Doi: 10.30473/IDEJ.2022.63811.1100 ISSN: 2588-4476

Iranian Distance Education Journal

Vol. 3, No. 2, (New Series) Summer-Autumn 2021 (P 16-31), Payame Noor University

Original Article

Online-only Learning Challenges in Higher Education in COVID-19 Era: A Research Synthesis

Farhad Seraji*[1], Hamed Abbasi Kasani[2], Solmaz Aghazadeh[3], Saied Sharifi Rahnamoo[4], Rasool Bakhtiari[5]

1. Full Professor of curriculum, Department of education, Bu- Ali Sina university, Hamedan, Iran.
2. Ph.D of ICT and higher education, Department of Education, Shahid Beheshti University, Tehran, Iran.
3. Ph.D candidate of TEFL, Department of English Language and Literature Shahid Beheshti University, Tehran, Iran.
4. Ph.D. candidate in curriculum, Department of Education, Bu- Ali Sina university, Hamedan, Iran.
5. M.S in curriculum, Department of Education, Bu- Ali Sina university, Hamedan, Iran.

Received: 2021/06/22 **Accepted:** 2021/10/22

Abstract

The present study aimed to identify the challenges of online- only system in the era of COVID-19. The qualitative research approach and the research synthesis method were adopted. The statistical population of the study included the research studies conducted during the COVID-19 in the field of e-learning system challenges which were collected from Scopus, Science direct, Eric, ResearchGate, and Google Scholar databases via using specific keywords. A total of 120 studies were selected and reviewed. After several screening stages among these studies, 47 study units were selected and reviewed based on their title, abstract, and research content, respectively. Research data were collected from qualitative analysis of the studied documents. Content analysis method was employed to analyze the research data. Analysis of the data revealed that the e-learning system in the COVID-19 era has challenges in twelve factors related to students, teachers, and managers which include ICT access and usage, studying and teaching from home, e-learning skills, content quality, teaching method, research activities, psychological factors, learning activities, evaluation, programs and policies, macro-social factors, and support.

Keywords

Challenges, online- only system, COVID-19, teachers, students, managers.

Introduction

With the spread of Coronavirus, most universities immediately shut down their face-to-face classes and changed their education to online-only. With regard to this imposed change, universities did not have enough time to plan, provide infrastructure, and train teachers and students. In the time before Coronavirus, however, some universities had shifted to forming blended learning environments to make the most of ICT capabilities, thereby increasing the quality of student learning and facilitating access to higher education. These universities where the teachers and students had already experienced blended learning and had the necessary infrastructure such as servers, software programs, LMS, and virtual classrooms, smoothly shifted from face-to-face to e-learning system, confronted fewer challenges and the existence of programs, strategies, and infrastructures assisted them to increase their e-readiness.

Universities, like any other organizations, need programs to electronicize their educational and administrative processes in order to enhance their e-readiness and technology acceptance in organizational, pedagogical, technological, and social dimensions. E-readiness refers to conditions and factors the quality of which should be ensured by universities prior to implementing e-courses and efforts should be made to promote them during implementation (1).

*Corresponding Author: fseraji@basu.ac.ir

Such efforts can contribute to the dynamic and complex interaction between the four dimensions and provide learners with an effective learning environment in the context of technologies (2). In e-readiness models, the social dimension refers to macro-social beliefs, general culture of the society, economic structures, cultural background, and role of institutions, families, and peers in the effectiveness of IT and the way it is used. The presence of these factors in a community helps to internalize abstract norms, gain peer support, as well as the support of reference groups for the development of online learning. (3,4,5).

Organizational dimension refers to policies, strategies, programs, cross-sectorial coordination, budgeting, creating the structures and systems required for content development, technology development, teacher training, and student preparation (6). Alshaher emphasize the importance of organizational dimension to 7S which includes strategy, structure, system, style/culture, staff, skills, and shared value as dimensions of universities' e-readiness from the organizational dimension. Universities go through three steps of awareness/exploration, adoption/early implementation, and mature implementation to organizationally integrate ICT with their curricula(7). Universities which have not yet made any clear and precise decisions and actions in terms of strategies, structure, and support are in the awareness/exploration phase. Universities which have made general decisions about the strategies and structures and support developments are in the adoption/early adoption/early implementation phase, and universities that have made specific decisions and have taken the necessary measures to determine the goals and policies, and create the structures, procedures, and support are in the mature implementation stage. Research shows that most universities are not organizationally prepared enough to launch blended learning courses (8). The pedagogical dimension refers to the extent to which educational principles are applied in the design and implementation of online curricula. Providing self-paced, multimedia and interactive contents, designing authentic and learner-centered learning activities, teachers' use of dialectic, interactive, participatory teaching methods, conducting formative evaluation and providing students with feedback and ongoing support are among the pedagogical components of online learning, the use of which is helpful in the preparation of university curricula and professional development of teachers in these areas (9).

Technological dimension is focused on supply and update, software, hardware, connectivity, security, flexibility of the system, technical skills and support, cloud computing, and data center (10). The quality of these services plays an important role in timely access to technical facilities, content development, training teachers and supporting students and assists the audience in understanding the usefulness of the e-learning system (11,12). Therefore, universities should strive to improve their IT infrastructure services, system quality, information quality, service delivery quality, and perceived usefulness. Kanwal and Rehman indicated that students' perceived usefulness of online learning system can be predicted based on system characteristics(13).

Hence, paying due attention to each of these four dimensions and striking a balance among them, along with creating e-readiness, can help to create an effective learning environment. However, factors such as administrative issues, lack of social interaction, weakness of academic skills, lack of technical skills, lack of learner motivation, lack of time and support for studies, internet access and cost, and technical problems may create barriers for universities to start e-learning courses (12). With the outbreak of Coronavirus, universities have focused on the technological dimension. Although the provision of technology is a prerequisite for launching an online learning environment, the provision of technology must be in line with the social, pedagogical, and individual requirements of teachers and students. This inconsistency has created many challenges in shifting from face-to-face education to online-only education at universities, some of which are related to managers, teachers, and students. Thus, the purpose of this study is to identify the challenges of online-only Learning in universities during COVID-19.

