

Research Article

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Assessment of Post–Covid E-Learning Quality Standards in Jordanian Public and Private Universities

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Abstract

Background/Purpose. The study sought to assess the quality standards of post-COVID e-learning in Jordanian public and private universities.

Materials/Methods. The study sample was randomly selected and comprised 452 faculty members across four public and five private universities. The descriptive survey method was used, and data were collected through a questionnaire.

Results. The study found that the level of assessment of COVID e-learning quality standards in Jordanian public and private universities is high. The standards ranked as follows: Regulatory and Legal Compliance (first place), Technology (second place), Instructional Design and Course Development (third place), Evaluation (fourth place), Delivery (fifth place), Financial (seventh place), Instruction and Instructor (eighth place), and Student Services (ninth place).

Conclusion. Based on the study's findings, recommendations were made to consider the quality standards of e-learning in public and private Jordanian universities, with a particular focus on the standards that received average scores for improvement.

1. Introduction

The information technology revolution contributed to a quantum leap in modern communication. These means had a practical impact on the application of the distance communication process. These concepts cast a shadow over education, preventing students from acquiring new concepts and skills without access to the university campus. They made the learning process enjoyable by taking into account individual differences among students and enabling everyone to participate and express their opinions (Chang & Wang, 2024). This interest has recently increased among specialists in the educational field, who see e-learning as a system that helps solve some of the problems facing traditional education because of the unique features that make it reliable (Abumandour, 2022).

The effectiveness of the educational procedure is contingent on the quality of e-learning, a critical concern primarily determined by its compliance with globally recognised standards (Kear et al., 2016). Investigations and studies have demonstrated that e-learning will not contribute adequately to the learning process if it is not efficient enough to meet worldwide criteria and standards; on the contrary, it may reduce its quality and negatively affect its outcomes (Saxena et al., 2021).

The e-learning experience, given its adoption since the spread of the Coronavirus, has sparked much discussion. Despite the intensification of the controversy that revealed confusion, opinions can be limited to two directions (Berki, 2020): a trend that pushes the adoption of this method represented by specialists in technological technologies and computers, Those who defend it with full force and enthusiasm, based on the tangible impact of the information revolution that appeared given the rapid development of digital Technology, on the details of daily life (Thierer, 2016).

The second trend, represented by several educational specialists, sociologists, and humanities, recommends deliberation through conducting more studies and environmental analyses, including constants and variables, before making any decision about the feasibility of adopting the e-learning method, the extent of its employment, and how it is used in higher education institutions in Jordan (Sweet & Michaelsen, 2023). Global benchmarks for excellence in education encompass all facets of the managerial learning process and human capital, including learners, instructors, facilities, student services, courses, assessment, and morality (Sunder M, 2016). The educational process is the primary determinant of the capabilities of future generations, who must possess the capacity for adaptation, innovation, and renewal. Moreover, the production and acquisition of knowledge at rates that make them competitive globally (Mian et al., 2020). Therefore, improving education is a fundamental pillar that countries seek to achieve.

The Hashemite Kingdom of Jordan is one of the countries that seek to achieve quality in their educational systems; inputs, processes, and outputs are given scientific and practical standards and achieve flexibility and clarity of vision, follow-up, and evaluation, given the needs of the labour market, quality requirements, and future development plans and their practical application (Smadi et al., 2022).

Research on post-COVID quality standards in Arab universities remains scarce, despite many studies examining e-learning during the COVID-19 era. The Ministry of Higher Education in Jordan released revised e-learning quality standards in 2023, but faculty members' opinions have not yet been thoroughly assessed. By investigating the degree to which post-COVID e-learning quality standards are met in Jordanian public and private universities, the current study seeks to close this evident research gap. Therefore, when implementing e-learning in institutes of higher learning, caution must be exercised by adhering to agreed-upon quality standards and standards related to the field of e-learning by providing higher education institutions with an interactive educational and training environment that attracts the interest of individuals in an era characterised by giant leaps in

knowledge production (Bigirwa, 2021). The importance of e-learning systems has made ensuring the quality of learning a vital challenge, underscoring the need to provide quality in e-learning programs in higher education institutions, as quality is an essential condition that higher education institutions globally aspire to achieve (Elumalai et al., 2021).

One of the technological advancements that has demonstrated its value and efficacy in imparting knowledge, skills, and scientific trends to pupils is e-learning (Anwar et al., 2020). Additionally, e-learning helps develop courses in line with specific scientific standards and focuses on both individual and cooperative learning (Ertl et al., 2021). This leads to new educational patterns that encourage student engagement in the learning process and facilitate and multiply techniques for student assessment (Barkley & Major, 2020). Additionally, the flexibility of the curriculum, through the delivery and provision of supplies, also provides an element of interaction in the learning process (Kariippanon et al., 2018). "Employing educational, information and communication technologies to raise the efficiency of the educational and training process in all its forms, and to control its quality" (Fedorenko & Rozhkov).

"An interactive system linked to the educational-learning process, which relies on the presence of a digital electronic environment that presents courses and activities to the student via electronic networks and smart devices" (Iqbal et al., 2020).

Using computers and the Internet for teaching and learning is known as e-learning (Matthew et al., 2021). Abdullateef (2022) defines e-learning as "a tool for synchronous learning or asynchronous environments that use Internet-connected technology devices, such as computers, laptops, smartphones, etc." While Abed (2019) defined e-learning as "education that is provided through modern communication mechanisms such as computers, networks, and multimedia of all kinds to deliver information to the learner in the shortest time, with the least effort, and with the greatest benefit". According to Zanelidin et al. (2019), e-learning is a planned process that uses technology to provide learners with high-quality audio, visual, and film content at the right time and the right level, as well as interactive learning activities.

