The relationship between the quality of education and students' satisfaction with the quality of the E-learning system and its effect on education to reduce complications of diabetes

La relación entre la calidad de la educación y la satisfacción de los estudiantes con la calidad del sistema E-learning y su efecto en la educación para reducir las complicaciones de la diabetes

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Abstract

Introduction & Background: This study was conducted with the aim of investigating the relationship between the quality of education and the level of satisfaction with the quality of the electronic education system in controlling the early complications of diabetes.

Methods: This was a descriptive correlational study. The population of this study includes SUMS students, the number of which is approximately 5000. In order to calculate a sample size, a sample of 357 people was randomly selected, using Cochran formula and simple random sampling. To assess the quality of the system and of the service, Delone and Mclean (2003)'s questionnaire, course content, Almaiah and Youssef (2019)'s questionnaire, students' satisfaction, Ayums (2006)'s questionnaire and the quality of the learning system, Almaiah, et al. (2016)'s questionnaire was employed. The reliability of the questionnaire was examined and confirmed through Cronbach Alpha. Furthermore, its composite reliability and its validity were again examined and confirmed through construct and content validity. Research hypotheses were analyzed through structural equation modeling techniques.

Results: The results showed that the quality of course content, educational system and service quality have a positive and significant association with student satisfaction. Also, students' satisfaction had a positive and significant relationship with service quality, which was ultimately associated with increased awareness of diabetes complications

Conclusion: These results show the importance of paying attention to the quality of education in students' satisfaction with the quality of electronic education, which can be used to identify at-risk groups and train them.

Keywords: System quality, service quality, course content, student satisfaction, electronic education system, complications of diabetes.

Resumen

Introducción y antecedentes. Este estudio se realizó con el objetivo de investigar la relación entre la calidad de la educación y el nivel de satisfacción con la calidad del sistema educativo electrónico en el control de las complicaciones tempranas de la diabetes.

Métodos. Este fue un estudio descriptivo correlacional. La población de este estudio incluye a los estudiantes de SUMS, cuyo número es de aproximadamente 5000. Para calcular un tamaño de muestra, se seleccionó aleatoriamente una muestra de 357 personas, utilizando la fórmula de Cochran y un muestreo aleatorio simple. Para evaluar la calidad del sistema y del servicio, el cuestionario de Delone y Mclean (2003), el contenido del curso, el cuestionario de Almaiah y Youssef (2019), la satisfacción de los estudiantes, el cuestionario de Ayums (2006) y la calidad de el sistema de aprendizaje, Almaiah, et al. (2016) se empleó el cuestionario. La confiabilidad del cuestionario fue examinada y confirmada a través de Cronbach Alpha. Además, su confiabilidad compuesta y su validez fueron nuevamente examinadas y confirmadas a través de la validez de contenido y de constructo. Las hipótesis de investigación se analizaron mediante técnicas de modelado de ecuaciones estructurales.

Resultados. Los resultados mostraron que la calidad del contenido de los cursos, el sistema educativo y la calidad del servicio tienen una asociación positiva y significativa con la satisfacción de los estudiantes. Además, la satisfacción de los estudiantes tuvo una relación positiva y significativa con la calidad del servicio, que en última instancia se asoció con una mayor conciencia sobre las complicaciones de la diabetes.

Conclusión. Estos resultados muestran la importancia de prestar atención a la calidad de la educación en la satisfacción de los estudiantes con la calidad de la educación electrónica, que puede ser utilizada para identificar grupos en riesgo y capacitarlos.

Palabras clave: Calidad del sistema, calidad del servicio, contenido del curso, satisfacción del estudiante, sistema educativo electrónico, complicaciones de la diabetes.

