The Moderating Effects of Time Pressure and Learning Demands on E-Learning Quality in Higher Education: Insights from the COVID-19 Pandemic

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Abstract

This study examined the key factors influencing the quality of e-learning in higher education institutions during the Covid-19 pandemic. The sudden and unplanned shift to online education imposed considerable time pressure and increased learning demands on faculty members, which may have affected the actual use of the Moodle platform and overall efficiency of e-learning. This study aimed to explore the relationship between facilitating conditions and the use of the Moodle platform, and to analyze the moderating effect of both time pressure and learning demand on the relationship between use behavior and the quality of e-learning. Primary data were collected through a structured questionnaire distributed via email and social media, resulting in 226 valid responses from faculty members actively using Moodle. The data were analyzed using Structural Equation Modeling (SEM). The results revealed a statistically significant positive relationship between facilitating conditions and use behavior as well as between use behavior and the quality of e-learning. Additionally, both time pressure and learning demands were found to be significant moderating factors in this relationship. These findings underscore the importance of providing a supportive infrastructure and manageable work environment to enhance the effectiveness of digital education.

***Keywords**: Facilitating Conditions, Use Behavior, Intensified Learning Demand, Time Pressure, Quality of E-Learning.*

Introduction

The integration of the Internet into e-learning has significantly transformed how individuals acquire education and training. Consequently, e-learning courses have been developed for educational purposes to advance electronic learning. To ensure that e-learning systems are valued and effectively utilized, leading to positive outcomes for learners, it is essential to critique and assess the various e-learning platforms. The COVID-19 pandemic has affected several business sectors (Crawford et al., 2020). Similar to other organizations, universities were compelled by COVID-19 to take precautions to curb its spread. Universities have also pursued virtual learning to lessen the impact of the pandemic on all universities, educators, and students. These structured courses can provide opportunities for university education when educational institutions are closed because of health threats. However, some minor issues and challenges have arisen because of the absence of an effective learning approach, with challenges being common among students and teachers (Bao, 2020). University students have transitioned from traditional classroom learning to virtual learning, necessitating institutional adjustments. Consequently, they face limited time to complete their work while ensuring that lecturers are developing the necessary information and skills to revitalize their teaching experience (Liguori & Winkler, 2020). Virtual learning is vital during emergencies, and while it opens up possibilities for enhancing educa-

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tion, various job-related factors can hinder or facilitate the implementation of online education (Brown, 2010; Browne, Jenkins, & Walker, 2006; Kinchin, 2012). Some authors have identified time pressure and learning demands as two major stressors for universities to adopt a virtual learning environment. As was the case globally, due to COVID-19, universities had to transition rapidly to online classes. This shift to e-learning was executed hastily, accompanied by time constraints and high learning demands, which may affect the actual use of Moodle in e-learning and quality of the e-learning process.

Based on the literature review, it is evident that since 2001, most researchers have focused on the intention to use and adopt new course content, its accessibility, customization, and user satisfaction. More recently, there has been a shift towards examining the outcomes of e-learning and how different consumption methods affect students (Cidral et al., 2018). Earlier studies predominantly explored the use of various technologies. However, with the latest technological advancements and improved Internet access, discussions have emerged regarding factors that positively correlate with the effectiveness of e-learning courses (Cheng, 2011). Al-Fraihat et al. (2020) have highlighted the necessity for research that concentrates on the quality of e-learning to evaluate these systems, aiming to enhance their functionality and meet learners' needs. This study sought to identify the factors that affect e-learning quality during the ongoing COVID-19 pandemic. Consequently, the demand for learning and the pressure of time in this educational setting were analyzed to illustrate their moderating influence on e-learning quality.

Research Problem

During the Coronavirus pandemic, universities were compelled to transition to e-learning at a pace that was both unplanned and unsuitable. Instructors in turn had to rapidly acquire new knowledge and skills to adapt to this new environment, placing universities under mounting pressure to meet time and learning demands. Additionally, increased workload intensity has heightened pressure, leading to a sense of accelerated work pace. Workers must be equipped with the necessary knowledge and skills to enhance their practical performance within a given timeframe. This situation may have contributed to the emergence of time-related pressure among educators, potentially affecting the quality of e-learning. The moderation analysis further explored how learning demands and time constraints impact e-learning quality. To achieve this, the following four research questions were posed.

- Q1: How do facilitating conditions relate to lecturers' Moodle use?
- Q2: What is the connection between lecturers' use of Moodle and the quality of e-learning?
- Q3: Does time pressure influence the relationship between use behavior and e-learning quality?
- Q4: Does increased learning demand affect the relationship between use behavior and e-learning quality?

