., & Lakhan, A. B. (2022). Relationship of social media addiction with academic performance: Mediating role of student engagement. *Gomal University Journal of Research*, *38*(2), 160-170.

Anggadwita, G., & Dhewanto, W. (2016). Women's entrepreneurial intentions in micro and small enterprises (MSEs) in Indonesia: The influence of environmental factors on perceived behavioral control. *Journal of Administrative and Business Studies*, *1*(1), 1-7.

Aslam, R., Iqbal, S., & Ahmed, N. (2022). Impact of entrepreneurship education on students'entrepreneurial inclination: A case of public sector universities. *Pakistan Journal of Educational Research*, *5*(1), 51-65. doi:https://doi.org/10.52337/pjer.v5i1.432

Ata, E. (2018). Evaluation of adult environmental awareness behaviours in terms of social learning theory according to perceptions of primary and secondary school students. *International Journal of Higher Education*, *7*(6), 54-62.

Chin, W. W. (1988). The partial least squares approach to structural equation modeling. *Modern Methods for Business Research*, *295*(2), 295-336.

Fernandez, A. I., Al Radaideh, A., Singh Sisodia, G., Mathew, A., & Jimber del Río, J. A. (2022). Managing university e-learning environments and academic achievement in the United Arab Emirates: An instructor and student perspective. *PloS One*, *17*(5), 1-16. doi:https://doi.org/10.1371/journal.pone.0268338

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39-50. doi:https://doi.org/10.1177/002224378101800104

Gfrerer, A., Hutter, K., Füller, J., & Ströhle, T. (2021). Ready or not: Managers' and employees' different perceptions of digital readiness. *California Management Review*, *63*(2), 23-48. doi:https://doi.org/10.1177/0008125620977487

Guo, X., Edghiem, F., Dakhan, S. A., & Khan, M. (2022). Investigating female students' entrepreneurial intention in the UK and Pakistan: An application of TPB. In *Entrepreneurship and change.* London, UK: Palgrave

Macmillan.

Hamutoğlu, N. B., Ünveren Bilgiç, E. N., Salar, H. C., & Şahin, Y. L. (2021). The effect of e-learning experience on readiness, attitude, and self-control/self-management. *Journal of Information Technology Education: Innovations in Practice*, *20*, 093-120. doi:https://doi.org/10.28945/4822

Havik, T., & Westergård, E. (2020). Do teachers matter? Students' perceptions of classroom interactions and student engagement. *Scandinavian Journal of Educational Research*, *64*(4), 488-507. doi:https://doi.org/10.1080/00313831.2019.1577754

Heidari, E., Mehrvarz, M., Marzooghi, R., & Stoyanov, S. J. (2021). The role of digital informal learning in the relationship between students' digital competence and academic engagement during the COVID-19 pandemic. *Journal of Computer Assisted Learning*, *37*(4), 1154-1166. doi:https://doi.org/10.1111/jcal.12553

Hussain, S., & Malik, M. I. (2018). Towards nurturing the entrepreneurial intentions of neglected female business students of pakistan through proactive personality, self-efficacy and university support factors. *Asia Pacific Journal of Innovation and Entrepreneurship*, *12*(3), 1-16.

Iqbal, J., Asghar, M. Z., Ashraf, M. A., & Yi, X. T. (2022). The impacts of emotional intelligence on students' study habits in blended learning environments: The mediating role of cognitive engagement during COVID-19. *Behavioral Sciences*, *12*(1), 1-19. doi:https://doi.org/10.3390/bs12010014

Janet, S. J., Akinde, S. I., & John, M. D. (2020). Modeling industrial sociology as in the discourse of entrepreneurship development. *International Journal of Humanities, Arts and Social Sciences*, *6*(5), 177-185. doi:doi:10.20469/ijhss.6.20001-5

Kim, H. J., Hong, A. J., & Song, H. D. (2019). The roles of academic engagement and digital readiness in students' achievements in university e-learning environments. *International Journal of Educational Technology in Higher Education*, *16*(1), 1-18.