Introduction

Nowadays Information and Communications Technology in education has undergone a major change[1] and has turned into an integral part of the workplace and classrooms. Furthermore, it has changed marketing methods, communication and learning. The art of teaching and training has been integrated with growth in Information Technology (IT) and has created a new approach to learning which is called E-learning[2]. For many of the applications and topics raised in this technology to develop, create and even be accepted among the spectrum of its users, they need to depend on standards; standards which paved the way for achieving goals such as the improvement of quality, the ability to adapt and integrate and reutilization of instructional materials by presenting a series of mutual frameworks and general guidelines. Even though the existence of standards in some domains has placed limitations on producers and developers, if care is taken so as to create and upgrade each standard, increasing speed and improvement will ensue. With the rapid progress of E-learning through the Internet, the need to have such standards is absolutely conspicuous. Since a long time ago, the debate about "standard" has been such a crucial issue in E-learning and teaching that institutions such as IEEE and AICC have made every endeavor to standardize the debates raised in E-learning and teaching[3]. With the rapid progress in IT, universities have changed their educational systems, using a combination of new technologies such as E-learning and M-learning[4,5]. Moreover, with the sharp increase in the use of the Internet, E-learning has become extremely widespread and many institutions of higher education have included it in their curriculum and are going to gain a lot of advantages such as the increase in the accessibility to education, the better provision of students' needs, tracking capabilities, the effectiveness of expenses, learners' adaptability and interaction[6,7]. In truth, E-learning is considered to be one of the most advanced and salient web-based systems in education[8].

Presenting educational resources and services in E-learning via digital technologies is turning into an important instrument for improving the quality of teaching and learning[9]. Electronic learning systems at universities are continuously turning into an integral part of curricula and will be added to curricula afterwards. The utilization of electronic learning system has had growing importance in education and has provided students, teachers and universities with a lot of advantages including an increase in the quality of teaching and learning and also the improvement of interaction between students and teachers[10]. Therefore, universities all over the world invest considerable amount of funds and resources in raising the quality of electronic learning systems. Notwithstanding the considerable investment in electronic learning systems, some

of the universities have failed to achieve the predicted advantages of the electronic learning systems[11]. Thus, in recent years, there has been an increase in the number of empirical studies aiming to survey the effective factors in the quality of E-learning and students' satisfaction with E-learning[12]. On the other hand, the investigation of studies has illustrated that most of these studies have considered teachers' understanding in their research[13,14]. while few have noted students' understanding of electronic learning systems. This approach ignores this reality that students are serving as the main users of utilization and assessment of electronic learning systems. Therefore, their opinions and concerns are necessary for the investigation of such factors. Investigating the students' satisfaction has been successful in raising awareness of education and its quality and is indicative of students' attention and interest in learning and teaching. Individual and environmental factors can influence students' progress and satisfaction with education. Culture and the atmosphere of the institution are one of the environmental factors which can affect the satisfaction with education. On the other hand, the atmosphere of learning and teaching including the course content, teaching methods, feedback, support and assessment methods can have an impact on students' satisfaction. Moreover, the whole curriculum, teaching staff and university management system are factors which can have an effect on learners' satisfaction[15]. There is a high correlation between students' satisfaction with E-learning systems and factors such as course content, content type and format, the number of class participants, understood productivity, the quality of communication and the transferred knowledge. Furthermore, students' satisfaction with E-learning systems is influenced by students' self-efficacy, their previous achievements, teachers' feedback, knowledge and computer skills[16].