Due to the significant developments witnessed in all fields, including the field of higher education, universities have witnessed significant transformations as a result of the emergence of several factors, most notably globalisation, competition, and the renewed needs of the labour market, which require universities to focus on qualitative education, improve quality, and be keen to achieve high levels of performance. This requires a review of the administrative procedures universities follow to implement quality standards, as Jordanian universities have declined in international rankings that rely on specific standards for quality, teaching, research, and e-learning (Salama et al., 2018).

Without a doubt, adherence to globally recognised quality standards is a critical component of any successful educational and training system, and e-learning is unquestionably one of the tools that foster creativity, interaction, and skills development. Adopting and applying quality standards for e-learning is a problematic issue, as this System requires the preparation of standards by experts in the field of e-learning, based on the international standards adopted for this purpose, and confirmation of its ability to meet the needs of society and keep pace with future developments and changes (Singh et al., 2023).

The success of the e-learning experience imposed by the COVID-19 pandemic revealed several deficiencies that must be addressed to develop and improve the e-learning system (Almaiah et al., 2020). During COVID-19, the Ministry of Higher Education and Scientific Research and the Educational Institutions Accreditation Commission held many workshops and seminars to motivate Jordanian universities to raise their quality. During the post-Corona pandemic period, the need has become

more urgent to develop and improve the e-learning system and to address the obstacles that accompanied it during the pandemic (Akour et al., 2020).

E-learning standards that adhere to the worldwide standards authorised for this purpose were recognised by the Higher Education Accreditation and Quality Assurance Commission Council in 2023. Thus, the purpose of this study was to respond to the following questions:

1. What is the Assessment of Post-Covid E-Learning Quality Standards in Jordanian Private and Public Universities?
2. Are there significant statistical variations in the Assessment of PostCOVID e-learning Quality Standards in Jordanian Private and Public Universities due to the variables (gender, Years of Experience, Academic rank, Academic Department (College), and university (Public/Private))?

The study aims to evaluate the quality standards of e-learning in the post-COVID stage in private and public Jordanian universities. The study also aimed to prove the existence of statistically significant differences in evaluating the quality standards of e-learning after COVID in private and governmental Jordanian universities due to the variable (gender, years of experience, academic rank, academic department (college), university (governmental). / private).

The importance of the study lies in its attempt to deepen and expand the theoretical concept of Assessment of Post-COVID e-learning Quality Standards in general, and clarify and understand it in a more profound and specialised way in public and private Jordanian universities. However, E-learning has become more applicable in the current era due to technological developments and the changes imposed by the COVID-19 pandemic.

The researcher expects this study to aid Jordanian institutions by promoting high standards for e-learning, a crucial need for all stakeholders in the e-learning community. The researcher also hopes that this study will serve as a basis for future research and a starting point for other research in this field, given the current conditions.

The study included these concepts and terms:

- E-learning: "An interactive system linked to the educational-learning process, based on the presence of a digital electronic environment that provides courses and activities to the student via electronic networks and smart devices" (Wang & Yu, 2022).
- COVID-19 virus: "A diverse strain of viruses that may cause respiratory diseases in humans, ranging in severity from the common cold to more serious diseases such as Middle East Respiratory Syndrome (MERS) and severe acute respiratory syndrome (SARS) " (Barth et al., 2021).

Educational Quality Standards: "All planned policies, measures, processes, and procedures on which the e-learning system is based and through which the quality of education is maintained and developed" (Hadullo et al., 2017).

2. Literature Review

The popularity of e-learning increased after the Coronavirus pandemic, prompting various studies to investigate how the pandemic altered expectations for the quality of e-learning. The study (Alhaythami, 2021) sought to examine the extent to which educational officials and faculty members influence the quality of online education at Umm Al-Qura College during the COVID-19 pandemic. Data were gathered using a questionnaire and a descriptive, comparative survey technique. There were 309 faculty members and academic leaders in the sample. The findings showed that, amid the epidemic, academic administrators and professors at Umm Al-Qura University have strict quality-control criteria for their online learning program.

Bawaneh et al., (2023) examined how distance learning affects the quality-assurance criteria for Amman's public secondary schools. A questionnaire was sent to 191 supervisors, both male and female. Educational supervisors reported a moderate level of implementation of quality standards in Amman's public secondary schools. Educational supervisors found a moderate level of implementation of distance learning in Amman, the capital.

Muhammad Abdul Rahman Khreisat (2022) examined the reality of implementing international quality assurance standards for e-learning in Jordanian universities. Data was collected using a questionnaire and descriptive survey method. The sample comprised 248 Jordanian university quality-assurance personnel. International quality assurance standards are moderately supported for Jordanian universities' e-learning applications. The study recommended e-learning quality-assurance criteria for Jordanian universities, based on global standards. An analytical descriptive technique and a questionnaire were used (Alaofi, 2016). It assessed the impact of e-learning on student satisfaction at Taibah University in Saudi Arabia. The analysis shows that Taibah University's Saudi Arabian remote learning program is improving in student satisfaction and quality. The research advised Taibah University to continue employing distance learning and study other countries' top practices.

Alsoud & Harasis (2021) examined Jordanian university students' e-learning readiness and experiences throughout the pandemic. The researchers compiled their findings using an online survey and descriptive methods. The sample includes 463 college men and women. Distance learners faced communication, accessibility, and technical concerns, according to the research. Internet and harsh learning conditions. It also showed that most students had never taken online courses before the outbreak and that roughly half had studied less than previously. The report advised Jordan's government, policymakers, and institutions to invest in a flexible educational system that promotes e-learning and distance learning for the future.

