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Original Article

Electronic assessment and its relationship with technology acceptance and student satisfaction

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Abstract

The present study investigated the relationship between technology acceptance, electronic assessment (e-assessment) methods and the satisfaction of students at Shahid Bahonar University of Kerman, Iran, using a descriptive-correlational design. The research population consisted of all the students (n = 14096) studying at Shahid Bahonar University of Kerman in the academic year 2021-2023. A sample of 387 students was selected using quota sampling. The data were collected using the Technology Acceptance Questionnaire (Teo, 2009) and two researcher-made satisfaction and e-assessment questionnaires, whose validity and reliability were estimated as 0.96 and 0.88, respectively. The collected data were analyzed using descriptive statistics and structural equation modeling (SEM). The proposed model was evaluated using a two-step approach (Anderson & Gerbing, 1988). The Baron and Kenny (1986) approach and Sobel's test (1982) were used to test the mediating relationships in the proposed model and their significance. The results showed a positive and significant relationship between e-assessment and student satisfaction (β=0.78). There was also a positive and significant relationship between the degree of technology acceptance and student satisfaction (β=0.16), but no significant relationship was found between e-assessment and the degree of technology acceptance among the students (β=0.01). These findings imply that technology acceptance cannot play a mediating role in the relationship between e-assessment and student satisfaction at Shahid Bahonar University of Kerman. However, satisfaction acted as a mediating variable in the relationship between technology acceptance and the assessment method.

Keywords: E-assessment, Technology Acceptance, Student Satisfaction, Students, University.

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Introduction

development of new means of communication has enabled modern man to free themselves from the dependence on place and time by using new methods of teaching and learning and to engage in learning in any place according to their needs and wants (Pirhaji Khozani, Shafiee, & Shekarriz, 2021). Thus, the tremendous transformations of higher education and its movement towards universalization have created a new perspective in the development of higher education and e-learning, as the most obvious application of information technology, has added a new aspect to higher education mechanisms (Sheykhpoor & Hatami, 2023).

Studies have shown that despite the many advantages of e-learning courses, students drop out at a higher rate than students of traditional courses (Sharghi, 2012) and have less desire to

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continue and complete them (Dutton & Perry, 2002; as cited in Otarkhani & Delavari, 2013). Accordingly, educational challenges need to be correctly identified to take necessary measures to resolve them and improve the quality of education and the ultimate goal of education, which is to improve the quality of students' learning, is realized (Moosavi et al., 2023). Hence, it is very important to know how to provide e-learning services and find variables contributing to accepting these types of services (Sumak, Hericko, & Pusnik, 2011). Satisfaction is a key variable (Chiu et al., 2005; as cited in Pourtavakoli Chatroodi, 2018) and one of the important indicators of the quality of education (Rodriguez et al., 2015). In other words, one of the important factors in evaluating the success of distance education is knowing the level of satisfaction of the learners, especially university students (Peng et al., 2020).

Scholars consider several factors to be effective in student satisfaction with e-learning systems including content, communication, assessment and learning system factors (Ketabchi et al., 2008), specific learning style and timely and diverse feedback from teachers (Ayum et al., 2006), learner's internet self-efficacy, instructor's timely response, flexibility, quality of e-learning course and technology, ease and usefulness of using the system and variety of evaluation (Paechter, 2010; Fahmi, 2017).

Furthermore, assessment methods used in e-learning are of great importance, and assessment with suitable and standard methods can be effective in satisfying students and ultimately improving the quality of e-learning. Stowell and Lamshed (2011) define e-assessment as the use of information technology for any assessment-related activity. Consequently, one of the most important capabilities of the e-learning environments is the diversity in assessment, which, on the one hand, can provide more effective strategies for real and original assessment and on the other hand, due to the continuous development of electronic tools can question the accuracy and validity of e-assessment (Joughin, 2019).

