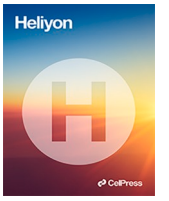
Heliyon 10 (2024) e24271

Contents lists available at ScienceDirect

Heliyon

journal homepage: www.cell.com/heliyon



Research article

Translating a value-based framework for resilient e-learning impact in post COVID-19 times: Research-based Evidence from Higher Education in Kuwait

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ARTICLE INFO

Keywords:
Distance education
Online learning
Knowledge management
Gulf Corporation Council (GCC) countries
Cultural and social implications
Value-based framework

ABSTRACT

The covid-19 pandemic has changed people's daily lives and behaviors all across the world and has impacted practically every element of human existence. The introduction of remote education systems and the move toward online learning have had some of the most significant effects. The on-site operations of educational institutions, such as schools, colleges, and universities, have had to be suspended in order to stop the virus' spread. In order to effectively disseminate instructional material and guarantee the unbroken progression of students' academic endeavors, educators have been forced to look for novel approaches. The study used the Value-Based Adoption Model (VAM) as a conceptual framework to look into the factors that affected Kuwait's e-learning outcomes in the midst of the covid-19 pandemic. 382 students at Kuwaiti universities and colleges were the source of quantitative data collection. The findings revealed that peer interaction emerged as the most influential factor in shaping outcomes within the educational context of Kuwait, while instructors and course design factors were not significant. Using the VAM, this study investigated the impact of several factors on students' e-learning results during times of crisis. The research expands the existing knowledge base in the field on this subject and suggests developing a well-organized online learning crisis approach. The main contribution of this work is summarized on (i) An integrated framework for the quality of the e-learning experience in universities in post-covid-19 times and (ii) A resilient higher education institutional learning strategy model in post-covid-19 times. The findings of this paper can be generalizable to other Gulf Corporation Council (GCC) countries such as Kingdom of Saudi Arabia, Qatar, United Arab Emirates (UAE), Bahrain and Oman. This is due to the shared cultural traditions and values, along with similar educational systems among these nations.

1. Introduction

The covid-19 virus, initially detected in Wuhan, China in December 2019, swiftly spread across the globe and resulted in a

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https://doi.org/10.1016/j.heliyon.2024.e24271
Received 21 August 2023; Received in revised form 24 December 2023; Accepted 5 January 2024
Available online 14 January 2024

widespread pandemic [1]. The crisis affected various sectors, particularly the education sector; more than 120 countries were compelled to suspend students' face-to-face learning [2]. The education system was seriously interrupted due to measures taken to curtail the spread of the disease.

In response to the covid-19 outbreak, various schools and higher education systems underwent a transition to e-learning as an alternative following the implementation of lockdown measures [3,4] Universities and colleges were pressured by the situation to change from using online learning as a supplemental tool to adopting an exclusive "online-only" form of education [5]. In response to the transition, faculty members proactively participated in intensive training programs to strengthen their proficiency in delivering well-structured online learning experiences. However, this shift has concurrently intensified the demand for high-quality education, intelligent technology, and contemporary IT equipment. Universities are now undergoing a transformation in their teaching methodologies and bolstering their investments in technology, thus enhancing their intellectual capital [6].

The transition to online learning has significantly disrupted the lifestyle of university students, thereby impacting their overall well-being. This disruption stems from the essential role that social interaction plays in the learning process. Social interaction not only fosters the acquisition of crucial social skills but also aids in the development of capabilities and self-confidence, all of which contribute to the holistic development of students' personalities [7]. Consequently, it is imperative to thoroughly investigate the standards and quality of online education, as it remains a critical area deserving of further research.

Despite the extensive utilization of e-learning platforms in higher education, there remains a need for further research on the application of the VAM to comprehend the factors that influence the adoption of such platforms and their impact on students' learning outcomes [8]. Some studies have applied VAM to investigate the adoption of e-learning platforms, but most of them have focused on factors related to the technology itself, such as its perceived usefulness and ease of use [9]. Additionally, the role of social influence and facilitating conditions in the adoption of e-learning has not been adequately explored. Therefore, this research aims to address this gap by examining the impact of five dimensions, namely the learner, instructor, course design, technology, and environment, on students' learning outcomes in the context of e-learning.

In Kuwait, higher education institutions are devoting increased attention to providing learners with a more flexible and interactive learning environment. The Kuwaiti strategy for educational development highlights the need for the efficient deployment of e-learning technology [10]. One of the principals aims of the Kuwait university strategic plan (2013–2017) was to "enhance the teaching skills of the academic faculty members to achieve teaching excellence". This plan is currently being implemented by providing an e-learning system that allows for greater interaction between students and teachers, which is expected to lead to improved learning outcomes [11]. Nevertheless, Kuwait still lags the expected timescales specified in the strategic plan in successfully implementing e-learning due to deficiencies in the provision of the necessary infrastructure [12]. Hence, there is a gap in the literature regarding the value of e-learning in Kuwait and whether the actions that the government has taken to encourage e-learning are enough.

Addressing this gap in the literature can significantly contribute to a more comprehensive understanding of the factors influencing the adoption of e-learning platforms. Moreover, it can provide valuable insights to inform the development of effective strategies that support the implementation and utilization of these platforms in higher education. Consequently, the research question at the core of this study is: "What are the factors that impact e-learning outcomes for higher education students in Kuwait?"

2. Literature review

In recent decades, educational institutes globally have adopted e-learning at an increasing and exponential rate as a means of enhancing learning and teaching. It is reported that over 1000 institutions in 50 countries currently provide e-learning options [13]. For example, the Massachusetts Institute of Technology (MIT) has made its learning materials available on the web for non-commercial use [14] British universities have invested significantly in e-learning systems [15], and the Open University in Milton Keynes, which has been successfully delivering online and distance learning since the 1970s, is now ranked among the top British universities [16]. Many British universities now offer distance learning; for example, the University of London offers degree courses in finance, economics, international relations, business and data science, and accounting [17].

3. Theoretical background

3.1. Value-based adoption model (VAM)

The VAM has gained significant attention in recent studies across various domains, including marketing, information technology, and healthcare. Developed by Kim, Chan, and Gupta [18], the VAM model was specifically designed to understand the value associated with adopting e-commerce. It aims to examine individuals' usage intentions towards technology and the factors influencing their decision to utilize mobile services [19]. With the VAM model, the assumption is that an individual is focusing on maximizing the value of usage. As indicated by Bian and colleagues, the perceived value is the receiving of the benefits in exchange for the sacrifices that an individual makes to get the product or service. With this concept, consumers assess the value that they receive from the product or service and accordingly make their decision [20].

The precursors of perceived value in individuals' usage intentions are derived from a balance of benefits and sacrifices associated with the technology. Specifically, benefits are classified into two categories: usefulness and enjoyment. On the other hand, sacrifices involve technical details and costs. This framework suggests that individuals assess both the positive aspects (usefulness and enjoyment) and the negative aspects (technical details and costs) of a technology to form their perceptions of its value [18].

The development of the VAM stemmed from the limitations encountered in the technology acceptance model (TAM) in its ability to

explain user acceptance of information and communication technology (ICT). Unlike the TAM, which primarily concentrates on technological aspects, it fails to consider the individuals utilizing the technology. Generally, when users accept a technology, they make sacrifices, underscoring the paramount importance of considering the user perspective [[18,21,22]]. Students using e-learning experience the benefit of continuity in the learning process, but this advantage comes at the cost of other factors, such as the development of social skills and full interaction with teachers and peers. The VAM offers an explanation for the value derived from the e-learning process, particularly focusing on learning outcomes. Additionally, the VAM model assists in comprehending learners' attitudes towards technology and their self-efficacy, contributing to a better understanding of the overall impact of e-learning.

