Original Article

The analysis of relationship between quality of e-learning system and students' academic performance (study case: student's in University of Kashan)

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Abstract
E-Learning is an important tool in higher education in the digital age and has led to the creation of a learning environment on based learner, flexibility in learning methods and the introduction of changes in teaching and learning process in higher education system. This changes led to challenges such as increasing or decreasing academic performance. Thus the purpose this research was the analysis of relationship between quality of e-learning system and student's academic performance. The type of research was descriptive-correlative and the statistical population included students at University of Kashan (N=6473), through Cochran's formula and stratified random sampling 236 ones were selected as a sample. In order to collect data's, used from the e-learning system quality questionnaire consisting of 47 answers closed items. To determine academic performance, the average of four semesters leading to the corona pandemic period was used. The reliability of the questionnaire was estimated 0.91 through Cronbach's alpha coefficient. Data's analysis was performed at two levels of descriptive and inferential statistic. Findings showed that the mean of all components of e-learning system except evaluation quality (2.90±0.95) is higher than the cut-off point 3. The mean of the students' academic performance (16.45±1.58) is higher than the average 10. Pearson correlation coefficient showed there is positive & significant relation between quality of e-learning system and students' academic performance. In addition, regression coefficients showed that among the components, only the component of class holding quality (Beta=0.23 & P= 0.015) can predict students' academic performance.

Keywords
Academic Performance, E-Learning, Covid 19, Student.

Introduction
E-learning (EL) has been growing for years and has provided a new opportunity for teachers, students, professors, educational planners and educational institutions (Mayadas, Bourne & Bacsich, 2009). EL is considered an important tool in higher education in the digital era and has caused the creation of a learner-based learning environment, flexibility in learning methods and the introduction of changes in the teaching and learning process in the higher education system (Venkataraman & Siva Kumar, 2015). The EL by using the latest achievements of the era of information and communication technology, has created new approaches and provided clear horizons in the field of education (Levy, 2007). Of course, it should be kept in mind that virtual teaching has created problems for teachers, professors and educational centers, such as unfamiliarity with new technology and unknown challenges (Maggio, Daley, Pratt & Torre, 2018) and it has led to challenges for learners such as increasing or decreasing in academic performance.

Therefore, paying attention to the category of quality improvement programs and service quality evaluation is one of the basic steps (Lim & Tang, 2000).

Paying attention to the quality of services in different dimensions is one of the effective factors in the success and survival of any organization, including the higher education system. Quality in higher education is a multidimensional concept that depends to a large extent on the academic status, university system, mission, conditions and standards of the university field (Aghamalai, Zare & Abedini, 2008). Also, these items can be studied in the evaluation of EL quality. Sugant (2014) states that in the evaluation of the EL system, the main dimensions of information quality (content and navigation capability) and system quality (technical part and responsiveness) should be emphasized. Wang (2003) proposed the ELS (Electronic Learning System) model in order to evaluate the satisfaction of learners and believes that the four factors of user interface, learning community, content and personalization are important factors in evaluating the satisfaction of learners and this model is not only able to evaluate the satisfaction of users in traditional and electronic environment but it also includes service quality factors in electronic learning. Ibrahim (2015) emphasizes this point that service quality in ELS has two dimensions: information quality and system quality. Information quality has two indicators; content and usability, and system quality includes the technical and responsiveness aspects.

Currently, students' views on all aspects of education provided in educational institutions are investigated and considered as an essential factor for quality monitoring in universities (Hill, Lomas & MacGregor, 2003). Since one of the characteristics of quality in a university is the fulfillment of students' expectations from the educational services process, the quality of this process can be determined by examining the students' point of view (Khorasani, Panahi & Ghanbari, 2021). Because improving the quality of educational services plays an important role in improving the academic performance of students, and the success and improvement of academic performance in any society shows the success of the educational system in the field of targeting and attention to meeting individual needs. In fact, the academic performance of students is one of the most important and objective criteria's for evaluating the efficiency and effectiveness of educational systems.