A lot of research on the acceptance of electronic learning systems has been conducted by many researchers[11-14]. Nevertheless, little empirical research has focused on determining the factors in the success in electronic learning systems. Almaiah & Mulhem (2018) studied the effects of the quality and environmental factors on students' satisfaction with the quality of electronic learning systems. The results of data analysis evidenced that there is a strong relationship between organizational factors (support for good management and change management) and the quality of electronic learning systems that has not been discovered before. Moreover, results indicate that quality factors (course content, quality of the system and the service) have a significant positive influence on students' satisfaction with the quality of electronic learning systems[17]. In Vietnam, Puriwat and Tripopsakul (2019) studied the relationships among features of the quality of electronic learning systems, the overall quality of the E-learning system, students' satisfaction with E-learning and students' dedication to E-learning. Results illustrated that the overall quality of E-learning system had a positive relationship with students' satisfaction with E-learning, which per se exerted a positive influence on students' dedication to E-learning[18]. Bashardost, et al. (2021) also studied the quality of education in each of the clinical sections among fifth and sixth-year dentistry students. Results illustrated that there was a significantly statistical relationship between the average score of the quality of education in terms of students' satisfaction and the clinical sections[19]. Ilbeygi and Sohrabi (2020), in their case study of the University of Tehran (UT), identified the factors effective in the students' use and satisfaction with blended electronic learning systems and also identified the extent of UT students' satisfaction with this measured and predicted system by presenting a model. Results showed that the understood facility (easiness) of working with the system, the atmosphere of the educational context, students' culture and tendencies, understood usefulness (productivity) and content features all had an influence on students' satisfaction with UT blended learning system[20]. In his study, Tayebi (2019) identified and prioritized the components effective in the academic satisfaction, learning and educational quality of nursing students at Urmia Faculty of Nursing and Midwifery. Findings of the qualitative section suggested that six factors (i.e., personal characteristics, teachers' professional competence, educational, academic, administrative and management factors, welfare facilities, occupational and professional factors) had a positive influence on academic satisfaction. Furthermore, factors such as personal characteristics, educational and academic (factors) and quantity and quality of the welfare amenities influence students' learning and, lastly, other factors such as personal characteristics, educational context, teachers' features in terms of professional and moral competence all affect the quality of education. Results concerning the qualitative section indicated that educational and academic facilities have the greatest influence on academic satisfaction and learning of students and among other factors effective in the quality of education, educational context and its features are of highest importance and effectiveness[21]. In their study, Shahhosseini, et al. (2015) presented an appropriate model so as to evaluate the quality of the services provided for students (the main clients of the following institutions) at online teaching institutions given the specific features of these universities and E-learning system. Results showed that academic factors had the strongest relationship and managerial factors had the weakest relationship with the quality of the service in students' section[22].

Given these points, it can be concluded that there has been little development in the domain of E-learning and it should be kept in mind that there is no domestic framework for improving the quality of this kind of education in the country. Moreover, the necessity of developing electronic courses to reduce expenses, increasing students' easy access to higher education and the absence of rich literature in this domain are serious challenges in electronic courses, on which more quantitative and qualitative research should be done. None of the previous studies has empirically examined the effects of quality on Iranian students' satisfaction and the quality of their elec-

tronic learning system. This study investigates the benefits gained from electronic learning system. This research examines how electronic learning systems aid educational institutions in facilitating students' learning, in increasing the fame of their educational system, in reacting quickly to changes, and in showing expenses much lower than they really are. In Iranian higher education, due to challenges such as the growing demand for higher education, budget deficit, shortage of full-time faculty members, and the need to eliminate geographical limitations, electronic learning and teaching have been paid attention to in the last decade[2]. Furthermore, owing to the outbreak of coronavirus pandemic, most Iranian universities have recently established E-learning centers within their campus.

One of the institutions of higher education which has established E-learning centers in the last few years is Shiraz University of Medical Sciences (SUMS). Considering what was mentioned regarding the necessity and importance of investigating the quality of E-learning and also given how inchoate E-learning is and despite the preliminary troubles existing in this domain, there has been little research conducted on this topic in SUMS so far. As a result, this study has two principal aims which are as follows: what are the key factors in students' satisfaction and the quality of E-learning system? And what would be the pattern that integrates some factors with each other in order to have examined the influence of the quality on students' satisfaction and the quality of E-learning system?

Therefore, the current research was conducted with the aim of increasing students' satisfaction with the quality of the e-learning system by examining the aforementioned quality and its effect on increasing awareness of reducing the complications of diabetes. The purpose of this study is to investigate the effect of quality on the satisfaction of students of the University of Medical Sciences with the quality of the e-learning system in order to finally answer this basic question: Are quality factors with the satisfaction and quality of the students of Isfahan University of Medical Sciences and their e-learning system in increasing awareness they are related to the complications of diabetes.

Figure 1. Conceptual model of the research

Materials and methods

Samples:
As mentioned earlier in the abstract, this study adopted a descriptive-correlational research method. The population of this study includes all SUMS students, the number of which comes to around 5000. Using Cochran formula, a sample of 357 SUMS students was randomly selected (using simple random sampling) and then scrutinized.

