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Original Article

Exploring and Classifying Critical Challenges of E-learning through a Systematic Approach at the University of Tehran

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Abstract

The purpose of current study is to explore the critical challenges of e-learning in higher education institutions. The data for this research were collected through a qualitative approach using a descriptive phenomenological method and semi-structured interview tool, then the findings were analyzed by Colaizzi's (1978) 7-step method. The research field included 12 academic experts in E-learning at the University of Tehran through purposeful Sampling. The validity of qualitative data, based on the four criteria of Lincoln and Goba (1985) including; credibility, transferability, dependability, and confirmability and also reliability by re-coding and two coders have been examined and confirmed. The results of the analysis led to exploring142 main concepts, then in the form of 10 critical challenges related to the most components of the educational system including; learner, teacher, technology, financial and information resources, ethical considerations, university culture, classroom leadership, support system, learning effectiveness, and satisfaction of internal stakeholders. Finally, using a systematic approach, the mentioned challenges have been classified into three main dimensions of learning-teaching system such as; input, process, and output.

Keywords

challenges, e-learning, systematic approach, qualitative approach, University of Tehran.

Introduction

The onset of the Fourth Industrial Revolution, on the one hand, and the integration of transformative technologies into educational organizations, on the other hand, have laid the groundwork for the introduction of new approaches, with e-learning being a notable example.

Cross first used the term e-learning. Although from his point of view, E-learning was a method of education that used the Internet for teaching and distribution of knowledge (Maru et al., 2022), over time, the definitions of it have changed, and from providing educational content and gaining learning experiences using the web environment. It has gone further in such a way that this new approach of memorization is defined as the use of information and communication technology in all teaching and learning processes, and it is considered a supplement and even a substitute for the face-to-face method. For example, Aali et al. (2020) state that e-learning refers to learning in which the learner acquires knowledge and creates individual meanings, develops learning experiences, achieves learning content, interacts with the content, instructor, and other learners, and gets support during the learning process by

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using the Internet. The learning system in the digital environment due to advantages such as easy and unrestricted access to information sources (Milichevich et al., 2021), increasing self-efficacy (Cicha et al., 2021), reducing costs and wasting time (Tawafak et al.,2021), being learner-centred (Melati & Harnanik, 2021), increasing academic progress and realizing learning outcomes (Ali et al., 2020), increasing the level of flexibility and interaction (Salloum et al., 2019), creating a balance between university applicants and the capacity to accept high-quality universities (Ali et al., 2020), has find a particular position in education, especially in higher education system, in such a way that some experts state that with the help of this approach, educational organizations have been able to bring many of the out-of-reach ideals of education and training closer to reality (Okoye et al., 2021). Studies indicate that in addition to the advantages of e-learning and the rapid growth of transformative technologies, another reason for the development, acceptance, and choice of this approach has been the outbreak of the COVID-19 crisis since December 2019. In other words, the spread of the coronavirus COVID-19 caused not only the growth rate of e-learning to increase several times (Lopez-Belmonte et al., 2021) but also to make extensive use of this approach in most parts of the world at once in such a way that the implementation of face-to-face classrooms has become a choice in the digital age (Septaria et al., 2021). Despite all this, although e-learning is gaining popularity by applying the latest achievements of the digital age (Salloum et al., 2019), severe challenges and limitations in successfully and effectively implementing this new approach have caused concerns. For example, some experts say this method transmits pure knowledge and reduces learning effectiveness. It causes the social isolation of learners (Srivastava, 2019); it provides the possibility of participation of other people instead of the learner in the learning environment (Al-Qahtani & Higgins, 2013), and learners have less communication with their teachers (Abbasi et al., 2020). Based on the results of the research, some challenges, such as insufficient face-to-face contact between learners and teachers, inadequate interaction of learners with each other, reducing the possibility of interaction and dialogue between the teacher and learners in virtual classes, insufficient preparation of some teachers to establish proper communication with learners in the digital environment, the inadequacy of space for separate conversations for learners, reducing the meaningful sense of social presence, creating concern and anxiety for students regarding the quality of interactions with their teachers, is related to the process of interaction in the electronic environment (Wilcha, 2020; Dhawan, 2020; Aboagye et al., 2020; Rajesh & Sethuraman, 2020; Hue Dung, 2020; Kilinc et al., K. (2023).

Therefore, the existence of these challenges has caused the improvement of the quality of interaction and the increase of people's participation in the online environment to become two of the most critical issues. Therefore, it is necessary to be sensitive to the educational system's quality to increase students' achievement and to design formal mechanisms to increase the enjoyment of learning and its effectiveness. Surveys show that identifying the mentioned challenges can have consequences such as Increasing access to learning resources, continuous improvement of educational and lesson planning by the needs of learners (Toquero, 2020), designing mechanisms to create imagination, creativity, and innovation (Maatuk et al., 2021) in the digital environment and ultimately leading to quality improvement The teaching-learning system in the digital environment. In other words, if the approach of learning in the digital environment is to be used as a substitute for learning in a face-to-face environment, it is necessary to continuously evaluate the quality of all aspects related to the system as mentioned above so that by identifying the main strengths and points that can be improved, it can be improved in the direction of quality. The results of the research and experiences of the top universities at the national and international levels show that the first step towards the realization of this vital task is to monitor and evaluate the current state of the electronic reminder system to identify the main obstacles and related challenges from the point of view

of the critical stakeholders of the educational system.