Reseach Objectives

The primary objective of this study was to investigate the key factors influencing the quality of e-learning in higher education institutions during the COVID-19 pandemic. Specifically, this study sought the following:

1- To examine the relationship between facilitating conditions and lecturers' use of the Moodle platform.
2- The relationship between lecturers' use behavior of Moodle and the perceived quality of e-learning.
3- To evaluate the moderating effect of time pressure on the relationship between use behavior and e-learning quality.
4- Assess the moderating effect of intensified learning demands on the relationship between use behavior and e-learning quality.
5- Provide practical recommendations for higher education institutions to enhance the effectiveness and resilience of e-learning systems during crises.

Research Significance

This study contributes to the growing body of knowledge on e-learning quality by addressing an underexplored dimension, namely the moderating effects of time pressure and intensified learning demands. While prior research has extensively examined technological factors and user behaviors, few studies have considered how external stressors influence the effectiveness of e-learning systems, particularly during crisis-driven transitions, such as the COVID-19 pandemic.

By integrating work-related stress variables into the analysis of e-learning outcomes, this study provides a comprehensive framework for understanding the dynamics that affect digital education quality. The findings offer practical implications for higher education institutions by emphasizing the need for robust facilitating conditions, effective workload management, and targeted support initiatives to enhance e-learning adoption and performance.

Ultimately, this study informs both academic scholarship and institutional practice, offering actionable insights for designing resilient e-learning environments capable of sustaining educational quality amid unforeseen disruptions.

Reseach Contribution

This study makes several significant contributions to the field of e-learning quality in higher education, particularly under the exceptional circumstances imposed by the COVID-19 pandemic. Its unique contributions are summarized as follows:

Addressing Research Gaps: This study bridges the gaps in the literature by examining how time pressure and intensified learning demands influence the connection between use behaviors and e-learning quality. They represent two essential variables that have been neglected in previous scholarly investigations.

Introducing an Innovative Methodological Approach: Research has used structural equation modeling (SEM) to analyze how facilitating conditions combine with use behavior and e-learning quality through an extensive methodology. The research methodology implemented both work-related stress factors (time pressure and learning demand) to evaluate e-learning outcomes through a moderated model approach.

Clarifying the Practical Importance of Results: This study provides direct applications that higher education institutions must use to develop superior digital learning systems. The findings underline the necessity for institutions to provide adequate infrastructure and adjustable workloads that enable better performance of distant education during emergency situations and throughout the entire academic cycle.

Expanding Existing Knowledge: This study advances the understanding of online education outcomes by integrating facilitating conditions with user behavior together with time pressure and learning demands to explain e-learning quality beyond system access and usability.

Exploring New Aspects: This study introduces an innovation by evaluating external job-related stressors to understand their impact on the quality outcomes experienced through e-learning. This research integrates organizational behavior theories with e-learning quality research through a new perspective approach.

Through these contributions, the current study not only advances theoretical frameworks in the field, but also provides actionable insights for educational policymakers, administrators, and practitioners seeking to foster resilient and effective digital learning environments in higher education.

Research Model

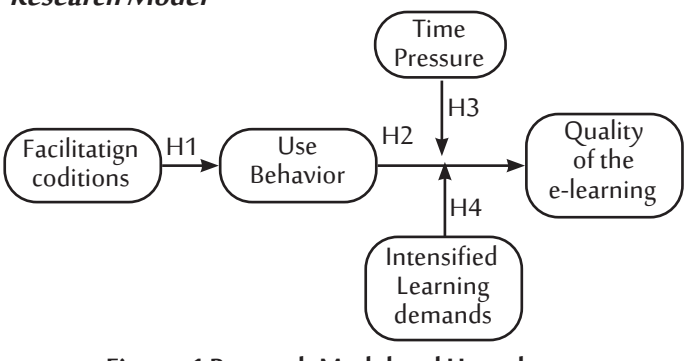

Figure. 1 Research Model and Hypotheses

Literature Review and Hypotheses Development

The sudden shift to e-learning during the COVID-19 pandemic has revealed critical challenges for higher education institutions, particularly regarding instructors' ability to adapt rapidly to new digital teaching environments (Crawford et al., 2020; Bao, 2020). Unlike traditional educational models, the emergency transition to online education imposed significant time pressure and learning demands on faculties, requiring them to acquire new skills and expertise within constrained timeframes (Liguori & Winkler, 2020; Kasdorf & Crittenden, 2021). This study is grounded in the conceptualization of e-learning systems as information systems (DeLone & McLean, 2003; Mohammadi, 2015), where external challenge stressors, specifically time pressure and intensified learning demands, may influence use behavior and, in turn, affect e-learning quality (Kubicek et al., 2015; LePine et al., 2005). Although previous research has focused extensively on technological readiness and user behavior (Venkatesh et al., 2003; Fathema et al., 2015), limited attention has been paid to the role of work-related stressors in shaping digital learning outcomes. By examining the moderating effects of time pressure and learning demands, this study extends the theoretical models of e-learning success and highlights the importance of integrating environmental stress factors into the evaluation of digital education effectiveness during crisis-driven transformations (Ebner et al., 2020).