Related Research

Success of universities in implementing online learning is influenced by variables related to

e-learning and technology acceptance in them. Students' learning experiences in the online learning environment as the main goal of the online learning system is formed as a result of the interaction of various social, organizational, technological, and pedagogical factors. In other words, success of universities in improving the quality of student learning is affected by macro-social support, decisions and programs of managers, and students' and teachers' competencies. Students' learning experience in the learning environment is affected by students' and teachers' skills and motivations and the programs and goals of managers. By taking the necessary measures, managers can improve universities' e-readiness and provide the conducive conditions for technology acceptance among students and teachers, thereby improving the possibility of achieving learning goals and increasing the satisfaction of students and teachers. E-readiness of universities has been studied in various researches and several factors involved in it have been identified. Selim considers students' and teachers' individual characteristics and IT and support services as important factors in online learning acceptance and argues that teachers' understanding of technology and their interest in using technology affects their teaching styles, encourages students to interact in the online learning environment, and is positively correlated with students' acceptance of e-learning(14).

Taat and Francis pointed out that usability, lecturer characteristics, system quality, the information provided, and available technical support are the key factors influencing the acceptance of e-learning among students(15). Also, Ansong et al found that IT infrastructure, perceived ease of use, organizational compatibility, expected benefits, competitive pressure, educational partners, content of course, and e-learning curriculum are among the determinants of e-learning acceptance in universities. According to the results of the study, the students believed that technological context, environmental context, organizational context, and nature of course play an important role in technology acceptance. On the other hand, the teachers perceived technological context, environmental context, and nature of course to affect technology acceptance. Furthermore, technological context and organizational context were important factors in the acceptance of technology from the perspective of managers (1). Similarly, Keramati et al observed that more readiness in the four factors of e-learning, namely, student, teachers, IT, and managers' support in terms of technology, organization, and pedagogy helps to increase the efficiency, success, and progress of teachers and students(12). Ghazal, Al-Samarraie and Aldowah (2018) also maintained that the characteristics of students, teachers, system, classmates, course design, and organization affect students' perceived ease of use and usefulness of LMS, which in turn influences their satisfaction (16). Of course, e-readiness is a dynamic concept and a changing phenomenon that should be constantly monitored throughout the stages of pre-implementation, implementation and post-implementation of online learning and necessary measures should be taken to develop e-learning according to its quality and extent (17).The online learning system is of great benefit to students as it takes into account the decisions and actions of managers, and the knowledge, skills, and attitudes of teachers towards e-learning to help students' learning, satisfaction, and success. However, students need various skills to enter online courses, including active synchronous and asynchronous communication, self-motivation, time management, team building, lateral thinking, self-regulated, self-directed learning, problem solving, and critical thinking skills.

Cigdam and Yildirim identified 18 variables related to e-learning skills and divided them into five categories of computer/internet self-efficacy, self-directed learning, learner control, motivation for learning, and online communication self-efficacy(18). In order to measure the e-readiness of students to enter online courses, Pillay, Irving, and Tones designed a tool with an emphasis on four subscales of technical skills, computer self-efficacy, learner preferences, and attitudes towards computers(19) .

Rajagopal, Firssova, de Beeck, Van der Stappen, Stoyanov, Henderikx & Buchem have also shown that in order to learn in online environments, students need intercultural skills and attitudes,

networked learning, active self-regulated learner skills, media and digital literacy, autonomy-driven learning, interactive and collaborative learning skills in an authentic international environment, and open-mindedness. Therefore, students who are taking online courses for the first time need ongoing support to obtain the necessary preparations. Providing students with such support helps them to accept e-learning and increases their satisfaction and academic achievement as well(20). Kanwal and Rehman noted that computer self-efficacy, internet experience, and enjoyment and system characteristics are significant predictors of perceived ease of use in students(13). In a similar vein, Fındık-Coşkunçay, Alkış, & Özkan-Yıldırım found that students' enjoyment, subjective norm, satisfaction, and interactivity and control affect their perceived usefulness and ease of use of the online learning environment(21).

Jung and Lee pointed out that students' time management pattern, task persistence, and language match correlate with their growth in knowledge, attitudes, aspirations, and skills in MOOC courses. According to this, students' technological, personal, and social unpreparedness for online courses may bring a number of challenges for themselves, managers, and teachers(22)

Teachers constitute another component in the online learning system. They shoulder the main responsibility of preparing content, teaching and evaluating students, and in so doing, they must have a proper understanding of the technological capabilities of the online environment and the features of distance learning and how to interact with students. In order to teach online, teachers should be able to virtualize different parts of teaching and its processes by taking the characteristics and capabilities of that environment into consideration. Under these circumstances, their virtual teaching may be significantly different from their face-to-face teaching (23).

Proposing a framework, Kohler, Mishra & Cain place emphasis on the necessity of three types of pedagogical, content, and technological knowledge and the way teachers combine them today. According to their framework, in order to teach effectively in the online learning environment, teachers must understand the new theories, concepts, and findings of their subject matters and make use of the capabilities and features of the online environment for synchronous and asynchronous teaching, interacting with the student, continuous evaluation and providing feedback(24). The effectiveness of this framework for teaching in higher education has been confirmed by numerous studies such as Benson and Ward (25), Brinkley-Etzkorn (26), Mei, Aas, and Medgard (27), Scott and Nimon (28), and Thomas and Chukhlomin (29.(

Drawing on the framework of Community of Inquiry, Garrison emphasize that in online learning, teachers should use multimedia, interactive, and cognitive facilities and pave the way for social presence, teaching presence, and cognitive presence by creating opportunities for interaction, asking questions, complimenting, exploration, information exchange, brainstorming, instructional design and setting curriculum (30,31, 32). Therefore, in the online environment, teachers have multiple roles and tasks such as instructional designer, process facilitator, advisor/counselor, evaluator, researcher, content facilitator, technologist, manager, content expert, and materials producer (33, 34, 35).Bawane and Spector pointed out that teachers' pedagogical understanding is central to accepting other roles such as professional, evaluator, social facilitator, technologist, advisor, manager, and researcher in the e-learning environment(33) .