3.2. Factors that affect e-learning outcomes

3.2.1. The learner dimensions

3.2.1.1. Learners' attitude towards smart technology (computers, tablets, laptops, etc.). Learner attitude can be defined as the learners' sentiments and perceptions regarding their engagement in e-learning activities with computers [23]. Research has indicated that the attitude towards smart technologies plays a pivotal role in users' satisfaction with e-learning [24,25]. It has been observed that a more positive attitude towards smart technologies leads to increased engagement and improved outcomes for students/learners. Based on this understanding, hypothesis 1 is formulated:

Hypothesis 1. (H1). Learner attitudes toward smart technology (computers, tablets, laptops, etc.) had a positive impact on perceived e-learning outcomes during the covid-19 crisis.

3.2.1.2. Learner smart technology (computers, tablets, laptops, etc.) anxiety. Smart technology anxiety is defined as the level of learners' apprehension or unease about using smart technology in an e-learning context [23]. Smart technology anxiety adversely influences students' and learners' satisfaction with e-learning, and it has a considerable effect on e-learning outcomes [26,27].

Hypothesis 2. (H2) is, therefore: learner smart technology (computers, tablets, laptops, etc.) anxiety had a negative impact on perceived e-learning outcomes during the covid-19 crisis.

3.2.1.3. Learner internet self-efficacy. Self-efficacy refers to individuals' inclination towards the performance of a particular function. In this case, it means an individual's ability to assess their own abilities and competencies when using the internet to conduct certain tasks or activities related to e-learning [23]. Students and learners who exhibit high levels of self-efficacy are more likely to adopt smart technologies [23,28]. Therefore, the following hypothesis is proposed:

Hypothesis 3. **(H3)**. Learner internet self-efficacy had a positive impact on perceived e-learning outcomes during the covid-19 crisis.

3.2.2. Instructor dimension

3.2.2.1. Instructor response timeliness. Instructor response timeliness pertains to students' perceptions of how promptly instructors address their requests for assistance with problems within the e-learning [24]. Previous studies have consistently shown that instructors with a high response rate on the e-learning platform positively influence students' satisfaction with e-learning [25,28]. Based on this understanding, the following hypothesis is proposed:

Hypothesis 4. **(H4)**. Instructor response timeliness had a positive impact on perceived e-learning outcomes during the covid-19 crisis.

3.2.2.2. Instructor attitude towards e-learning. Instructor attitudes regarding e-learning are concerned with how students and learners view their instructors' attitudes toward these courses [24]. A social impact model described how people interpret the attitudes of others in their social group, particularly supervisors, toward technology [26,28]. Therefore, the following can be used to express **Hypothesis 5 (H5):** instructor attitudes toward e-learning had a positive impact on students' perceived e-learning outcomes during the covid-19 crisis.

3.2.3. Course dimension

3.2.3.1. E-learning course flexibility. E-learning course flexibility is known as an individual's perception of their ability to take e-learning courses anytime and anywhere without causing major disruption to their way of life or working hours [23]. High levels of flexibility in the course, whether in terms of time or location, will have a major impact on students' and learners' willingness to participate in e-learning and whether they obtain high levels of satisfaction [25,29]. Hence, the following is proposed:

Hypothesis 6. **(H6)**. E-learning course flexibility had a positive impact on perceived e-learning outcomes during the COVID-19 crisis.

3.2.3.2. E-learning course quality. An important antecedent factor of satisfaction and positive outcomes for students in e-learning programs is the quality of the course in terms of its content, design, and presentation [26]. One of the most important aspects of a

course's quality is its facility for interaction, which is a salient feature of the constructive or cooperative learning model. E-learning assists in building two-way communication between students and instructors. Based on the above discussion, the following hypothesis is proposed:

Hypothesis 7. **(H7)**. E-learning course quality had a positive impact on perceived e-learning outcomes during the covid-19 crisis.

3.2.4. Technology dimension

3.2.4.1. Technology quality. Technology quality relates to the learner's experience of the technological features of the online learning program and how well these function in supporting the learning process. It includes such features as sound quality, earphones, and electronic blackboards [23]. Several researchers have drawn attention to the importance of the quality of technological aspects of e-learning programs, including reliable high-speed connectivity [26,30]. Hence, the following hypothesis [31] is proposed:

Hypothesis 8. **(H8)**. Technology quality had a positive impact on perceived e-learning outcomes during the covid-19 crisis.

3.2.4.2. Internet quality. In this context, internet quality is defined in terms of learners' perceptions of how effective the network is in supporting their learning [27] This includes regular maintenance of software and hardware. Essentially, internet quality includes media richness as well as connectivity reliability, which is essential for synchronous and asynchronous delivery and access to materials online at any point in time. Breakdowns can be irritating and demotivating for learners [30]. Therefore, the following hypothesis is proposed:

Hypothesis 9. (H9). Internet quality had a positive impact on perceived e-learning outcomes during the covid-19 crisis.

3.2.5. Environmental dimension

3.2.5.1. Learners' perceived interaction with others. Learners' perceived interaction with others is simply defined in terms of how learners view the level of interaction they have online with fellow students and teachers, as well as interactions with course materials [30]. The greater the extent of students' perceptions of interaction with others online, the higher their level of satisfaction with the online learning program [25]. Interaction allows higher e-learning outcomes to be [24,27]. Therefore, the following hypothesis is proposed:

Hypothesis 10. **(H10)**. Learners' perceived interaction with others had a positive impact on perceived e-learning outcomes during the covid-19 crisis.

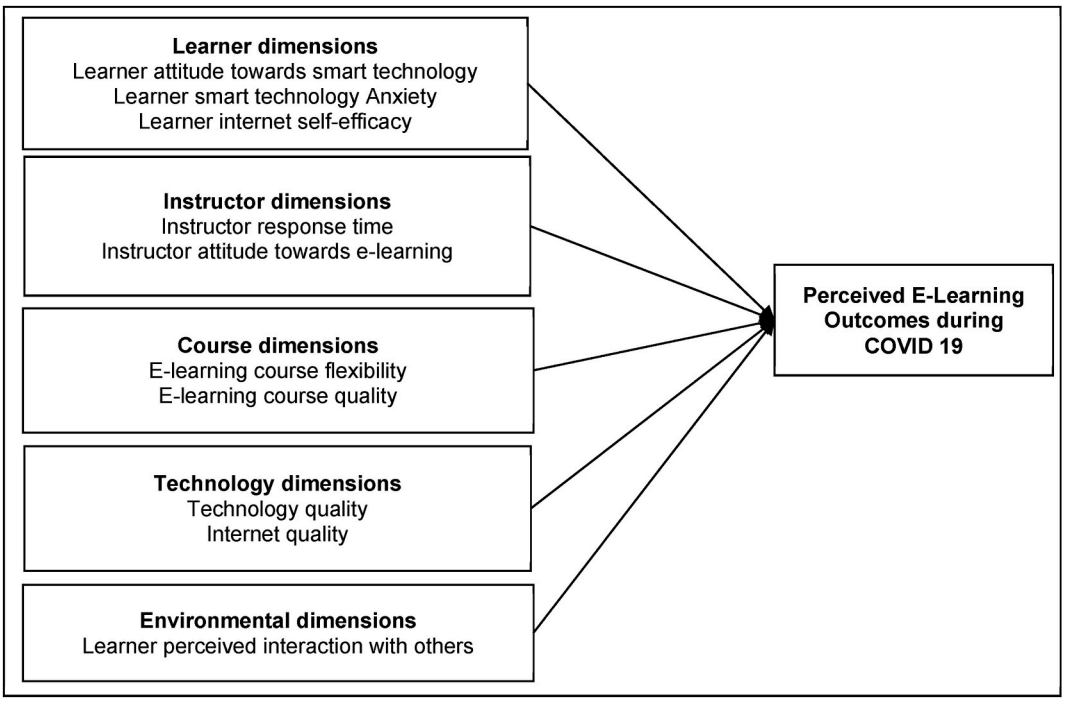

Fig. 1. Proposed conceptual model for perceptions of e-learning outcomes
Source: Research-based (The Authors).

