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Research Article

The Quality of Selected Online Learning Platforms and Their Effect on Education in the Sultanate of Oman

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The COVID-19 pandemic has led to the largest interruption in education around the world, affecting some 1.6 billion students. Classroom education stopped, to be replaced by online e-learning platforms. In higher education, e-learning is made available through recorded lectures, with online platforms becoming a significant part of the overall system. This study aims to identify the quality of online learning platforms, applying a set of criteria from the perspective of faculty members and students in higher education institutions in the Sultanate of Oman. The descriptive approach is used and the researchers collected data through a questionnaire directed at 32 faculty members and 104 students. The results show that e-learning programs are generally of high quality, from the perspective of the participants, but with statistically significant differences according to the type of program.

1. Introduction

E-Learning is a successful product in the current era of technological innovation, and its introduction has become inevitable in light of the current and accelerating changes in all developed and developing societies. Zaghdoud [1] comments that the Internet and multimedia technologies have reshaped the way knowledge is presented, as e-learning has become an alternative to traditional education.

However, the literature does not agree on a specific definition of e-learning, probably because of the rapid development of electronic technologies and devices, but researchers do agree that it is used to facilitate the educational process. Karima [2] defined it as a means of providing educational experiences in an interactive teaching-learning environment. It is based on the computer and its multiple applications and the Internet, and the process of learning and teaching goes beyond the walls of the classroom with the opportunity for the teacher to support the learner synchronously or asynchronously. Khdeem [3] added that it is a type of education in which modern communication tools are used through a computer, an interactive whiteboard, a smartphone or an electronic tablet, and various digital media networks, whether remotely or in person during the classroom. The Organization for Economic Cooperation and Development (OECD) considers e-learning as the use of information and communication technology in the various educational processes to support and enhance education, in this case in higher education institutions. Online learning can be used alone or to complement traditional classes [4].

Basilaia and Kvavadze [5] observe that e-learning is an organized process that aims to achieve educational outcomes using technological means that provide sound, image, films, and interaction between the learner, content, and educational activities at the appropriate time. Karar [6] defined it as an educational program that uses information technologies and computer networks to support and expand the educational process through many means, including computers, the Internet, and electronic programs prepared by either specialists or companies under the auspices of government. It aims to create an interactive environment rich in applications based on computer and Internet technologies,

enabling access to learning resources at any time and from anywhere. That is, e-learning refers to all forms of learning and education in which information and communication technologies are exploited to enable face-to-face and online interactions [7].

E-Learning achieves many educational goals and benefits, as summarized by various researchers [8–10]: the interactive learning environment allows teachers to employ information technology in educational activities, developing their own professional performance, improving the quality of education and learning outcomes, raising the level of communication with learners, and achieving equal educational opportunities for all. It is suitable for different methods of education; Jawad [11] added that e-learning achieves many goals at the individual and community level, increasing the experience of teachers, especially with regard to preparing educational materials, and the ability to access information sources in various forms via the Internet and use them to explain, clarify, and provide educational content in electronic form.

Most of the literature indicates that e-learning is characterized by effectiveness, one of its advantages overtraditional methods; it is less expensive as it saves learners the cost of travel, earning them more time and providing not only educational resources but also assessment tools that allow them to measure their progress. It is also characterized by flexibility as it allows the learner to find information from anywhere and at an appropriate time. It contributes to creating an environment that increases opportunities for cooperative education, thus transferring learning to a more realistic environment, away from the artificial situation that isolates learners from each other.

Recent developments worldwide have imposed the use of e-learning in the educational process, and the online learning environments that have emerged have become a significant source of income for many universities. It is used as a tool to embody the quality of higher education and improve the image of the university [3]. Bader Khan, referred to in [12], saw it as a creative way to provide a learner-centered, well-designed, predesigned interactive environment for anyone, anywhere and at any time, using the features of the Internet and digital technologies in accordance with the principles of instructional design appropriate to an open and flexible learning environment. Zaghdoud [1] concluded that educational institutions must study and understand this phenomenon and take strategic action in order to create more effective and attractive e-learning environments and platforms.

E-Learning platforms are an integrated set of interactive services that are not restricted by time or place and are provided through the Internet, with the necessary tools and materials for teachers, learners, and those concerned with learning. They support and enhance the educational process, through which learners can access courses and participate in various learning activities. They help to create collective spaces for learners, enabling them to communicate with each other from a distance, exchange information, and solve problems [13].