Highlighting the role of teachers' professional development in effective teaching, Farmer and Ramsdale maintained that teachers must obtain the necessary knowledge and skills in the areas of community and netiquette, active teaching/facilitating, instructional design, tools and technology, and leadership and instruction before entering e-courses(36). Coskuncay also indicated that online teaching is affected by social factors, technological factors, application characteristics and individual factors and these factors are related to the behavioral intention and perceived usefulness of the teachers regarding the application of LMS(37).

On the one hand, in the online environment, teachers are in interaction with students and their personal, technological, and psychological weaknesses in the online environment affect the

quality of their teaching. On the other hand, teachers' teaching is affected by the decisions and actions of managers with regard to technology supply, support provision, and regulation. In addition to these factors, teachers' knowledge, attitudes, skills, and technological characteristics about the online learning environment may influence the quality of their teaching and bring some challenges for the e-learning system.

Managers are considered as another component of the online learning system that facilitate the implementation of online learning in the time of Coronavirus via adopting strategies, creating structures, and providing support. Strategy includes specifying the purpose, advocacy, implementation, definition, and policy of the university in relation to e-learning; structure is related to the existence or creation of governance, models, scheduling, and evaluation; and support includes technical, pedagogical, incentives dimensions.

According to Bokolo et al, institutional structure, resource support, technology infrastructure, management strategies, and ethical considerations are key variables that positively predict administration readiness to diffuse Blended Learning initiatives in higher education(5). Porter, Graham, Bodily, and Sandberg suggested that clarity and defensibility of goals and clarity of policies from the strategic aspect and creating the necessary structures for ICT facilities, providing an evaluation system, creating the mechanism for professional development and operational planning as well as technological, pedagogical support, course load reductions, financial scholarships, tenure/promotion contribute to the development and acceptance of technology integration in education(38). Moreover, Porter and Graham found that availability of sufficient infrastructure, technological support, pedagogical support, evaluation data and an institution's purpose for adopting BL increase teachers' acceptance of Blended Learning. Therefore, managers of the online learning system have the task of defining and approving their strategies and programs for the development of online learning, providing the technical, human and support structure for students and teachers, and creating the necessary mechanisms to evaluate and improve the performance of teachers(39)

Hence, when the level of e-readiness in the technological, social, pedagogical and organizational dimensions of universities is low, the level of academic satisfaction and achievement of students will also be low and students, teachers, and managers will face more challenges. With the spread of Coronavirus and the shift from face-to-face learning system to online learning, most universities did not have enough opportunities to formulate strategies, policies, programs, provide training for teachers, and prepare students. This situation has led to many challenges for managers, teachers, and students in implementing online learning. Therefore, the main research problem of the present study is concerned with the challenges that universities face in providing only- online learning during COVID-19 era.

Research Questions

1. What are the student-related challenges in the only- online learning during the COVID-19 era?
2. What are the teacher-related challenges in the only- online learning system during the COVID-19 era?
3. What are the manager-related challenges in the only- online learning system during the COVID-19 era?

Research Methodology

The purpose of this study is to identify the challenges of only- online learning system during COVID-19. The present study is a qualitative research which employed a research synthesis method. Research synthesis aims to combine experimental research to make generalizations. (40). In order to conduct the research synthesis, the seven-step method was adopted which is

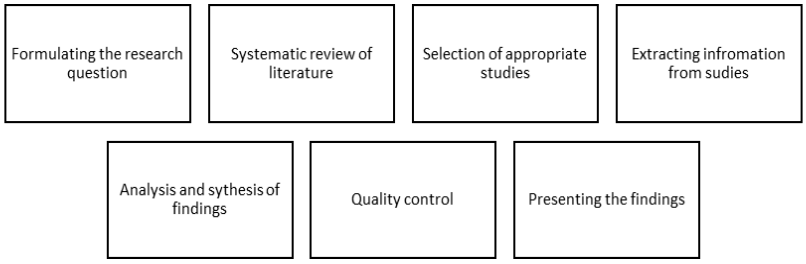

Figure 1. Illustrated in
Figure 1. Research synthesis steps in the present study

In the first step of implementing the research synthesis method, the main research question should be identified, which is already mentioned in the introduction section. In step two and Three Systematic Review of Literature and Selection of appropriate studies are collected from Scopus, Science direct, Eric, ResearchGate, and Google Scholar databases. Keywords which were used for searching the articles include: Challenges of / Barriers to / Threats of e-learning/ Online learning / Distance Learning / Virtual Learning + COVID-19.
after a comprehensive search in the databases, a total of 120 research studies were selected and reviewed. After several screening stages among these research studies, 47 study units were selected and reviewed based on their title, abstract, and research content, respectively.

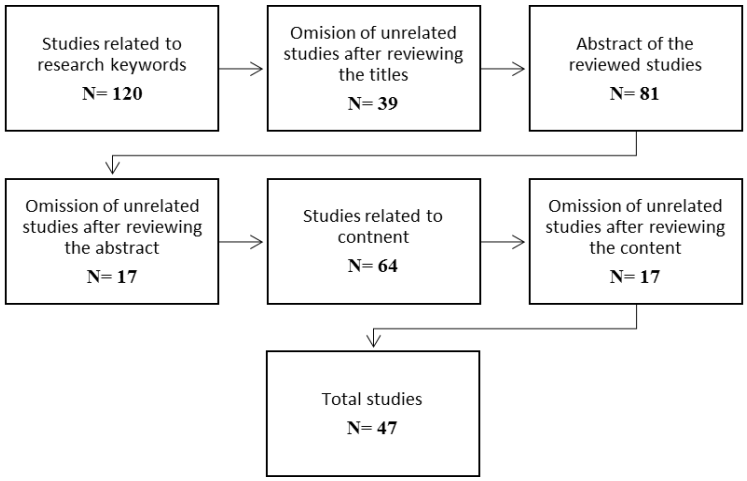

Figure 2. Steps for selecting, screening and organizing research

The CASP tool helps the researcher to determine the accuracy, validity, and importance of research studies through 10 questions. These questions focus on the following: research purposes; method rationale; research plan; sampling method; data collection; reflectivity; ethical considerations; accuracy of data analysis; clear expression of findings; and the value of research. Based on these 10 questions, the members of the research team, three of whom are also experts in this area, evaluated the extracted research studies and selected the items that had a good (31-40) or excellent (41-50) score on the 50-point scale. the 47 articles which were selected are presented in the appendix .