Technology acceptance is another factor affecting student satisfaction. Information and communication technology (ICT) has many potential benefits, increases educational productivity and improves the technological literacy of learners, but the development and deployment of these technologies are not enough to enjoy these benefits but must be accepted by users (Mansourzadeh, Mahmoodi, & Habibi, 2017). Despite spending huge costs and investments in the production, purchase and transfer of technology, potential users do not use new technologies despite having access to them. In other words, many new technologies are not accepted by users, including students (Wang, 2003). Nevertheless, with the growing development of new technologies in organizational settings, it is necessary to pay attention to technological effects and determine the technology acceptance rate by users based on related theories (Noori, Hatami, & Ebrahimiyan, 2018). By definition, technology acceptance is an explainable and provable consent to use information in the tasks that are designed to support them (Amiri & Nasirzonouzi, 2016). Acceptance is a multidimensional phenomenon and involves a wide range of key variables such as people's perceptions, beliefs, attitudes and characteristics, as well as their involvement with information technology (Chang & Cheung, 2001; as cited in Noori, Hatami, & Ebrahimiyan, 2018). Various internal and external factors are effective in accepting new technologies. Individual factors (subjective norms and mental image), organizational factors (senior manager support, information technology expertise, formality, focus, size, depth of change and organizational readiness) and managerial factors (attitude, innovation, information technology knowledge and managerial tenure) are effective in the adoption of information technology in the organization (Movahedi et al., 2015).

Literature Review

A review of the literature confirms the impact of information technology on various areas of human needs, especially education. On the other hand, one of the controversial issues in higher

education is the development of the online education system, as well as the quality and success rate of this system. The degree and quality of success of online education are affected by various factors. Previous studies have suggested that one of the most important factors in the success of online courses is the satisfaction of students as the main audience of these courses (Cantoni, Cellario, & Porta, 2004). Manee (2013) considers academic satisfaction to be the level of enjoyment and satisfaction of a person from their role and experiences as a student (Farsi et al., 2021). Many studies have addressed student satisfaction with educational services, and have shown that satisfaction is influenced by various factors. The articles published from 1983 to 2010 have classified these factors into six categories: student, professor, educational content, social network and educational management and services (Sohrabi Yurtchi et al., 2011).

Following the literature, one of the factors affecting students' satisfaction with educational services is the assessment method. Assessing students' learning is one of the important issues of virtual curricula. In an ideal electronic education system, the student's activities, progress and interests are monitored and assessed by a software system, and the student goes through the stages of learning and growth step by step. In fact, reaching a stage is a confirmation of learning the concepts discussed in the previous stages. Accordingly, the student's evaluation is performed throughout the training program (Ranjdoust, 2018). In other words, in the traditional view, student learning is assessed to determine the grade, retention or promotion of the learner, and it was considered the endpoint of the teaching and learning process. However, according to the new perspective, evaluation is a part of the learning process in electronic education and connects the teaching and learning processes (Karimi & Amini, 2023). Different researchers have proposed different tools for evaluation in electronic learning including tests (written, oral, practical, multiple-choice, short answer, true-false, etc.), chat and online discussion groups, interviews, telephone evaluations, real-time audio and video conferencing, projects, electronic portfolios, peer assessment, essay writing, joint group assignments, self-evaluation, written assignments and e-mails (Abbasi Kasani et al., 2020).

Another factor that can affect students' satisfaction with e-learning, as indicated in the literature, is the technology acceptance by students. In other words, success in e-learning settings depends to a large extent on its acceptance by the student and the use of the electronic education system. Dillon and Morris (1996) define user acceptance as "demonstrable willingness within a user community to use information technology for the activities it is intended to serve" (Noori, Hatami, & Ebrahimiyan, 2018). Continuous use is defined as the probability of using the system and application by the user (Davis, 1989; as cited in Shirmohammadi & Ansaripoor, 2017). Various internal and external factors are effective in accepting new technologies. Individual factors (subjective norms and mental image), organizational factors (senior manager support, information technology expertise, formality, focus, size, depth of change and organizational readiness) and managerial factors (attitude, innovation, information technology knowledge and managerial tenure) are effective in the adoption of information technology in the organization (Movahedi et al., 2015).