Also, while considering the issue's importance, although research has been conducted at the national and international levels in recent years, less attention has been paid to it with a systematic approach, especially at the national level, which will be mentioned in the following to some of the most important of them. For example, Mousavi et al. (2013) state that the obstacles related to e-learning include three dimensions: "technology, pedagogy, and reduction of interaction. In this regard, Mohammad Hosni's research (2022) results show that communication and interaction, presence and participation, technical issues, quality assessment, measurement of student learning outcomes, and economic issues are among the most critical challenges facing the E-learning system. On the other hand, Mansouri et al. (2022) include the main challenges confronting e-learning, including 1. insufficient skills of faculty members in choosing and using appropriate media, 2. weakness of faculty members in the relative use of the online environment to produce educational content, 3. They need more bandwidth in universities, and 4. insufficient speed of progress in updating suitable software for producing digital content.

Ebrahimzadeh et al. (2021) also acknowledge that the challenges related to e-learning during the outbreak of COVID-19 include Threats to survival and health, inappropriate technical infrastructures, the existence of diversity in information, and insufficient credibility regarding the health system and the resulting costs. Similarly, the most important results of Sadeghlou's research (2021) indicate that among the most fundamental problems of electronic courses are poor eyesight, risk of inactivity, and overweight, causing mental and emotional issues such as sleep disorders, causing anxiety due to staying at home for a long time and reducing the motivation to learn. On the other hand, the study results of Ebrahimi et al. (2021) students point out that the most critical challenges in electronic environments have been related to technical, pedagogical, teaching, student performance, and interaction factors.

On the other hand, the findings of Salimi et al.'s research (2022) indicate that the goal is to prevent the reduction of the quality of teaching-learning processes and related challenges. In this regard, some strategies such as redesigning new missions (professional training, change and development training, political maturity of students), updating the goals and processes related to teaching and learning (developing knowledge, skills, attitude, and multifaceted education), providing the requirements and infrastructure (hardware and software) can play a significant role in increasing the effectiveness of the approach. Birmipour and Echersh (2019) state that with the sudden acceptance of e-learning in Higher Education, many senior managers and faculty members will have to revise their worldview regarding accepting and adjusting to it. Qalandari et al. (2019) also state that the effective implementation of e-learning depends on identifying challenges related to technology, pedagogy, and human resources. Montazer et al. (2019) state that the challenges of e-learning development include: 1. How can we continue the flow of education due to the inadequacy of hardware and software equipment, which needs to be clarified for the learners? and 2. The inadequacy of the necessary infrastructure has caused consequences such as the creation of the digital divide.

Finally, Narenji Thani et al.(2018) identified the challenges of e-learning including; Challenges related to the instructor (high expectations of the instructor from the learner, lack of familiarity of the instructor with related software, lack of familiarity of the instructor with teaching methods in e-learning courses); challenges related to the student (lack of awareness of the learner regarding the support facilities, wrong attitude of the learner towards Educational courses in the electronic environment, lack of comprehensive familiarity with related software, etc., insufficient motivation of the learners in the educational courses in the electronic environment, insufficient familiarity of the learners with the educational system in the electronic environment, lack of the necessary skills of E-learning in the learners);

challenges Related to the assistant, challenges related to interaction (lack of face-to-face interaction, lack of correct interaction between the instructor and the learner, lack of inclusive and inclusive interaction); challenges related to electronic content (insufficient production of content suitable for the electronic environment, inability to update electronic content on time); Providing inappropriate content with electronic courses by the instructor, inadequacy of standard content (challenges related to culture) (existence of cultural differences in learners, lack of proper culturalization in the field of learning in an electronic environment, wrong attitude towards learning in an electronic environment), related challenges With the teaching method, challenges related to evaluation (not paying attention to the evaluation of learners in the electronic environment, not providing feedback by the instructor to the learner, wrong evaluation policies in e-learning, not paying attention to formative evaluation, relying on final evaluation), technical challenges, challenges Related to the goals and strategies of the university, he categorized the challenges related to the education and empowerment system.

As mentioned before, research has also been carried out at the international level about the obstacles and challenges of the teaching-learning system, and some of the most important ones will be discussed in the following. For example, Alhamdawee (2023) stated that among the most critical challenges of the e-learning system are issues such as lack of financial resources, insufficient equipment related to information and communication technologies, insufficient internet bandwidth, and insufficient knowledge and skills of key stakeholders. The findings of Zalat et al. (2021) also show that the biggest obstacles to e-learning in the era of COVID-19 are the instability of internet speed, insufficient access to laboratories in the electronic environment, and lack of hardware facilities such as computers. Almahasees et al. (2021) state that the level of compatibility with E-learning, especially for deaf and hard-of-hearing learners, insufficient interaction and motivation, technical and Internet issues, data privacy, and security have been considered learning problems in the electronic environment. Almaiah et al. (2020) also include the challenges of this field. They understand problems related to technical infrastructure, change management, and financial support. In this regard, Aini et al. (2020) have stated that students are not sufficiently satisfied with things such as easy access to the Internet and the existence of a technical and educational support system, and this is while teachers are also faced with challenges such as; Having the necessary skills, self-regulation skills and creating a feeling of isolation are faced. In the same direction, Toquero's research (2020) believes that the consequences of the outbreak of the COVID-19 pandemic lead to challenges such as Inadequate transfer of content in the online environment (as opposed to face-to-face training), insufficient lesson planning, and caused some of the key beneficiaries to doubt the effectiveness of e-learning and the economic and occupational consequences of the learners. On the other hand, Yessenova et al. (2020) also addressed challenges like Significant costs, lack of technical support, the need to train experienced teachers, and the comprehensive development of new courses. Finally, the results of the research of Narh et al. (2019) show that the main challenges of e-learning include institutional challenges (inefficient orientation of students by service providers, system failures, and speech patterns), student-technology challenges (weak computer skills and self-efficacy, insufficient skills in the use of online handles and poor time management by learners), environmental factors (poor internet connections, lack of advanced ICT technologies to support e-learning).