Data collection instruments
Quality of E-learning: in order to assess the quality of E-learning, Almaiah, et al. (2016)'s standard questionnaire was used. This questionnaire has four questions and in order to complete it, 5-point Likert scale has been used which are as follows: 1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree. Using Cronbach Apha, Almaiah, et al. (2016) calculated the reliability coefficient of the aforementioned questionnaire which turned out to be 0.82[23] and, finally, the reliability coefficient in this research was calculated to be 0.80.

Students' satisfaction: in order to assess students' satisfaction, AYUM (2006)'s standard questionnaire was used which made use of three questions. Moreover, 5-point Likert scale was used in order for participants to complete the questionnaire. AYUM (2006) measured the internal consistency of this questionnaire and the result was 0.83 (using Cronbach Alpha) and the internal consistency of this research was also 0.81, which is representative of the high reliability for this questionnaire.

Quality of course content: in order to assess the quality of course content, Almaiah and Alyoussef (2019)'s standard questionnaire was used which made use of four questions and once more 5-point Likert scale was used. Almaiah and Alyoussef (2019) used content validity and Cronbach Alpha, respectively, to assess their questionnaire's validity and reliability. Alpha coefficient was reported to be 0.80[10] and in this current research, reliability was estimated to be 0.78, which suggests a high reliability for this questionnaire.

Quality of the educational system: in order to assess the quality of the educational system, Delone and Mclean (2003)'s standard questionnaire was used which made use of five questions and its rating scale was based on 5-point Likert scale mentioned earlier. Using Cronbach Alpha, Delone and Mclean (2003) estimated the internal consistency of this questionnaire at 0.87[24] Moreover, the reliability coefficient in this research was calculated to be 0.82, which again shows a high reliability for this questionnaire.

Quality of the service: in order to assess the quality of the services, Delone and Mclean (2003)'s standard questionnaire was again used; however, this preceding questionnaire made use of only three questions and its rating scale was again based on 5-point Likert scale mentioned earlier. In Delone and Mclean (2003)'s study, the internal consistency was reported to be 0.85[24] and in this research 0.84, which again is indicative of the high reliability for this questionnaire.

Operational definitions

DM complications presence of one or more of complications on DM patients such as retinopathy, diabetic foot, renal complications, stroke, heart complications, teeth decay, neuropathy, hypertension, and sexual dysfunction.

Awareness:

To collect data from a questionnaire organized by the interviewer, which includes 28 items of knowledge related to diabetes complications. Possible correct answers for assessing awareness of diabetes complications were 28. Awareness was calculated by adding up the correct answers and calculating the average of 15 with the minimum and maximum correct answers being 5 and 25, respectively.

In this current research, content validity of the questionnaire was examined and confirmed by 3 teachers of educational sciences. In order to analyze the data, descriptive and inferential statistics were used and for the computation, the software "PLS Smart" was used.

Results

In this research, descriptive and inferential statistics were used to analyze the data and to test the hypotheses. In order to examine the research hypotheses, Partial Least Square Structural Equation Modeling (PLS) was used. In (Table 1) and (Table 2) descriptive statistics of the research variables are presented.

Table 1. Means and SDs of the research variables

Variables	Mean	SD
Quality of E-learning	3.81	0.73
Students' satisfaction	3.72	0.68
Quality of the course content	2.65	0.73
Quality of the educational system	2.85	0.71
Quality of the service	3.51	0.74

Table 2. Internal validity, composite reliability and divergent validity of the research variables

Scales	AVE	CR	R^2	Q^2
Students' satisfaction	0.561	0.784	0.263	0.132
Quality of the service	0.595	0.814	-	-
Quality of the educational system	0.640	0.872	-	-
Quality of the course content	0.507	0.804	-	-
Quality of E-learning	0.548	0.829	0.573	0.279

(Table 3), is examined in order to investigate the divergent validity of the model in question. Average Variance Extracted (AVE) is higher than 0.5, which confirms the internal validity of the model. The Composite Reliability (CR) is also higher than 0.7. Moreover, based on Fornell-Larcker criterion and due to the fact that the amount of the main diameter is higher than that of the intra-class correlation coefficient, it can be asserted that the divergent (discriminant) validity of the model is confirmed.