Studies in Iran

Past studies have demonstrated a two-way relationship between some variables. For instance, Pirhaji Khozani et al. (2021) examined the effects of technology integration, perceived efficiency and ease of use on continuance intention and performance mediated by behavioral intention and satisfaction among all students and teachers of non-profit primary schools in Khomeini Shahr (353 students and 151 teachers). The findings indicated that perceived ease of use affects perceived efficiency, technology integration affects behavioral intentions, perceived efficiency is effective in behavioral intentions, perceived ease of use affects behavioral intentions, perceived efficiency affects student and teacher satisfaction, perceived ease of use

influences student and teacher satisfaction, behavioral intention is effective in academic performance, academic performance affects continuance intention and satisfaction affects continuance intention.

Seyedi Raad and Tajfar (2023) also conducted a study on 270 students completing the master's program in information technology management in two universities in the second semester of the academic year 2020-2021 and used learning management systems (LMS) with almost the same specifications. The data were collected from 152 questionnaires on a five-point Likert scale. The research hypotheses were tested using partial least squares regression (PLS) analysis with Smart PLS software. The results showed that perceived usefulness has a significant effect on the perceived satisfaction and also the perceived usefulness and perceived satisfaction have a significant effect on the ease of use of the e-learning system.

Ganji Arjenaki (2017) also investigated the quality of electronic tests and their impact on student satisfaction using a correlational design. The research population included all students (n = 682) at Payame Noor University, Farrokhshahr Branch, in the academic year 2013-2014. The sample size was estimated to be 250 students using Morgan's table. The participants were selected through multi-stage cluster sampling. The data were collected using a researcher-made questionnaire with a reliability index of 0.92. The results confirmed a significant positive relationship between student satisfaction and the quality of electronic tests.

In another study, Sefidi et al. (2023) investigated the satisfaction and quality of online tests from the perspective of dental students at Qazvin University of Medical Sciences. This descriptive-cross-sectional study was conducted on 231 students studying at Qazvin Dental School in 2020. The students were selected using the census method. The data were collected using a researcher-made questionnaire with 27 items scored on a 5-point Likert scale: "very low", "low", "moderate", "good" and "excellent". The questionnaire was administered after the confirmation of its reliability and validity. The collected data were analyzed using descriptive statistics (mean and standard deviation) and inferential statistics (Spearman test and Mann-Whitney correlation test). The findings showed that students were satisfied with the quality of online tests.

Studies abroad

Teo (2009) modeled technology acceptance in pre-service teachers in Singapore. The research population included 475 teachers. The developed model had a good fit and all the relationships between the components of the technology acceptance model were confirmed.

Al-Azawei & Lundqvist (2015) tried to develop the technology acceptance model (TAM) to investigate learners' satisfaction with online education. The participants were 70 language learners from the Babol University of Iraq who voluntarily attended the study and at the end of the online course, they were asked to fill out two questionnaires: The Index of Learning Styles (ILS) and a standard questionnaire that were validated. Then, structural equation modeling was performed to test the proposed hypotheses. The model achieved an acceptable fit and explained 44.8% of the variances in the research variables. An analysis of the components of technology acceptance showed that perceived usefulness was the best predictor of satisfaction, while online self-efficacy and ease of use had no direct effect on satisfaction.

In another study, Aziz Aljawdah et al. (2017) examined the impact of the mediating role of student satisfaction on the relationship between educational quality, service quality and the adoption of e-learning among Karbala University students using structural equation modeling (SEM). The data were collected using a questionnaire whose validity and reliability were confirmed from the students selected by stratified random sampling. Finally, the data from 284 questionnaires were analyzed with the Lisrel software. The findings confirmed the influence of the factors on the adoption of e-learning mediated by the students' satisfaction.

Mar'atus and Sutirman (2020) also examined how the e-learning factors of the technology acceptance model (TAM) affect student satisfaction and the quality of educational services. The results showed that the ease of use and usefulness of e-learning systems (one of the components of the technology acceptance model) have a positive and significant effect on the quality of e-services through student satisfaction.