Facilitating Condition (FC) and Use Behavior (UB)

Venkatesh and Torba (2008) described facilitating conditions as the degree to which a person perceives that they have access to the organization's resources and infrastructure necessary for utilizing the system (Venkatesh & Bala, 2008). It has been reported that the technological framework is a limitation of e-learning programs (Engelbrecht 2005; Selim 2007). Prior studies have shown a direct positive impact of FC on usage behavior (Oliveira et al. 2015; Venkatesh et al. 2003). Cheong et al. (2004) also conducted a study and discovered a positive and significant link between facilitating conditions and behavioral intention. In this research, the facilitating condition refers to the extent to which a lecturer believes, in relation to their intention to adopt Moodle, that the organizational and technical infrastructure at their university influences this decision. Consequently, we propose the following hypotheses:

H1: Facilitating conditions are significantly and positively associated with lecturers' use of Moodle platforms.

Use Behavior (UB) and Quality of E-learning

Academic research often emphasizes the importance of service efficiency in creating e-learning programs. The successful implementation of e-learning projects relies heavily on three critical factors: service, device, and knowledge quality (Holsapple and Lee-Post, 2006). A consistently performing e-learning system is crucial as it influences the overall functionality of the system. Achieving a competitive advantage requires prioritizing this aspect (Udo et al., 2011). As noted by Inglis (2005) and Ehlers and Pawlowski (2006), universities must ensure high service quality in higher education in order to effectively engage in e-learning. McGorry (2003) highlights the need for higher education to focus on delivering superior e-learning quality standards.

Delone and McLean (2003) discovered a notable connection between service efficiency, user behavior, and service quality. Numerous researchers in the field of information management have employed a methodological approach to establish a positive link between system performance and usage (Hsieh & Wang, 2007; Halawi, McCarthy, & Aronson, 2008). The association between system quality and usage has also been demonstrated to be robust in this domain (Balaban et al. 2013; Garcia-Smith and Effken 2013; Lin 2007; Marjanovic et al. 2016). Zhao (2003), Moore (2005), and Marshall (2006) similarly identified educators' satisfaction and usage patterns as crucial indicators of success and can impact the quality of e-learning. Based on these insights, we propose the following hypothesis:

H2: Lecturers' use of the Moodle platform has a significantly positive effect on the perceived quality of e-learning.

Time Pressure as a Moderator

The concept of Time Pressure is described as 'the degree to which employees feel they lack sufficient time to complete their work tasks' (Ohly & Fritz, 2010). Some studies (Reis et al., 2017; Schmitt et al., 2015) indicate that a certain amount of time pressure can boost employees' dedication and involvement in their work. Baethge et al. (2018) emphasize the importance of assessing how time limitations impact an employee's performance based on how long they are exposed to them. When universities were forced to shift to online education due to the unforeseen coronavirus pandemic, it was evident that this requirement was temporary. Once lecturers had gained all the necessary knowledge and skills to become e-lecturers, their operations would revert to normal. However, we suggest that the pressure on lecturers to utilize the Moodle platform during COVID-19 diminishes the link between their platform usage behavior and the quality of e-learning. Therefore, we propose the following hypothesis:

H3: Time pressure moderates the relationship between use behavior and the quality of e-learning

Intensified Learning Demands as a Moderator

Learning demands refer to the extent to which employees acquire new knowledge and skills to effectively perform their work tasks (Kubicek et al., 2015). On-the-job learning is critical for maintaining success, particularly when employees encounter changes in their responsibilities or work environments (Loon & Casimir, 2008). Such transitions create additional pressure to update job-related skills and expertise continuously (Kubicek et al. 2015). Furthermore, individuals who frequently use technological systems, such as computers, experience higher task intensity than those with less technology-intensive roles (Baarne et al., 2010; Kubicek et al., 2015). During the COVID-19 pandemic, academic staff have rapidly transitioned to e-learning, prompting an accelerated need to master new digital tools.In this context, intensified learning demands may influence how effectively lecturers' use of Moodle translates into improved e-learning quality. Specifically, when learning demands are high, lecturers may either enhance their use of Moodle to meet performance expectations, strengthen their positive relationship with e-learning quality, or experience overload, weakening this relationship. Therefore, we propose the following hypothesis:

H4: Intensified learning demands moderate the relationship between lecturers' use behavior and the quality of e-learning.

Methodology

The research model is examined quantitatively. The questionnaire served as a suitable tool for gathering data, as it explored the participants' responses. The automated survey ensured complete data with no omissions, as all the questions were compulsory for data collection. Consequently, the survey data was grounded in reliable metrics from related studies on usage behavior, Facilitating Conditions (Venkatesh et al. 2012), and time pressure (Durham et al. 2000), as well as Intensified Learning demands (Kubicek et al. 2015) and eLearning quality (Venkatesh 2003; Jan And Contreras 2016). The questionnaire uses a five-point Likert scale. Respondents indicated their level of agreement with the statement: (5) strongly agree, (4) agree, (3) neutral, (2) disagree, and (1) strongly disagree.