Table 3. Results of the model fit (goodness of fit)

Communality	R^2	GOF
0.216	0.418	0.301

As can be seen, goodness of fit is calculated to be 0.301 and its model fit is absolutely confirmed. By examining the results of (Table 4) and (Figure 2) and (Figure 3), it can be concluded that the amount of t in the paths of the research variables is higher than 1.96 and all the hypotheses are confirmed.

Table 4. Hypothesis testing

Row	Hypotheses	Impact factor	T-statistics	Results
1	There is a significant positive relationship between course content and students' satisfaction.	0.185	4.737	confirmed
2	There is a significant positive relationship between the educational system and students' satisfaction.	0.312	8.014	confirmed
3	There is a significant positive relationship between the quality of services and students' satisfaction.	0.196	3.540	confirmed
4	There is a significant positive relationship between students' satisfaction and the quality of E-learning.	0.481	12.661	confirmed

Figure 2. Model of standardized coefficients

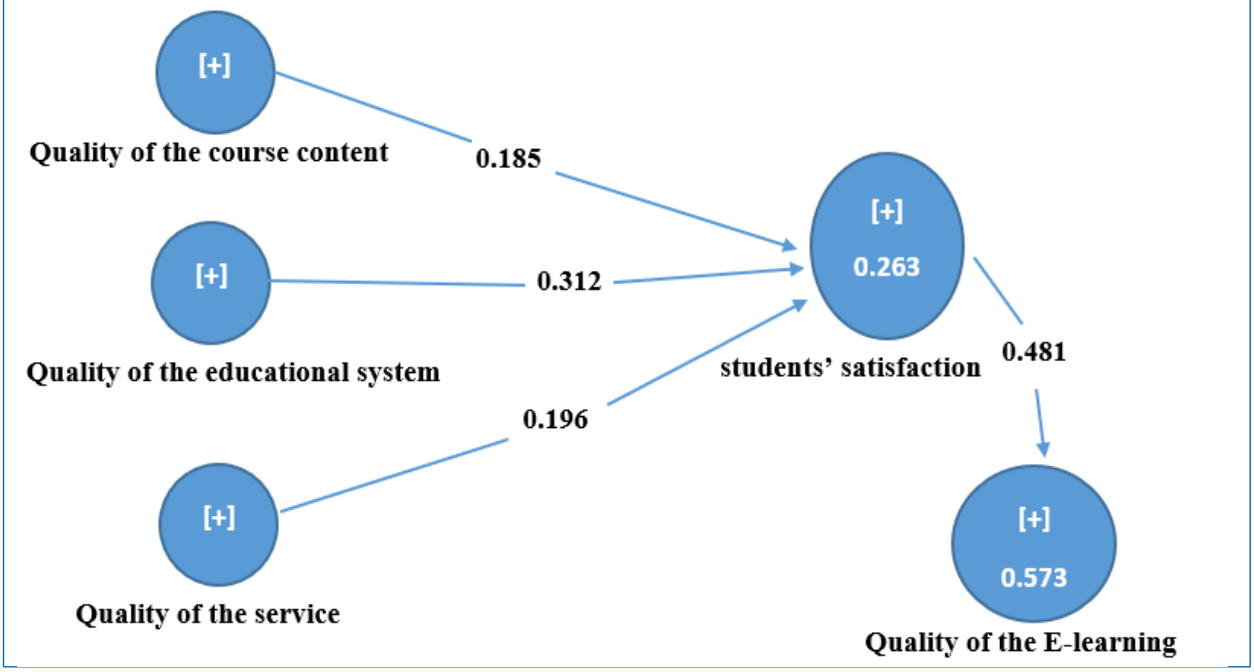
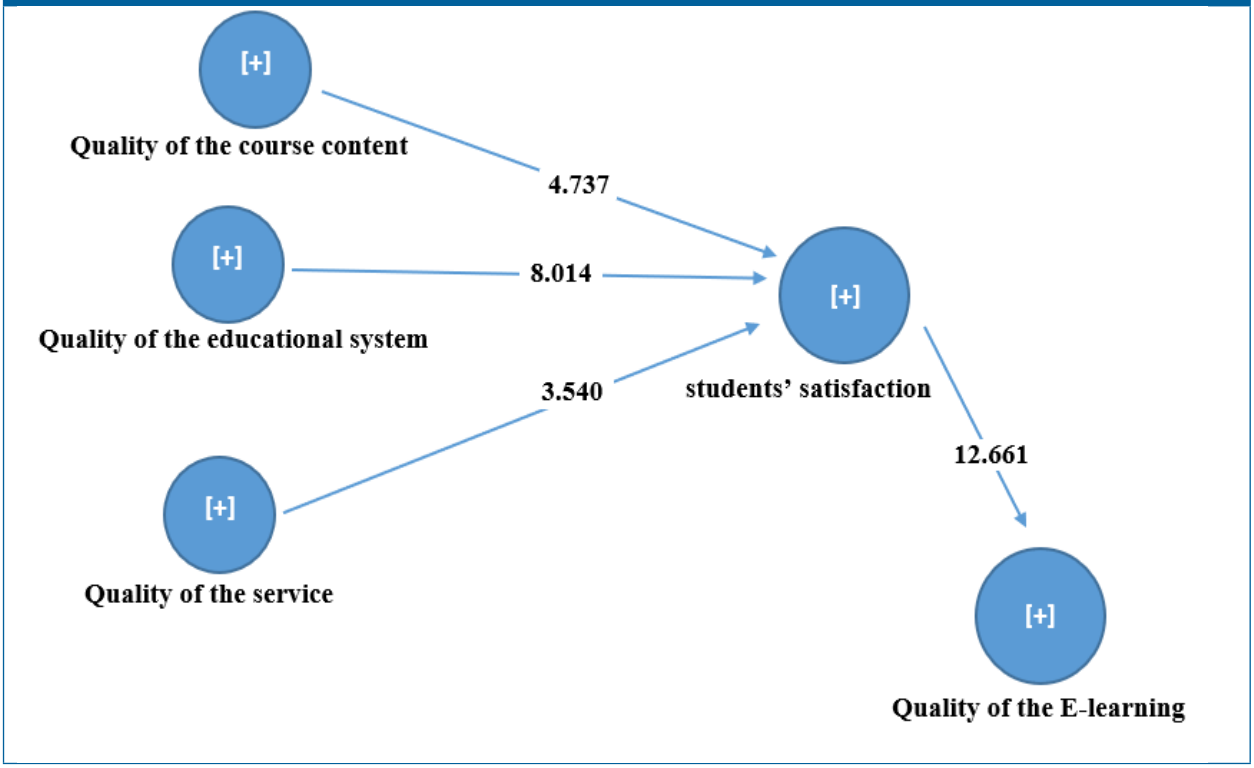