Moreover, Elsalem et al. (2020) investigated students' anxiety and behavioral changes in remote electronic tests during the COVID-19 pandemic. The participants were selected from undergraduate medical students of the University of Science and Technology, Irbid, Jordan. The survey was conducted through a questionnaire with 29 items that were prepared in Google Forms and distributed among the students of medical faculties (medicine, dentistry, pharmacy, nursing and applied medical sciences). The findings indicated that electronic exams adversely affected medical school students.

No study has yet addressed the relationship between e-assessment and student satisfaction with a focus on the mediating role of technology acceptance. Besides, satisfaction is an important factor contributing to learners' retention, improving the quality of educational services and paving the way for transformation in the educational system following global developments. Moreover, given that the quality of services is one of the factors affecting the success and survival of any organization, including the higher education system, the present study aims to examine whether technology acceptance can play a significant mediating role in the relationship between e-assessment and the satisfaction of students at Shahid Bahonar University of Kerman.

Following the theoretical framework and the conceptual model of the study (Figure 1), the following hypotheses were developed and tested in this study:

Main hypothesis

- E-assessment has a significant relationship with technology acceptance and student satisfaction.

Sub-hypotheses

1. There is a significant relationship between e-assessment and technology acceptance of students at Shahid Bahonar University of Kerman.
2. There is a significant relationship between e-assessment and the satisfaction of students at Shahid Bahonar University of Kerman.
3. There is a significant relationship between e-assessment and the satisfaction of students at Shahid Bahonar University of Kerman with the mediation of technology acceptance.
4. There is a significant relationship between e-assessment and technology acceptance with the mediation of student satisfaction at Shahid Bahonar University of Kerman.

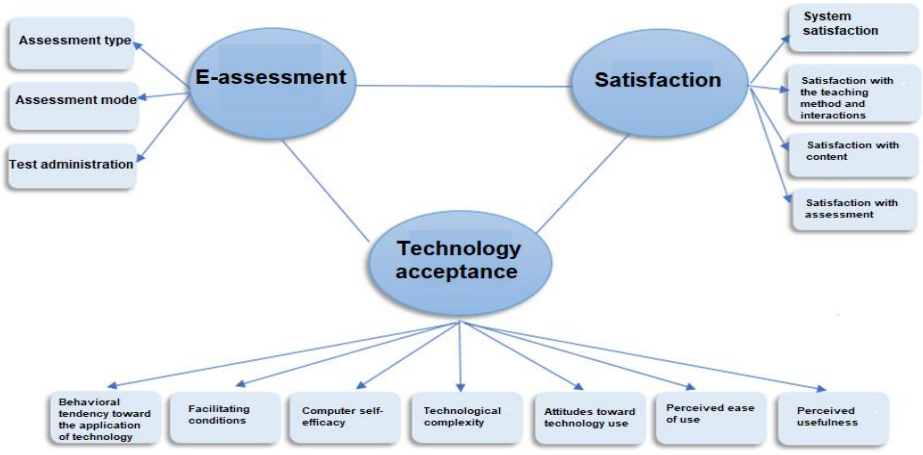

Figure 1. The conceptual model of the study

Research Methodology

This study adopted a descriptive-correlational design. The research population consisted of all the students (n = 14096) studying at Shahid Bahonar University of Kerman, Iran in the academic year 2021-2023. The sample size was estimated as 374 persons using Cochran's formula. Taking a 15% dropout rate in similar studies, 36 additional questionnaires were added to the estimated sample size, and a total of 410 questionnaires were distributed. Accordingly, a total of 387 questionnaires were completed and returned. The participants were selected using quota sampling. To this end, the sample size was estimated following the frequency of students by faculty, gender and academic levels (bachelor's, master's and Ph.D.)