3.3. A proposed conceptual model for E-learning

Based on the theoretical review, a conceptual model is proposed in Fig. 1.

4. Methods

For this research, the deductive research approach was deemed appropriate, aligning with positivist philosophy and quantitative research. The deductive approach is consistent with the nature of this study and its objectives.

The data collection process involved utilizing a convenience sampling technique to gather data from students at universities and colleges in Kuwait. The survey was administered between September 2022 and December 2022. A 5-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree, was employed for all constructs. Adapted items were modified to suit the research context. For instance, statement 1 of learner internet self-efficacy was revised to read, "I feel confident browsing the internet to attend my e-learning course."

The target population for this research comprised students in both public and private universities, as well as colleges in Kuwait. A total of 450 survey copies were distributed using Google Forms to students. The researchers initially shared the questionnaire link via electronic means such as emails, WhatsApp, and SMS messages, urging students to complete it. By the deadline, 401 completed forms had been collected. After screening for incomplete and irrelevant responses, a total of 382 forms were deemed suitable for analysis. With an 84 % response rate, the sample size was considered sufficient [32].

5. Results

SmartPLS v. 3.3 was used to examine the conceptual model. Fig. 2 shows the results of the Structural Equation Model (SEM) test. The results are discussed below.

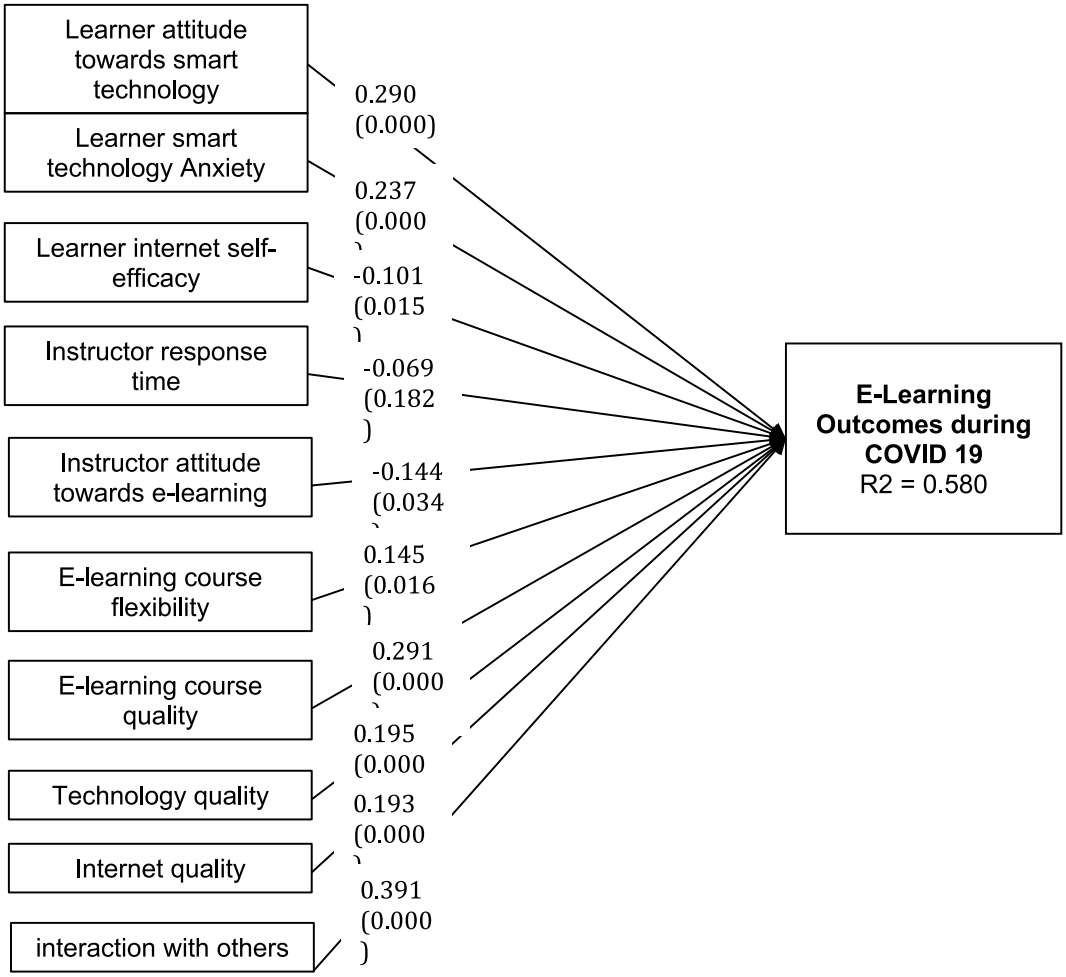

Fig. 2. The SEM model.

The results demonstrate that the students' attitudes towards smart technology exert a significant influence of 0.290 on learning outcomes. This significance is indicated by the t-statistic exceeding 1.96 and the p-value of significance being lower than 0.05. As a result, hypothesis 1 (H1) is supported. When examining the impact of learner smart technology anxiety (related to computers, tablets, laptops, etc.) on e-learning outcomes, the path weight is found to be 0.237. This weight is deemed significant as it meets the required conditions for the t-statistic and p-value of significance. However, the results indicate a positive influence. Therefore, H2 is not supported. The final factor examined in learner dimensions is learner internet self-efficacy. The results reveal a significant path weight of −0.101. However, contrary to the study's presumption of a positive influence, the observed influence is negative. As a result, hypothesis 3 (H3) is not supported. The influence of instructor response time on e-learning outcomes was investigated, and the results indicate a negative path weight of 0.069. Furthermore, the findings reveal that this influence is not statistically significant. Consequently, hypothesis 4 (H4) is not supported. Additionally, the results demonstrate a negative effect of instructors' attitudes towards e-learning on e-learning outcomes. Although this influence is found to be significant, it contradicts the hypothesized positive influence of the study. Therefore, Hypothesis 5 (H5) is not supported. The examination of course flexibility's influence on e-learning outcomes reveals a significant beta value of 0.145, indicating a positive influence. Therefore, Hypothesis 6 (H6) is supported. Another factor explored in course dimensions is course quality, which holds significant importance in various domains, including education. The results demonstrate a path weight of 0.291 for course quality, which is also significant. As a result, Hypothesis 7 (H7) is supported. In relation to technology quality, the results reveal a significant path weight of 0.195, indicating a significant relationship. As a result, hypothesis 8 (H8) is supported. Internet quality, the second factor within the technology dimension, demonstrates an influential path weight of 0.193 on e-learning outcomes. This weight is also found to be significant, providing support for hypothesis 9 (H9). The final hypothesis of this study investigated the influence of interaction with others on e-learning outcomes. Interaction is considered a beneficial and constructive engagement activity that enables students to acquire knowledge and experiences from their peers, and it remains a crucial aspect of e-learning. The results indicate that this factor exhibits the highest influence on e-learning outcomes, with a significant path weight of 0.391. Consequently, hypothesis 10 (H10) is supported.