This study focused on all university academics in the UAE and Jordan who used Moodle. A total of 226 individuals participated in this survey. Jordan has 10 public universities, 17 private universities, and 51 community colleges, whereas the UAE has nearly 60 institutions, ranging from colleges to universities. Consequently, the researchers employed a convenience sampling technique to select the study participants, distributing the survey through popular social media platforms, such as LinkedIn.

The data underwent a validity test for statistical analysis to determine the likelihood of implausible responses to questions and to characterize variables by their central tendency and dispersion. Subsequently, a statistical hypothesis test was conducted to derive the research findings. The reliability of the questionnaire responses was assessed using a Reliability Test, specifically Cronbach's alpha, to evaluate the consistency of the questionnaire dimensions. The researcher employed Pearson's correlation coefficient was used to assess internal consistency by correlating each statement within a dimension with its overall mean. Measures of central tendency, such as the arithmetic mean and relative mean, were used, while the standard deviation and coefficient of variation served as measures of dispersion to describe the study variables. Structural Equation Modeling (SEM) was applied using two techniques, path analysis and linear structural relationship analysis, to estimate model parameters encompassing all variables simultaneously. To evaluate the model's goodness of fit in the path analysis, indicators such as the relative chi-square, Goodness of Fit Index (GFI), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA) were employed. If the data lack stability, the value of this parameter is zero, whereas complete stability results in a value of one. A measure equal to or exceeding 0.60 indicates that the research results can be considered reliable.

As illustrated in Table (1), the Alfa value spans from 0.700 to 0.926 in relation to the dimensions of the questionnaire, which impacts the honesty coefficient, ranging from 0.837 to 0.962. This indicates that the questionnaire is dependable and the results derived from it can be trusted.

Internal consistency pertains to the consistency with which each survey item aligns with its respective group. It was assessed by determining the correlation coefficient between each survey item and the overall mean of the group to which it belonged. Table (2) presents the Pearson correlation coefficients between the term "Facilitating Conditions" and the group's overall mean.

Table (2) indicates that the correlation coefficients varied from (0.819 to 0.861) and were both positive and significant at the ($\alpha = 0.01$) level regarding the dimension "Facilitating Conditions." This suggests that the dimension effectively measured the intended construct.

Table (3) shows the Pearson correlation coefficients between the terms of "**Time Pressure**" and the general mean of the group:

Table (3) indicates that the correlation coefficients ranged from 0.832 to 0.891, and they were both positive and significant at α

Table (1): The Rliability Measures on the Dimensions of the Questionnaire

Dimensions	# of questions	Alfa Reliability Coefficient	Honesty (*) Coefficient
Facilitating Conditions	3	0.792	0.890
Time Pressure	4	0.880	0.938
Learning Demands	6	0.904	0.951
Use Behavior	3	0.700	0.837
Quality of E- Learning	4	0.926	0.962

(*) Honesty coefficient is the square root of reliability coefficient

Table (2): Pearson Correlation Coefficients between of (Facilitating Conditions) and General the Mean of the Group

Variables	Label	Correlation coefficient
X_1	The IT department ensures support services are available for Moodle users.	.819**
X_2	I possess the required resources and expertise to effectively utilize Moodle.	.847**
X_3	The use of Moodle aligns well with the requirements of my work.aq	.861**

**. Correlation is significant at the 0.01 level (2-tailed).

Table (3): Pearson Correlation Coefficients between (Time Pressure) and General the Mean of the Group

Variables	Label	Correlation coefficient
T_1	The use of Moodle has resulted in an excessive workload with insufficient time to complete it.	.832**
T_2	The use of Moodle makes me feel as though I have no days off.	.891**
T_3	The use of Moodle frequently requires me to address work-related issues during my personal time.	.864**
T_4	The use of Moodle frequently places me under significant pressure to meet task deadlines.	.844**

**. Correlation is significant at the 0.01 level (2-tailed).

= 0.01 level in relation to the "Time Pressure" dimension. This suggests that the dimension effectively measured the intended construct.

Table (4) shows the Pearson correlation coefficients between the terms of "**Learning** Demand" and the general mean of the group:

Table (4) indicates that the correlation coefficients ranged from 0.748 to 0.870, and they were both positive and significant at the α = 0.01 level regarding the dimension "Learning Demands." This suggests that the dimension effectively measured the intended construct.

The following table (5) shows the person correlation coefficients between the terms of "Use Behavior" and the general mean of the group:

Table (5) indicates that the correlation coefficients ranged from 0.750 to 0.826, and they were both positive and significant at α = 0.01 level in relation to the "Use Behavior" dimension. This suggests that the dimension effectively measured the intended construct.