Instruments

The data in this study were collected using Teo's (2009) Technology Acceptance Questionnaire and two researcher-made e-assessment and student satisfaction questionnaires:

Technology Acceptance Questionnaire (Teo, 2009): The Technology Acceptance Questionnaire (2009) has 18 items with 7 components including perceived usefulness (1 to 3), perceived ease of use (4 to 6), attitude towards technology use (7 to 9), technological complexity (10 to 12), computer self-efficacy (13 and 14), facilitating conditions (15 and 16) and behavioral tendency toward the application of technology (17 and 18). The items are scored on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.

Student Satisfaction Questionnaire: This researcher-made instrument has 19 items and 4 components: satisfaction with the systems (1 to 5), satisfaction with the teaching method and resulting interactions (6 to 10), satisfaction with the content (11 to 15) and satisfaction with assessment (16 to 19). The items are scored on a five-point Likert scale ranging from very high (5) to very low (score 1). The total score in this questionnaire shows academic satisfaction.

E-assessment Questionnaire: This researcher-made tool has 25 items and 3 components of assessment type (1 to 5), evaluation mode (6 to 14) and test administration (15 to 25). The items are scored on a five-point Likert scale ranging from very high (5) to very low (score 1). The total score is calculated as the sum of the scores for all items.

Reliability

Cronbach's alpha is a classic measure of reliability and internal consistency (internal reliability), which indicates the internal consistency and reliability of a variable and its related indicators. Cronbach's alpha value higher than 0.7 indicates an acceptable level of reliability (Cronbach, 1951). As shown in Table 1, Cronbach's alpha values for all the research variables are greater than 0.70. Thus, the instruments used in this study have acceptable reliability.

Table 1. Cronbach's alpha coefficients by variable

Variable	Number of items	Cronbach's alpha
Satisfaction	19	0.90
E-assessment method	20	0.76
Technology acceptance	18	0.86
Total	57	0.88

Validity

1. Face validity

The validity of the instrument was assessed by measuring its face and content validity. For this purpose, this researcher-made questionnaire was reviewed by 5 professors from the Department of Educational Sciences of the Faculty of Literature and Humanities. As shown in Table 2, the validity of the whole questionnaire was equal to 0.96 (X.P(X)/N = 0.96):

Table 2. The content validity of the instrument

Items	X	f	f/N	P(X)/N	XP(X)/N
Very acceptable	0.90	0.90	56	280	1
Acceptable	0.05	0.06	4	20	0.75
Somehow acceptable	0.01	0.03	1.6	8	0.50
Unacceptable	0.003	0.01	0.4	2	0.25
Very unacceptable	0	0	0	0	0
Total	0.963	1	62	310	-

2. Construct validity

Confirmatory factor analysis for satisfaction

Figure 2 displays the factor loadings and correlations between the four components of student satisfaction:

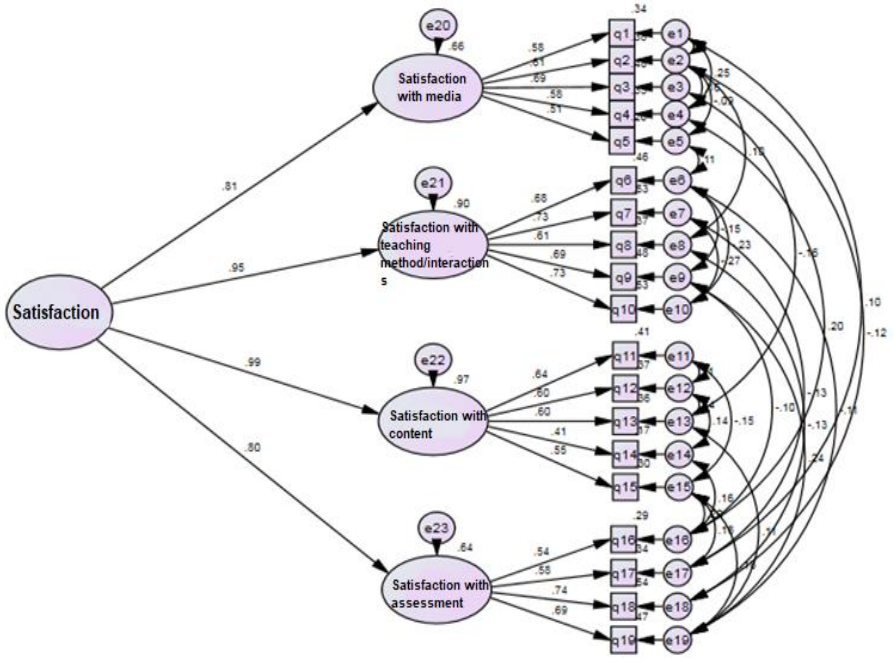

Figure 2. Confirmatory factor analysis for student satisfaction
(RMSEA = 0.015, CMIN/DF = 0.08, P = 0.251, CMIN = 132.10)

The data in Table 3 indicate that the confirmatory factor analysis model has a good fit. In other words, given the acceptable fit indicators, the model can be used to explain the components of student satisfaction:

Table 3. The goodness of fit indices of the confirmatory factor analysis model of satisfaction

Fit indices	CMIN	DF	CMIN/DF	NPAR	P	GFI	AGFI	IFI	TLI	CFI	NFI	RMSEA
Fitted model	132.10	122	1.08	68	0.251	0.97	0.95	0.99	0.99	0.99	0.95	0.015

Acceptable range	df	-	<3	-	>0.05	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	<0.08

As can be seen in the above table, the goodness of fit indices of the model is acceptable, indicating that the confirmatory factor analysis model of satisfaction is properly fitted.

Confirmatory factor analysis for e-assessment

Figure 3 shows the factor loadings and correlations between the three components of e-assessment:

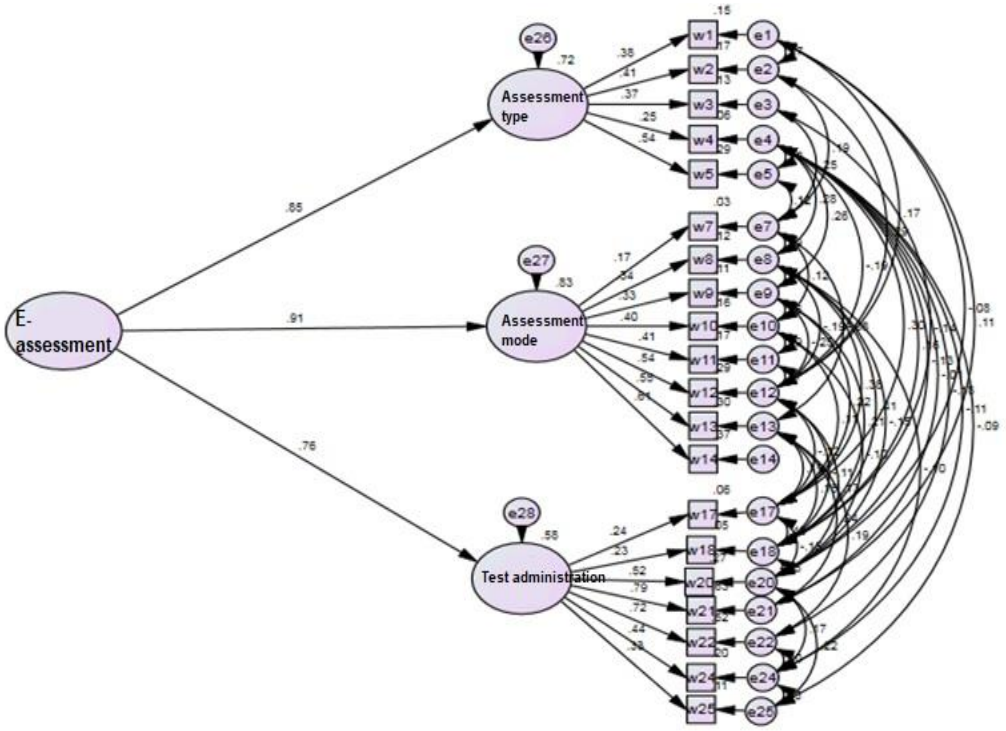

Figure 3. Confirmatory factor analysis for e-assessment
(RMSEA = 0.025, CMIN/DF = 1.24, P = 0.041, CMIN = 144.94)