Figure 3. The amounts of t-statistics



Discussion

Awareness about the complications of DM

More than two-thirds of students learned about diabetes complications from health professionals. Most of the study participants (92.5%) were aware of diet modification to prevent diabetes complications. (91.3%) knew about the risk factors related to the complications caused by alcohol and smoking. Diabetic foot (73.9%) was the most known complication of diabetes, followed by eye complications (72.6%) and cardiac complications (63.2%).

Based on the results of the first research hypothesis, path coefficient of the exogenous variable of the course content on satisfaction equals 0.185 and is significant with the t being 4.737 and the significance level 0.001 and the reliability of 0/95. As a result, the null hypothesis is rejected and the very first hypothesis is confirmed. These results are in keeping with Bashardoust, et al., (2021), Ilbeygi and Sohrabi (2020) and Almaiah & Mulhem (2018) findings[17,19,20]. Therefore, in order to specify the results, it can be said that course content refers to the information or the output processed by the E-learning system. This information is related to a period within which a teacher is the one who is accountable and this is, for sure, a yardstick of the significance of the period[10]. Hassanzadeh, et al. (2012) and Almaiah & Mulhem (2018) illustrated that the quality of the course content has a positive relationship with students' satisfaction[25]. Studies have shown that if the content and information of the course (related to the E-learning system) have been frequently updated and is comprehensive enough, then the content and information of the course will conform to the learners' expectations and learners will feel satisfied and comfortable with the E-learning system[26]. Moreover, such course content and information presented by the E-learning system might persuade students into continuing to use the E-learning system by increasing the satisfaction with their own system. Therefore, the quality of the course content is considered to be in the foreground as far as students' satisfaction is concerned as a result, it can be concluded that the quality of the course content can influence the students' satisfaction with the E-learning system[26].