Muflih et al. (2021) examined how digital Technology, teaching quality, evaluation, economic situation, psychological state, and course type affected Jordanian university students' attitudes toward online learning during the emergency transition of COVID-19 to online learning. A questionnaire was given to 4037 students from four public and private Jordanian institutions. The quality of the online experience—including instruction and evaluation—improved students' future views of online learning, but personal challenges—such as financial and psychological pressures—reduced their motivation to learn online. These findings underscore the critical need to foster sustainable quality cultures in the post-COVID-19 era, with the world's higher education systems increasingly relying on digital learning environments.

A number of studies have emphasised the necessity of robust technological infrastructure, institutional support and pedagogical effectiveness to ensure high-quality e-learning. For example, Alsoud and Harasis (2021) documented the obstacles encountered by university students in Jordan during remote teaching in emergency situations, with system usability, communication, and institutional readiness contributing significantly to the overall learning process. On the same note, Almaiah et al. (2020) identified key variables influencing the implementation and quality of e-learning systems during the pandemic, including technological strength and organisational support. The results of Abumandour's (2022) research also showed that barriers to implementation, particularly in applied and engineering disciplines, constrained the efficiency of online education. In addition to these findings, Elumalai et al. (2021) showed that students focused on the quality of content, student-instructor interaction, and assessment practices in the quality of e-learning during the pandemic. Together, these studies demonstrate the importance of systematic evaluation frameworks to ensure that e-learning environments meet acceptable quality criteria in the post-COVID environment.

The results of the current study, compared with the existing body of literature, will provide a region-specific assessment of the quality of post-COVID e-learning at Jordanian universities,

especially in the context of new national standards launched in 2023. The past literature has pointed to high heterogeneity of e-learning preparedness, student satisfaction, and institutional capacity across nations (Alsoud & Harasis, 2021; Almaiah et al., 2020), and other researchers like Abumandour (2022) and Abed (2019) emphasised the current issues of institutional inability to provide high-quality digital learning opportunities. The present research is in line with these findings, as it recognises the merits of technology and instructional aspects and also sheds light on existing gaps in the state, including financial resources and student services, which reflect realities in the global community. Nevertheless, this research has a unique aspect in presenting a systematic analysis of e-learning quality in line with the latest Jordanian standards, which has been poorly studied in previous work. In this way, the study not justifies previous findings regarding the problems of post-COVID e-learning but also contributes to the academic discourse by introducing empirical evidence specific to the situation in higher education in Jordan.

3. Methods

The research design utilised in this study was quantitative, employing a descriptive survey. This research is conducted within a field research framework that uses a survey method to evaluate e-learning quality standards in the post-COVID stage across both types of universities. The study sample was randomly selected, and its number was (452) faculty members from nine Jordanian and private universities, where four public universities were chosen within the three regions (north, center, and south): Yarmouk University, the German Jordanian University, the University of Mutah, and the University of Jordan, and five private universities: Princess Sumaya University for Technology, Al-Zaytoonah Private University of Jordan, Al-Ahliyya Amman University, Al-Isra University, and Petra University. Table 1 presents information about the sample used in the study.

An electronic questionnaire was used in this research study and sent via institutional communication channels, such as email and learning management systems, to ensure broad, secure access for faculty members. The participants who voluntarily answered the instrument were 452 teaching staff members in Jordanian universities (public and private). The tool was initially developed based on the holistic model of e-learning quality proposed by Frydenberg (2002), and its items were revised to reflect the post-COVID changes introduced by the Jordanian Ministry of Higher Education. Content validity was tested through expert review; construct validity and internal consistency were verified using findings from the pilot study and Cronbach's alpha coefficients, as provided in the methodology section. The following measures made the instrument theoretically based and empirically sound.

3.1. The Statistical Methods Used

After collecting the data and compiling the essential details of the variables, the information was coded and input into a computer for thorough statistical analysis. The software chosen for this purpose was SPSS, version 25. The processing of the data gathered from the study's sample—more precisely, the participants—was made more accessible by this software. In order to answer the research's questions and evaluate its hypotheses, the investigator employed the following statistical techniques:

The study's instruments were evaluated for reliability using Cronbach's Alpha Coefficient, and their validity using the Coefficient of Self-Validation.

Descriptive statistics: These provided a general overview of the study sample's features. Statistics such as means and standard deviations were included, which improved understanding of the data and its applicability to the larger population from which the sample was drawn. The study questions were answered using arithmetic and standard deviation methods.

The following equation was used to determine the judging standard (Nemoto & Beglar, 2014):

Class length = upper limit - lower limit (for weights) = 1.33

Number of default classes

Three criteria are used to judge the paragraphs:

(1-2.33) a low score moderate degree; (3.68-5.00) high score (3.67-2.34) ;

Use the t-test for independent samples to determine the variations between two variables, one qualitative and the other quantitative, consisting of two categories. The purpose of the ONE-WAY ANOVA test is to compare two variables—one qualitative and the other quantitative—across multiple groups. Duncan's test is used to find differences between groups.

3.2. Study Tool

The study analysed existing studies to attain its goals, focusing on Frydenberg's (2002) study on e-learning quality standards to design the questionnaire. The questionnaire included two sections:

- First, this is related to the demographic characteristics of the study's sample of faculty members in private and public Jordanian universities (gender, college, academic qualification, academic degree, years of experience, and university).
- The second concerns evaluating the quality standards of e-learning in the post-COVID stage in public and private Jordanian universities. It consists of 9 axes distributed as follows: (Institutional Commitment to Technology Student's Services, Instructional Design and Course Development Instruction, Instructor's Delivery Finances, Regulatory and Legal Compliance Evaluation).