The data in Table 4 reveal that the confirmatory factor analysis model has a good fit. In other words, given the acceptable fit indicators, the model can be used to explain the components of e-assessment:

Table 4. The goodness of fit indices of the confirmatory factor analysis model of e-assessment

Fit indices	CMIN	DF	CMIN/DF	NPAR	P	GFI	AGFI	IFI	TLI	CFI	NFI	RMSEA
Fitted model	144.04	117	1.24	93	0.041	0.97	0.94	0.99	٠.98	0.99	٠.93	0.025
Acceptable range	df	-	<3	-	<0.05	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.08

As displayed in the above table, the goodness of fit indices of the model is acceptable, indicating that the confirmatory factor analysis model of e-assessment is properly fitted.

Confirmatory factor analysis for technology acceptance

Figure 4 displays the factor loadings and correlations between the seven components of technology acceptance:

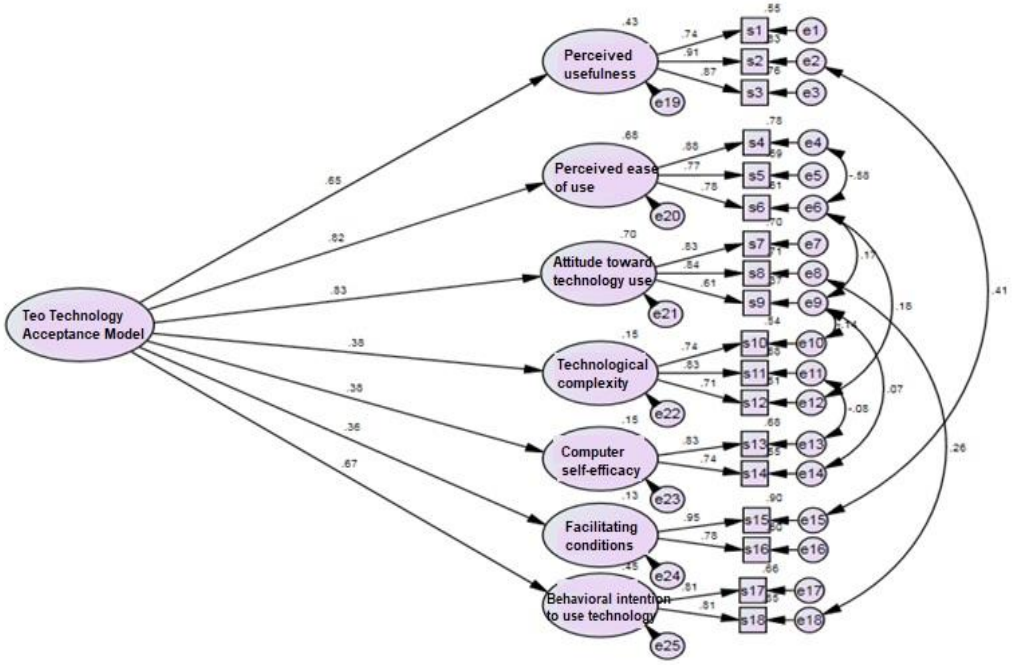

Figure 4. Confirmatory factor analysis for technology acceptance (RMSEA = 0.022, CMIN/DF = 1.19, P = 0.099, CMIN = 112.06)

As displayed in Table 5, the confirmatory factor analysis model has a good fit. In other words, given the acceptable fit indicators, the model can be used to explain the technology use components:

Table 5. The goodness of fit indices of the confirmatory factor analysis model of technology acceptance

Fit indices	CMIN	DI	CMIN/DF	NPAR	P	GFI	AGFI	IFI	TLI	CFI	NFI	RMSEA
Fitted model	11.026	94	1.19	77	0.99	.97	95	.99	.99	.99	.97	022
Acceptable range	df	-	<3	-	<0.05	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.08

As displayed in the above table, the goodness of fit indices of the model are acceptable, indicating that the confirmatory factor analysis model of technology acceptance is properly fitted.