5.1. Construct reliability and convergent validity

The results from the analysis of model 1 are presented in Table 1. These findings indicate that the measurement model is appropriate for further analysis. It is evident from the reliability values in Table 1 that they meet the recommended criterion of at least 0.6, as suggested by Hair et al. [33] This signifies that the measurement model demonstrates satisfactory reliability. Additionally, the model demonstrates adequate convergent validity, as the average variance extracted (AVE) values presented in the same table exceed the threshold of 0.5, as recommended by Hair et al. [33]. Consequently, the measurement model exhibits no concerns in terms of reliability or validity.

5.2. Discriminant validity

In order to assess the quality of the model, discriminant validity was examined following the recommendation of [34] The Fornell-Larcker ratio was utilized for this purpose. The results presented in Table 2 indicate that the model exhibits no issues with discriminant validity. Therefore, it can be concluded that the constructs within the model are distinct from each other, confirming their individuality and uniqueness.

6. Discussion

6.1. Key findings

The global impact of the covid-19 epidemic has been substantial, affecting various industries worldwide, including education. The closure of universities and colleges on an unprecedented scale has posed significant challenges to the educational pursuits of millions of students. In response to this situation, educational institutions swiftly adopted e-learning techniques to ensure the continuity of the

Table 1
Reliability and convergent validity.

Variable	RELIABILITY	AVE
Course Flexibility	0.871	0. 772
Course Quality	0.847	0.657
E-Learning Outcomes	0.892	0.734
Instructor Attitude Towards E-Learning	0.864	0.615
Instructor Response Time	0.884	0.658
Interaction with Others	0.820	0.606
Internet Quality	0.838	0.574
Learner attitude toward smart technology (computers, tablets, laptops, etc)	0.825	0.616
Learner smart technology (computers, tablets, laptops, etc) Anxiety	0.893	0.679
Learner Internet Self-Efficacy	0.861	0.608
Technology Quality	0.824	0.544

Table 2
Fornell-Larcker results Moreover, Table 3 presents a summary of the hypotheses testing that was done for this study and the findings that were discussed in this section.

	CF	CQ	LO	AL	RT	IN	IQ	LC	LA	LS	TQ
CF	0.879										
CQ	0.632	0.810									
LO	0.402	0.478	0.857								
AL	0.454	0.514	0.270	0.784							
RT	0.394	0.524	0.258	0.469	0.811						
IN	0.399	0.417	0.566	0.301	0.191	0.778					
IQ	0.287	0.363	0.428	0.451	0.384	0.322	0.758				
LC	0.256	0.162	0.308	0.307	0.226	−0.007	0.339	0.785			
LA	−0.158	−0.106	0.169	−0.001	−0.166	0.133	−0.134	−0.114	0.824		
LS	0.260	0.247	0.179	0.316	0.397	0.258	0.365	0.284	−0.321	0.780	
TQ	0.460	0.544	0.339	0.427	0.585	0.157	0.525	0.302	−0.354	0.521	0.737

CF=Course Flexibility, CQ=Course Quality, LO = E-Learning Outcomes, AL = Instructor Attitude Towards E-Learning, RT = Instructor Response Time, IN=Interaction with Others, IQ=Internet Quality, LC = Learner attitude toward smart technology (computers, tablets, laptops, etc), LA = Learner smart technology (computers, tablets, laptops, etc) Anxiety, LS = Learner Internet Self-Efficacy, TQ = Technology Quality.

Table 3
Summary of the hypotheses.

Hypothesis	Test statement	Beta	T-Statistics	P value of significance	Conclusion
H1	Learner attitude toward smart technology (computers, tablets, laptops, etc)- > E-Learning Outcomes	0.290	6.075	0.000	Supported
H2	Learner smart technology (computers, tablets, laptops, etc) Anxiety - > E-Learning Outcomes	0.237	5.271	0.000	Not Supported
H3	Learner Internet Self-Efficacy - > E-Learning Outcomes	−0.101	2.428	0.015	Not Supported
H4	Instructor Response Time - > E-Learning Outcomes	−0.069	1.336	0.182	Not Supported
H5	Instructor Attitude Towards E-Learning - > E-Learning Outcomes	−0.144	2.120	0.034	Not Supported
H6	Course Flexibility - > E-Learning Outcomes	0.145	2.412	0.016	Supported
H7	Course Quality - > E-Learning Outcomes	0.291	4.913	0.000	Supported
H8	Technology Quality - > E-Learning Outcomes	0.195	3.918	0.000	Supported
H9	Internet Quality - > E-Learning Outcomes	0.193	3.649	0.000	Supported
H10	Interaction with Others - > E-Learning Outcomes	0.391	8.781	0.000	Supported

learning process. However, the rapid implementation of these alternative approaches encountered obstacles and complications during the initial stages.

The significant influence of course quality and technology on the enhancement of e-learning outcomes is a notable and compelling finding. Given the complexity and fast-paced nature of our lives, it is imperative for universities and colleges to meticulously address the intricacies of course design and the utilization of appropriate technology to maximize learning outcomes [35]. Furthermore, an important insight gleaned from this study is the value of interaction with peers, even within the online learning environment, as it facilitates peer learning and amplifies the overall learning outcomes for students.

Within the learner dimension, the study revealed that learners' attitude towards smart technology emerged as the sole significant factor influencing e-learning outcomes, whereas learner smart technology anxiety did not exhibit significance. These findings align with the research conducted by Stefanovic et al. [27] and Sun et al. [23], which also identified a positive and significant influence of learners' attitude towards smart technology on learning outcomes, while indicating a negative influence of learner smart technology anxiety. Furthermore, the study did not find support for either of the instructor dimensions, contradicting the findings of Arbaugh [24], Thurmond et al. [28], and Sun et al. [24], which demonstrated a positive and significant relationship between instructor response time and e-learning outcomes. However, it is important to note that while instructors play a crucial role in delivering the educational content, the focus of the learning process and its outcomes ultimately lies on the students themselves. As emphasized by Kim et al. [18], the primary attention should be directed towards the achievement of students' goals, highlighting their progress and success in the e-learning environment.

Additionally, the study revealed the significance of course flexibility and quality as crucial determinants of e-learning outcomes. This finding aligns with previous research conducted by Arbaugh and Duray [25], Piccoli et al. [26] and Sun et al. [23], which established a positive relationship between course dimensions and e-learning outcomes. Regarding the technological dimensions, the results demonstrated the significance of both factors. These findings corroborate the conclusions drawn by Piccoli et al. [26] and Sun et al. [23], which indicated that technology quality exerts a positive and significant influence on e-learning quality.

Finally, it is important to note that individual students have agency in determining their learning outcomes, but the study also revealed the significance of interaction with peers in influencing e-learning outcomes. This finding corroborates the research

conducted by Stefanovic et al. [27] and Sun et al. [23], which demonstrated a positive and significant relationship. This emphasizes the importance of interaction, as highlighted in prior studies [36,37], and underscores the value of engaging in discussions and debates with fellow students to facilitate the achievement of desired learning outcomes [38].

6.2. Interpretation of key findings: an integrative resilient learning model in higher education institutions based on COVID-19 pandemic experience

Our research provides interesting insights for the enhancement of the e-learning experience, and also grounds significant interpretations into research evidence. In this section we synthesize the key findings and we communicate a resilient higher education institutional learning system with bold impact as an amalgamation of the key findings of our research. This model is summarized in Figs. 3 and 4 below.

The first contribution of our research is summarized in Fig. 3, where diverse, complimentary and integrated factors contribute to framework for the enhancement of the quality of e-learning outcomes and the impact of institutional learning strategies including e-learning utilization.