Also, in line with the current research, various researches have been conducted. For example, Farajollahi et al (2012) in the study of the effect of electronic services quality on satisfaction of students in universities, show there are direct and significant relation between components of information quality, education quality, technical quality, service quality and satisfaction. Keshavarz et al (2012) in a research entitled "evaluation of the impact of EL on the academic progress of students of the University of Medical Sciences" showed that empowerment, changes in the content of education, tools and facilities, and increasing students' awareness have a positive effect on the academic progress of students. Shah Hosseini et al. (2014) in evaluating the quality of services provided to students in virtual education, showed that the educational factor has the most and the management factor has the least relationship in the quality of services for students. Raja Irfan et al. (2014) in a research titled the effect of distance education on students' performance showed that the relationship between different variables and students' performance was positive. This study supports the hypothesis that training sessions and assignments have a significant and strong effect on student performance. Fatani (2020) in evaluating students' satisfaction from teaching through video conferencing during the Corona pandemic period, showed that the majority of the studied sample agreed with using this method and believed that the sessions are intellectually challenging, the lecturers are dynamic and students are encouraged to participate in discussions. Torres Martín et al. (2021) showed in a research that students are dissatisfied with digital educational processes in different dimensions. The studied students stated that the teaching functions, duties and beliefs of the teaching staff in electronic education are not satisfactory. Akbari, Javadi & Danesh (2022) in the study of factors affecting students' willingness to continue using ELS, found that among the factors affecting user satisfaction, the factors of

information quality, service quality, system quality, enjoyment and concentration have been studied. Also, according to the results, system quality and concentration did not affect user satisfaction. Also, service quality and concentration on the user's willingness to continue using the e-learning system has not had an effect. Maghsoudi, Safaee & Hashemi (2022) in evaluating the quality of virtual education during the corona epidemic from the perspective of professors and students of Farhangian University, showed that to what extent professors and students can have different opinions. While the professors participating in this research had a positive attitude towards virtual education in Farhangian University, the students showed a negative attitude towards it during the Corona pandemic.

Considering the increasing spread of virtual education and the fact that during the corona pandemic, education is conducted in the context of virtual space, maintaining the standards and quality of education is one of the most important tasks of the higher education system and academic centers. It is obvious that the evaluation of the quality of EL and its related systems in universities and higher education centers provides various and numerous data's and information to policymakers and higher education planners, based on which, the weaknesses and strengths of the programs and systems should be identified and necessary corrective measures should be taken to fix and solve the existing problems. It is expected that the results and findings of this research can provide an image of the efficiency and success of EL and its related systems in the studied university in the context of its main functions in the fields of education, research and services. The system used has both strengths and weaknesses. On the one hand, it has provided opportunities for professors and students, and on the other hand, it has created challenges. For the researchers, the question is whether the EL method can be as effective as the face-to-face education on academic performance or not? Based on this and according to the theoretical and experimental foundations of the research, the current research aims to find out whether the academic performance of Kashan University students is affected by the quality of the EL system in different dimensions (teaching quality, classroom management, evaluation method, system quality & the quality of holding the class) or not?

Research method

This research in terms of purpose is applied and in terms of the method and nature of data's collection is descriptive-correlation. The statistical population of this research included 6473 students in University of Kashan in the academic year of 2021-2022. The criteria's for entering the research included: students of all fields, engaged in studies and gender of both girls and boys. The criteria's for leaving the research included the incompleteness of the questionnaires and unwillingness to cooperate. In the executive process, first talked about the purpose of the study and maintaining the confidentiality of the material with students and at the same time informed consent was obtained from the students regarding their participation in the research, and then the questionnaire was distributed among them. Since in this research, the variance of the statistical population was unknown, it was necessary to conduct a pilot study on a number of students. Therefore, 30 students were randomly selected and the questionnaires were distributed among them. By estimating the variance (0.40), significance level (0.95), population size (6473) and error rate (0.05), the sample size through Cochran's formula and stratified random sampling method 236 one was obtained. The estimated sample size was 236 people, of which 192 questionnaires were returned. Considering that the return rate of the questionnaire was about 81%, based on this, statistical tests were performed on 192 students. A researcher-made questionnaire was used to collect data's. The EL system quality questionnaire includes 47 closed answer items in the form of five components of teaching quality, classroom management, evaluation method, e-learning system quality and class holding quality in terms of a five-point scale with a cut-off point of 3. In order to determine the academic performance, the average of the four academic semesters leading to the corona pandemic was used. In order to measure the validity of the

questionnaire, face validity (judgment of experts) and construct validity (factor analysis) were used. Through construct validity, it was determined that the system quality had the highest weight and factor load with 0.86. The reliability of the questionnaire was estimated through Cronbach's alpha coefficient equal to 0.91. Data analysis of this research were performed by using SPSS version 22 and Amos Graphic software's at two levels of descriptive statistics (frequency, percentage, mean, standard deviation, skewness & kurtosis) and inferential (one-sample t-test, Pearson correlation coefficient, regression and structural equation model).