E-Learning faces many challenges, including what [14] indicated which is the lack of sufficient experience for many learners in the use of technical resources. Advanced infrastructure such as electronic devices and Internet connections is required, but there may be an absence of specialists in the management of e-learning and its systems. Al-Haj and Dahans [15] highlighted faculty members' limited skills in using technology and their prevailing fear of reducing their role in the educational process and transferring it to educational software designers, society's view of e-learning and lack of confidence in it, and the lack of recognition by official authorities in some countries of the certificates granted by universities using e-learning platforms. The challenges facing e-learning can be classified as the availability of the technology and the lack of experience in its use; the readiness of students and teachers for e-learning; convictions of the importance and effectiveness of e-learning; and the transfer of educational materials, their quality, and evaluation. With reference to the quality and effectiveness of e-learning programs, there is a remarkable consensus on the need for standards to determine the objectives of specific programs and to measure how far they are met and establish mechanisms to systematically monitor quality improvement and its effectiveness [16].

Fathi and colleagues [17] emphasized that the success of any educational and training system depends largely on its commitment to internationally agreed quality standards, as education is not provided in a random way but rather is a well-planned and designed system. In order to achieve and ensure quality in e-learning, three basic conditions must be met: ensuring real growth in the learner's personality and behavior; alignment with the needs of the community under the existing conditions, given the practical and professional characteristics of the institution; and the availability and application of accurate standards and indicators for the program's design and production. Many studies have confirmed that if e-learning is not designed well, taking into account quality standards and indicators, it will not add any value to the educational process.

The process of achieving quality in e-learning faces many challenges, the most important of which is the compatibility of the quality of the educational service provided to the beneficiary in the e-learning system with the level of service quality that he expects [8]. Different definitions of quality involve their close association with standards, the gateway to achieving quality in education in any institution. Muhammad and Abdulnaeem, referred to in [8], defined quality as an endorsement of a set of items that prove by scientific study and careful research that they are sufficient to meet the critical needs to complete the product in its final form. It determines the specifications and conditions that should be available in the education system [8]. Harthy, cited in [18], defined quality in education as a comprehensive system that deals with the various aspects of the educational system through inputs, processes, and outputs, with the aim of improving its products.

Qudah [19] adds that one of the most important reasons for academic institutions' interest in the quality standards of the educational process is to raise and improve the level of their outputs. This is confirmed by the standard specification, the most important of which is the focus on the service

to recipients, which calls on universities to adopt clear methods to identify the degree of students' satisfaction with the services provided by the educational institution, and the performance and level of response of universities to the requirements and needs of students.

In order to achieve quality in e-learning, a set of conditions must be met: students enrolled in this type of education should have appropriate input capabilities; this type of education should be related to the educational content and the applications or programs used; it should include faculty development and continuous evaluation; it requires close monitoring of the implementation of instructional programs.

2. Research Problem

Most of the higher education institutions in the Sultanate of Oman turned to e-learning during the COVID-19 pandemic, as an emergency alternative to ensure the continuity of education and learning during periods of home quarantine; the use of instant messaging applications and platforms increased rapidly [20]. The aim was primarily to reach students and teach them in their homes, providing them with educational materials and activities. Müezzin [12] found that after private and public educational institutions were closed, many of them resorted to video chat programs via the Internet, including various Google programs and GoToMeeting. Despite the existence of these alternatives, the educational process still experienced many problems. These included teachers and students being unfamiliar with this type of education, and the fact that not all students had access to the Internet and electronic devices.

Alameri et al. [21] added that a goal of these platforms was that university students and faculty members in technical and humanitarian disciplines should learn innovative technologies, as a theoretical and practical foundation for skills in the field of innovation in education. The absence of face-to-face communication and the new e-learning environment posed challenges for both learners and teachers, increasing their workloads, especially in the time and effort expended in preparing content and in learning activities. While the quality of the learning services provided through these platforms could not be relied on, the quality of individual teaching and learning might also be reduced [22].