Table (6) shows the Pearson correlation coefficients between the terms of "Quality of E-learning" and the general mean of the group:

Table (4): Pearson Correlation Coefficients between (Learning Demands) and General the Mean of the Group

Variables	Label	Correlation coefficient
L_1	The use of Moodle requires me to frequently develop new professional skills.	.813**
L_2	The use of Moodle has increasingly required me to acquire new knowledge to perform my job tasks.	.870**
L_3	The use of Moodle requires me to update my knowledge more frequently.	.868**
L_4	The use of Moodle has increasingly required me to familiarize myself with new work processes.	.866**
L_5	The use of Moodle has progressively required to become accustomed to new work routines	.797**
L_6	The use of Moodle has increasingly required me to operate new work equipment, such as devices and software programs.	.748**

**. Correlation is significant at the 0.01 level (2-tailed).

Table (5): Pearson Correlation Coefficients between (Use Behavior) and General the Mean of the Group

Variables	Label	Correlation coefficient
M_1	Using Moodle is an enjoyable experience	.797**
M_2	I am currently utilizing the Moodle platform.	.826**
M_3	I devote a significant amount of time to using Moodle for both learning and work-related tasks.	.750**

**. Correlation is significant at the 0.01 level (2-tailed).

Table (6): Pearson Correlation Coefficients between (Quality of E-Learning) Items and the Overall Group Mean

Variables	Label	Correlation coefficient
Y_1	Relative to traditional education methods, the use of Moodle has led to an improvement in the quality of teaching and learning.	.901**
Y_2	Using Moodle has simplified the teaching and learning process relative to traditional education.	.897**
Y_3	Moodle use has enhanced my teaching and learning effectiveness compared to traditional educational practices.	.921**
Y_4	The use of Moodle has resulted in greater productivity for both lecturers and students compared to traditional education.	.901**

**. Correlation is significant at the 0.01 level (2-tailed).

Table (6) indicates that the correlation coefficients ranged from 0.897 to 0.921, and they were both positive and significant at the α = 0.01 level in relation to the dimension "Quality of E-learning." This suggests that the dimension effectively measured the intended aspect.

Data Analysis and Findings

Descriptive Statistics

A descriptive analysis was performed to outline the study variables concerning measures of central tendency and variability and was applied to the pertinent sections of the research. Consequently, the findings are presented using descriptive statistics, including mean, relative mean, standard deviation, and coefficient of variation, to evaluate the significance of the "Facilitating Conditions" variable within the sample.

Table (7): The Descriptive Statistics Concerning "Facilitating Conditions"

Variables	Mean	Relative mean%	Std. Deviation	C.V(*)	Agreement	Order
X_1 The IT department ensures support services are available for Moodle users.	3.81	76.20	1.04	27.3	Agree	3
X_2 I possess the required resources and expertise to effectively utilize Moodle.	3.89	77.80	0.91	23.5	Agree	2
X_3 The use of Moodle aligns well with the requirements of my work.	3.91	78.20	0.96	24.5	Agree	1
X Facilitating Conditions	3.87	77.37	0.82	21.1	Agree	

(*) C.V (coefficient of variation) = standard deviation/mean × 100.

According to Table (7), it can be inferred that the sample shows consensus on "Facilitating Conditions," as the average response is 3.87, indicating an "Agree" level of agreement. The coefficient of variation was 21.1%, suggesting 78.9% agreement among the respondents. Regarding the specific phrases, the agreement level is "Agree," with response means ranging from 3.81 to 3.91.

To assess the significance of "Time Pressure" from the sample's viewpoint, descriptive statistics were utilized, including mean, relative mean, standard deviation, and coefficient of variation. The findings were as follows:

Table (8): The Descriptive Statistics Concerning "Time Pressure"

Variables	Mean	Relative mean%	Std. Deviation	C.V(*)	Agree-ment	Order
T_1 The use of Moodle has resulted in an excessive workload with insufficient time to complete it.	3.62	72.3	0.97	26.8	Agree	3
T_2 The use of Moodle makes me feel as though I have no days off.	3.70	74.1	1.05	28.4	Agree	2
T_3 The use of Moodle frequently requires me to address work-related issues during my personal time.	3.80	76.0	1.00	26.4	Agree	1
T_4 The use of Moodle frequently places me under significant pressure to meet task deadlines.	3.58	71.5	1.06	29.7	Agree	4
T Time Pressure	3.67	73.5	0.88	23.9	Agree	

(*) C.V (coefficient of variation) = standard deviation/mean × 100.

According to Table (8), it can be inferred that the sample generally agrees on "Time Pressure," as the average response is 3.67, indicating an "Agree" level of consensus. The coefficient of variation was 23.9%, suggesting 76.1% agreement among the respondents. Regarding specific phrases, the agreement level is "Agree," with response averages ranging from 3.58 to 3.80.