Examining the records related to previous research reveals that the emergence of the E-learning approach on the international level prompted some universities and higher education institutions on the national level to utilize the electronic environment for implementing teaching and learning systems. Investigations indicate that, as mentioned earlier, all institutions could have performed better in this area; hence, some have limited their usage.

Subsequently, following the coronavirus epidemic, this limitation and threat became mandatory for educational institutions that needed to be adequately prepared to adopt the E-learning approach.

They encountered diverse challenges across different dimensions, leading to occasional contradictions and confusion among the key stakeholders within the higher education system. As new technologies have become increasingly indispensable, it is imperative to pinpoint the prevailing challenges and obstacles in order to devise suitable mechanisms for enhancing learning effectiveness in higher education.

Research method

The current research has been done in terms of practical purpose and from the point of view of gathering findings and using a qualitative approach and phenomenological (descriptive) research method. Semi-structured interviews with faculty members and experts in the e-learning field at the University of Tehran were used to explore the challenges of the teaching-learning system in the digital environment. The sampling method used in this research was purposeful. In other words, the individuals mentioned earlier were included in the study based on two primary criteria:

1. At least two years of teaching experience in the electronic environment and during the COVID-19 pandemic (across undergraduate, graduate, and Ph.D. levels).
2. Exceptional research accomplishments in teaching and learning systems in the digital era (including reputable articles, books, etc.).

The current research reached saturation by completing ten interviews, but two more were conducted to ensure more certainty. In this regard, Lincoln and Goba's (1985) four judgment criteria were used to provide the validity of the research findings. The following actions were taken: First, the text of the conducted interviews was implemented and given to the interviewees along with the questions to know their reaction at this stage; 2. To be transferable, the fat description method was used. All the research details, from sampling to data analysis, were thoroughly described. Moreover, finally, 4. To check the findings' reliability, all the interviews were recorded and fully implemented, the findings were reduced through short notes and summarizing, and critical concepts were extracted by observing the coded principles.

Table 1. Calculation of reliability between two coders

Number	Interview code	Total	Points of agreement	Non-agreement	Agreement percentage
1	6	51	20	11	%78/43
2	10	54	19	16	%70/37
3	12	31	11	9	%70/96
4	**total**	**136**	**50**	**36**	**%73/52**

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Table 2. Coefficient of agreement in decoding by research

Number	Interview code	Total	Points of agreement	Non-agreement	Agreement percentage
1	4	30	25	5	%83/3
2	9	31	24	7	%77/4
3	8	25	23	2	%92
4	**total**	**136**	**72**	**14**	**%83/7**

As noted in Tables No. 1 and 2, to ensure reliability, two methods of agreement between two

coders (repeatability index) and decoding reliability were used, and reliability was confirmed in both cases. As mentioned before, the 7-step method of (Habibi-Kaleybar et al., 2020) was used to analyze the findings.

Research findings

As mentioned before, to analyze the findings from the interviews, the seven-step Claizzi approach was used in the first step; all the interviews were read several times and then turned into writing; in the second step, sentences and concepts were used. Meaningful and related to the discussed phenomenon were extracted separately from the participants. In the third stage, an attempt was made to extract a meaningful concept from each phrase that indicates the participant's thinking. An example of the analysis of the mentioned steps can be seen in Table No. 3

Table 3. Sample from ID Phrases Key with Use from Colaizzi's (1978) method

Key phrases	The text of the interview
- Inadequate preparation of the instructor to implement learning processes -teaching in the electronic environment - Inadequate knowledge and skills of learners in how to search for materials in databases and other software related to research - Inadequacy of necessary facilities for students to participate in class at home - Insufficient attention to ensure the understanding of the topics raised by the students due to the lack of opportunity for questions and answers - Inadequate adaptability skills of learners toward learning in the electronic environment - Inadequate comprehensive skills in entering and using the electronic environment	We only had a few challenges at the entrances. We may have doubts about the level of preparation of students and professors, which were resolved in the last three semesters. If I had conducted this interview with you two semesters ago, I would have said there are many entrance challenges. A part of a good teacher's teaching depends on his readiness to enter these systems. It means that our input, whether a professor, a student, or a program, must have the same minimums. Nevertheless, we are not facing severe weaknesses and challenges. Professors and students are facing these issues. For example, the student can only access or use some of the facilities and capacities of the system. For example, save, keep, download, transfer, and listen again. Because the entrance preparations were few, it was also a challenge, but now the challenges are becoming less. When discussing the correct teaching-learning process, we may need more facilities to manage that space when we want to combine capacities. Of course, it does not mean that it does not exist at all; no, this can also create an atmosphere of deep thinking and learning like face-to-face classes, but in this context, interactivity, especially in undergraduate courses where the number of children is more, the opportunity to address children's questions and whether their learning is done correctly or if they are facing weaknesses. However, let us create a platform where students can learn from different sources and places. We must equip students with search engines. For example, in human resources, we should provide the space for him to read four new theories, not that we should provide all the theories in terms of knowledge or cognition.

Then, in the fourth step, the key terms were carefully studied, and after comparing and removing duplicates, the primary themes were divided into ten themes. Then, in the subsequent phases, the main themes were placed according to the relationship, using a systematic approach, and were classified into three main categories: educational inputs, processes, and outputs. In the final step, the identified themes were sent to the participants to validate the research results, and necessary corrections were made based on the feedback received. The main concepts, basic and organizer themes are listed in Table 4.