Latipet al. [22] identified difficulties in achieving quality standards for e-learning in Arab countries, given that the e-learning systems may have been designed for different cultures and environments. On one hand, they failed to involve learners in activities to ensure good quality and, on the other, to identify good practices in this field of e-learning. There were no formal procedures or policies to review the quality of the e-learning system, develop it, and monitor its effectiveness. Evaluation methods that comply with quality standards must, therefore, be approved and adopted. In addition, users must be aware that the provision of content through e-learning platforms requires its own standards [3]. Afifi and Al-Omari [10] believe that the majority of quality models in e-learning and distance education focus on standards for designing only the educational content, without considering the other elements of the e-learning system. In particular, they recommended the need to pay attention to developing e-learning quality standards in light of the growing competition between universities in providing applications and services for this type of education. Otaibi and Roqi [8] added that the problem also arises whenever they are subject to the standards of nonprofit organizations. Hayat [18] confirms that the educational programs adopted in the e-learning system require continuous evaluation and feedback in order to be developed and reformed. Quality in e-learning is a prerequisite for the success of the educational process, as it largely depends on commitment to globally agreed standards in both the technology used and the e-learning programs themselves [23].

Umek and colleagues [24] confirm that it is important to analyze the opinions of the participants and stakeholders about the use of e-learning platforms, with the availability and application of accurate standards for their design and production. It must be remembered that e-learning is not just another way of applying traditional teaching, but rather a new approach to education, and that quality assurance methods must take this fact into account [25].

On the other hand, [26] believed that it is important to recognize traditional cultural, social, and educational values when adopting general evaluation models and criteria for e-learning and to adapt these models to suit the community and therefore ensure the quality of e-learning.

Given the importance of improving e-learning in the Sultanate and the proximity and nature of the researchers' work, and sensing the importance of evaluating the experience of the e-learning process in higher education institutions and educational platforms in accordance with international quality standards, in a manner commensurate with the nature of Omani society, this study asks "What is the reality of the quality of e-learning platforms used in higher education institutions from the perspective of the Omani user?"

The following emerged from this question:

(i) What is the reality of the quality of e-learning platforms used in Omani higher education institutions from the perspective of faculty members and students?

(ii) Are there statistically significant differences (at the 0.05 level) in the quality of e-learning according to the different programs used, from the perspective of students and faculty members?

(iii) Are there statistically significant differences in the quality of e-learning platforms between Omani public and private higher education institutions, from the perspective of faculty members?

(iv) Are there statistically significant differences in the quality of e-learning platforms between Omani public and private higher education institutions from the students' perspective?

The significance of the study from the theoretical perspective is that it is the first of its kind, to the researchers'

knowledge, in the field of evaluating e-learning platforms based on approved international standards in the Sultanate of Oman. From a practical perspective, it will advise those in charge of higher education on the quality of the e-learning platforms used. The answers to the research questions will contribute to raising the quality of e-learning in Oman.

Finally, the limitations of the study are as follows:

(i) Spatial boundaries: this study is limited to higher education institutions in the Sultanate of Oman

(ii) Temporal limits: this study was conducted in the second semester of the academic year 2020/2021

(iii) Objective limits: the study is limited to evaluating the e-learning platforms Microsoft Teams, Google Meet, and Zoom

(iv) Human limits: this study is limited to faculty members and students in Omani higher education institutions

3. Literature Review

3.1. Overview. E-Learning via the Internet, mobile devices, and social networking tools has a contemporary constant replacing traditional classes. The process of shifting from the traditional system of education to the electronic system is a complex process that requires preparation and the provision of the appropriate tools and supplies to meet educational goals. It must take into account not only the abilities and skills of students but also their culture and privacy when communicating and interacting [27].

A United Nations report [28] indicated that the COVID-19 pandemic caused the largest interruption to education in history, affecting about 1.6 billion students. As there are currently no indications that this crisis and the unprecedented interruption to education will end, online learning has been made available for higher education through recorded lectures and online platforms. It is, therefore, important to seize this opportunity to find new ways to confront the learning crisis and develop a set of sustainable solutions, including digital solutions that require institutions to have appropriate content, effective teaching models and practices, and an enabling learning environment. There is a report [29] that e-learning has thus imposed itself strongly on academic institutions, commensurate with modern technological developments, and that the introduction of modern technology in the field of higher education is one of the main pillars of quality in education.

Hayat [18] summarized the importance of e-learning as contributing to facilitating and increasing communication and exchanging opinions between students and their teachers. e-Learning tools, including e-mail, dialogue, chat, and instant forums, help to form knowledge and strong opinions among learners. On one hand, courses can be constructed in light of specific scientific standards; on the other hand, they enable students to learn individually and according to their own abilities and encourage them to manage their learning in the manner that suits them. In addition, e-learning provides all the courses and documents needed and references related to topics being studied.