To assess the significance of "Learning Demand" from the sample's viewpoint, descriptive statistics were utilized, including the mean, relative mean, standard deviation, and coefficient of variation. The findings were as follows:

Table (9): The Descriptive Statistics Concerning "Learning Demands"

Variables	Mean	Relative mean%	Std. Deviation	C.V(*)	Agree-ment	Order
L_1 The use of Moodle requires me to frequently develop new professional skills.	3.78	75.6	0.90	23.8	Agree	5
L_2 The use of Moodle has increasingly required me to acquire new knowledge to perform my job tasks.	3.82	76.4	0.85	22.3	Agree	4
L_3 The use of Moodle requires me to update my knowledge more frequently.	3.85	77.0	0.87	22.5	Agree	3
L_4 The use of Moodle has increasingly required me to familiarize myself with new work processes.	3.88	77.6	0.80	20.7	Agree	2
L_5 The use of Moodle has progressively required to become accustomed to new work routines.	3.96	79.2	0.83	21.0	Agree	1
L_6 The use of Moodle has increasingly required me to operate new work equipment, such as devices and software programs.	3.73	74.6	0.99	26.6	Agree	6
L Learning Demands	3.84	76.7	0.72	18.8	Agree	

(*) C.V (coefficient of variation) = standard deviation/mean × 100.

According to Table (9), it can be inferred that the sample generally agrees on "Learning Demands," as the average response is 3.84, indicating an "Agree" level of consensus. The coefficient of variation was 18.8%, suggesting 81.2% agreement among the respondents. Regarding specific phrases, the agreement level is "Agree," with response averages ranging from 3.73 to 3.96.

To assess the significance of "Use Behavior" from the sample's viewpoint, descriptive statistics were employed, including mean, relative mean, standard deviation, and coefficient of variation. The findings were as follows:

Table (10): The Descriptive Statistics Concerning "Use Behavior"

Variables	Mean	Relative mean%	Std. Deviation	C.V(*)	Agreement	Order
M_1 Using Moodle is an enjoyable experience.	3.73	74.6	0.99	26.5	Agree	3
M_2 I am currently utilizing the Moodle platform.	3.86	77.2	0.96	24.8	Agree	1
M_3 I devote a significant amount of time to using Moodle for both learning and work-related tasks.	3.80	76.0	0.95	25.0	Agree	2
M Use Behavior	3.80	75.9	0.76	20.1	Agree	

(*) C.V (coefficient of variation) = standard deviation/mean × 100.

According to Table (10), it can be inferred that the sample generally agrees on "Use Behavior," as the average response is 3.80, indicating an "Agree" level of consensus. The coefficient of variation was 20.1%, suggesting 79.9% agreement among the respondents. Regarding specific statements, the agreement level is "Agree," with mean responses ranging from 3.73 to 3.86.

To assess the significance of "E-Learning" from the sample's viewpoint, descriptive statistics were applied, including mean, relative mean, standard deviation, and coefficient of variation. The findings were as follows:

Table (11): The Descriptive Statistics Concerning "E-Learning"

Variables	Mean	Relative mean%	Std. Deviation	C.V(*)	Agreement	Order
Y_1 Relative to traditional education methods, the use of Moodle has led to an improvement in the quality of teaching and learning.	3.33	66.6	1.12	33.6	Neutral	4
Y_2 Using Moodle has simplified the teaching and learning process relative to traditional education.	3.50	70.0	1.04	29.8	Agree	1
Y_3 Moodle use has enhanced my teaching and learning effectiveness compared to traditional educational practices	3.46	69.2	1.05	30.3	Agree	2
Y_4 The use of Moodle has resulted in greater productivity for both lecturers and students compared to traditional education.	3.38	67.6	1.09	32.2	Neutral	3
Y E- learning	3.42	68.4	0.97	28.5	Agree	

(*) C.V (coefficient of variation) = standard deviation/mean × 100.

According to Table (11), it can be inferred that the sample generally agrees on "E-learning," as the average response is 3.42, indicating an "Agree" level of consensus. The coefficient of variation was 28.5%, suggesting a 71.5% agreement level, which reflects a consensus among the respondents regarding the statements.

The degree of agreement is "Agree" concerning phrases (Using Moodle has simplified the teaching and learning process relative to traditional education, Moodle use has enhanced my teaching and learning effectiveness compared to traditional educational practices) since the mean of responses is 3.50, 3.46 respectively, while the degree of agreement is "neutral" concerning the phrases (Relative to traditional education methods, the use of Moodle has led to an improvement in the quality of teaching and learning, The use of Moodle has resulted in greater productivity for both lecturers and students compared to traditional education) since the mean of responses is 3.38, 3.33 respectively which means they do not reach to the acceptable level.

Testing Goodness of Fit

To validate the proposed research model, path analysis was conducted using the collected questionnaire data. The model's goodness of fit was assessed based on widely recognized fit indices, including the chi-square to degrees of freedom ratio (CMIN/DF), Goodness of Fit Index (GFI), Comparative Fit Index (CFI), Tucker-Lewis index (TLI), and Root Mean Square Error of Approximation (RMSEA). The results, summarized in Table (12), demonstrate that the model adequately represents the observed data according to established statistical standards.