Table 4. The main concepts, basic and organizer themes of challenges related to teaching and learning in the digital environment

Interview sources	Frequency	organizer	Basic themes	Main concepts
M1M 3 M4M 6M 7 M8M 9M 1	8	input	Challenges related to learner	Inadequate knowledge of learners towards the electronic environment, insufficient adaptability skills of learners towards learning in the ,electronic environmentadequate knowledge and skills of learners in how to use technology, insufficient attention of learners to the importance of electronic education, insufficient ,motivation of learners to learn adequateknowledge and skills inclusive for learning in the electronic environment, reducing the level of concentration of learners in the electronic environment, inadequacy of necessary facilities to participate in class at home, not taking classes seriously and increasing the rate of absenteeism of students, lack of attention of learners to the importance of acquiring digital literacy, insufficient familiarity of learners ,related software-with Research adequateknowledge and skills of learners in how to search for materials related -in databases and other research software, insufficient general preparation to receive materials in the electronic environment, insufficient attention of learners to doing homework during the semester, insufficient attention of learners to Questioning skills and negative attitude of learners towardsE-learning

M1M 2 M3M 4M 5 M6M 7M 9 M10M 11 M12	11	Challenges related to the teacher	The inadequate skill of lecturers in producing electronic and multimedia content, insufficient mastery of lecturers in how to use technology in the teaching process, insufficient motivation of lecturers to work in the electronic environment, the insufficient familiarity of lecturers with new and relevant approaches of teaching in an electronic environment, the insufficient familiarity of lecturers in using From the electronic content production software, the lecturer's insufficient knowledge of the features of the learning management system, the lecturer's insufficient preparation to implement the teaching-learning processes in the electronic environment, the insufficient knowledge and skill of transferring content in the electronic environment, the existence of challenges related to the change of teaching approaches in the experienced lecturers. Inadequate media and digital literacy of the teacher, the teacher's ignorance of the level of student attention in the electronic class, insufficient attention to the individual differences of the learners in the electronic teaching-learning process, the insufficient mastery of the teacher regarding how to evaluate the learners in the electronic environment, insufficient familiarity with the method Multimedia and self-learning content, teachers' low willingness to do group and team activities, negative attitude of teachers towards e-learning, insufficient attention to ensure the understanding of the material presented by the learners due to the lack of opportunity for questions and answers.

M3M 4 M6M 7M 8 M9M 10 M11M 12	9	(Challenges related to the technology system (software, hardware, infrastructure	Volume limitation for uploading in the university's e-learning system, the problem of downloading files from the university's e-learning system, insufficient access to appropriate and up-to-date software, lack of digital library, insufficient access to YouTube educational resources due to the presence of a filter, the use of some internal software that They often have defects, insufficient facilities to implement the process of memorizing learning in the university management system, insufficient equipment necessary to communicate effectively in the electronic environment, inconsistency between audio and video in electronic classes, insufficient tools and equipment required to participate in electronic classes. Inadequate access of learners and teachers to appropriate hardware, insufficient access to appropriate software for evaluating learners, holding an electronic class without using visual and interactive facilities due to insufficient internet speed, insufficient internet speed, insufficient infrastructure necessary to implement the education process in the environment electronic, unbalanced distribution of technological facilities in all parts of the country, insufficient access to the system due to electronic management due to the instability of the electricity situation, insufficient number of available servers, limitation in bandwidth, insufficient facilities for sharing information in the electronic environment, insufficient space suitable in the learning management system for the purpose of teacher and inclusive interaction, instability in accessing the learning management system due to insufficient internet speed, insufficient access to suitable software for electronic content production, lack of sufficient attention to technical and pedagogic principles and standards in electronic content production

M1M 2 M3M 4M 5 M6M 7M 8 M9	9	Financial and information resources	Insufficient attention to the degree of suitability of educational regulations and regulations with the electronic environment, insufficient with the attention to compliance requirements and standards necessary to enter the electronic environment, insufficient attention in the design of appropriate instructions and guidelines to familiarize the stakeholders with the electronic environment, insufficient attention to the adaptation of approved educational topics to the electronic approach, insufficient attention to formulating the requirements and standards of student admission by the electronic approach, insufficient attention to complying with the -requirements contained in the e learning system approved by the Ministry of Education, lack of appropriate guidelines and instructions for the production of electronic content. The high cost of maintaining equipment and hardware, the high cost of access to the appropriate Internet, the allocation of insufficient financial resources for the implementation of electronic education, the insufficient universal access to the appropriate hardware due to financial problems, the insufficient allocation of financial resources for the provision of the necessary facilities and equipment for the implementation of the teaching and learning system. In the electronic environment, producing electronic consuming and -content is time .expensive

M2M 3 M4M 5M 6 M7M 8M 9 M10M 12	10		Ethical Considerations in the Digital Environment	Increasing the amount of plagiarism, violation of privacy and intellectual property rights, increasing the production and dissemination of invalid information, increasing the number of adverse effects resulting from inappropriate use of the electronic environment in the education system, increasing the -of-amount of cheating in end semester exams, spreading scientific dishonesty, deception, and information exchange, disregarding the copyright law, increasing the -non production and dissemination of scientific electronic content and Unethical in the electronic environment, problems related to .content copyright
M1M 2 M3M 4M 5 M6 M7	7		University culture	The resistance of some learners to studying in an electronic environment, the Challenge in adapting from a face-to-face environment to an electronic environment, insufficient information about the benefits of E-learning, the presence of negative beliefs about E-learning in senior university administrators, insufficient attention to culture-building regarding attracting attention and learners' belief in authentic learning, lack of resources and multimedia content, the existence of incorrect attitude towards E-learning in the university