E-Learning facilitates the process of education outside the working hours of educational institutions and thus helps students to acquire self-learning skills and reduce time and effort. It also encourages teachers and learners to use modern technologies and raise the level of communication between them, in addition to the possibility of providing educational materials in different forms [30].

E-Learning has many advantages for students, including the ability to accommodate large numbers of learners and take into account individual differences between them, as they can complete learning processes in environments appropriate for them and progress according to their own abilities. It also increases learners' sense of justice and equality in the distribution of opportunities in the educational process. From expressing their ideas to searching for information and facts by different means in addition to traditional methods [19, 20], e-learning ends the learner's isolation and keeps him in constant contact with his educational institution. Educational content is updated with ease, but it is necessary that the programs and applications of e-learning services are of high quality.

Al-Qudah and Hamed [19] stated that it is important to recognize the quality of the education process, not as something that is delivered to the learner by the e-learning provider but rather as a coproduction between the learner and the learning environment. The e-learning used may be synchronous, bringing together all the learners at the same time, with direct communication established between them so that they can interact directly with the teacher. Examples of such tools are video conferencing and virtual classes. Alternatively, asynchronous e-learning does not require the presence of all the students at the same time; each can obtain instructional materials according to a preplanned program, choosing the appropriate time and place to study, with tools including e-mail, video media, and CDs [31].

Providing quality in e-learning is essential for any academic program or course, a prerequisite for the success of the educational process. Therefore, adherence to agreed international quality standards is required to guarantee the success of any educational system; these standards act as a social contract between teachers and education authorities on the one hand and between the education authorities and students on the other hand [18]. Otaibi and Roqi [8] stressed that applying total quality standards in educational institutions leads to qualitative development, in line with educational and administrative developments to achieve excellence in all their services.

The importance of e-learning quality standards lies in the fact that a number of criteria must be met to help students make the right choice among the many learning opportunities available to them, which vary in terms of quality and availability. Equally, they are needed by educational institutions and universities to meet the needs of students and provide efficient and effective services. This reduces the conflict between what is taught and what must be achieved and also helps in judging the quality of learning [18].

The criteria for accreditation and quality assurance vary from one country to another, depending on the objectives of the e-learning provided and also according to the sociocultural conditions of each country. Wenceslao [32] stated that most of the studies reviewed identified the following criteria for evaluating e-learning: ease of use, response time, interaction, web design and courses, accessibility, reliability, cost-effectiveness, functionality, security, stability, accuracy, flexibility, interoperability, and continuity. Many institutions and organizations have sought to set special standards to ensure the quality of e-learning, each party according to its perspective and interest. They include the Association of Asian Open Universities, which has developed a framework to ensure the quality of e-learning, with eight basic areas for professional development processes. The Chinese Committee for e-learning Technology Standards, commissioned by the Chinese Ministry of Education, has identified four directions for deriving quality standards for e-courses. In the same field, the European Association of Distance Learning Universities has prepared standards for the quality of e-learning systems and has developed a guide containing a set of standards and indicators for evaluating the quality of e-learning in general [33].

Canadian standards for e-learning consist of three main areas. The first is the quality of inputs for e-learning products and services, with thirteen dimensions. The second area, on which this study focuses, is the quality of processes and practices in e-learning services and products. It has five dimensions, the first four coming under the heading of communication management: managing and supporting students, connecting and managing learning, building knowledge, and improving students' ability to solve problems. The fifth dimension, privacy and personal management, comprises achievement files that allow evaluation of the learner and the provision of a long-term inventory characterized by privacy, security, and ease of access. The third area is the quality outputs of e-learning services and products, with three basic dimensions [34].

The challenges to the effectiveness of e-learning are summarized by [8] lack of compatibility between the culture of e-learning elements and the evaluation requirements according to quality standards of the teacher, the learner, and the technical and administrative staff; inadequate quality of the educational services provided in the electronic system, compared with the level of service required by the teacher and the learner; the inadequacy of existing conditions in the e-learning system according to quality standards; and the desire for immediate, not long-term, results.

3.2. Related Works. Ngoc and Phung [7] investigated the challenges facing students learning English as a foreign language online through Moodle and Microsoft Teams platforms. A questionnaire and semistructured interviews were used to collect study data, and the results showed that students had negative attitudes toward many aspects of online education, as they faced technical problems and lack of social interaction.

Al Mulla and Abdullah [13] evaluated the digital platforms used in distance education in international schools in Kuwait, from the perspective of art education teachers and directors, using a questionnaire to collect study data from a sample of 45 teachers and 11 directors. The study concluded that the best standards in terms of availability and use were the digital content standards on the platform and the digital content display standard.