In step, Four and Five the text of the conducted research studies is considered as data which is documented exactly like the text of the interview. Therefore, conducting research through research synthesis method requires the qualitative content analysis of the past studies and the

findings of studies conducted in a specific area. One of the effective methods of qualitative analysis is conducting content analysis via coding method, which leads to recognizing and discovering the framework of existing patterns in qualitative data (41). Coding can be used when the researcher wants to analyze the data obtained from the analysis of events. Corbin and Strauss proposed three coding techniques: open coding, axial coding, and selective coding. In this study, Corbin and Strauss's coding methods were used to analyze the data(42).

In step Six, for regarding quality control, an effort was made to select the most appropriate study units based on indicators such as purpose, method rationale, research design, ethical considerations, clear expression of findings, research value, etc. In order to increase the generalizability of the findings, the inter-rater agreement method between the two coders was used and the agreement between the two coders was calculated to be 92%. Considering that this reliability value is more than 70, it can be said that the percentage of reliability between the two raters is acceptable in this study. Finally, in Step 7, the results of the previous stages are presented.

Research Findings

By analyzing the content of research-related documents, a total of 12 challenging factors were identified and the two challenging factors of ICT access and usage and evaluation were shared among students, teachers, and managers. The four challenging factors of teaching and learning from home, content, teaching method, and psychological factors were shared by teachers and students. The challenging factors of e-learning skills and research activities were related to students only, the challenging factor of learning activities was related to teachers only, and finally, the three challenging factors of policies and plan, macro-social factors, and support were related to managers. In the following section, the challenges of only- online learning during COVID-19 are presented for students, teachers, and managers, separately.

Table 1. Student-related challenges

Student-related challenges		Sources
Challenging factors	Challenging items	
ICT access and usage	Lack of financial support for students at university, high internet costs, lack of funding for providing students with the hardware and software that they need, lack of access to tools and software, time difference in connecting to the international student network, lack of access to electronic services, lack of technical compatibility of some phones and laptops, lack of equal access to internet due to students' location, technical disruption in hardware, network congestion during education**,** lack of students' familiarity with various learning technologies, inability to work with computers	1,4,7,13,22,28,29,30,35, 43
Studying from home	Lack of adequate learning resources at home, difficulty in concentrating on classroom topics at home, lack of parents' understanding of e-learning, lack of facilities at home to do hands-on assignments	13,35
Online learning skills	Lack of time management skills, lack of deep understanding of course issues by students, weakness in having asynchronous communication with teachers and students, having lower levels of independent learning skills, lack of required intellectual skills, weakness in taking initiatives, weakness in participation and doing teamwork, weakness in online discussion skills, not taking responsibility for learning, unfamiliarity with questioning skills, unfamiliarity with individual learning methods	3,11,34,36

Content	Low quality of electronic contents, difficult, extensive, and unfocused assignment design, student plagiarism	40,35,11,16,7,25
Teaching method	Lack of seriousness in asynchronous online classrooms, lack of enough opportunities for questions and answers, impossibility of carrying out laboratory work and hands-on activities, lack of order and a clear structure in online classes, lack of harmony between teaching methods and e-learning philosophy, impossibility of having group discussions when doing homework, excessive dependence of e-learning on learners' effort, inability of online learning in fulfilling objective goals, lack of students' involvement in e-learning	11,16,34,35,36,43
Evaluation	The use of inappropriate methods to evaluate students, student cheating in evaluations (using a cheating assistant)	40,42,27
Research activities	Delays in projects and assignments, such as the suspension of dissertations, postponement of students' graduation, impossibility of conducting or doing field studies in some research studies	12,34,22,4
Psychological factors	feelings of loneliness, depression and stress, lack of active online psychological and academic counseling centers, distraction and lack of focus in online classes, anxiety and frustration among students, academic depression due to the slow pace of student learning and consequently low self-esteem, lack of interest in online classes, reduced motivation for students' mobility at different levels to continue their education, lack of face-to-face communication, disruption of students' educational and study plans	36,4,7,29,11,31,1,6,26, 13,18,19,32,37

Table 2. teachers-related challenges

Teachers -related challenges		Source
Challenging items		
ICT access and usage	Incompatibility of some phones and laptops, network congestion and increased use of distance learning in certain hours, lack of computer skills, inability to fix technical problems, inability to access online learning resources, the problem of internet connection (limited internet network), shortage and lack of access to appropriate educational tools in online learning, lack of access to electronic services	1,4,44,11,18,10,14,21 ,22,24,27,29,35,38,40
Online teaching competencies	Unfamiliarity with the methods of dealing with students' individual differences, inability to choose appropriate educational software, unfamiliarity with methods of motivating students, unfamiliarity with asynchronous communication skills, lack of skills in proper use of social networks in teaching, lack of understanding of the philosophy of online learning, unfamiliarity with ways of creating a personalized learning environment, teachers' low ability in improving students' practical skills, lack of self-assessment skills in teachers, lack of teacher-student interaction in online classes, lack of student engagement in online classes, lack of proper lesson plans, lack of serious presence of teachers in the online classes, lack of change in teaching methods, lack of teaching assistants for	42,35,7,46,47,27,32,1 4,24,19,30,5,11,22,25,36, 8,34,41,45