M1M 2 M3M 4M 7 M8M 9 M10M 11 M12	10	Process	Classroom leadership	The teacher's use of traditional teaching methods with emphasis on the lecture method, the teacher's lack of attention to the students' skills in the electronic teaching-learning process, insufficient attention to the continuous evaluation of the realization of learning outcomes during the semester, the existence of a challenge in establishing proper communication with the learner, insufficient attention of the lecturer to create an interactive environment with emphasis on creativity and innovation in the teaching and learning process, insufficient attention of the lecturer to design suitable mechanisms for the formation of deep learning, insufficient attention of the lecturer to allocate enough time to answer As if to pervasive questions and ambiguities, the teacher's insufficient use of available facilities and equipment to realize learning, the teacher's insufficient attention to creating effective relationships between learners, the teacher's insufficient attention to motivating students in order to increase the participation in the learning process, the teacher's insufficient attention to transfer Subjects from different angles, presentation of course materials without regard to the level of applicability and increasing comprehensive skills, insufficient order in the continuous holding of classrooms by the teacher, insufficient comprehensive access to the teacher to solve problems, insufficient use of the teacher to provide concrete and practical examples. In the process of teaching and learning, insufficient attention of the instructor to the use of a team and group approach in performing the tasks and assignments of the learners, insufficient attention to the preparation of an educational scenario suitable for the electronic environment, insufficient attention to the production of interactive multimedia content, poor monitoring of the learning process of the learners in the electronic environment., the existence of disorganization and lack

				of coordination in the timely organization of classes, insufficient attention to the comprehensive evaluation of learners, the reduction of motivation of learners to learn due to the inapplicability of the presented content, lack of face-to-face interaction, insufficient interaction of learners with each other, insufficient interaction learner with the instructor, insufficient interaction between the instructor and the learner in an efficient manner, insufficient interaction of the learners with the content, the instructor's use of repetitive and outdated content, emphasis on final evaluation, failure to receive comprehensive feedback by the instructor, insufficient attention to diversity in the final evaluation (variety of questions), report, assessment), the irregularity of conducting tests, the incorrectness of the test method due to the system failure, insufficient attention to continuous evaluation in electronic education, the low importance of formative assessment, incorrect evaluation of learners, the inadequacy of the accurate and appropriate evaluation index in order to differentiate learners, Insufficient attention to the importance of updating electronic content, insufficient fit between the content produced and inclusive needs, using the recorded file of online classes as multimedia content.
M1M 2 M4 M8	4		Support system	Weakness in the online support system: Lack of sufficient support for learners during the teaching and learning process, insufficient attention to the need for academic and psychological support for learners, insufficient specialist and expert forces to support teachers and learners, insufficient access to IT. specialists and programmers to solve data center problems, insufficient access To the teachers to solve the problems, the lack of response from the educational experts

M4M 5 M7M 10 M11	5	output	Effectiveness of learning	Inadequate realization of skill-oriented, reducing the degree of realization of learning outcomes in the e-learning approach, insufficient interest of learners to continue their studies, the inadequacy of knowledge and skills received during education to be used effectively in the work environment, an insufficient realization of the degree of change in the knowledge, attitude, and abilities of the graduates. Inadequate impact of the amount of learning or knowledge received in increasing the role of graduates in industry and society, the inadequacy of the amount of learning of learners in recognizing challenges related to the specialized field, the insufficient skill of learners in understanding the realities and challenges in industry and society.

M1M 2 M3M 4M 6 M7M 9M 10	8		Satisfaction of internalstakeholders	The inadequacy of students' satisfaction with the teaching methods of academic staff members, Inadequate satisfaction of learners with the content provided during the study, and inadequacy of learners' satisfaction with improving the knowledge and skills received. There is a feeling of wasting time during the academic period, the insufficient level of satisfaction of the learners with the way the lecturers communicate in the electronic environment, the insufficient satisfaction of the lecturers with the way the university supports them, the insufficient satisfaction of the lecturers with the quality of the student's learning, the resistance of the lecturers to the use of new technologies in the classroom. Inadequate satisfaction of teachers with the state of easy access to the learning management system, objection of teachers to the inattention of those in charge to the importance of empowering the teacher, insufficient motivation of teachers to the electronic environment due to physical and mental injuries, lack of mechanisms to encourage learners to learn continuously; Inadequate motivation of learners towards the electronic environment due to some of them suffering from mental, psychological and social problems

As mentioned above, the analysis results identified ten main challenges, which are discussed below.

1. Challenges related to learners

Considering that learning in the digital environment is an inclusive approach should be taken towards learners. Have an essential role in realizing its effectiveness. In other words, success in implementing the teaching-learning process in the online environment requires learners with special skills who can actively participate in this new learning approach. Hence, the inadequacy of their abilities and skills is one of the most critical challenges of the teaching-learning system. In this regard, most of the participants also expressed in sentences such as: "The most important challenge related to the input of the E-learning system is the lack of knowledge of the learners regarding learning in the electronic environment (M1)", "In the E-learning system, lack of motivation and not taking the educational environment seriously by learners will reduce the effectiveness of learning (M4) ", "one of the essential challenges of the E-learning system is the resistance of the learners towards studying in the said environment due to the resistance to changing the way of learning and adapting to the electronic environment from the face-to-face environment (M4). "

2. Challenges related to teachers:

Teachers, as another essential dimension of the teaching-learning system, play a crucial role in the success of this approach and enhance the achievement of learning outcomes for students. Instructors need to have a mastery of specialized knowledge in this approach. Teachers create an environment where learners can recognize and develop their potential talents to recognize and improve their professional and personal abilities. The method takes steps. These changes will be made based on the desired characteristics of the teacher (Qorbankhani & Salehi, 2016). While memorizing learning in the e-learning environment, lecturers face challenges due to university policies, individual characteristics, Etc. In this regard, the participants stated: "Among the existing challenges is insufficient skill and knowledge in preparing and compiling educational content and educational packages by the teacher (M1) ", "Teachers' lack of familiarity with electronic education and insufficient digital literacy is also a challenge In the E-learning environment (M4)." "One of the most critical challenges in the E-learning environment is that the teacher needs to take electronic education seriously (M4).