A five-point Likert scale was adopted, which gives five answers for each paragraph of the questionnaire, where the answers carry numerical weights from 1-5 representing the degree of the answer "strongly agree (5), agree (4) notsure (3), Disagree (2), strongly disagree (1)".

3.3. The Validity and Reliability of the Study Tool

Validity

The instrument was administered to nine knowledgeable and experienced professors at Jordanian colleges to assess the tool's validity by asking them to evaluate the paragraphs' validity. Each of them belonged to the field within which it falls, and they were asked to delete, modify, move, and correct each paragraph between the fields in which it falls. Belong to it, or any other suggestions they deemed appropriate, and in light of the arbitrators' comments, some paragraphs were amended by deletion and addition or modification and correction, and the questionnaire related to trends comprised 87 paragraphs distributed over nine areas.

Reliability

The study tool's validity and reliability are pivotal aspects of statistical analysis. These concepts are integral in assisting researchers in confirming the accuracy of their analysis findings. They determine whether the results can be confidently applied to the entire study population or if their generalizability could be improved. To assess the research tool's stability, the researcher employed Cronbach's alpha coefficient to gauge reliability. Furthermore, the researcher utilised the subjective validity coefficient, essentially the square root of the reliability coefficient, to measure validity. An initial sample of 27 participants was selected to validate the research tool's reliability and validity.

Table 1. The Reliability of the Study Tool.

Variables	Number of Items	Cronbach's Alpha	Coefficient of Self-Validity
Institutional Commitment	12	0.91	0.95
Technology	12	0.92	0.96
Student services	10	0.96	0.98
Instructional Design and course development	10	0.93	0.96
Instruction and instructor	12	0.98	0.99
Delivery	8	0.94	0.97
Financial	6	0.95	0.97
Regulatory and Legal Compliance	6	0.93	0.96
Evaluation	11	0.91	0.95
Overall questionnaire (Learning Quality)	87	0.98	0.99

The variables within the questionnaire exhibited Cronbach's Alpha values spanning from 91% to 98%, while the self-validity coefficient ranged from 95% to 99%. In terms of the overall questionnaire, Cronbach's alpha was 98%, and the self-validity coefficient was 99%. All of these values exceeded the minimum acceptable threshold of 60% in social and educational research.

4. Results

What is the Assessment of Post–Covid E-Learning Quality Standards in Jordanian Public and Private Universities?

Arithmetic means and standard deviations were computed to address this issue and evaluate the quality standards of e-learning in Jordanian universities from the perspective of the faculty as a whole and across the tool's nine areas.

Given the weights of the five-point Likert-scale questionnaire items mentioned previously, an arithmetic mean of 3.67 or higher is considered high. If the arithmetic mean is between 2.34 and 3.66, it is considered average; if the arithmetic mean is between 1 and 2.33, it is considered low. As shown in Table 5.

Table 2. Arithmetic Means and Standard Deviations for Evaluating E-Learning Quality Standards in the Post-COVID Stage in Private and Public Jordanian Universities, Jordanian Universities for the Fields, and as a Whole.

Variable	Mean	SD	Evaluation
Institutional Commitment	3.61	0.819	medium
Technology	4.20	0.536	high
Student services	3.523	1.079	medium
Instructional Design and course development	4.19	0.581	high
Instruction and instructor	3.56	1.191	medium
Delivery	3.63	1.048	medium
Financial	3.58	1.169	medium
Regulatory and Legal Compliance	4.25	0.455	high
Evaluation	4.13	0.654	high
Overall questionnaire (Learning Quality)	3.85	0.519	high

The results indicated that the assessment of post-COVID e-learning quality Standards in Jordanian private and public universities, from the point of view of the study sample, as the overall arithmetic average of the scale reached (3.85) with a high degree. All the arithmetic means of the e-learning quality standards ranged between (4.25 and 3.53 and 4.25, and the standard deviations of all the standards were less than 1.5. The eighth domain, Regulatory and Legal Compliance, topped the criteria domains with a mean of 4.25 and an SD of 0.455, with a high level. At the same time, the second standard (Technology) ranked second, with a mean of 4.20 and a standard deviation of 0.536, with a high degree. The fourth standard (Instructional Design and course development) ranked third, with a mean of 4.19, an SD of 0.581, and a high degree. In fourth place came the ninth standard (Evaluation), with a mean of 4.13 and SD of 0.654, with a high degree.

With a reasonable degree, an arithmetic mean of 3.63, and a standard deviation of 1.048, the sixth standard (Delivery) came in fifth place. The first standard (Institutional Commitment), which ranked sixth, had a moderate degree, an arithmetic mean of 3.61, and a standard deviation of 0.819. With a moderate degree, a mean of 3.58, and an SD of 1.169, the seventh standard, Financial, ranked seventh. Instruction and teacher, the fifth standard, had an arithmetic mean of 3.56, an SD of 1.191, and a modest degree, placing it in eighth position. With a moderate degree, a mean of 3.53, and an SD of 1.079, student services ranked last and ninth, respectively. The study sample's results for each standard are listed below:

4.1. Comparative Statistical Tests (t-test and ANOVA)

To supplement the descriptive results above, further comparative statistical tests were conducted to determine whether e-learning quality perceptions differed by gender, academic department, university type (public vs private), academic rank, and years of experience. Procedures of independent sample t-tests and one-way ANOVA were performed, and when necessary, Duncan used post-hoc tests. Tables 3-9 give the detailed results.