	teachers, not encouraging students to engage in group discussions, incompatibility of teaching methods with online teaching philosophy, unfamiliarity with the online teaching administration process, unfamiliarity with individual guidance methods, unfamiliarity with synchronous teaching methods, unfamiliarity with the methods of creating interaction and expanding class participation, disorder in online classes, inadequate learning environment, large number of students in online classes, inadequate duration of online classes, difficulty in controlling group interactions during online classes, increased teaching workload, distrust and lack of motivation for online teaching, unwillingness to motivate students	
Teaching from home	Difficulty in focusing on teaching at home, lack of access to suitable hardware equipment for teaching and content development from home, impossibility of designing assignments in certain courses due to lack of facilities at home	13,18,40
Content	Lack of trust in the quality of content and educational resources, unfamiliarity with content design methods for online teaching, impossibility of preparing content for practical courses, low quality of learning content, lack of sufficient time to learn course content, inconsistency between e-learning philosophy and designing curriculum content	11,18,47
Learning activities	Lack of group discussions in doing learning assignments, not determining the expected learning activities for each session, lack of a specific trend in teaching-learning activities	7,11,14,31,33,40
Evaluation	Unfamiliarity with methods of providing educational feedback, unfamiliarity with using diagnostic evaluation method, weakness in administering formative and summative evaluation, lack of trust in the security and quality of online evaluation	14,20,36,42
Psycho-social factor	Feelings of loneliness in teachers, lack of alignment between the social environment and online learning, technophobia, resistance to change, negative attitudes of teachers	3,7,27,29,36

Table 3. Manager-related challenges

Manager-related challenges		Source
Challenging factors	Challenging items	
Programs and policies	Managers' resistance to change due to lack of understanding of the philosophy and features of online learning, lack of plans to update systems and infrastructure, lack of specific plans and strategies to increase bandwidth and improve network speed and performance, lack of plans to provide appropriate platforms, lack of plans for training teachers, lack of plans to enhance technical readiness and improve students' e-learning skills, lack of a clear strategy for continuing e-learning, inflexibility in universities' structure to help implement e-learning programs.	2,18,27,42,29, 22,11,20,25,9, 18,32
Macro-social factors	Interference of political issues in the educational management of universities, the difficulty of developing macro and specific	

	social guidelines, the impossibility of consulting experts and specialists due to the traditional management view, fear of disease outbreak among students and teachers.	9,22,10,32
Support	Limited number of teaching staff and support team members, lack of cooperation and participation of various university departments in the e-learning program, weakness in communicating programs and informing students, teachers, and staff, lack of funds, lack of support for teaching students learning skills, unavailability of electronic support services, pressure on the educational technology section to advise and support teachers and students	2,17,14,27,47, 39
Content	Limited number of content development team members, difficulty in combining online education contents in face-to-face education, difficulty in attracting content development specialists, difficulty in coping with innovations in content management systems, low quality of contents and online learning resources	47,18,32,11
Evaluation	Impossibility of guaranteeing technical security of online evaluations, incorrect implementation of formative and summative evaluation methods, difficulty of evaluating students in practical lessons and workshops	24,33,42

Table 4. Summary of extracted challenges

Row	Challenging factor	Student-related	teachers-related	Manger-Related
1	ICT access and usage	*	*	*
2	Studying and teaching from home	*	*	
3	E-learning skills	*		
4	Content	*	*	
5	Teaching method	*	*	
6	Research activities	*		
7	Psychological factors	*	*	
8	Learning Activities		*	
9	Evaluation	*	*	*
10	Programs and Policies			*
11	Macro-social factors			*
12	Support			*

Discussion

The findings of this study revealed that universities had challenges in implementing online-only learning during COVID-19 in 12 factors, which are discussed separately in the following section.

ICT access and usage. ICT is at the center of online learning. Al-araibi et al (10) and Keramati et al (12) has emphasized the technological readiness of universities. ICT includes hardware, bandwidth, infrastructure facilities, instructional software, and the internet. Lack of sufficient access to these items and inability to use them properly creates some challenges for students, teachers, and managers. Providing e-learning equipment and tools has always been one of the most important components of e-learning in universities. With the spread of Coronavirus, managers have been initially concerned with launching e-learning and shifting from face-to-face education to online education, provision of infrastructure, internet, virtual classroom, and LMS. Despite these efforts, having access to these tools and using them has been one of the challenges that students, teachers, and managers had to face.

Studying and teaching from home. Another challenge for both students and teachers was online learning and teaching from home. Students faced difficulties such as lack of proper learning

environment at home, lack of a suitable place to study and lack of proper understanding of the family and parents about the electronic environment in online education. Teachers also faced challenges due to the inability of recording their voices for teaching, lack of space, and noise of the family members. This challenge has not been addressed in e-readiness models, but it can be related to the social dimension of online learning. Having social beliefs about the adoption of online technologies by adults and community members can help reduce the challenges of online studying and teaching. This challenge concerns both teachers and students.

E-learning skills. With the spread of Coronavirus, attending online courses was the only mandatory option for students to study and some students were forced to enter these courses without technical, communication, personal, and social skills. In line with these findings, Cigdam and Yildirim(21) and Rajagopal et al (20) argued that students need technical skills, time management, independent learning, and independent thinking and studying skills. In addition to these skills, they need to take responsibility for their learning in order to succeed in online courses, otherwise they will have to confront various challenges. In online learning environments, students need certain skills that could enable them to participate in online classes and debates, study textual and multimedia content, ask questions, and study regularly and independently. These skills are different from the skills in face-to-face learning environments .

Content. Electronic content is one of the most important inputs of e-learning system and is considered as one of the components of universities' e-readiness. Electronic contents should be developed in the form of self- paced and multimedia modes, and should incorporate reflection, simulation, augmented reality, virtual reality, and game in accordance with pedagogical and technical standards in order to attract students and engage them in the learning process. In the development of electronic content, university managers have the responsibility to provide the necessary technical contexts, take organizational actions, and ensure the necessary coordination. On the other hand, teachers should produce and provide quality content to students by drawing on their skills and knowledge about electronic content development tools and educational principles. However, with the spread of Coronavirus in most universities, the task of developing electronic content was mostly left to teachers, some of whom faced certain challenges due to unfamiliarity with audio, video, and video editing tools, and lack of understanding of educational and technical principles in developing quality content. As a result, students were not satisfied with the content provided for the reason that it was of low quality.