The results of the second research hypothesis showed that path coefficient of the exogenous variable of the quality of the educational system on students' satisfaction equals 0.312 and is significant with the t being 8.014 and the significance level 0.001 and the reliability of 0.95. As a result, the null hypothesis is rejected and the second hypothesis is confirmed. These results are in keeping with Bashardoust, et al., (2021), Ilbeygi and Sohrabi (2020) and Almaiah & Mulhem (2018) findings[17,19,20]. Therefore, in order to specify the results, it can be said that this model measures the quality of the educational system including features such as usefulness (productivity), flexibility, chats, associations, videos and other common features[10]. The quality of the educational system is a key component to reach the goals set by the organizations. The quality of the system represents the appropriate IT features in the domain of teaching. Previous studies on the success in E-learning have shown that the quality of the system has had a positive influence on students' satisfaction[17]. On the other hand, according to Cheng (2003), this is actually the quality of the educational system, features of the input, process, and output which satisfy internal and external stakeholders by fulfilling their explicit and implicit expectations[26]. In his paper on the quality of management teaching, Moreover, Zhao (2003) suggests that the quality of online teaching system of a university be evaluated in terms of the effectiveness of the course, adequacy of access to technology infrastructure, students' satisfaction and academic satisfaction. In their Multimodels of Quality in Education, Cheng & Tam (1997) proposed 7 models in order to conceptualize the quality of educational system which are as follows: the goals and specifications model, the resources-input model, the process model, the satisfaction model, the legitimacy model, the absence of problems model and the organizational learning model. This is while students' satisfaction was examined and confirmed as the most important model of quality in education[27]. Therefore, the quality of the educational system has a significant positive influence on students' satisfaction with E-learning.

Based on the results of the third research hypothesis, path coefficient of the exogenous variable of the quality of the services on students' satisfaction equals 0.196 and is significant with the t being 3.540 and the significance level 0/001 and the reliability of 0.95. As a result, the null hypothesis is rejected and the third hypothesis is confirmed. These results are in keeping with Bashardoust, et al., (2021), Ilbeygi and Sohrabi (2020), Shahhosseini, et al., (2015), Almaiah & Mulhem (2018), Puriwat & Tripopsakul (2019)'s findings[17-20,22]. Therefore, in order to specify the results, it can be said that the quality of the services is mostly described as to what extent does the level of services fulfill users' expectations in terms of empathy, confidence, responsiveness, reliability and tangibility? In the domain of E-learning, the quality of the services represents the quality of the back-up unit of the E-learning system in the environment of people making use of that very system[26]. The services presented via the system make contact with the users, so the quality of the services is important for the E-learning system's success. Almaiah and Mulhem (2018) argued that the quality of the services is absolutely vital to ensure the achievements of educational institutions and to maintain competitive advantages[17]. A review of literature shows that the quality of higher education services is the major factor in students' satisfaction and also shows that the increase in the quality of higher education services can lead to the growth in students' satisfaction. Accordingly, in a competitive market of higher

education, institutions of higher education should strive to continuously provide students with services so as to fulfill their expectations and desires[28-30]. The quality of the services has been shown as an essence with which it would be possible to forge and maintain a good relationship with clients and, therefore, can be regarded as a background to satisfaction from Bing, Moliner and Sanchez's viewpoints[31]. From this perspective, Elliot and Shin (2002) and Ham and Hayduk (2003) both confirmed the existence of a positive relationship between the understood services and students' satisfaction[29,30]. Therefore, the quality of the services has a positive influence on students' satisfaction with E-learning.