Lassnig, M., Müller, J. M., Klieber, K., Zeisler, A., & Schirl, M. (2021). A digital readiness check for the evaluation of supply chain aspects and company size for industry 4.0. *Journal of Manufacturing Technology Management*, *33*(9), 1-18. doi:https://doi.org/10.1108/JMTM-10-2020-0382

Lestari, E. D., Rizkalla, N., & Purnamaningsih, P. (2022). The effect of perceived university support, entrepreneurial self-efficacy and proactive personality in promoting student entrepreneurial intention in Indonesia. *Journal of Management and Business Education*, *5*(2), 169-197. doi:https://doi.org/10.35564/jmbe.2022.0011

Mehrvarz, M., Heidari, E., Farrokhnia, M., & Noroozi, O. (2021). The mediating role of digital informal learning in the relationship between students' digital competence and their academic performance. *Computers and Education*, *164*, 1-12. doi:https://doi.org/10.1016/j.compedu.2021.104184

Mohammed, S. A., Abdullah, S., Ghawanmeh, & Alqaadan. (2020). Theory of planned behavior, human capital theory, and social learning theory towards entrepreneurial intention. the role of Islamic perspective entrepreneurship, an attempt towards discussion: A general-review paper. *International Journal of Management*, *11*(11), 864-871. doi:https://doi.org/10.34218/IJM.11.11.2020.081

Núñez-Canal, M., de Obesso, M. D. L. M., & Pérez-Rivero, C. A. (2022). New challenges in higher education: A study of the digital competence of educators in Covid times. *Technological Forecasting and Social Change*, *174*, 1-13. doi:https://doi.org/10.1016/j.techfore.2021.121270

Ngoc, H. V. (2021). Augmenting student engagement through the use of social media: The role of knowledge sharing behaviour and knowledge sharing self-efficacy. *Interactive Learning Environments (Just Accepted)*. doi:https://doi.org/10.1080/10494820.2021.1948871

Osman, Z., Mohamad, L., & Mohamad, R. K. (2021). Enhancing students' online engagement among online distance learning institutions' students in Malaysia. the role of digital readiness as a mediator. *Turkish Online Journal of Qualitative Inquiry*, *12*, 9473-9483.

Palo, R., Maricuţoiu, L. P., & Costea, I. (2019). Relations between academic performance, student engagement and student burnout: A cross-lagged analysis of a two-wave study. *Studies in Educational Evaluation*, *60*, 199-204. doi:https://doi.org/10.1016/j.stueduc.2019.01.005

Rasool, Y., Shaikh, E., Shaukat, G., Almashaqbeh, H. A., & Raza, A. (2022). Exploring entrepreneurial intentions and perceived barriers of university students in a developing country, Pakistan. *Journal of Xidian University*,

16(2), 417-422. doi:https://doi.org/10.37896/jxu16.2/035

Salimi, G., Heidari, E., Mehrvarz, M., & Safavi, A. A. (2022). Impact of online social capital on academic performance: Exploring the mediating role of online knowledge sharing. *Education and Information Technologies*, *27*, 1-22. doi:https://doi.org/10.1007/s10639-021-10881-w

Sandybayev, A., Mohamed, A. S. J. A., & Ahmadi, S. A. A. A. (2020). Digital education: Intensifying Emirati student's performance in the long run through hologram technology. *Journal of Advances in Humanities and Social Sciences*, *6*(4), 138-146. doi:https://doi.org/10.20474/jahss-6.4.3

Soomro, B. A., & Shah, N. (2021). Entrepreneurship education, entrepreneurial self-efficacy, need for achievement and entrepreneurial intention among commerce students in Pakistan. *Education+ Training*, *64*(1), 107-125. doi:https://doi.org/10.1108/ET-01-2021-0023

Thapa, P., Bhandari, S. L., & Pathak, S. (2021). Nursing students' attitude on the practice of e-learning: A cross-sectional survey amid COVID-19 in Nepal. *PloS One*, *16*(6), 1-17.

Um, N. (2021). Learners' attitude toward e-learning: The effects of perceived system quality and e-learning usefulness, self-management of learning, and self-efficacy. *International Journal of Contents*, *17*(2), 41-47.

Zhao, Y., Llorente, A. M. P., & Gómez, M. C. S. (2021). Digital competence in higher education research: A systematic literature review. *Computers and Education*, *168*, 1-14. doi:https://doi.org/10.1016/j.compedu.2021.104212

Zreen, A., Farrukh, M., Nazar, N., & Khalid, R. (2019). The role of internship and business incubation programs in forming entrepreneurial intentions: An empirical analysis from Pakistan. *Central European Management Journal*, *27*(2), 97-113. doi:https://doi.org/10.7206/jmba.ce.2450-7814.255

Zubkova, M., Samoylenko, N., Chernitsova, J., Podlovilina, E., & Glotova, A. (2021). E-learning environment to enhance students' engagement in learning foreign languages at the university: Theory and practice. In *37th International Business Information Management Association Conference (IBIMA),* Cordoba, Spain.