Teaching method. Teaching in an online learning environment is done in two synchronous and asynchronous modes. In order to teach effectively in this environment, in addition to understanding the capabilities and characteristics of the online environment, teachers must design the teaching process in accordance with the characteristics of these two environments (23). They should also be able to present instructional goals, the general framework of the course and important concepts, design various learning activities, create and manage discussions, engage in formative evaluation and provide feedback, create cognitive, teaching, and social presence so that students in the online learning environment gain pleasant and useful learning experiences. Therefore, lack of proper pedagogical understanding about the online learning environment (23) and lack of professional development programs required for teachers (36) confronts them with some challenges with regard to interacting with students and motivating them, choosing educational software, dealing with individual differences, designing an online lesson plan, and creating and managing grouped discussions. studies conducted by Brinkley-Etzkorn (26), Mei, Aas, and Medgard (27), Scott and Nimon (28), and Thomas and Chukhlomin (29) also acknowledge that teachers' unfamiliarity with online teaching competencies makes it difficult for them to understand the philosophy and characteristics of online teaching and to employ the required knowledge, skills, and attitudes in that environment accordingly .

Learning activities. In the online learning environment, the extent of the learners' effective engagement in the learning process is determined by their engagement in learning activities.

Emphasizing a constructive approach and taking advantage of technological possibilities, teachers should design activities in a way that students are willing to participate. This study showed that teachers' inattention to students' interests, needs, and abilities in designing learning assignments and their unfamiliarity with designing attractive, original, and authentic activities causes students not to do their assignments willingly or not to meet the pre-determined deadlines. Therefore, designing inappropriate learning activities indicates the weakness of teachers, on the one hand, and confronts students with many challenges, on the other.

Evaluation. In addition to being objective, operational, and reliable, evaluating students in an online learning environment must be pedagogically defensible. Evaluation is part of the learning process, and if it is administered in the form of a formative process, it can facilitate active and enjoyable learning for the learner. The findings of this study revealed that one of the main challenges for teachers is their unfamiliarity with formative evaluation methods and providing feedback along with their lack of confidence in the outcomes of asynchronous online evaluation. These issues have also posed some challenges for students and managers.

Research activities. One of the most important challenges for students during the COVID-19 was related to their research activities. With the outbreak of COVID-19, some research activities, such as student projects and dissertations were suspended. Students had difficulty attending the laboratory, conducting field studies, such as conducting face-to-face interviews and focus group interviews, attending fields, as a result of which they were unable to graduate on time.

Support. Providing support services for students and teachers is one of the organizational tasks of managers (43). Universities should provide support services for the development of effective e-learning in the technical, pedagogical, incentives areas which can be provided before, during and after e-learning courses. Support services have been considered as one of the components of online learning development in some studies such as Selim (14) and Ghazal et al (16). Some support services include providing accurate and clear information about the learning management system, preparing user guides, facilitating access to learning resources, providing students with psychological counseling, answering teachers' and students' technical questions in a timely manner and guidance for transferring to the labor market and creating jobs. These services must be offered with planning, cross-sectoral coordination, and supplying the required budget and human resources.

Universities can be divided into three levels of awareness/exploration, adoption/early implementation, and mature implementation in terms of providing support services. Most universities are at the basic level of awareness/exploration (8). In the development of e-learning, these universities have not realized the importance of support in helping students achieve academic progress, satisfaction, and learning, and have not taken appropriate administrative measures in this regard. In order to provide support services during Coronavirus, universities had to face the challenges of limited number of educational technology staff members, lack of coordination between different university departments, universities' poor communication and informing systems, lack of funding, lack of technical support for students and teachers, and lack of psychological counseling services.

Policies and plans. With the outbreak of Coronavirus, universities' policies and strategies turned to making online learning mandatory and specific plans were needed in order to make that policy work. One of the most important organizational tasks of university managers is to prepare operational plans to provide technology, train teachers, and provide guidelines and specific programs to prepare students (5,38). According to the findings of this study, lack of understanding of the philosophy and nature of e-learning on the part of the managers, lack of a clear program to address technological weaknesses, lack of programs for training teachers, and guiding students were among the main challenges.

Macro - social factors. Macro-social factors play an important role in the development of e-

learning and internet use (4). According to the findings of this study, the intervention of political issues in the management of universities, the difficulty of developing macro and specific social guidelines, the impossibility of consulting experts and specialists due to the traditional management view, and fear of disease outbreak among students and teachers were among the social barriers and challenges for university managers during COVID-19. Macro-social factors improve the creation of structures, technology acceptance, and the attitude about using technology at different layers of society. Existence of social structures, support of different social groups, social systems, institutions, and perceptions of families and peers about learning through technology can reduce managers' challenges in developing online learning.

Psychological factors. Students and teachers who have a good knowledge of the online environment and have the necessary communication skills to interact with other students and teachers are satisfied with being in the online learning environment and gain enjoyable learning experiences. In contrast, students and teachers who are unfamiliar with the features of this learning environment or do not have the necessary skills to learn and teach in such an environment, feel lonely and do not have the necessary motivation and confidence to advance their learning. This study showed that students face psychological challenges such as lack of motivation, distraction, lack of self-confidence, depression, and feelings of isolation due to lack of face-to-face communication with classmates and teachers. Moreover, teachers are not content with their engagement and activity in the online learning system due to technophobia, resistance to change, and negative attitudes towards online learning.