3. Challenges related to the technology (software, hardware, infrastructure)

Training courses in the electronic environment must equip the learners with tools and facilities, user-friendly graphic interfaces, Etc. Environment (Mohmandoost, 2019). Learners should be provided with this. According to the results of the research on the higher education system, one of the main challenges in the field of electronic courses that most of the participants in the research mentioned are the issue of low internet speed, infrastructure problems, and problems related to the university's E-learning system, which is severe damage to the Correct is the teaching-learning process. In this regard, the participants in the research have acknowledged the following: "One of the most critical challenges faced by learners and teachers was holding an electronic class without using good video and interaction facilities due to the insufficient speed of the Internet (M12)." "In the discussion of tools and equipment, we faced many software and hardware problems because educational production content in the electronic environment, we needed ample storage space (M6) ", "The inadequate fit between the produced content and inclusive needs is one of the challenges related to multimedia content in the E-learning environment (M8) ".

4. Challenges related to financial and informational resources

Conducting training courses in e-learning demands financial resources, which could pose a challenge for any e-learning organization and network users to provide fully. Participants expressed concerns regarding the need for more allocation of financial resources by their organizations' management for implementing e-learning. Another challenge that organizations encounter is the high costs associated with setting up and maintaining equipment. Additionally, there are challenges related to hardware and support for educational packages, exacerbated by financial constraints (M4) ", "Inadequate universal access to appropriate hardware due to financial problems is also one of the most critical challenges (M8) ".

5. Challenges related to ethical considerations in the digital environment

According to its characteristics, each educational space requires a set of rules and regulations related to observing professional ethics that consider the appropriate frameworks for that space. The academic space in the electronic environment is included. Learners' and teachers' inadequate attention to these regulations can cause many challenges in e-learning. Among the ethical challenges mentioned by faculty members include the spread of scientific dishonesty in the electronic space, the spread of academic plagiarism, the increase in the production and dissemination of invalid information deception, the violation of privacy and intellectual property rights, etc. In this regard, the participants stated: “I believe the most critical challenge in the e-learning environment was ethics-related issues. Issues such as the spread

of scientific dishonesty, digital fraud, and disregarding the copyright law were among the most critical challenges in the E-learning environment (M4)." "The Challenge I observed is related to the issue of fraud. Many students received help from their family and friends during the exam (M12) ".

6. Challenges related to university culture

Culture is a fundamental dimension and infrastructure that affects the learning process at different levels and in other ways, especially design, application, and evaluation (Masoumi & Masoumi, 2012).In the e-learning approach, there needs to be a culture of e-learning and belief in the E.L. method by the learner, professor, and the whole system (Mohamandoost, 2018). In the field of challenges related to the e-learning culture, faculty members have pointed to issues such as the problem of transfer and transfer of face-to-face Education to electronic and non-institutionalization or insufficient acceptance of education in the electronic environment in society. In this regard, they acknowledged that: "one of the most critical challenges is the Challenge of non-acceptance. The E-learning environment is efficient in the process of teaching and learning by teachers, learners, and the learners' families (M4) ", "the insufficient effort of creating a culture in line with E-learning and its consequences is considered one of the most critical challenges (M5) ".

7. Challenges related to classroom leadership

Classroom leadership is when the teacher tries to motivate the students to do the tasks. The most important components related to the said process are Paying attention to the Kurds at the edge of the thigh, Using the correct teaching method, Using appropriate methods to measure results, Studying, editing, and presenting The scenario and proper teaching by the teacher, paying attention to the importance of interaction and participation of learners in the classroom. Studies show that if this process is challenged, the e-learning system will have problems and be ineffective for learners. In this regard, the participants in the form of sentences such as: “Teachers still use traditional learning methods to teach students; The use of these methods due to low efficiency significantly reduces the motivation of learners to learn (M1) ", "Learning in the E-learning environment has become a radio-oriented approach in such a way that the teacher has to create an interactive environment, and It is not essential to take into account the individual differences of learners (M2) ", "In the electronic environment, the teacher cannot fully deal with the problem of formative evaluation of learners due to too many connections and allocate time to question and answer (M7) ", "Challenge Another is the existence of disorder in the holding of classrooms; the entry and exit of teachers and learners in the e-learning environment is often faced with disorder and disruption (M12) ", "The problem I have encountered in the e-learning environment is the problem of communication with the instructor and other learners because the electronic environment was such that there was no video and face-to-face communication (M3) ",
"When the instructor was present at the university, there was video communication, and the learners could go to the instructor to solve problems go and ask their questions, but now this is not possible in e-learning (M12) ", "Due to the continuous interruption of the system, the lecturers were facing problems such as cheating and injustice in conducting tests and measuring the learning of the students (M9) ", "During the training course, the teachers could not demonstrate the high importance of continuous evaluation due to software and hardware problems, so their emphasis was more on the final assessment have pointed out the importance of the mentioned process (M8) ".

8. Challenges related to the support system

Course support includes educational support, information resources, communication support, and support related to technology and access.In this regard, the participants have stated: "Another challenge of the process is the lack of proper support during e-teaching (M4) ", "Among the challenges of the psychological field is the lack of academic and psychological

counselling (M4) ", "There is no coordination between the support department, the instructor, and the teacher (M8)." "Another point is that in the e-learning environment, The importance of professional support and service personnel is not enough. In the mentioned environment, we need lecturers, IT. specialist programmers, and support specialists (M4) ".