Table (12): Goodness of Fit Indices

Indicator	Value	Suggested Guidelines
CMIN/DF (Chi Square / df)	2.035	≤ 3
GFI (Goodness of Fit Index)	0.975	≥ 0.9
CFI (Comparative Fit Index)	0.951	≥ 0.9
TLI (Tucker- Lewis Index)	0.905	≥ 0.9
RMSEA Root Mean Square Error of Approximation	0.021	≤ 0.08

As shown in Table (12), the model exhibited a good fit with the sample data. The CMIN/DF ratio (2.035) was below the recommended threshold of 3. Additionally, the RMSEA value (0.021) fell well below the acceptable maximum of 0.08, indicating a close fit. Furthermore, the GFI, CFI, and TLI values exceeded 0.90, confirming that the model achieved an acceptable and satisfactory level of fit with the data.

Hypotheses Testing

1- **Testing the Direct Relationships (H1 and H2)**

To examine H1 and H2, path analysis techniques were used to assess the interrelationships among the study variables. Table (13) presents the estimated path coefficients and their corresponding significance levels. As shown in Table (13), all p-values are less than 0.01, indicating statistically significant relationships.

Specifically, facilitating conditions (FC) were found to have a significant positive effect on use behavior (UB), supporting H1. Furthermore, the results confirm a significant positive relationship between use behavior (UB) and the quality of e-learning (EL), thus supporting H2.

Facilitating conditions significantly predicted use behavior (estimate = 0.587, $p < 0.01$), and use behavior significantly predicted the quality of e-learning (estimate = 0.418, $p < 0.01$), confirming the acceptance of H1 and H2.

Table (13): The Estimated Regression Weight for the Model

Variables	Estimate	Standard Error	Critical Value	P-Value	R Square
Intercept	1.525	.192	7.953	***	0.394
UB ← FC	.587	.049	12.102	***	
Intercept	.263	.283	.927	.354	0.364
EL ← UB	.418	.087	4.806	***	

*** Significant at 0.01 level.

Following the confirmation of the direct relationships outlined in H1 and H2, the analysis examined the moderating effects proposed in H3 and H4. Specifically, the moderating roles of time pressure and intensified learning demands were tested to determine whether these variables significantly influenced the strength or direction of the relationship between use behavior and the quality of e-learning. The results of the moderation analysis are presented in subsequent sections.

2- **Testing the Moderating Effect of Time Pressure (H3)**

To test H3, the effect of use behavior (UB) on e-learning (EL) was analyzed across different levels of time pressure (low and high). The results of this analysis are presented in Table (14).

As shown in Table (14), the impact of use behavior (UB) on e-learning (EL) is 0.535 under conditions of low time pressure, compared to 0.335 under conditions of high time pressure. These results indicate that the strength

Table (14) Estimated parameter across the two levels of time pressure

Variables	Low time pressure				High time pressure			
	Estimate	Standard Error	Critical Value	P-Value	Estimate	Standard Error	Critical Value	P-Value
Intercept	.522	.337	1.548	.122	.058	.462	.126	.900
EL ← UB	.535	.115	4.672	***	.335	.132	2.541	.011

*** Significant at the 0.01 level.

of the relationship between the UB and EL is greater when the time pressure is low. Therefore, H3 is supported, confirming that time pressure moderates the relationship between use behavior and the quality of e-learning.

3- **Testing the Moderating Effect of Intensified Learning Demands (H4)**

To test H4, the effect of use behavior (UB) on e-learning (EL) was analyzed across different levels of intensified learning demands (low and high). Table 15 presents the results of the analysis are shown in Table (15).

Table (15) Estimated Parameter across the Two Levels of Intensified Learning

Variables	Low intensified learning				High intensified learning			
	Estimate	Standard Error	Critical Value	P-Value	Estimate	Standard Error	Critical Value	P-Value
Intercept	.232	.268	.868	.385	.131	.503	.261	.794
EL ← UB	.465	.086	5.405	***	.336	.129	2.605	.009

*** Significant at the 0.01 level.

As shown in Table (15), the impact of use behavior (UB) on e-learning (EL) is stronger under low-intensified learning conditions (estimate = 0.465) than under high-intensified learning conditions (estimate = 0.336). These results indicate a significant difference between the two states. Accordingly, it can be concluded that use behavior plays a more substantial role in influencing the quality of e-learning when learning demands are lower. Therefore, H4 is supported.

Discussion

Hypothesis H1 was accepted. This hypothesis is empirically supported. Consequently, hardware, applications, and technological support are Moodle's key aims. Hence, the results support those of the study by Chang et al. (2007), Al-Fraihat and Sinclair (2020), Agudo-Peregrina et al. (2014) and Al-Okunk et al. (2020). Previous studies have confirmed the requirement of facilitation, such as the required support provided to organizations and assistance by technology in removing the hindrances to the use of modern technology (Taylor & Todd, 1995). Promoting conditions were found to have a significant positive influence on teachers' Moodle use. To overcome most of the hurdles of Moodle, we offered complete assistance during the trial phase, such as IT support, services, expertise, and better hardware. This support was provided by any of the teachers.