Wea and Kuki [35] examined the perceptions of students of the College of Teacher Education and Training of the University of Nusa Nipa in Indonesia about the use of the Microsoft Tamayuz application. Data was collected by questionnaire from the study sample of 176 students, and the results showed that the students had positive perceptions about the use of the e-learning program.

Latip and colleagues [21] examined the effect of using Moodle, Microsoft Discrimination, and Zoom platforms on self-learning and academic performance, with a sample of 450 students. The advantages and disadvantages of e-learning were included in the quality content analysis, and the main result was that the strategic design of the university's e-learning program was more important than individual contextual variables in assessing students' perceptions. Students considered that the e-learning communication on the campus was very effective and that those who had an experience of using the new technologies for learning had positive attitudes toward e-learning.

Rizki [30] analyzed the perception of economics students at the University of Bordj Bou Arreridj, Algeria, about the reality of e-learning and its obstacles. The study sample consisted of 42 male and female students, with a questionnaire to collect data. The students acknowledged the importance of e-learning and did not agree that there were obstacles.

Ibrahim and Al-Nafi'i [36] investigated the standards of teachers in the International Society for Technology in the field of education in Oman and recommended the development of technology standards for teachers based on the ITA Standards for Technology in Education.

Bin [27] evaluated the experience of e-learning in a course on the skills in searching for information. The researcher used a questionnaire to collect students' opinions about their experience of the electronic course. The results showed the importance of e-learning in terms of facilitating students' study and following up on their development and activity during the semester.

Al-Qudah and Hamed [19] evaluated the quality of e-learning and its impact on the degree of satisfaction of students at Taibah University, Saudi Arabia, using a questionnaire distributed to a random sample of 300 male and female students. The study concluded that the general trend of satisfaction was high. It recommended that the university continues to adopt e-learning as a strategic option and to learn about the best international practices in the field of e-learning.

Khdeem's study [3] aimed to diagnose the reality of distance education platforms in higher education institutions in Algeria, using some website analysis tools to collect data. The results showed a shortage of distance e-learning support: installation, updating, insurance, and response to various screens. Traditional methods of education should be complemented by e-learning.

Mahnawy and Ahmed [37] studied how to employ e-learning to achieve quality standards in secondary education in Iraq. The study sample from 15 schools comprised 800 male and female students and 20 computer teachers. A questionnaire was used to collect data, and the study concluded that it was necessary to employ e-learning to improve secondary education.

Alameri and colleagues [21] investigated students' opinions about the effectiveness of e-learning using digital learning platforms Moodle, Microsoft Teams, and Zoom and the impact on their self-learning and academic achievement. The sample consisted of 450 male and female students. The researchers pointed to many results, including that most students believe that the three platforms are important for all universities today, helping their learning activities more effectively than traditional methods, improving their self-study abilities, and encouraging them to progress in line with their abilities. The results also showed that the quality of Moodle, Microsoft, and Zoom curricula reflected the educational level of universities at the present time.

Zahia [31] aimed to identify the role of the two types of e-learning, synchronous and asynchronous, during COVID-19. The researcher used the ethnographic method, studying data and reports from the University of Hail in Saudi Arabia. The results showed that the university was adopting a comprehensive approach to the digital environment and overcoming all obstacles faced by teachers and learners through field training, facilitating the process of virtual education, and confirming the effective role played by e-learning in the success of the university year.

The study by [38] aimed to identify the challenges and problems facing students of higher institutions related to the transition to e-learning during the COVID-19 pandemic, with a sample of 141 male and female students. Results indicated that the most important barriers were their unwillingness to study online, social challenges, and the lecturer's challenges. Thakker et al. [39] investigated the perceptions of engineering students about the available e-learning platforms, with the aim of providing solutions to help enhance e-learning in the long term. The study sample of 364 students indicated that Google was the preferred system.

Karima [2] investigated the role of e-learning within educational institutions and research centers, using the descriptive-analytical method, a sample of 150 members of the university faculty, and a questionnaire to collect data. e-Learning achieved good results in educational service quality, the needs of teachers, and the educational process.

Otaibi and Roqi [8] aimed to identify the concept of quality, its principles, and its importance in the educational process, as well as reviewing the quality standards adopted for the e-learning system. These standards varied in terms of their number, the diversity of studies, and the institutions involved.