Conclusion

With the spread of Coronavirus, the only strategy for universities to continue their education was to use an online learning system that had to be implemented with operational programs, managers' support, and the participation of teachers and students. Due to the unpreparedness of universities from the social, organizational, pedagogical and technological perspective, students, teachers and managers faced several challenges in implementing online learning, with some of them shared by students, teachers, and managers, and some others specifically related to one or two of them. Although some challenges such as ICT access and usage, students' poor e-learning skills, teachers' weaknesses in synchronous and asynchronous teaching, design of e-learning activities, evaluation, and lack of specific programs and policies were already identified as challenge of universities in developing e-learning before the Coronavirus, some of these challenges, such as the role of macro-social factors and studying and teaching from home were among e-learning challenges that have not been taken into consideration previously. These findings can be of great help in developing e-learning knowledge in the field of e-readiness in higher education in several dimensions. First, in the present study, an attempt was made to identify the challenges of e-learning in universities in a comprehensive way in terms of social, organizational, pedagogical, and technological dimensions. Second, some challenges, such as teaching and learning from home and macro-social factors have not been considered in previous research studies. While identifying these challenges, the present study suggests that the role of macro-social factors, such as the impact of cultural, economic, historical factors, social norms and families in the development of e-learning in higher education should be explored. These factors are different from each other in developed and developing countries. Third, with the spread of the Coronavirus, almost all universities, students, and teachers shifted from face-to-face education to online education. Identifying these challenges, in addition to helping to improve current online education, will expand the acceptance of e-learning among teachers, students, and managers, and the e-learning system will become more prominent among them in the future.

References

[1] Ansong E, Lovia Boateng S, Boateng R. Determinants of e-learning adoption in universities: Evidence from a developing country. Journal of Educational Technology Systems. 2017 Sep;46(1):30-60. https://doi.org/10.1177/0047239516671520.

[2] Hassanzadeh A, Kanaani F, Elahi S. A model for measuring e-learning systems success in universities. Expert systems with Applications. 2012 Sep 15;39(12):10959-66. https://doi.org/10.1016/j.eswa.2012.03.028

[3] Al-Gahtani SS. Empirical investigation of e-learning acceptance and assimilation: A structural equation model. Applied Computing and Informatics. 2016 Jan 1;12(1):27-50. doi.10.1016/j.aci.2014.09.001.

[4] Chiu YL, Tsai CC. The roles of social factor and internet self-efficacy in nurses' web-based continuing learning. Nurse education today. 2014 Mar 1;34(3):446-50. doi.10.1016/j.nedt.2013.04.013

[5] Bokolo Jr A, Kamaludin A, Romli A, Mat Raffei AF, A/L Eh Phon DN, Abdullah A, Leong Ming G, A. Shukor N, Shukri Nordin M, Baba S. A managerial perspective on institutions' administration readiness to diffuse blended learning in higher education: Concept and evidence. Journal of Research on Technology in Education. 2020 Jan 2;52(1):37-64. doi. 10.1080/15391523.2019.1675203.

[6] Ahmadi H, Nilashi M, Ibrahim O. Organizational decision to adopt hospital information system: An empirical investigation in the case of Malaysian public hospitals. International journal of medical informatics. 2015 Mar 1;84(3):166-88. doi: 10.1016/j.ijmedinf.2014.12.004

[7] Alshaher AA. The McKinsey 7S model framework for e-learning system readiness assessment. International Journal of Advances in Engineering & Technology. 2013 Nov 1;6(5):1948-66. doi.10.7323/ijaet/v6_iss3**.**

[8] Graham CR, Woodfield W, Harrison JB. A framework for institutional adoption and implementation of blended learning in higher education. The internet and higher education. 2013 Jul 1;18:4-14. doi:10.1016/j.iheduc.2012.09.003 .

[9] Bhuasiri W, Xaymoungkhoun O, Zo H, Rho JJ, Ciganek AP. Critical success factors for e-learning in developing countries: A comparative analysis between ICT experts and faculty. Computers & Education. 2012 Feb 1;58(2):843-55. https://www.learntechlib.org/p/50851/.

[10] Al-araibi AA, Naz'ri bin Mahrin M, Yusoff RC, Chuprat SB. A model for technological aspect of e-learning readiness in higher education. Education and Information Technologies. 2019 Mar;24(2):1395-431. http://dx.doi.org/10.1007/s10639-018-9837-9.

[11] Alsabawy AY, Cater-Steel A, Soar J. Determinants of perceived usefulness of e-learning systems. Computers in Human Behavior. 2016 Nov 1;64:843-58. doi. 10.1016/j.chb.2016.07.065.

[12] Keramati A, Afshari-Mofrad M, Kamrani A. The role of readiness factors in E-learning outcomes: An empirical study. Computers & Education. 2011 Nov 1;57(3):1919-29. https://doi.org/10.1016/j.compedu.2011.04.005

[13] Kanwal F, Rehman M. Factors affecting e-learning adoption in developing countries–empirical evidence from Pakistan's higher education sector. IEEE Access. 2017 Jun 9;5:10968-78. doi.10.1109/ACCESS.2017.2714379.

[14] Selim HM. Critical success factors for e-learning acceptance: Confirmatory factor models. Computers & education. 2007 Sep 1;49(2):396-413. https://doi.org/10.1016/j.compedu.2005.09.004.