9. Challenges related to learning effectiveness

The effectiveness of an educational system means that its final outputs are desirable compared to the system's goals (Bazargan, 2013). In this regard, the participants stated: "Sound output is the result of good input and an efficient process. When the process has problems naturally, the output also faces problems; for example, the graduate received little information in the learning environment, and this little information cannot cover the individual's needs outside the learning environment (M11) ", "a challenge observed in society is that learners acquire knowledge in the learning environment that they cannot use in the future and the work environment. The knowledge learned is impractical and does not lead to skill (M12) ".

10. Challenges related to the satisfaction of internal stakeholders of the university

What is expected in the outputs of the educational system is that the lecturers can provide an accurate report of the learners' progress at the end of the course. However, in the electronic environment, university faculty members have faced a few challenges, including the teacher's incorrect and unrealistic understanding of comprehensive academic progress and insufficient reporting of academic progress due to the uncertainty of students' answers to the exam. In this regard, Participants have stated that: "Regarding the challenges related to the output, the teacher does not have a proper understanding of the student's academic progress (M9) ", "The progress report The student has difficulty in the exam due to the uncertainty of the student's honesty (M10).

Discussion and conclusion

As previously mentioned, identifying the challenges related to the learning-teaching system plays a crucial role in learning effectiveness. Thus, the current research identified and analyzed these challenges using a systemic approach.The analysis of the findings led to identifying 142 main concepts classified into the three main dimensions of the teaching-learning system (input, process, and output). The challenges related to each dimension have been investigated and discussed. One of the most important dimensions of the educational system in the digital environment is the learner because, according to the shift in the learning approach from teacher-centred to learner-centred, they are at the center of all teaching-learning processes. According to the opinion of the participants, insufficient knowledge, skills, and motivation to study in the digital environment, along with a negative attitude towards E-learning, decreased learner concentration due to the variety of materials and resources, insufficient adaptability of learners to work in the electronic environment, and insufficient commitment to active participation in classrooms, cause serious obstacles to achieving learning goals. In this regard, Nare et al. (2019) believe that insufficient mastery of learners and technology, lack of time management and self-confidence, inadequate information and communication technology literacy, and reduced self-efficacy are the main obstacles to learning success in the digital environment. Additionally, Ebrahimi et al. (2020) point out issues such as reduced responsiveness and inclusive responsibility, insufficient desire to interact with other learners, and neglecting the importance of participation in the learning process as critical issues in universities for optimal use of new learning approaches. In line with the results of the present research, Qalandari et al. (2019) also believe that the absence of learner readiness and willingness to participate in the electronic environment, understanding the usefulness and ease of use of the environment, leads to resistance among the main stakeholders of the university, including teachers, towards new technologies in classroom management, considering it a threat to diminish their role. In this regard, the

teacher is the second important dimension in the present research. Research shows that since instructors play a crucial role in developing e-learning systems, it is essential for them to have the necessary competencies to enhance learning effectiveness in the digital environment. However, the results of the present research indicate that the lecturer's insufficient skills in preparing and editing content suitable for the digital environment, teachers' inadequate skills in applying new technologies, underestimating the necessity of working in the digital environment, most teachers' insufficient familiarity with new teaching approaches, teachers' lack of skills in producing multimedia content, and teachers' inadequate attention to individual differences and students' needs in the teaching process are among the most significant obstacles to the development of this approach. Confirming this aspect of the research findings of other researchers challenges such as a negative attitude towards learning in the digital environment, the necessity of teachers' required competencies, creating a sense of isolation for teachers in the digital environment, teachers' inadequate skills in selecting and using appropriate media, and the weakness of teachers in effectively utilizing virtual space for educational content production, rather than training experienced teachers, have been highlighted. This part of the research aligns with the findings of Mansouri et al. and Ebrahimi et al. The third critical dimension is the technology system. Technology refers to tools, techniques, and processes for creating, designing, developing, and maintaining products, systems, and services. The hint is that improving precision and increasing interest follows various organizations that also face challenges in using technology, such as insufficient bandwidth in universities, inappropriate technical infrastructures, unstable internet speed, inadequate access to laboratories in the digital environment, lack of hardware facilities, insufficient access to suitable software, and inadequate tools and equipment for participating in online classes. In this context, Montazer et al. (2019) discuss the challenges and issues related to developing electronic education and learning during the pandemic. COVID-19 includes inadequacy of hardware and software equipment and facilities, lack of necessary infrastructure, digital divide, and significant educational inequality, among other challenges mentioned. The findings of this part of the research, along with the results of Ebrahim Yemi et al. (2021), Qalandari et al., Birmipour and Etchersh (2019), Zalt et al. (2021), Almasi et al. (2021), Almaya et al. (2020), Aini et al. (2020), and Yesenva et al. (2019), all point in the same direction. Financial and information resources represent the fourth fundamental dimension related to inputs in education. Financial resources in education refer to providing educational services to learners. These resources are allocated to present education with quality and effectiveness, which may pose challenges for organizations, such as high costs of maintaining equipment and hardware, inadequate financial resources for implementing e-learning, lack of universal access to suitable hardware due to financial constraints, and insufficient allocation of financial resources for providing the necessary facilities and equipment for implementing the teaching and learning system in the digital environment. In alignment with the current research, Ebrahimzadeh et al. will focus on technology; hence, their learners may drop out of school automatically. Qalandari et al. (2019) also highlighted the cost of multimedia learning materials, start-up expenses, and limited budgets in their research. The findings of this study are consistent with the results of Abray Mazadeh et al. (2021), Mohammadhasani. (2022), Almaya et al. (2020), and Aini et al. The fifth fundamental challenges related to inputs is ethical considerations in the digital environment, which include the increase in plagiarism, violations of privacy and intellectual property rights, the rise in production and dissemination of invalid information, the escalation of negative effects from inappropriate use of the electronic environment in the education system, the surge in cheating during end-of-semester exams, and the proliferation of unscientific and unethical electronic content in the digital realm. This Challenge is consistent with the research findings of Qalandari et al. (2019). University ranking is also considered the sixth fundamental theme.