Results
The data's analysis of this research was done at two levels of descriptive and inferential statistics.

A. Descriptive analysis of the sample group
Descriptive analysis of the sample group according to gender and academic performance in the form of frequency and percentage is reported in Table (1).

Table 1. Frequency of sample group according to gender and average

Variable	Level	Frequency	Percentage
Gender	Male	84	43.8
	Female	108	56.2
	Under 12	9	4.7
	12-14	27	14.1
Average	14-16	45	23.4
	16-18	74	38.5
	18-20	37	19.3

Table (1) shows that the highest frequency of the sample group is related to female student's equivalent to 56.2 percent. The most number of samples, i.e. 38.5% of students, had average 16-18.

B. Normality test
In order to study the normality of the data's, skewness and kurtosis criteria were used, the results were reported in Table (2).

Table 2. Normality test

Variable	Skewness	Kurtosis
EL	-1.045	1.62
Academic performance	-0/294	0.447

According to table (2), since the variable data's of EL quality and academic performance are in the range of +2 and -2, therefore, the data's of both variables are normal and parametric statistical tests can be used.

C. Hypothesis Analysis
Research hypotheses were presented in the form of three hypotheses.

H1: the state of the quality of the electronic education system and its dimensions from the students' point of view is favorable.

Table 3. The compare the mean of each variable with the criterion score

Variable	n	Mean & Std	t	df	P-Value
teaching quality	192	0.73±3.26	-22.65	191	0.001
classroom management	192	0.15±3.09	-24.7	191	0.164
evaluation method	192	0.95±2.90	-15.63	191	0.165
system quality	192	0.96±3.20	-16.008	191	0.001
class holding quality	192	0.91±3.15	-19.56	191	0.001

The analysis of table (3) showed that the mean of all the components of the EL system except for the evaluation quality (2.90±0.95) is higher than the cut point 3. One sample t-test showed that this difference in the error level of 0.05 for the component of class management and evaluation quality is insignificant.

H2: the academic performance of students is favorable.

Table 4. The compare the mean of academic performance with the criterion score

Variable	n	Mean & Std	t	df	P-Value
Academic performance	192	1.58±16.45	56.76	191	0.001

The analysis of table (4) showed that the mean of academic performance of students (16.45±1.58) is higher than the average 10. One-sample t-test showed that this difference is significant at the error level of 0.05.

H3: There is a significant relationship between the quality of e-learning system and students' academic performance.

**Table 5.** Correlation between the quality of EL system and academic performance

Variable	r	P-value
e-learning and academic performance	0.21	0.023

Pearson's correlation coefficient showed that there is a positive and significant relationship (r=0.21) between the quality of EL system and students' academic performance.

Table 6. The impact of EL system components on academic performance

	B	Beta	SD	t	P-value	Durbin-Watson	VIF	Tolerance
constant	15.36	-	0.64	24.17	0.000		-	-
teaching quality	0.077	0.036	0.18	0.42	0.67		1.38	0.72
classroom management	0.045	0.026	0.127	0.35	0.72	1.54	1.05	0.95
evaluation method	0.045	0.027	0.158	0.28	0.78		1.8	0.55
system quality	0.22	0.135	0.168	1.32	0.19		1.35	0.74
class holding quality	0.407	0.23	0.166	2.45	0.015		1.78	0.56