Learner dimension: Our research proved the centric role of learners within the e-learning experience in the times of covid-19 pandemic. We also revealed that the following four important aspects of learners e-learning experience are critical for the learning outcome:

- Attitudes towards smart technology
- Preparedness to use technology
- Self-confidence
- Social interactions

The main lesson learnt based on this research-oriented evidence is that a resilient higher education institutional learning strategy has to support and reinforce these capabilities. Universities, have to promote the students' preparedness to use learning technologies, and also have to provide a wide spectrum of institutional learning services that capitalize the novel, innovative, unique value propositions of new technologies. In a future research we are willing also to study further this dimension. Students engagement, participation and motivation to utilize e-learning or blended learning settings, is also another bold component of our framework. To this direction a number of novel learning interventions based on active, blended, transformative and collaborative learning provide strategic and operational support.

Instructor dimension: The pivotal role of the instructors' dimension was also identified in our research. It was rather surprisingly evident that the contribution of instructors in the e-learning process has weak aspects. From this point of view, it is important to

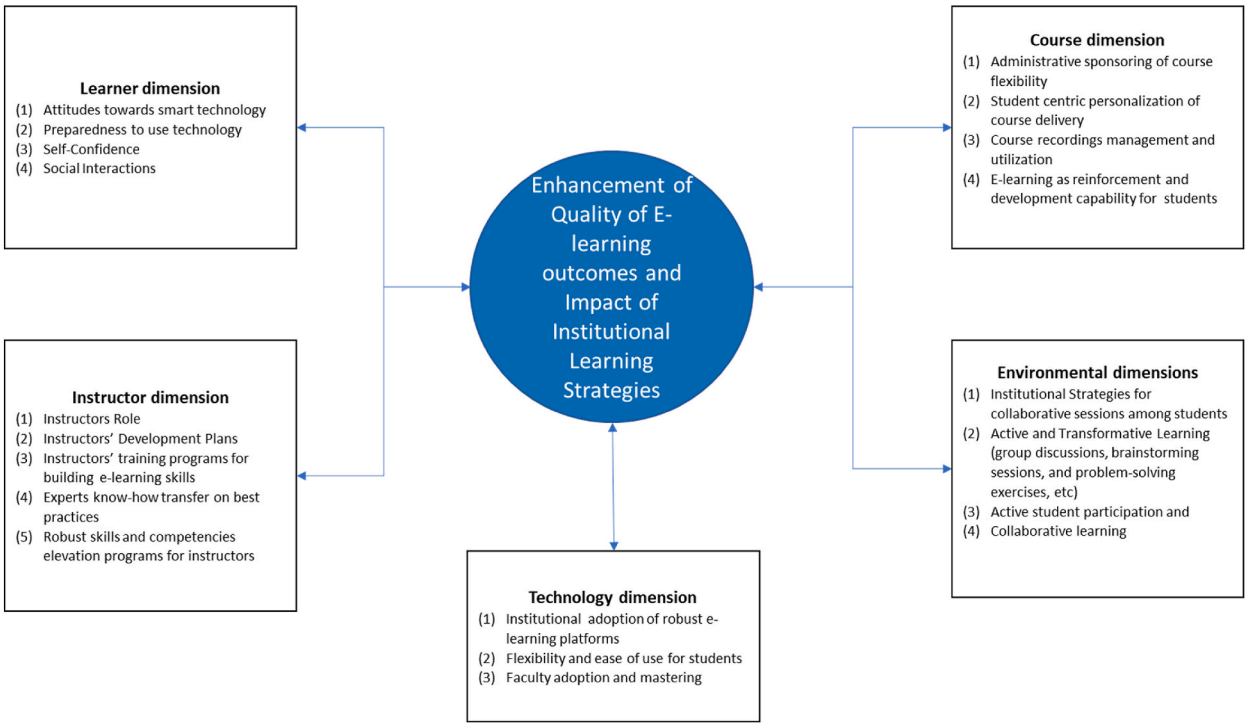

Fig. 3. An integrated framework for the quality of the e-learning experience in universities in post-covid-19 times.

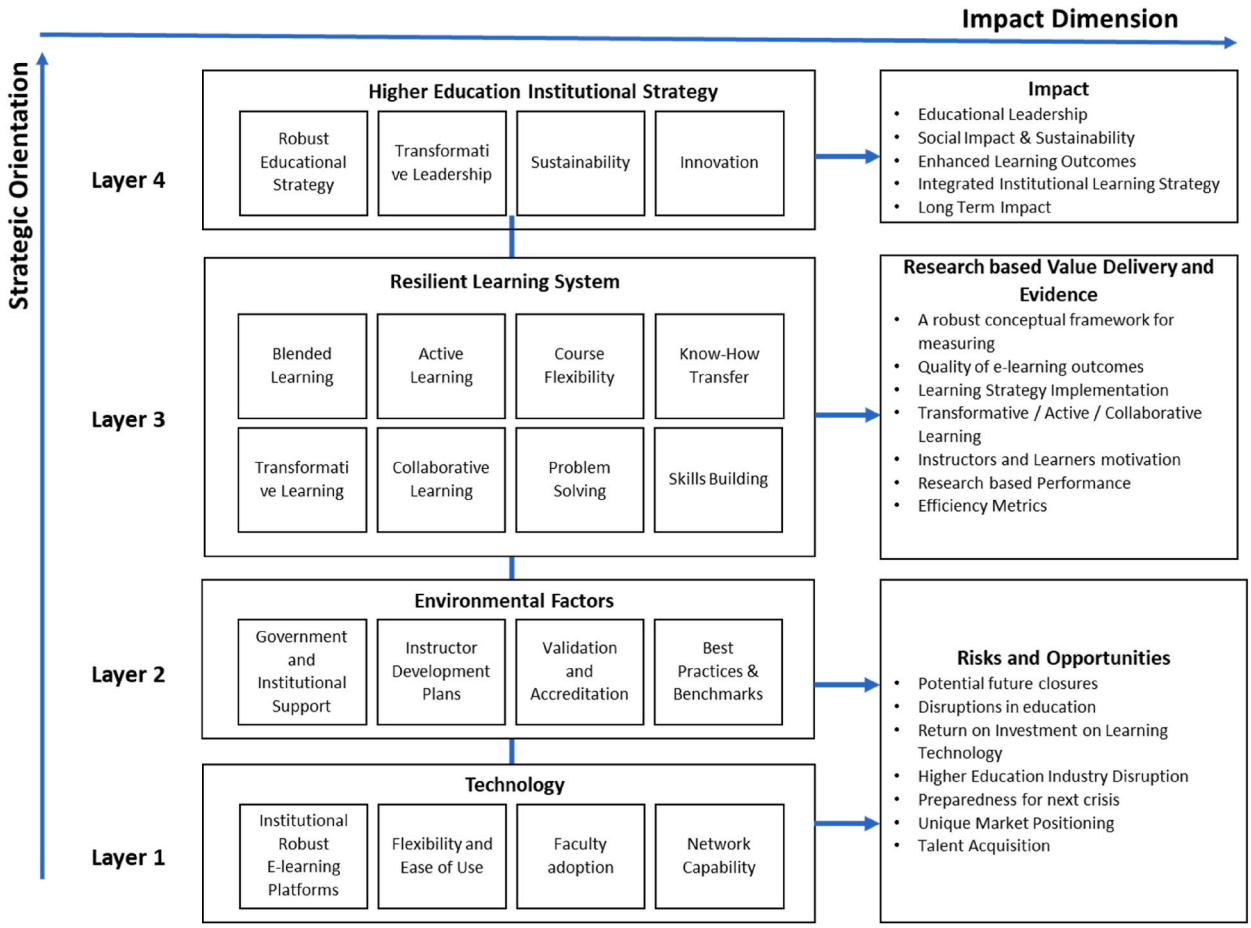

Fig. 4. A Resilient Higher Education Institutional Learning Strategy in post-covid-19 times.