Table 3. T-test for Independent Samples to Compare Gender-Based Learning Quality

	Gender	Mean	t	sig
Learning Quality	F	3.8564	0.211	0.833
	M	3.8460		

Table 4. Independent Sample T-test for Academic Department Learning Quality Differences

	Academic Department	Mean	t	sig
Learning Quality	Scientific colleges	3.8197	-1.248	0.213
	Humanities colleges	3.8807		

Table 5. Independent Sample T-test for University Learning Quality Differences

	University	Mean	t	sig
Learning Quality	Public	3.9135	2.853	0.005
	Private	3.7678		

Table 6. ONE-WAY ANOVA Test Will Examine Learning Quality Disparities Based on Academic Rank

	Academic rank	Mean	f	sig
Learning Quality	Assistant Professor	3.6831	4.301	0.014
	Associate Professor	3.8755		
	Professor	3.8888		

Table 7. Duncan's Test to Find Differences Between Groups

Academic_rank	Subset for alpha = 0.05	
	1	2
Assistant Professor	3.6831	
Associate Professor		3.8755
Professor		3.8888

Table 8. ONE-WAY ANOVA to Compare Learning Quality by Experience

	Experience	Mean	f	Sig
Learning Quality	Less than 5 years	3.7402	5.232	0.001
	5 to 10 years	3.7852		
	11 to 15 years	3.9482		
	More than 15 years	3.9510		

Table 9. Duncan's Test to Find Differences Between Groups

Experience	Subset for alpha = 0.05	
	1	2
Less than 5 years	3.7402	
5-9 years	3.7852	
10-14 years		3.9482
+ 15 years		3.9510

4.1.1. First Standard: Institutional Commitment

Table 10. Arithmetic Means and Standard Deviations for Assessment E-Learning Quality Standards for the Post-COVID Period Within the Field of Institutional Commitment

N	Item	Mean	SD	Evaluation
1	Sufficient resources for online education in line with the university's strategic plans	3.60	1.131	medium
2	There are written and published policies and procedures for the e-learning process	3.58	1.148	medium
3	The strategic plans established for e-learning are consistent with the plans of the relevant authorities	3.51	1.077	medium
4	Keeping up with quality policies in all aspects of work	3.64	0.990	medium
5	Formulate a clear vision for e-learning	3.56	1.065	medium
6	Regulatory commitment to implementing e-learning quality standards	3.58	1.061	medium
7	Providing appropriate mechanisms to measure the level of satisfaction of beneficiaries with the provision of e-learning programmers	3.62	1.026	medium

N	Item	Mean	SD	Evaluation
8	Announce strategic objectives clearly to everyone	3.60	1.075	medium
9	Continuous development of infrastructure	3.63	1.055	medium
10	Continuous training for faculty members to activate the e-learning system	3.61	0.960	medium
11	The university provides an electronic platform to answer all necessary inquiries	3.60	1.026	medium
12	The university conducts various activities to promote e-learning and support research.	3.77	0.945	high
General mean		3.61		medium

The results in Table 3 indicate that the assessment of Post-COVID e-learning Quality standards in Jordanian private and public universities regarding Institutional Commitment is, to a moderate degree, with a general arithmetic mean of 3.61 and arithmetic averages for the phrases ranging from 3.77 to 3.51. This can be explained.

The phrase "12" came in first place (The university carries out various activities to promote e-learning and support research in it). With an arithmetic mean of 3.77 and a deviation of 3.77. Standard (0.945) and with a high degree, and the phrase "4" (Keeping up with quality policies in all aspects of work) came in second place with an arithmetic mean 3.64 and a standard deviation (0.990) and with a moderate degree, while the third place was the phrase "9" which stated (Continuous development of infrastructure) with an arithmetic mean 3.63 and a standard deviation 1.055 and with a medium degree,

Followed in fourth place by the phrase "7" (Providing appropriate mechanisms to measure the level of satisfaction of beneficiaries with the provision of e-learning programs), with an arithmetic mean of 3.62 and a standard deviation. (and to a moderate degree. The phrase "3" (The (1.026 strategic plans established for e-learning are consistent with the plans of the relevant authorities) came in last place with an arithmetic average 3.51.

This can be explained by the need for greater institutional commitment to mechanisms that promote these practices, as they require dedicated councils and committees to discuss them and set standards for their implementation and success. The outcome aligns with Khuraisat's (2022) research, which found that institutional dedication to implementing high-quality e-learning standards at Jordanian universities was moderately evident.

4.1.2. Second Standard: Technology

Table 11. Arithmetic Means and Standard Deviations for Assessment E-Learning Quality Standards for the Post-COVID Period Within the Field of Technology

N	Item	Mean	SD	Evaluation
1	The university provides technical support to address any emergency defect during the learning process	4.16	0.793	high
2	The university provides an electronic library of educational resources	4.13	0.736	high
3	Provides Internet service for students and faculty members	4.18	0.754	high
4	The e-learning techniques used at the university are effective.	4.20	0.768	high
5	The university provides an excellent educational platform for the continuation of the education process	4.32	0.788	high
6	Provides a secure and unified access system	4.31	0.761	high
7	E-learning systems support various types of devices and operating systems, including smartphones and tablets.	4.15	0.739	high
8	Providing systems to verify the identity of beneficiaries.	4.19	0.746	high
9	Make sure beneficiaries' privacy is protected by having well-defined policies and procedures	4.28	0.811	high
10	Providing the necessary infrastructure to implement e-learning programs	4.12	0.795	high
11	Provides modern and advanced applications and technologies	4.14	0.845	high
12	Provides a sufficient number of computer laboratories	4.17	0.814	high
General mean		4.20		high

Table 11 results show that the assessment of post-COVID e-learning Quality standards in Jordanian private and public universities about technology is to a high degree, with a general arithmetic mean of 4.20 and arithmetic averages for the phrases ranging from 4.32 to 4.12. This can be explained.