Since the value of Durbin Watson's statistic (1.54) is in the range of 1.5 to 2.5, there is no correlation between the errors and according to the VIF and tolerance indices, there is no collinearity between the research variables and the results of the regression is reliable. The regression coefficients showed that among the components, only the component of class holding quality (Beta=0.23 and P=0.015) has the ability to predict students' academic performance, and the other components have a non-significant effect.
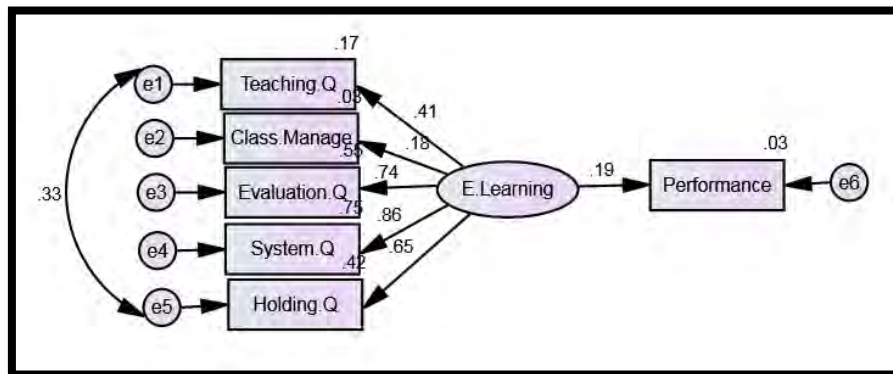
Model 1. Path analysis between variables

Table 7. Summary of model results

Index	CMIN	IFI	CFI	NFI	RMSEA
Obtained amount	1.57	0.98	0.98	0.95	0.055
Acceptable level	3>	0.90	0.90	0.90	0.08

Based on the results of table (7), the tested model of the current study has a good fit with the conceptual model and the collected data's, and the positive relationship between quality of the EL system and students' academic performance was positive and significant.

Conclusion

Today, universities are under increasing pressure to prove their participation in the development of societies, so that accountability for the realization or non-fulfillment of educational goals has become a necessity. Accordingly, the quality of the services provided is of considerable importance. Therefore, the general purpose of this research was to evaluate the quality of EL services of Kashan University during the Corona epidemic, which was examined in the form of several components and items.

Results shows that with regard to the students' perspectives, the mean of teaching quality in EL system is significantly higher than the average and accordingly is relatively satisfactory. This result indicates that students are relatively satisfied about teaching quality of professors, sending audio or video educational files, sending text pamphlets (written file), creativity in teaching, attractiveness of educational content, flexibility in changing the content based on the conditions of virtual education, suitable utilization from class time for learning and teaching, creating areas for participation and group work for students, online question and answer and solving ambiguities in the form of chat or audio-video, appropriate answers from professors in messengers or virtual networks and recognizing the level of student learning during teaching. Results are line with Fatani's (2020) findings that students have favorite views about teaching based on video conference during the Corona pandemic. In contrary, Adnan & Anvar (2020) found the online learning is not a productive method for teaching in developing countries such as Pakistan.

The analyses also revealed the mean of classroom management is significantly higher than average and is relatively satisfactory from the viewpoint of students. This result indicates that students are relatively satisfied about the professors classroom management quality in several dimensions such as appropriate use of time and preventing time waste, starting and ending classes according to predetermined schedule and time, making sure of students' active attendance (listening and attending) in classes, helping students after their absence from classroom, instilling positive attitudes to online classrooms, improving cooperation and participation between students, obliterating students' distracting factors in online classrooms, creating a single link for all sessions instead of one link for every session, activating webcam in classes, activating student's

microphones in classrooms, uploading tutoring movies in learning management system, accessing old films of online classes, and the possibility of turning student's webcam on. In contrary to these results, Adnan & Anvar (2020) observed that learning in online classes is not an appropriate method of face to face student-teacher interaction in Pakistan. Torres Martin et al (2021) realized that students are not satisfied about electronic educational processes, teacher functions, and responsibilities and beliefs of organizational staff.

The analyses also revealed that the mean of students' satisfaction from the quality of e-learning system and the class holding quality is significantly higher than test value and is relatively satisfactory from the viewpoint of students. This result indicates that students are relatively satisfied about the quality of learning management system in several dimensions such as logging in and logging out LMS (username and password), The beauty and attractiveness of the LMS, Re-login to the LMS during the class, availability of a link to access the class for students, unlimited capacity to accept students in classes, system facilities for teacher-student interaction during class, access to recorded classes by mobile phone, the possibility of students' participation to produce educational content in the system, correct display of exam questions, convenient recording of answers to questions at the end of the exam, and connecting and disconnecting of the system and support of technicians.