communicate that instructors development plans including special training programs for building e-learning skills and competence is a critical requirement for the implementation of any blended or e-learning strategy at institutional level. In our research also, we identified that additional elevation programs related to soft skills of instructors are required. These include communication skills, skills related to teamwork, motivation and problem solving and probably others. Last but not least our research also outlined that the know-how transfer from top experts in the domain of e-learning and educational e-learning strategies can facilitate effectively the e-learning strategy at institutional level. Our personal comment on this is that always the know-how transfer programs have to take into consideration also the local dimension and the cultural dimensions of any country like Kuwait. The following are the main dimensions of instructor component in our framework at a glance:

- Instructors Role
- Instructors' Development Plans
- Instructors' training programs for building e-learning skills
- Experts know-how transfer on best practices
- Robust skills and competencies elevation programs for instructors

Course dimension: The implementation of the e-learning strategy at course level is a critical success factor for the quality of the e-learning experience. In our research the following key conclusions is a good input for interpretations:

- Administrative sponsoring of course flexibility
- Student centric personalization of course delivery
- Course recordings management and utilization
- E-learning as reinforcement and development capability for students

In post-covid-19 times, the academic administration has to be a champion of course flexibility, by introducing novel strategies for blended, or distant learning. The flexibility in terms of time and place delivery of courses is only the starting base. Flexibility also in the

composition of the learning programs and the selection of diverse e-learning or technology-enhanced learning experiences are also directions that must be investigated. The student-centric personalization of the learning experience at course level and also program level, has to be strategized with the introduction of an institution-wide strategy for the impact of e-learning to the learning strategy of the institution. It is also obvious that nowadays the evolution of artificial intelligence, learning analytics, cloud learning services, and other learning technologies, allow a wide spectrum of parametrization of course experience. Also, our research provided insights at the functional level of the course delivery identifying important best practices that must be integrated in the integrated learning strategy at institutional level. Course recordings management and utilization must be considered as a pivotal component for the e-learning outcome. At a greater extend this service can be treated as a pillar for student reinforcement and development enabler. Considering course content and course recordings at institutional level as a data ecosystem for personalized learning paths composition and student-centric active exploration of the learning content, is a good step towards a resilient learning strategy.

Environmental dimensions: The environmental dimensions that highlighted in the key findings of our research include and are not limited to the following items:

- Institutional strategies for collaborative sessions among students
- Active and transformative learning (group discussions, brainstorming sessions, and problem-solving exercises, etc)
- Active student participation and
- Collaborative learning

The overall idea is that environmental factors, are serving as enablers and multipliers of the learning outputs enabled by the e-learning experience. It is evident that academic administration should remove barriers for collaborative sessions among students and should design new creative modes for learning interactions among learners and other stakeholders of the learning process. TO this direction novel learning paradigms like active and transformative learning can lead a new generation of higher education "out of the box" experiences, capitalizing on flexibility, personalization problem solving, team building, critical thinking and decision making capabilities.

Technology dimension: In our research design we approach the technology dimension of the e-learning experience at a high-abstract level. We did this on purpose since we are focusing on the overall guiding principles of diverse learning technologies at institutional level. Our research brings forward the following necessities for the learning technologies in universities:

- Institutional adoption of robust e-learning platforms
- Flexibility and ease of use for students
- Faculty adoption and mastering

In a resilient institutional learning strategy at higher education institutions, three constitutional factors have to be secured. First of all, the utilization of robust-learning platforms with the necessary technical and operational support and also with capabilities aiming to support instructors in the provision of high quality learning experience. This general statement allows many diverse implementation modes that go beyond the scope of this research. For example, one question is: should modern universities invest money and resources on learning technology centers that will implement and diffuse an institution wide strategy?

One of the most critical success factors is also related to the flexibility and the learners' friendliness of the learning technology. This is a factor that some times is under-estimated considering that all learning platforms have the same degree of sophistication and friendliness. Same comment also for the instructors' side. Learning technology adoption and mastering has to overcome some times skills deficit or psychological barriers to adopt from the side of instructors. Fig. 3, summarized all these key findings on a framework that promotes the quality of the e-learning experience.

6.3. The integrative resilient higher education institutional learning strategy model

In our effort to synthesize the key findings of our research on a re-useable way for supporting higher education learning strategy at institutional level we introduce in this section our proposed integrative resilient higher education institutional learning strategy model.

It is organized around two dimensions namely strategy orientation and impact. The first dimension is covering all the levels of strategy considerations from operational to strategic themes including four main levels, namely:

- Level 1. Learning Technology
- Level 2. Environmental Factors
- Level 3. Resilient Learning System
- Level 4. Institutional Learning Strategy.

The second dimension is related to the impact of the learning strategy executed at institutional level addressing risks and opportunities and utilizing research-based evidence. In Fig. 4, below, we provide a high level abstraction of our model and in the following paragraphs we elaborate further on the key components of our proposition which is a bold contribution of our research study.

Strategic Orientation: In our proposition the four levels of strategic orientation summarize critical pillars for the effective implementation of the learning strategy in academic institutions at psot-covid-19 times capitalizing on the experience of the e-learning

delivery of covid-19 times.

The following enumeration of significant success factors and key performance indicators for each level, is not exhaustive. It is a first step of a research-based approach. The purpose of this proposed model as an outcome of our research is to support higher education administrators to learning strategy implementation with an agenda of areas of consideration that require strategic approach, roadmaps and implementation plans.

Level 1. Technology.

- Institutional Robust E-learning Platforms
- Flexibility and Ease of Use
- Faculty adoption
- Network Capability

At level 1, our proposed model incorporates basic aspects related to the learning technology including platform, flexibility, adoption technological capability. Additional considerations that were not investigated in this research study can be also added. For example: Acquisition mode e.g. open source, cloud based, commercial.

Level 2. Environmental factors.

- Government and Institutional Support
- Instructor Development Plans
- Validation and Accreditation
- Best Practices & Benchmarks

The environmental factors, already discussed in previous section are supposed to be "hygiene" factors that allow the learning strategy and technology to be fertile with good outcomes. They are related to prerequisites and enablers of high impact learning interventions. Government and Institutional support, promoting flexibility offering resources and granting new programs for flexible education are important aspects. Adoption of international top quality best practices and benchmarks as well as initiatives securing top quality including accreditation, validation and certification are also critical environmental factors.

Level 3. Resilient Learning System.

- Blended Learning
- Active Learning
- Collaborative Learning
- Transformative Learning
- Course flexibility
- Problem Solving
- Know-how transfer
- Skills building

The resilient learning system component of our proposition has a central role in our approach. It is an amalgamation of four basic learning paradigms namely: blended, active, collaborative and active learning. It orchestrates the course and program flexibility and learning content packaging promoting problem solving, decision making, know-how transfer aiming to robust and resilient skills and competencies building to learners. It is obvious that each of these components is a huge chapter and a critical success factor for the overall performance of the institutional learning strategy. It goes beyond the scope of this research to elaborate further on the determinants of all these pillars. We are intending in the future to provide more research based evidence for the operational and strategic aspects of each of these dimensions.

Level 4. Higher Education Educational Strategy and Leadership.

- Robust Educational Strategy
- Transformative Leadership
- Sustainability
- Innovation

At this level, the main considerations are related to the formulation of the higher education institution strategy related to educational objectives, transformative leadership, sustainability and innovation. The fine tuning of these components in the context of the local reality and the educational national priorities is a creative process. There is no magic solution, but rather a constructive process with objectives, operational plans, roadmaps and implementation plans. Additional consideration are related to organization charts or novel network approaches for bringing in to the strategy formulation and implementation of diverse talent from the institution and from the experts ecosystem.

6.3.1. Impact orientation

In the impact dimension of our proposed model three additional important components are incorporated namely: Risks and

opportunities, research based value delivery and evidence and impact. In our proposition the resilient higher education learning strategy is a living organization. At any moment it provides a snapshot of a value mix, but it is informed continuously analyzing facts and data from the internal and external environment of the institution.