The interest in e-learning can be explained by establishing e-learning centres and resources across various Jordanian universities, providing technical and technological support to improve and develop the e-learning environment in higher education institutions. This result is consistent with the study (Benama, 2021), which confirmed that Umm Al-Qura University provides distance education programs in a technical environment and with high-quality technological equipment. It also aligns with Al-Dahshan's study (2020), which confirmed that the COVID-19 pandemic has drawn

universities' attention to the importance of developing infrastructure and technology to enhance the e-learning environment. At the same time, I disagreed with the study (Khuraisat, 2022), which found the application of the technology standard in Jordanian universities to be moderate.

4.1.3. Third Standard: Student Services

Table 12. Arithmetic Means and Standard Deviations for Assessment E-Learning Quality Standards for the Post-COVID Period Within the Field of Student Services

N	Item	Mean	SD	Evaluation
1	There is an electronic centre affiliated with the university to communicate and interact with students	3.56	1.137	medium
2	Providing administrative consulting services to students to address and resolve any difficulties that may arise	3.58	1.219	medium
3	Students can communicate with faculty members and university staff easily and conveniently	3.41	1.484	medium
4	The university trains students to use e-learning tools	3.52	1.145	medium
5	It provides a mechanism for following up on the student's study plan and providing advice on choosing courses	3.41	1.517	medium
6	Documenting students' files and results in high quality.	3.69	0.999	medium
7	Facilitating students' attendance at virtual classes	3.62	1.164	medium
8	Providing access to electronic libraries and scientific books	3.36	1.467	medium
9	Providing access to electronic libraries and scientific books	3.56	1.155	medium
General mean		3.523		medium

According to Table 12's findings, the assessment of Post-COVID e-learning Quality standards in Jordanian private and public universities regarding (Student services) is to a moderate degree, with a general arithmetic mean of 3.523, with arithmetic averages for the phrases ranging from 3.69-3.41. This can be explained.

This can be explained by the need for more training and awareness programs for university students, as well as support, assistance, and advice in choosing academic courses. This aligns with Khuraisat's (2022) study, which showed a moderate level of assistance and support for students in e-learning programs. At the same time, this result contradicts the study by Benama (2021), which reported the efforts made by the Deanship of E-Learning and Distance Education at Umm Al-Qura University in light of the Corona crisis regarding student service.

4.1.4. Fourth Standard: Instructional Design and Course Development

Table 13. Arithmetic Means and Standard Deviations for Assessment E-Learning Quality Standards for the Post-COVID Period Within the Field of Instructional Design and Course Development

N	Item	Mean	SD	Evaluation
1	The materials are designed to suit the requirements of e-learning	4.17	0.767	high
2	Content design takes into account individual differences among learners	4.30	0.820	high
3	Content design takes into account learners' scientific backgrounds	4.15	0.830	high
4	Presenting the scientific material in a way that facilitates the educational process	4.09	0.837	high
5	Present educational objectives	4.05	0.853	high
6	Providing digital content in its various forms (texts, audio, and visual materials) that supports all the learners' needs	4.14	0.807	high
7	Facilitating access to educational content.	4.11	0.756	high
8	Continuous updating of the contents of the study material	4.29	0.805	high
9	Displaying electronic content in an organised manner that facilitates the process of navigating between its parts	4.21	0.776	high
10	Displaying electronic content in various educational ways and activities	4.30	0.770	high
General mean		4.19		high

Table 13 indicates that the assessment of Post–Covid e-learning Quality standards in Jordanian private and public universities regarding Instructional Design and course development is to a moderate degree, with a general arithmetic mean of 4.19, with arithmetic averages for the phrases ranging from 4.30 to 4.09. This can be explained.

This result reveals that the standard of (Instructional Design and course development) and its outcomes are at the required quality level and are consistent with information and communications technology standards. This result differs from the study of Khresat (2022), which demonstrated the extent to which the standard for designing and developing educational content in Jordanian universities is "medium," in addition to the study.

(Bernama, 2021), which showed that the standard for designing and developing educational content at Umm Al-Qura University remains in the construction and development stage amid the sudden shift towards distance education.

4.1.5. Fifth Standard: Instruction and Instructor

Table 14. Mean, SD, and Evaluation of the Responses of the Instruction and Instructor Variable

N	Item	Mean	SD	Evaluation
1	Electronic library services and electronic research opportunities are provided	3.54	1.470	medium
2	Determine the office hours on the electronic portal for the subject.	3.63	1.164	medium
3	Involving faculty members in preparing digital courses.	3.61	1.108	medium
4	The faculty member receives professional and technical support from the university when faced with a problem in e-learning applications, quickly when needed	3.57	1.465	medium
5	The faculty member receives training related to the use of TechnologyTechnology, electronic content development, and electronic teaching skills	3.72	1.154	high
6	Provides an electronic portal that provides manuals	3.51	1.447	medium
7	The university provides programs to prepare and train learners to use TechnologyTechnology and teaching skills in e-learning environments.	3.46	1.439	medium
8	Providing a supervisory staff for the academic environment	3.64	1.106	medium
9	Providing technicians, administrators, and clarifying their responsibilities and roles	3.43	1.380	medium
10	Providing opportunities for faculty members to participate in decisions to ensure the quality of e-learning and develop policies related to the e-learning environment, such as intellectual property and copyrights.	3.44	1.395	medium
11	The faculty member has a safe and encouraging professional environment with a precise reward system	3.61	1.072	medium
12	Verify faculty satisfaction with e-teaching experiences	3.51	1.438	medium
General mean		3.56		medium

Table 14 shows that the assessment of Post-Covid e-learning Quality standards in Jordanian private and public universities, regarding (Instruction and instructor), is to a moderate degree, with a general arithmetic mean of 3.56 and arithmetic averages for the phrases ranging from 3.72 to 3.43. This can be explained by the lack of trained and qualified personnel to manage information and communication technologies and to employ various electronic applications in the educational

process. Most faculty members need specialised training in communication technologies to develop their skills in creating electronic educational materials and exploiting various devices and applications. Digital in the educational field. This result is consistent with Khuraisat's study (2022), which confirmed that the degree of implementation of the Instruction and instructor standards in Jordanian universities is "moderate".