Based on the results of the fourth research hypothesis, path coefficient of the exogenous variable of students' satisfaction on the quality of E-learning equals 0.481 and is significant with the t being 12.661 and the significance level 0.001 and the reliability of 0.95. As a result, the null hypothesis is rejected and the fourth hypothesis is confirmed. These results are in keeping with Ilbeygi and Sohrabi, (2020), Mohammad, (2021), Riandi, et al., (2021), Almaiah & Al Mulhem (2018), Puriwat & Tripopsakul (2019)'s findings[17,18,20,32,33]. Therefore, in order to specify the results, it can be said that this framework measures students' expectations of the accepted E-learning system, which is due to the comparison of the performance/outcome of a system with students' expectations. Delone and Mclean (2003)'s model illustrates that users' satisfaction is one of the key elements of confidence in success in any system. As a result, in the domain of E-learning system as a kind of IT in educational environments, students' satisfaction with the quality of the E-learning system is considered to be absolutely crucial[17]. Owing to the fact that there were some limitations in this research including the limited period of time at which this study was conducted, it is somehow impossible to reach logical conclusions based on the results of this study. Therefore, it is necessary that other longitudinal research on similar topics be conducted. Moreover, using questionnaires as the sole data collection instrument has its intrinsic limitations[32,33].

Based on the findings of the research, the following are recommendations for the managers and officials at Shiraz University of Medical Sciences:

Educational content should be continuously assessed by students and also be reviewed and upgraded unceasingly.

Due to the influence of the orientation of curricula such as course content, the quality of the educational system, etc. on the quality of E-learning and students' satisfaction, it is highly suggested that efficient orientations in E-learning be taught to online teachers by holding specialized workshops.

Examining strong and weak points of E-learning and redressing deficiencies and potential flaws.

Aims and strategies of the university should be closely reviewed in a way that change management is prioritized if necessary.

Based on the findings, teaching and learning along with management and provision of organizational support are the most influential factors in learning and since educational systems cannot be reformed by resorting to administrative mandates, care should be taken in employing teachers, in reviewing and designing content, and in assessing and evaluating it.

Carrying out an initial evaluation so as to raise students' awareness of the cognitive basis of E-learning system.

Having a grounding in IT, pedagogy and communication so as to upgrade the quality of E-learning in the educational system of the Faculty of Medical Sciences.

Continuous assessment of E-learning so as to investigate the dynamics of the educational system.

The establishment of an institution which engages in guaranteeing and improving the quality of E-learning in the Faculty of Medical Sciences.

Pathology of the quality of E-learning and analysis of importance/performance.

The establishment of a center for quality evaluation in the faculty, one dependent office of which assumes the responsibility for supervision and evaluation of E-learning centers.

The formation of consortium at the virtual faculty and entrusting specialized supervision and setting standards, criteria and indices of the quality of E-learning to them.

University officials should have a definite plan to receive feedback on the quality of the services provided for students, staff and teachers and practical programs should be prepared in order to deal with the weak points mentioned in the feedback.

The faculty should be in communication with other reputable universities and institutions.

Holding necessary workshops and instruction in this regard which can improve the performance of the E-learning system, thereby leading to students' satisfaction.

During the semester, teachers should pay complete attention to giving feedback on students' scholastic achievement and this feedback should be in time as well as be continuous.

Skilled and efficient teachers especially who have the capacity to work with the E-learning system should be invited to teach. This can result in students' satisfaction.

Students, staff and teachers' complaints should be paid attention to as knowledge gained from clients. Moreover, the university should appreciate the importance of their complaints both as weak points and as remediabl.

Conclusions

The main purpose of this research was to create a model to investigate the effects of educational quality on students' satisfaction with the quality of the e-learning system from the students' perspective. SEM technique was used for experimental evaluation of the research model. The findings showed strong support for the research model. All the proposed hypotheses were confirmed in this research, which provides significant insight into the understanding of the effect of the quality factors on the quality of e-learning. This model shows a strong relationship between quality factors (course content quality, educational system quality, and service quality) with e-learning system quality that was never known before. In addition, the results show that quality factors (course content quality, system quality, and service quality) have a positive and significant effect on students' satisfaction with the quality of the e-learning system. Therefore, educational institutions seek to achieve more benefits; On the other hand, e-learning systems should pay considerable attention to quality factors during the process of designing and implementing their systems, because these factors play an important role in improving the quality of e-learning systems and its services.

Ethical Approval

The Ethics Committee of Shiraz University of Medical Sciences approved the protocol of this study with the code of IR.SUMS.REC.1400.283 The participants voluntarily participated in the present study.

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Conflict of interest

The authors declare no conflict of interest.

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