The results showed that from the students' point of view, the mean of evaluation quality was relatively unfavorable. In the dimension of educational evaluation quality of professors, students about creativity and diversity in assignment, definition of assignment in the system by setting deadlines, feedback to assignments in the system itself, preparation of questions bank for tests, use of random questions in tests and immediate feedback to students' performance in tests or assignments had a relatively unfavorable view. Also, Sarboland (2019) discovered the dissatisfaction of students about the effectiveness of practice and assignments provided in the e-learning method. Shah Hosseini et al (2015) reported that students evaluated the assessment methods in their institution as unfavorable.

The correlation coefficients showed that there is a positive and significant relationship between the quality of EL system and academic performance of students. In other words, the more the quality of the electronic EL system increases and improves in different dimensions, the better the academic performance of the students will be. In addition, the results showed that among the components, only the component of the class holding quality can predict the students' academic performance, and the other components have a positive and non-significant effect.

In this regard, Badali, Shafieifar & Bakhtyarizade (2021) showed that the use of EL in the conditions of Corona can be effective in increasing the learning and academic motivation of medical students. Also, Daeei Zadeh, Hossein Zadeh & Qaznavi (2019) and Alizadeh & Rezaei (2019) and Raja Irfan et al. (2014) found that EL had an Significant effect on the academic performance of learners. Keshavarz et al. (2013) showed that empowerment, changes in the content of education, tools and facilities, and increasing students' awareness have a positive effect on students' academic progress. This shows that EL can be a successful and efficient system if the educational content is properly formulated, using up-to-date equipment, empowering students to use the equipment and increasing their awareness.

The reason for low effect of the EL system quality on academic performance of students may be the inadequate familiarity of professors with different teaching styles and skills and educational evaluation skills in learning management system, relative weakness of EL infrastructure, low internet bandwidth, and weakness of students' capabilities in using electronic education systems. By strengthening these things, it is possible to help improve the academic performance of students. EL will have the necessary quality when the orientation adopted by the professors is the most compatible with the features and capabilities of the virtual environment. If professors are familiar with teaching and evaluation methods in EL systems, it can have a great impact on improving students' academic performance. Because the professor plays an important role in the

transfer of knowledge, skills, sense of competition and also satisfaction in the student.

The results show that in the University of Kashan, the level of students' satisfaction about the components of teaching quality, class management quality, system itself quality, and class holding quality is relatively favorable but the students were not very satisfied about quality of evaluation. Also, the EL system can be effective on the academic performance of students to some extent. Therefore, the university should strive to increase and improve the quality of educational services and create better conditions. Due to the fact that providing customer service is the philosophy of every organization, and considering that the ultimate goal is customer satisfaction, it is suggested:

- Students' constructive opinions should be used more in different stages of planning, designing, providing and evaluating educational services. The managers of the studied universities are advised to consider the results of the educational quality assessment as one of their educational planning documents.

- Considering the role and impact of the quality of virtual education on the academic performance of students, the fields of expansion and substructures of technology in universities should be strengthened.

- Regarding the role and impact of the quality of electronic education on the academic performance of students, the fields of expansion and technological substructures in universities should be strengthened so that in this way universities are increasingly placed on the path of growth and development. Students should be encouraged to use electronic systems in the learning process due to the direct relationship between the quality of EL and academic progress.

- Students were relatively satisfied with the teachers' teaching method and little satisfied with the evaluation methods. In order to achieve ideal conditions, it is suggested that teachers should pay more attention to the use of new teaching and evaluation methods in accordance with the conditions and facilities of the EL system.

- In the post-corona period, it is likely that EL will continue in a hybrid way. Therefore, it is necessary for the ministries related to education to make policies to improve students' ability and their full preparation for online learning. This can provide the universities with the necessary guidelines to provide an executive mechanism to improve students' skills.

Limitations

The study has some limitations. First, the scope of the research was limited to students. Second, the scope of the research was limited to Kashan University, and the impossibility of generalization to other educational centers and organizations. Other limitations of the research were the use of self-report questionnaires to evaluate the variables, cross-sectional data collection and investigation, and non-cooperation of some students in answering the questionnaire questions.

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Conflicts of Interest

The authors declare that they have no competing interests.

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