4.1.6. Sixth Standard: Delivery

Table 15. Arithmetic Means and Standard Deviations for Assessment E-Learning Quality Standards for the Post-COVID Period Within the Field of Delivery

N	Item	Mean	SD	Evaluation
1	Students are monitored to ensure academic honesty	3.65	1.074	medium
2	Granting all students fair access to programs regardless of ability or capacity.	3.48	1.410	medium
3	Provides support services such as academic advising, information resources, and libraries	3.63	1.134	medium
4	Facilitating access to various databases	3.63	1.258	medium
5	The student can access everything he needs for the educational process electronically.	3.64	1.231	medium
6	Use an appropriate e-learning management system with all the necessary features and capabilities.	3.65	1.128	medium
7	Providing the technical infrastructure, networks, and physical facilities for effortless electronic access.	3.67	1.161	high
8	Educational content is reviewed and supervised	3.69	1.179	high
General mean		3.63		medium

Table 15 indicates that the assessment of post-COVID e-learning Quality standards in Jordanian private and public universities, with regard to the (Delivery), is to a moderate degree, with a general arithmetic mean of (3.63) and arithmetic averages for the phrases ranging from (3.69-3.48).

This is explained by the fact that the (delivery) standard is still in the construction and development stage in light of the sudden changes, as it has yet to reach the stage of mastery and quality. It needs to be studied towards development to achieve standards of quality and mastery. This matches Khuraisat's (2022) study, which showed that the degree of application of the standard for designing and developing educational content in Jordanian universities is "medium," though it differed in some respects.

According to academic authorities and faculty members at Umm Al-Qura University, the quality control of the university's distance education program in light of the COVID-19 pandemic is of a "high degree" (Benama, 2021).

4.1.7. Seventh Standard: Financial

Table 16. Arithmetic Means and Standard Deviations for Assessment E-Learning Quality Standards for the Post-COVID Period Within the Field of Financial

N	Item	Mean	SD	Evaluation
1	Basic hardware and software for managing education operations are provided	3.60	1.171	medium
2	An annual budget is allocated to support e-learning	3.64	1.206	medium
3	There is funding for the e-learning system inputs and management of its operations	3.64	1.163	medium
4	Financial commitments and technical plans are in place and appropriate to the specifications of the university's e-learning programs.	3.65	1.162	medium
5	The university provides sufficient financial funds to cover the budget for technological resources	3.46	1.467	medium
6	The costs of training, human resources qualification, maintenance and follow-up expenses, and the acquisition of high-quality programs, electronic applications, and protection and electronic security systems are covered.	3.48	1.447	medium
General mean		3.58		medium

Table 16 illustrates that the assessment of post-COVID e-learning quality standards in Jordanian private and public universities, with regard to the (Financial), is to a moderate degree, with a general arithmetic mean of 3.58 and arithmetic averages for the phrases ranging from 3.64-3.48.

This result explains the insufficient budget granted to universities allocated to developing the digital environment in university institutions, covering training costs, qualifying human resources, maintenance and follow-up expenses, acquiring electronic programs and applications, and electronic protection and security systems characterised by high quality.

4.1.8. Eighth Standard: Regulatory and Legal Compliance

Table 17. Arithmetic Means and Standard Deviations for Assessment E-Learning Quality Standards for the Post-COVID Period Within the Field of Regulatory and Legal Compliance

N	Item	Mean	SD	Evaluation
1	Commitment to achieving academic integrity in the electronic work environment, such as preventing cheating and impersonation.	4.22	0.699	high
2	Ensure that the electronic content provided by faculty members is up to date and does not violate national laws and policies	4.29	0.706	high
3	We ensure compliance with intellectual property rights and copyright principles	4.27	0.678	high

N	Item	Mean	SD	Evaluation
4	A precise and announced regulation for higher education covering all aspects of e-learning	4.25	0.701	high
5	The applicable systems and laws that implement e-learning are adhered to.	4.25	0.654	high
6	The higher education regulations related to e-learning cover all the gaps	4.23	0.716	high
General mean		4.25		high

Table 17 shows that the assessment of Post-Covid e-learning Quality standards in Jordanian private and public universities regarding (Regulatory and Legal Compliance) is, to a moderate degree, with a general arithmetic mean of 4.25, with arithmetic averages for the phrases ranging from 4.29 to 4.22.

This is explained by the fact that Jordanian universities can implement e-learning thanks to the regulatory, legislative, and legal framework, which is in line with the plan to integrate e-learning into higher education organisations for the year 2021. This plan was issued by the clauses of Article 13 of the Higher Learning and Scientific Research Law, as System No. 69 for the year 2021, the system for integrating e-learning into higher education organisations was issued by Section 5 of Paragraph (A) of Article 6 and Article 13 of the Higher Learning and Science Studies Law.