Culture in the e-learning environment encompasses values, beliefs, behaviours, practices, and interactions observed in the e-learning process. It involves respecting the privacy of learners and teachers in cyberspace, fostering critical thinking skills in learners, enhancing communication and social skills online, developing ICT skills, acknowledging cultural and individual differences online, promoting positive interactions and cooperation in the virtual realm, fostering life and career skills in the digital space, cultivating a culture of participation and engaging learners in the e-learning process. The final Challenge related to educational input, from the perspective of university faculty members, pertains to challenges associated with e-learning culture. These challenges include some learners' resistance to studying in an electronic environment, the transition from face-to-face to online learning, inadequate understanding of the benefits of e-learning, and negative beliefs about e-learning among managers. Mehmandoost et al. (2018) identified challenges related to learner culture, lack of culturally appropriate learning environments, and attitudes toward e-learning; these findings align with the research results of Qalandari et al.(2019).

The second dimension of challenges identified in the teaching-learning system is the process, with the first fundamental theme extracted being challenges related to classroom leadership. The research participants highlighted various challenges, such as the lecturer's insufficient focus on creating an interactive environment emphasizing creativity and innovation in the teaching and learning process, inadequate design of mechanisms for fostering deep learning, inadequate time allocation by the lecturer to address comprehensive questions and uncertainties, presentation of course materials without considering applicability levels and enhancing comprehensive skills, lack of continuity in conducting classes by the instructor, underutilization of available facilities and equipment by the instructor for effective learning, and inadequate emphasis by the instructor on building meaningful relationships among learners. Montazer et al. (2019) expressed various criticisms of the quality of current e-learning systems, including the potential for an education-oriented rather than a learner-centred system. In their research, Qalandari et al. (2019) highlighted challenges such as lack of feedback, learner engagement, learning models, presentation flexibility, real-time feedback, technical and learner issues, learner support, and computer anxiety. Heydaripour et al. noted the need for a specific strategy formulation in their research. This Challenge is in line with the research results of Qalandari et al. The second fundamental theme related to the educational process, from the perspective of university faculty members during the challenges of the coronavirus pandemic, pertains to the support system. Through analyzing and examining the interviewee quotes, the researcher concluded that teachers encounter numerous challenges, such as lack of support and inadequate assistance for learners during the teaching and learning process, insufficient attention to the necessity of academic and psychological support for learners, shortage of specialized and expert personnel to provide support for teachers and learners, and inadequate access to IT specialists and programmers to address data center issues. This Challenge aligns with the research findings of Sadegh Lo (2021), Qalandari et al. (2019), Almahas Y et al. (2021), Aini et al. (2020), and Nare et al. (2019).

The third dimension of identified challenges is the output, with the primary theme related to challenges concerning learning effectiveness. Effectiveness in learning signifies the success rate of an educational institution in enhancing learners' knowledge, abilities, and skills. The analysis of the findings in the current research led to the identification of some significant challenges, such as inadequate realization of skill-oriented education, decline in achieving learning outcomes through e-learning, lack of learners' interest in continuing education, inadequacy of applying knowledge and skills acquired during education in the workplace, insufficient change in students' knowledge, attitudes, and skills, limited impact of knowledge acquired on graduates' roles in industry and society, insufficient learning among learners to recognize specialized field challenges. Lastly, the final identified theme related to educational

output is the challenges concerning the satisfaction of key stakeholders in the e-learning system. From the perspective of faculty members, these challenges encompass various aspects, such as the inadequate satisfaction level of learners with the teaching methods used by teachers, insufficient content satisfaction during studies, lack of satisfaction among learners in enhancing their knowledge and skills, a sense of time wastage during studies, unsatisfactory communication between lecturers in the electronic environment, inadequate support from the university for lecturers, dissatisfaction among lecturers with the quality of student learning, and learners' resistance to adopting new technologies in the classroom. The need for more learners' satisfaction regarding easy access to research findings, as highlighted by Ebrahimzadeh et al. (2021), also underscores the issue of learner dissatisfaction with e-learning.

Practical suggestions

Based on the results and findings of the research, the following practical and research suggestions are presented:

- Modify and maintain the infrastructure.
- Allocate adequate bandwidth to professors and students for this purpose.
- Develop effective software for universal use.
- Systematic training and orientation are required for professors and students before the start of each semester.
- Create and provide standardized teaching materials to faculty.
- Promote the culture of e-learning in society.
- Establish a platform for enhanced interaction, improved content quality, and better teaching.
- Conduct exams in person or online using software that cannot be bypassed.
- Place greater emphasis on evaluations throughout the semester in the teaching and learning system and implement continuous assessments.

Research limitations

Any research may encounter limitations during fieldwork and study, sometimes impacting the results. The following limitations can be identified in this research: the most significant challenges related to the teaching-learning system in the online environment were identified from the perspective of lecturers while incorporating the opinions and suggestions of students, who are critical stakeholders of the university, not only enhances educational effectiveness but also boosts the achievement of learning outcomes and fosters a positive learning experience for them. Therefore, researchers in this field are advised to consider this aspect in future studies.

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