Finally, Afifi and Al-Omari [10] proposed a model for measuring aspects of quality and standards in e-learning and distance education programs at the University of Dammam, Saudi Arabia.

4. Data Collection and Analysis

The researchers applied the descriptive-analytical approach to achieve the objectives of the study, as it describes a certain phenomenon and reports its status as it is in reality [40], by reviewing the literature, building measurement tools, and collecting data from the study community. The analysis provides answers to the research questions and suggests recommendations. The study community consisted of faculty members and students in Omani higher education institutions. A questionnaire was distributed electronically because of the COVID-19 conditions. The sample consisted of 124 male and female students and 32 faculty members from 24 public and private universities in the Sultanate.

4.1. Data Collection Tool. The researchers designed two scales to measure the study data, collected by a questionnaire on the quality of the programs used in e-learning, one directed to faculty members and another to students. The Canadian standards for e-learning were adopted, containing the five dimensions already described, presented in Table 1 [34]. The researchers added items on the quality of the programs used in e-learning, with two open questions for students to offer an opinion of the challenges facing them and for faculty members to obtain their suggestions for improving the quality of e-learning programs.

A five-point Likert scale was used to measure the responses to the closed-answer items, as detailed in Table 2.

The researchers then checked the validity of the study tools, by presenting the originals to a group of arbitrators. The questionnaire items were modified in accordance with the arbitrators' recommendations on their content and presentation.

The consistency of the electronic form of the questionnaires was tested with an exploratory sample of the study population, and Cronbach's alpha was calculated. Using the SPSS program, the results showed high stability coefficients, approaching 1, where the resolution for faculty members reached 0.92 and for students 0.98; see Table 3.

4.2. Procedure. The researchers reviewed the literature in order to define the problem accurately and on a clear scientific basis and to clarify the importance of addressing the study questions and objectives theoretically and scientifically.

They then identified the study community and transferred the study questionnaires into an electronic form as described above. The questionnaires first explained the objective of the study and gave instructions for answering the questions. Respondents were then required to provide demographic information and the type and name of the educational institution to which they belonged. The final section consisted of items in the five dimensions to measure the quality of e-learning programs. The design, validity, and reliability were confirmed using SPSS.

After the validity of the measurements and their relevance to the objectives of the research had been assured, the researchers published the electronic questionnaire on

Table 1: The dimensions of the e-learning quality scale for faculty members and students.

Dimension	Number of points for students scale	Number of points for the faculty members scale
Student management	5	6
Learning management	8	10
Knowledge delivery management	5	6
Ease of use	6	6
Privacy and assessment management	4	8
Total	28	36

Table 2: Measurement distribution of levels.

Levels	Degree	Arithmetic mean range
Very high	5	4.2 to 5
High	4	3.4 to 4.19
Medium	3	2.6 to 3.39
Weak	2	1.8 to 2.59
Very weak	1	1 to 1.79

Table 3: Cronbach's alpha stability coefficient results.

Scale	Dimension	Number of points for each scale	Stability coefficient	Overall stability coefficient
Students scale	Student management	6	0.76	0.92
	Learning management	10	0.75	
	Knowledge delivery management	6	0.92	
	Ease of use	6	0.61	
	Privacy and assessment management	8	0.88	
Faculty members scale	Student management	5	0.91	0.98
	Learning management	8	0.95	
	Knowledge delivery management	5	0.93	
	Ease of use	6	0.92	
	Privacy and assessment management	4	0.88	

various social networking sites, most importantly WhatsApp and Twitter, with the aim of reaching the widest possible study sample from various educational institutions. The data was then entered into SSPS and checked as suitable for statistical treatment. After analysis, the results were evaluated in relation to the research questions and compared with the results of previous studies. Finally, the results were summarized and recommendations made.

4.3. Results and Discussion. In order to interpret and analyze the results, the researchers reduced the Likert measures to a triple scale to facilitate the interpretation of the average response; see Table 4.

By type of institution, around two-thirds of faculty members and students were from public academic institutions and the remainder from private ones. The detailed figures for staff and students are presented in Tables 5 and 6, respectively.

The analysis of the measurement of responses to items in the questionnaire is as follows.

The first question was "What is the reality of the quality of the e-learning platforms used in Omani higher education institutions from the perspective of faculty members and students?"

Table 4: Distribution of the level of availability score for the arithmetic mean.