4.1.9. Ninth Standard: Evaluation

Table 18. Arithmetic Means and Standard Deviations for Assessment E-Learning Quality Standards for the Post-COVID Period Within the Field of Evaluation

N	Item	Mean	SD	Evaluation
1	Student performance is linked to learning outcomes	4.09	0.876	high
2	Develop tools to measure learning objectives to match e-content activities	4.13	0.816	high
3	Providing a system for monitoring and supervising computerised examinations	4.22	0.888	high
4	Involving students in evaluating electronic academic content	4.12	0.873	high
5	Sequence and diversity of assessment tools to suit learners' work	4.03	0.874	high
6	Continuously evaluate and review educational materials to ensure their quality	4.03	0.893	high
7	Providing a mechanism to measure the level of beneficiaries' satisfaction with providing the material in e-learning mode	4.11	0.841	high
8	Choose measurement and evaluation tools that suit educational activities and digital content	4.08	0.859	high

N	Item	Mean	SD	Evaluation
9	Constant progress through accurate assessment methods to gauge students' performance and happiness	4.20	0.913	high
10	Providing continuous feedback on students' academic progress	4.22	0.797	high
11	Continuously evaluate faculty members through clear policies and procedures to ensure the quality of e-learning standards	4.20	0.913	high
General mean		4.13		high

Table 18 indicates that the assessment of post-COVID e-learning Quality standards in Jordanian private and public universities, with regard to the evaluation, is to a moderate degree, with a general arithmetic mean of 4.13 and arithmetic averages for the phrases ranging from 4.22 to 4.03.

This is comprehensible given that Jordanian universities depend on mechanisms for measuring and evaluating e-learning programs clearly and clarity of policies and procedures for evaluating students, linking student performance to results, and working to develop electronic programs to measure the level of students and their progress in educational programs. This result differs from Khuraisat's study (2022), which confirmed that the degree of implementation of the evaluation in Jordanian universities is "moderate".

5. Discussion

The statistical data presented in Tables 3-10 in the Results section allow to shed more light on the differences in the perception of the quality standards of post-COVID e-learning by the faculty members of the Jordanian public and private universities. As evidenced by both the descriptive results and the comparative analyses, the most ratings occurred in the area of Technology, Regulatory and Legal Compliance, Instructional Design and Evaluation.

These findings are in line with the findings of Alsoud and Harasis (2021), who reported that the COVID-19 period led to a substantial increase in the readiness of the system and technological infrastructure, and with the findings of Elumalai et al. (2021), who stated that the technological infrastructure and system readiness played a key role in the quality of online learning. Conversely, the poor scores for Student Services, Institutional commitment, Instruction and Instructor, and Financial support indicate the Jordanian higher education sector's inability to grapple with structural and administrative issues. This trend aligns with the findings of Khuraisat (2022), who documented moderate institutional readiness and pointed to the lack of support and resource allocation.

Abusamandour (2022) observed similar barriers, particularly in faculty training, student support, and resource availability during the transition to online learning. The comparative tests also revealed wide variation in examinations across types of universities, academic status, and years of service, with faculty, senior academic status, and older staff tending to record higher ratings. These patterns are consistent with the findings of Makhoulf and Alani (2024), who suggested that differences in institutional capacity and staff experience have a significant impact on perceptions of online learning quality following COVID-19. All these findings show that although the technological and regulatory aspects of e-learning in Jordan are coming of age, financial investment, staff development, and services to students still require enhancement to achieve a complete, integrated quality framework.

6. Conclusion

This study evaluated the quality standards of post-COVID e-learning in Jordanian public and private universities, engaging 452 faculty members from four public and five private institutions. The findings revealed that the overall quality of e-learning is elevated, with Regulatory and Legal Compliance receiving the top ranking, followed by Technology, Instructional Design, and Evaluation. A T-test indicated no significant differences for gender or type of college. Notable disparities were observed by university type, with public universities achieving higher scores than private institutions. Furthermore, academic rank and years of experience influenced the evaluation of e-learning quality, with professors and individuals with over 15 years of experience assigning higher ratings. Suggestions were proposed to elevate standards, particularly in areas such as student services and finances, to promote post-Covid e-learning at Jordanian universities. These findings highlight the necessity for sustained emphasis on the quality of e-learning inside institutions. The research has some limitations, as it used self-reported data from samples of nine universities in Jordan and was conducted using a cross-sectional design, which cannot be used to infer causality.

6.1. Recommendations

The findings of the study recommended to the researcher:

- This is by providing a permanent technical and training support by the Ministry of Higher Education to ensure a smooth implementation of e-learning quality standards especially in enhancing student support and student services, which registered the lowest mean of all the study domains. 4. Having an autonomous department dedicated to e-learning on the local (universities and higher education institutions) and central (ministries of higher education) level to monitor the enforcement of its standards so that there is proper coordination between the academic and administrative departments.
- Having specialized technicians to maintain the websites and make them user friendly to every user and educational and guiding videos to enable them to understand how to access and utilize the provided learning systems.
- Creating adequate annual financial budgets to mobilize the modern e-learning systems in accordance with the research findings, which pointed at medium performance according to the financial sector, and focusing on more investments towards improving the general quality.
- there is need to come up with general curricula to students or special classes on e-learning systems and clarify them as a pre-requisite course before joining the university to help them in interaction and electronic communication skills.
- The quality assurance system development in the education sector of private universities, as the t-test results revealed higher learning quality ratings in the state universities than on the private ones, which implies that special attention should be paid to enhancing the situation in the sphere of the private university.
- Continuously designing the e-learning quality standards within Jordanian universities relying on the international standards of quality assurance.
- Conducting research on the quality of e-learning in universities in the future will be done, where the teaching staff responsible of education departments across the Jordanian universities will be trained on how to implement standards and monitor their implementation.

Declarations

Author Contributions. (T.A.: Literature review, conceptualization. T.A. and N.M.: methodology, data analysis. N.M.: review-editing and writing, original manuscript preparation. All authors have read and approved the published on the final version of the article)

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