Thus, hypothesis H2 was accepted. This means that the use of the e-learning system by the instructor results in a high dependence and emphasis on such interactive tools as a variety of learning styles and the provision of materials for the evaluation of students. In line with the findings of Volery and Lord (2000), who researched the crucial performance drivers of online learning, the most crucial factor in assessing online learning is system consistency. In addition, the instructor's behavior positively impacts the efficiency of the e-learning system. As Sun et al. (2008) state, this confirms their findings. That is, these findings support the results indicated by Hassanzadeh et al. (2012) that educational system efficiency is positively and explicitly related to student happiness and the use of the platform meaningfully; that is, the frequency with which teachers utilize the education tools of the e-learning system, and involvement in promoting resources such as online forums and active learning tools, significantly increases the usability and optimal performance of e-learning platforms.

Hypothesis H3 was accepted, As the results of Hypothesis H2 proved that actual user behavior has a strong link to e-learning quality leading us to support Hypothesis H3. This research shows how increasing time pressure weakens the effectiveness relationship between e-learning use behavior and quality achievements. Time pressure limits how e-learning use habits affect e-learning quality according to our research results, which match Enber et al. (2020) findings from Austrian universities. The workload of helping lecturers and students remained elevated due to the COVID-19 pandemic, which decreased the quality of learning.

Hypothesis H4 was accepted, which ensures that the moderation relationship between e-learning use behavior and e-learning quality is exerted negatively. More precisely, use behavior has a more serious impact on e-learning when the degree of instructors' learning demands is lower. The study of Stoyanov and Kirschner (2004) agrees with these findings, and based on this research, the main problem that arises while running e-learning courses or curricula is the lack of poor professional competencies of instructors. In the absence of sufficient preparation for or expansion of e-learning, teachers may battle using this instructional strategy.

Implications

These research findings have multiple important effects on e-learning quality assessment in higher education during the COVID-19 pandemic. From a theoretical perspective, this study validates established effectiveness theories on e-learning systems through an evaluation of advanced factors beyond basic system adoption and usage. This study proves that a link exists between e-learning use behavior and educational quality, and understands time constraints and learning requirements as elements influencing the connection between them.

In terms of practical implications for lecturers and administrators, this study demonstrates that lecturers and administrators should focus on creating sufficient facilitating conditions, including hardware and software, and technical help to achieve effective e-learning system use. Useful and user-friendly e-learning platforms require development to enhance the quality of learning. This study suggests that administrators should incorporate sufficient teaching staff to ease time constraints within e-learning sessions, and they must commit to extensive teacher education before implementing e-learning strategies. User education about e-learning systems, combined with their benefits, will drive better system adoption, utilization results, and overall acceptance.

For educational institutions, research suggests that educational organizations must deliver complete training systems to teach students and teaching staff the effective use of e-learning software. The report emphasizes that students need proper access to the required technology equipment, including laptops, for successful remote education. Online collaboration and student coordination must be established to improve the student-learning journey.

From a management perspective, this study provides solutions by identifying important factors that lead to the successful implementation of e-learning programs. E-learning initiatives require examinations based on time and learning requirements to determine their effectiveness.

In conclusion, the findings contribute essential knowledge for improving the quality of e-learning education at universities during unexpected disruptions such as the global COVID-19 crisis. This research demonstrated how various technological elements integrate with organizational arrangements while involving human functions to achieve e-learning system success.

Limitations and Recommendations for Future Studies

The present study has some limitations that researchers need to recognize. The research geographic boundary focused on a single Middle East region while conducting its study, which reduced the potential applicability of these findings beyond that specific area. The examination depended mostly on instructor perspectives because it did not include insights from students or administrative representatives who also participated in e-learning activities. This study applied a cross-sectional approach that presented a single-time assessment that missed the understanding of any potential evolutionary patterns in participants' perceptions or experiences. The research analyzed only time pressure and learning demands as moderating variables but failed to explore other possible influential factors between use behavior and e-learning qual-

ity. The convenience of the sampling methods restricts researchers from drawing conclusions that apply to wider groups of individuals.

Future research should consider these limitations by introducing several new recommendations. The research should advance by enlarging its participant base to cover multiple Middle Eastern regions and developed countries, because this will improve both the validation level and practical application of the model. A complete understanding of the e-learning environment requires input from several stakeholders, including students, administrative staff, and other key associates. Longitudinal research methodologies should be used to track user perceptions and behavioral changes over time as students progress in their professional careers. Future research should consider gender differences and various levels of computer literacy as possible additional factors that affect e-learning experiences. The implementation of more diverse and solid sampling approaches would enhance generalization across different research populations while preventing biases that often appear with convenience sampling. Studies that compare the effectiveness of e-learning systems in different academic institutions within cultural contexts will identify factors that have general or culture-based effects on system performance. Future investigations should focus on these research areas to construct an advanced understanding of e-learning qualities, along with the worldwide effects on learning performance building from current findings.

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