Risks and Opportunities.

- Potential future closures
- Disruptions in education
- Return on Investment on Learning Technology
- Higher Education Industry Disruption
- Preparedness for next crisis
- Unique Market Positioning
- Talent Acquisition

The strategic impact of any learning strategy has to integrate the risks and the opportunities at any given period of time. In post-Covid-19 times, with the recent experience of the pandemic the potential future closures and the relevant disruptions in education delivery is an existing threat and risk. The developing discussion on the next virus "X" has to serve as a lighthouse.

Additional opportunities in the post-covid 19-times are related to the return on the investment on learning technologies that took place on the pandemic. It is critical for higher education administration to capitalize on the infrastructures and to seek opportunities for additional learning impact out of their utilization introducing blended, distant, flexible curricula and programs.

Additionally, the evolution of Artificial Intelligence (AI) and the possible higher education market disruption is one more significant opportunity and threat. Institutions in higher education have to foresee the next developments on the industry and to prepare in creative mode for the next generation higher education in times of AI. One more critical pillar is the acquisition of talent in terms of learners and also learning strategy and learning technology experts capable of implementing the learning strategy.

Research based Value Delivery and Evidence: One of the novelties of our approach is related to the deployment of a research value-based framework for the measurement of the quality of e-learning experience and the learning efficiency. According to our strategic proposition for strategic value and impact, a research-based value delivery framework must utilize data and promote effectively a continuous improvement mechanism for the implementation of the resilient learning strategy in higher education institutions. The following core parts should be supported effectively:

- A robust conceptual framework for measuring
- Quality of e-learning outcomes
- Learning Strategy Implementation
- Transformative/Active/Collaborative Learning
- Instructors and Learners motivation
- Research based Performance
- Efficiency Metrics

The overall idea is that a learning and development data ecosystem within universities utilizing data from learning systems and services can enhance a research-based learning performance. It can also maintain, monitor and implement metrics, key performance indicators and benchmarks for the learning strategy. This infrastructure can be also used for the continuous improvement of critical processes like instructors and learners' motivation, engagement and active participation as well as for the execution of active, collaborative and transformative learning initiatives. Furthermore, this research-based value framework can offer a resilient decision-making tool for higher education administrators. It can also be the first step for implementing robust dashboard for unique learning experiences for students.

Impact: This is the last value component of our proposed a resilient higher education institutional learning strategy model. The orchestration of the four levels of strategy orientation and the impact dimension of our strategic approach has to promote jointly the following impact directions:

- Educational Leadership
- Social Impact & Sustainability
- Enhanced Learning Outcomes
- Integrated Institutional Learning Strategy
- Long Term Impact

In Fig. 4, below, we provide a high-level abstraction of our proposed model.

7. Conclusions, implications and future work

The advent of e-learning as a result of the covid-19 pandemic and subsequent lockdowns has necessitated the adaptation of schools and universities to ensure the continuity of education and the fulfillment of students' learning outcomes [39]. As such, one significant practical implication arising from this research is the imperative to develop a resilient learning system that can readily transition and

bridge the gaps caused by potential future closures or disruptions in education. It is crucial to note that this study does not undermine the value of face-to-face education; rather, it emphasizes the potential of blending e-learning with traditional learning approaches. This integration between traditional and e-learning methods underscores the importance of social interaction between instructors and students, as it serves to solidify information and enhance the educational experience. The findings of this study underscore the critical role of social interaction in enhancing the quality of e-learning.

One important theoretical implication of this study is the development of a robust conceptual framework for measuring the quality of e-learning outcomes. A solid theoretical foundation guides scholars in refining e-learning models that can enhance the performance of educational institutions. In this study, a theoretical framework based on the VAM was employed to understand and explain the enhancement of e-learning outcomes. By linking this theory to the factors influencing e-learning outcomes, the study contributes to the refinement of a conceptual model that promotes the quality of e-learning outcomes.

The findings of this study underscore the pivotal role of students in the e-learning process. When students actively engage and interact with their peers, they foster meaningful connections that amplify the outcomes of e-learning. Conversely, the insignificant influence of the instructor dimension suggests that instructors in universities and colleges in Kuwait may not be fulfilling their expected roles and that the e-learning platform itself is self-sustaining, requiring minimal intervention from instructors. Overall, these results highlight the importance of student engagement and collaboration while shedding light on the need for further exploration of the instructor's role in the e-learning context. By understanding these dynamics, educational institutions can adapt their strategies and approaches to optimize e-learning outcomes.

The following recommendations are made for university and college management bodies so they can enhance the e-learning outcomes for their students and encourage instructors to become more proactive.

Learner dimension: It was noticed from the results that only learners' attitudes towards smart technology were significant. This does not lessen the value or importance of the other factors. It is important that students are well versed in the technology and prepared to use it. It is also necessary that students have confidence in using the internet and are comfortable with it.

Instructor dimension: While the factors of the instructor dimension did not show significance in the study, it is important to acknowledge the crucial role instructors play in the learning process. Therefore, it is recommended that university and college management bodies invest in comprehensive training programs for instructors to effectively utilize the e-learning platform. This can involve bringing in experts and providing personalized one-on-one sessions to address specific needs. By equipping instructors with the necessary skills and knowledge, they can cultivate a positive attitude towards e-learning, which will be reflected in the delivery of their courses and ultimately contribute to enhanced e-learning outcomes.

Course dimension: As both factors of the course dimension demonstrated significance in the study, it is advisable for university and college management bodies to prioritize flexibility in course delivery. This can be achieved by allowing students to access e-courses from various locations and offering flexibility in terms of course timing. Additionally, recording the course sessions, even if they are conducted live, can greatly benefit students. The availability of course recordings allows students to revisit and review the course content at their own pace, serving as a valuable resource for reinforcing their understanding and enhancing e-learning outcomes.

Technology dimension: It was found that both factors of this dimension were significant. Therefore, it is recommended that university/college management bodies use the latest technologies for e-learning platforms, which allows students the flexibility to use any device that they want.

Environment dimension: Within the environment dimension, which encompasses a single factor, it is recommended that university and college management bodies encourage instructors to facilitate collaborative sessions among students. This can be achieved through activities such as group discussions, brainstorming sessions, and problem-solving exercises. By promoting active student participation and fostering a collaborative learning environment, interactions among students can be enhanced, leading to richer engagement and ultimately greater learning outcomes.

This research is of a cross-sectional nature, which limits its ability to capture changes in the research dimensions over time. To address this limitation, future researchers are encouraged to adopt a longitudinal approach using a mixed-methods design, which can provide a more comprehensive understanding of the dynamics of e-learning outcomes. In light of this, several areas for future research are recommended. Firstly, conducting a comparative study between public and private universities and colleges to explore variations in e-learning outcomes and identify potential lessons learned from each sector This comparative analysis can shed light on effective strategies and practices that contribute to positive e-learning outcomes.

Additionally, future studies should consider incorporating the perspectives of instructors by seeking their opinions and insights on e-learning outcomes. By understanding instructors' experiences and perceptions, valuable insights can be gained to improve instructional practices and support mechanisms in e-learning environments. Furthermore, it is recommended to conduct qualitative research methods, such as interviews and focus groups, involving university or college management bodies. This qualitative inquiry can provide a deeper understanding of their thoughts, perceptions, and recommendations for enhancing e-learning. Their valuable input can inform strategies and initiatives aimed at improving the overall quality and effectiveness of e-learning experiences.