Level	Range of arithmetic mean	Availability score
Very high	4.2 to 5	High
High	3.4 to 4.19	
Medium	2.6 to 3.39	Medium
Weak	1.8 to 2.59	Weak
Very weak	1 to 1.79	

Table 5: Distribution of faculty responses by type of institution.

Institution	Number of responses	Ratio (%)
Public	22	66.7
Private	11	33.3
Total	33	100

Table 6: Distribution of student responses by type of institution.

Institution	Number of responses	Ratio (%)
Public institutions	42	34.1
Private institutions	81	65.9
Total	123	100

In order to answer this question, the arithmetic averages and standard deviations were calculated for each dimension of the scale, with results as shown in Tables 7 and 8. All dimensions from the perspective of faculty members (Table 7) achieved a high result, with knowledge delivery management reaching a mean of 4.1 ± 0.7.

Most of the measures of quality as perceived by students (Table 8) were high, although the dimension of privacy and assessment management was only medium (3.2 ± 1.1).

When faculty were asked about the most important challenges to using e-learning platforms, their responses were limited to technical issues, weak Internet connection, inability to organize time, lack of a mechanism for monitoring and evaluating students, checking cheating operations, the process of registering and adding students, maintaining students' focus, and interaction during the learning process.

Students' responses to the most important challenges in using e-learning platforms were technical issues, weak Internet connection, difficulty studying practical materials through e-learning platforms, difficulty adapting to the new system of education, faculty members not having technical skills in education, the absence of real interaction between the teacher and students, inability to focus, feelings of boredom, and inability to organize their time.

Concerning suggestions for developing and improving the quality of e-learning through electronic platforms, the responses of faculty members included the following proposals: conducting training workshops to promote the use of electronic platforms, with a manual for their use, a mechanism to enlist students collectively rather than individually, support with devices for presenting lectures such as a drawing pad, changing the culture of society, accepting the use of cameras, creating an appropriate environment for students to receive the lessons; reducing Internet subscription prices for students and faculty members, working on a specialized e-learning platform for each institution, finding a mechanism to update devices used in e-learning, employing technicians to help, and providing more tools to explain and clarify the system and to facilitate the communication process.

The students also had many proposals: finding a solution to the poor Internet provision and making it free to students, continuing e-learning for some subjects, improving the efficiency and skills of faculty members in educational advances via the Internet, each institution adopting a unified platform for all its students, finding a way to motivate students to communicate and interact through electronic platforms, providing materials and explanations to help students' learning, and providing devices for students.

The second question was "Are there statistically significant differences ($p = 0.05$) in the quality of e-learning in the programs used in e-learning, from the perspectives of students and faculty members?"

ANOVA was used to analyze the answers to this question, with the results as shown in Table 9 for faculty members and Table 10 for students. Overall, there are no statistically significant differences in the quality of e-learning by type of program.

The third question was "Are there statistically significant differences (0.05) in the quality of e-learning platforms between Omani public and private higher education institutions, from the perspective of faculty members?"

The *t*-test of independent samples was used to calculate statistical differences in the responses by type of academic institution, with the adoption of the 0.05 significance level. The results in Table 11 indicate no statistically significant differences ($P = 0.05$) in the quality of educational platforms by type of institution in four dimensions: student management, learning management, communication management, and privacy and assessment management, respectively, at 0.2, 1.8, 1.9, and 0.4 at significance levels of 0.8, 0.07, 0.06, and 0.7. However, there was a statistically significant difference at the 0.05 level for the ease of use dimension, in favor of private education institutions ($t = 2.8$) with a significance level of 0.02.

The fourth question repeated the third, but from the students' perspective.

The same procedure was followed, and the analysis, as shown in Table 12, found no statistically significant differences at the significance level of 0.05 in the quality of educational platforms by type of academic institution in four dimensions: learning management, communication management, ease of use, and privacy and assessment management, at 2.1, 1.8, 0.4, and 0.9 with significance levels, respectively, of 0.54, 0.68, 0.69, and 0.38. However, a statistically significant difference at the 0.05 level was found for the dimension of student management, in favor of public education institutions ($t = 2.1$ and $P = 0.04$).

The answers to the first and second questions indicate that the programs used in e-learning are of high quality. The researchers attribute this result to the fact that all these programs were designed and created by the largest technology companies in the world.

Regarding challenges related to e-learning, all respondents believed that they might affect the quality of education, through the problems listed above. The researchers conclude that it is necessary to provide strong support mechanisms for both faculty members and students, making continuous evaluations of e-learning programs and applications, enhancing the e-learning culture, and cooperating with stakeholders to find mechanisms to ensure continuous improvement through a strong technological infrastructure, drawing on local and global expertise to improve and upgrade e-learning.