[15] Taat MS, Francis A. Factors Influencing the Students' Acceptance of E-Learning at Teacher Education Institute: An Exploratory Study in Malaysia. International Journal of Higher Education. 2020;9(1):133-41. https://doi.org/10.5430/ijhe.v9n1p133.
[16] Ghazal S, Al-Samarraie H, Aldowah H. "I am still learning": Modeling LMS critical success factors for promoting students' experience and satisfaction in a blended learning environment. IEEE Access. 2018 Nov 5;6:77179-201. https://doi.org/10.1109/ACCESS.2018.2879677.
[17] Alkarney W, Albraithen M. Are critical success factors always valid for any case? A contextual perspective. IEEE Access. 2018 Oct 18;6:63496-512. https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=8496768
[18] Cigdem H. Effects of students' characteristics on online learning readiness: A vocational college example. Turkish Online Journal of Distance Education. 2014 Jul 1;15(3):80-93. https://www.learntechlib.org/p/157215/.
[19] Pillay H, Irving K, Tones M. Validation of the diagnostic tool for assessing tertiary students' readiness for online learning. High Education Research & Development. 2007 Jun 1;26(2):217-34. doi.10.1080/07294360701310821.
[20] Rajagopal K, Firssova O, de Beeck IO, Van der Stappen E, Stoyanov S, Henderikx P, Buchem I. Learner skills in open virtual mobility. Research in Learning Technology. 2020 Mar 19;28. https://doi.org/10.25304/rlt.v28.2254.
[21] Findik-Coşkunçay D, Alkiş N, Özkan-Yildirim S. A structural model for students' adoption of learning management systems: An empirical investigation in the higher education context. Journal of Educational Technology & Society. 2018 Apr 1;21(2):13-27. https://www.jstor.org/stable/26388376.
[22] Jung I, Lee J. The effects of learner factors on MOOC learning outcomes and their pathways. Innovations in Education and Teaching International. 2020 Sep 2;57(5):565-76. https://doi.org/10.1080/14703297.2019.1628800.
[23] Adam IO, Effah J, Boateng R. Activity theory analysis of the virtualisation of teaching and teaching environment in a developing country university. Education and Information Technologies. 2019 Jan;24(1):251-76. https://doi.org/10.1007/s10639-018-9774-7.
[24] Koehler M, Mishra P. What is technological pedagogical content knowledge (TPACK)?. Journal of Education (Online). 2013 October 1;193(3):13-19. https://doi.org/10.1177/002205741319300303.
[25] Benson SN, Ward CL. Teaching with technology: Using TPACK to understand teaching expertise in online higher education. Journal of Educational Computing Research. 2013 Mar;48(2):153-72. https://www.learntechlib.org/p/131848/.
[26] Brinkley-Etzkorn KE. Learning to teach online: Measuring the influence of faculty development training on teaching effectiveness through a TPACK lens. The Internet and Higher Education. 2018 Jul 1;38:28-35. doi.10.1016/J.IHEDUC.2018.04.004.
[27] Mei XY, Aas E, Medgard M. Teachers' use of digital learning tool for teaching in higher education: Exploring teaching practice and sharing culture. Journal of Applied Research in Higher Education. 2019 Jul 1;11(3):522-37. https://doi.org/10.1108/JARHE-10-2018-0202.
[28] Scott KC, Nimon K. Construct validity of data from a TPACK self-assessment instrument in 2-year public college faculty in the United States. Journal of Research on Technology in Education. 2020 Aug 6;53(4):427-45. https://doi.org/10.1080/15391523.2020.1790444.
[29] Thomas M, Chukhlomin V. Introducing TCA-TPACK: A Competency Based Conceptual Framework for Faculty Development in Technology-Enhanced Accounting and Business Education. InSociety for Information Technology & Teacher Education

International Conference 2020 Apr 7 (pp. 490-495). Association for the Advancement of Computing in Education (AACE). https://www.learntechlib.org/primary/p/215785/.
[30] Garrison DR. Online community of inquiry review: Social, cognitive, and teaching presence issues. Journal of Asynchronous Learning Networks. 2007 Apr;11(1):61-72. https://www.learntechlib.org/p/104064/.
[31] Stenbom S. A systematic review of the Community of Inquiry survey. The Internet and Higher Education. 2018 Oct 1;39:22-32. doi.10.1016/j.iheduc.2018.06.001.
[32] Fiock H. Designing a community of inquiry in online courses. The International Review of Research in Open and Distributed Learning. 2020 Jan 1;21(1):135-53. https://doi.org/10.19173/irrodl.v20i5.3985
[33] Bawane J, Spector JM. Prioritization of online instructor roles: implications for competency-based teacher education programs. Distance education. 2009 Nov 1;30(3):383-97. https://doi.org/10.1080/01587910903236536.
[34] Baran E, Correia AP, Thompson A. Transforming online teaching practice: Critical analysis of the literature on the roles and competencies of online teachers. Distance Education. 2011 Nov 1;32(3):421-39. https://doi.org/10.1080/01587919.2011.610293.
[35] Martin F, Budhrani K, Kumar S, Ritzhaupt A. Award-winning faculty online teaching practices: Roles and competencies. Online Learning. 2019 Mar;23(1):184-205. https://files.eric.ed.gov/fulltext/EJ1211042.pdf
[36] Farmer H, Ramsdale J. Teaching competencies for the online environment. Canadian Journal of Learning and Technology/La revue canadienne de l'apprentissage et de la technologie. 2016 Aug 8;42(3)23-40. https://doi.org/10.21432/T2V32J
[37] Coskuncay F. A model for instructors' adoption of learning management systems: Empirical validation in higher education context. Turkish Online Journal of Educational Technology-TOJET. 2013 Apr;12(2):13-25. https://files.eric.ed.gov/fulltext/EJ1015409.pdf
[38] Porter WW, Graham CR. Institutional drivers and barriers to faculty adoption of blended learning in higher education. British Journal of Educational Technology. 2016 Jul;47(4):748-62. https://doi.org/10.1111/bjet.12269.
[39] Porter WW, Graham CR, Bodily RG, Sandberg DS. A qualitative analysis of institutional drivers and barriers to blended learning adoption in higher education. The internet and Higher education. 2016 Jan 1;28:17-27. https://www.learntechlib.org/p/199083/.
[40] Hedges LV, Cooper H. Research synthesis as a scientific process. The handbook of research synthesis and meta-analysis. 2009 Feb 5; 1:4-7. http://www.jstor.org/stable/10.7758/9781610441384
[41] Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. Qualitative health research. 2005 Nov; 15(9):1277-88. https://doi.org/10.1177%2F1049732305276687.
[42] Corbin J, Strauss A. Theoretical sampling. Basics of qualitative research (3rd ed.). 2008:143-58. https://dx.doi.org/10.4135/9781452230153.
[43] Lee JW. Online support service quality, online learning acceptance, and student satisfaction. The internet and higher education. 2010 Dec 1;13(4):277-83. https://doi.org/10.1016/j.iheduc.2010.08.002.