Lastly, extending the scope of future research to include high school students and teachers is recommended. By applying the same dimensions examined in this research to high school settings, insights can be gained on the potential factors influencing e-learning outcomes among these individuals. This broader perspective will contribute to a more comprehensive understanding of the transition from high school to university or college e-learning environments. Overall, these recommended avenues for future research will contribute to advancing knowledge in the field of e-learning and provide valuable insights to enhance e-learning outcomes in various educational settings.

Ethics statement

All participants provided informed consent.
Ethics approval number:BAP-1/23-08-2022
Name of the approving ethics committee: Arab Open University Kuwait, Business Studies Program.

Availability of data and materials

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Funding

Not applicable.

CRediT authorship contribution statement

Afnan Alkhaldi: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Sawsan Malik:** Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Rashed Alhaimer:** Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Abdullah Alshaheen:** Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Miltiadis D. Lytras:** Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix 1

LEARNING STRATEGIES FOR RESILIENT HIGHER EDUCATION IMPACT IN POST-COVID 19 TIMES: CAPITALIZING ON THE EXPERIENCE OF HIGHER EDUCATION INSTITUTIONS IN KUWAIT FROM THE CRISIS OF COVID-19.

Dear Respondent, This study aims at investigating the impact of the online learning strategies on the learning outcomes post COVID 19. Answers would remain confidential

Part 1
General information
Kindly tick the most appropriate answer from the below.

DEM1	Gender:
	Male ☐ Female ☐
DEM2	**Nationality:**
	Kuwaiti ☐ Non-Kuwaiti ☐
DEM3	**Age:**
	18–20 years ☐ 21–24 years ☐ 25–30 years ☐ 31 or older ☐
DEM4	**Year at university:**
	freshman ☐ sophomore ☐ junior ☐ senior ☐
DEM5	**Name of university/college:**

Part 2
Research Conceptual Variables
Kindly provide your answers on the questions below using a scale from 1 to 5 that range from strongly disagree to strongly agree.

Learner Dimensions

(*continued on next page*)

Part 2 (*continued*)

Learner Dimensions						
Learner attitude toward smart technology (computers, tablets, laptops, etc)						
CODE	STATEMENT	SD	D	N	A	SA
Learner attitude toward smart technology (computers, tablets, laptops, etc)						
CODE	STATEMENT	SD	D	N	A	SA
ATC1	I believe that working with smart technology (computers, tablets, laptops, etc) is very easy.	1	2	3	4	5
ATC2	I believe that working with smart technology (computers, tablets, laptops, etc) does not require having technical abilities.	1	2	3	4	5
ATC3	I believe that working with smart technology (computers, tablets, laptops, etc) makes a person more productive at the task that he/she is doing.	1	2	3	4	5
ATC4	I believe that working with smart technology (computers, tablets, laptops, etc) is enjoyable.	1	2	3	4	5
Learner smart technology (computers, tablets, laptops, etc) Anxiety						
CODE	**STATEMENT**	SD	D	N	A	SA
COA1	Working with a smart technology (computers, tablets, laptops, etc) would make me very nervous	1	2	3	4	5
COA2	I get a sinking feeling when I think of trying to use a smart technology (computers, tablets, laptops, etc)	1	2	3	4	5
COA3	smart technology (computers, tablets, laptops, etc) make me feel uncomfortable	1	2	3	4	5
COA4	smart technology (computers, tablets, laptops, etc) make me feel uneasy and confused	1	2	3	4	5
Learner Internet self-Efficacy						
CODE	**STATEMENT**	SD	D	N	A	SA
ISE1	I feel confident browsing the internet to attend my e-learning course.	1	2	3	4	5
ISE2	I feel confident downloading necessary materials for my e-learning course from the Internet	1	2	3	4	5
ISE3	I feel confident linking to desired e-learning screens easily.	1	2	3	4	5
ISE4	I feel confident locating necessary information on the Internet for a specific topic related to my e-learning course.	1	2	3	4	5
Instructor Dimensions						
Instructor Response Time						
CODE	**STATEMENT**	SD	D	N	A	SA
IRT1	I received comments on assignments or examinations for this course in a timely manner.	1	2	3	4	5
IRT2	My instructor takes the time to thoroughly examine my work as soon as possible	1	2	3	4	5
IRT3	My instructor responds to students queries in a timely manner	1	2	3	4	5
IRT4	My instructor provide amble time for feedback when promised	1	2	3	4	5
Instructor Attitude Toward the Technology						
CODE	**STATEMENT**	SD	D	N	A	SA
ATT1	Compared to traditional classrooms, instructor considers e− learning is superior.	1	2	3	4	5
ATT2	Instructor was enthusiastic about teaching the e-learning class	1	2	3	4	5
ATT3	Instructor handled the e-learning class effectively	1	2	3	4	5
ATT4	Instructor explained well how to use the e-learning system.	1	2	3	4	5
Course Dimensions						
E-Learning Course Flexibility						
CODE	**STATEMENT**	SD	D	N	A	SA
COF1	Taking the e-learning course via the Internet allowed me to arrange my course work more effectively.	1	2	3	4	5
COF2	The advantages of taking the e-learning via the Internet outweighed any disadvantages	1	2	3	4	5
COF3	Taking the e-learning course via the Internet allowed me to spend more time on non-related activities	1	2	3	4	5
COF4	Taking the e-learning course via the Internet allowed me to take a course I would otherwise have to miss	1	2	3	4	5
E-Learning Course Quality						
CODE	**STATEMENT**	SD	D	N	A	SA
COQ1	Conducting the e-learning course via the Internet improved the quality of the course compared to traditional courses.	1	2	3	4	5
COQ2	The quality of the e-learning course compared favorably to traditional courses.	1	2	3	4	5
COQ3	I feel the quality of the e-learning course I took was largely unaffected by conducting it via the Internet.	1	2	3	4	5
Technology Dimensions						
Technology Quality						
CODE	**STATEMENT**	SD	D	N	A	SA
TEQ1	I feel the information technologies used in e-Learning are very easy to use	1	2	3	4	5
TEQ2	I feel the information technologies used in e-Learning have many useful functions	1	2	3	4	5
TEQ3	I feel the information technologies used in e-Learning have good flexibility	1	2	3	4	5
TEQ4	I feel the information technologies used in e-Learning are easy to obtain	1	2	3	4	5
Internet Quality						
CODE	**STATEMENT**	SD	D	N	A	SA
INQ1	I feel satisfied with the speed of the Internet connection during e-learning	1	2	3	4	5
INQ2	I feel the communication quality of the Internet is very good	1	2	3	4	5
INQ3	I don't face a problem with the internet connection when attending an e-learning course	1	2	3	4	5
INQ4	I feel its easy to go on-line to join my e-learning course	1	2	3	4	5

(*continued on next page*)

Part 2 (*continued*)

Learner Dimensions						
Learner attitude toward smart technology (computers, tablets, laptops, etc)						
CODE	STATEMENT	SD	D	N	A	SA
Environmental Dimensions						
Learner Perceived Interaction with Others						
CODE	**STATEMENT**	SD	D	N	A	SA
PIO1	Student-to-student interaction was easier in e-learning than in traditional learning	1	2	3	4	5
PIO2	Class discussions were easier to participate in than traditional learning.	1	2	3	4	5
PIO3	I learned more from my fellow students in e-learning than in traditional learning	1	2	3	4	5
PIO4	Interacting with other students and the instructor using e-learning system became more natural as the course progressed	1	2	3	4	5
E-learning Outcome						
CODE	**STATEMENT**	SD	D	N	A	SA
ELO1	I feel that I learned as much from e-learning as I might have from a traditional learning.	1	2	3	4	5
ELO2	I believe that e-learning outcomes are far better than traditional learning.	1	2	3	4	5
ELO3	The quality of the learning experience in e-learning is better than in traditional learning.	1	2	3	4	5

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