The results for the third and fourth questions showed statistically significant differences by institution type, but only for the dimension of ease of use in favor of private education institutions in the case of faculty members, and the dimension of student management in favor of public education institutions from the students' perspective.

Table 7: Results of the quality scale of programs used in e-learning from the faculty members' perspective.

Dimension	Arithmetic mean	Standard deviation	Degree of availability
Student management	3.7	0.6	High
Learning management	3.7	0.7	High
Knowledge delivery management	4.1	0.7	High
Ease of use	3.9	0.6	High
Privacy and assessment management	3.6	0.7	High
Total	3.8	0.5	High

Table 8: Results of the quality scale of programs used in e-learning from the students' perspective.

Dimension	Arithmetic mean	Standard deviation	Degree of availability
Student management	3.7	1.0	High
Learning management	3.4	0.9	High
Knowledge delivery management	3.6	1.0	High
Ease of use	3.6	1.1	High
Privacy and assessment management	3.2	1.1	Medium
Total	3.5	0.9	High

Table 9: Results of the one-way variance analysis of the quality measure of e-learning programs for faculty members for the variable of program type.

Source of variance	Sum of squares	Degrees of freedom	Mean of squares	P value	Probability value
Between groups	0.1	1	0.1	0.4	0.5
Within groups	9.4	31	0.3		

Table 10: Results of the one-way analysis of variance for the measure of the quality of e-learning programs for students of the variable of program type.

Source of variance	Sum of squares	Degrees of freedom	Mean of squares	P value	Probability value
Between groups	1.8	3	0.6	0.6	0.6
Within groups	107.1	119	0.9		

Table 11: Results of the t-test for the quality measure of e-learning programs for faculty members for the institution type variable.

Axes	Type of institution	Arithmetic mean	Standard deviation	"T" value	Significance level
Student management	Public	3.7	0.6	0.2	0.8
	Private	3.6	0.8		
Learning management	Public	3.5	0.6	1.8	0.07
	Private	3.9	0.3		
Knowledge delivery management	Public	3.9	0.7	1.9	0.06
	Private	4.4	0.5		
Ease of use	Public	3.8	0.6	2.8	0.02
	Private	4.2	0.4		
Privacy and assessment management	Public	3.6	0.7	0.4	0.7
	Private	3.7	0.7		

Table 12: Results of the t-test for the quality measure of e-learning programs for students according to the variable of the type of institution.

Axes	Type of institution	Arithmetic mean	Standard deviation	"T" value	Significance level
Student management	Public	3.9	0.9	2.1	0.04
	Private	3.6	1.1		
Learning management	Public	3.3	0.9	0.6	0.54
	Private	3.4	1.1		
Knowledge delivery management	Public	3.8	0.9	1.8	0.68
	Private	3.5	1.1		
Ease of use	Public	3.6	0.8	0.4	0.69
	Private	3.5	1.2		
Privacy and assessment management	Public	3.1	0.9	0.9	0.38
	Private	3.3	1.1		

5. Conclusion

E-Learning platforms were originally established to support the education process, but during the COVID-19 pandemic, they have played a major role in ensuring the continuation of education. Microsoft, Google, and other high-tech companies have designed and implemented useful e-learning platforms for all education levels, from primary school to university. This study aimed to validate the previous facts about e-learning and show that the programs used in the Sultanate enjoy high quality, from the perspective of faculty members and students, with no significant problems related to quality in general.

The analysis showed that faculty members and students do face some challenges related to Internet connection services, poor technical support, inability to organize learning times, the lack of a mechanism through which the faculty member can enroll students in the program collectively, the difficulty of maintaining focus, the lack of mechanisms to verify the absence of cheating, and the weak skills of faculty members and students in dealing with e-learning tools. Many of these problems arise from the fact that the systems were developed in an emergency situation with no or limited prior experience.

Indeed, the current reality indicates that the near future will see more developments in the field of e-learning because of its active role in the continuation of the education process in various parts of the world. These developments will focus on how to reduce the difficulties identified and increase the efficiency of e-learning.

Data Availability

This article aims to support researchers who are interested in the field of education, by sharing the research data and the template of the data collection tool through the following link: https://drive.google.com/drive/folders/1THMhsPBEtwdr7yTReXhhXeYPzBC2-mrc?usp=sharing.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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