Following the data from the factor analysis model, the correlation values between the variables are not greater than 0.90. Thus, there is no need to merge or remove them. Moreover, as shown in Figure 5, all factor loadings are greater than 0.44, confirming that all components

and items have good factor validity. Although the factor loads for some components are smaller than 0.5, Abareshi and Hoseyni (2012) stated that if the factor load is between 0.3 and 0.5, it is enough to continue the analysis.

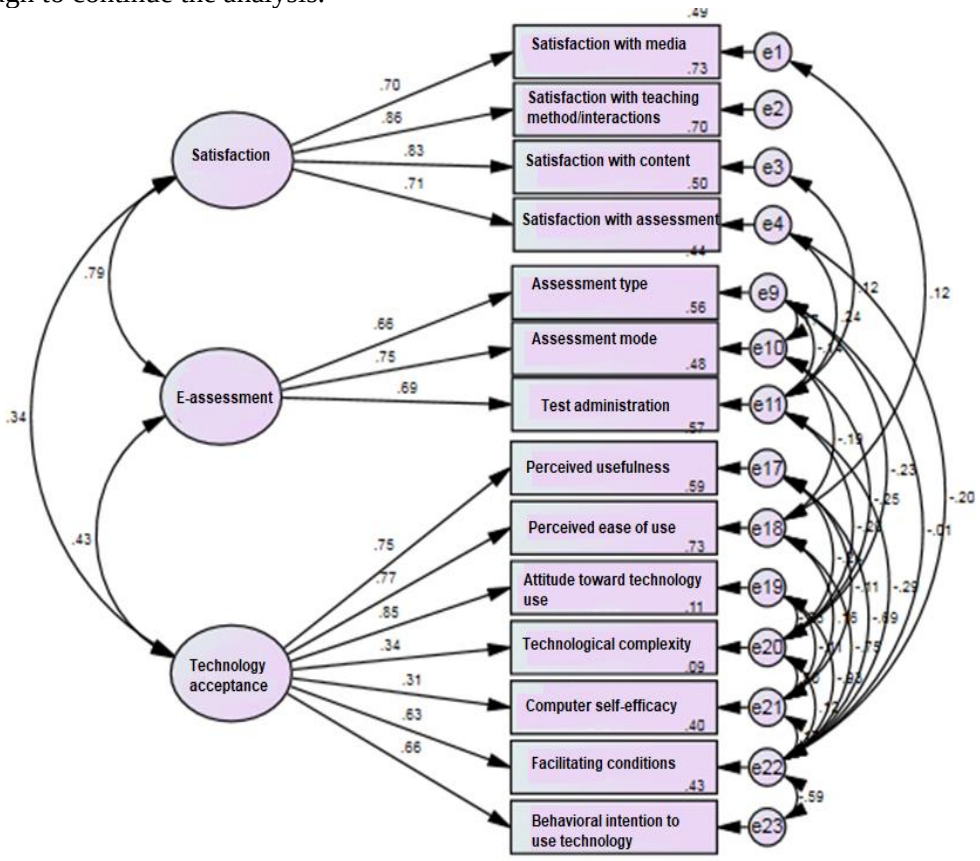

Figure 5. The measurement model for the research variables
(RMSEA = 0.022, CMIN/DF = 1.19, P = 0.180, CMIN = 55.71)

As shown in Table 6, the data follow a normal distribution pattern. Thus, most of the goodness of fit indices are within the acceptable range, indicating that the measurement model has an acceptable fit.

Table 6. The goodness of fit indices of the measurement model for the research variables

Fit indices	CMIN	DF	CMIN/DF	NPAR	P	GFI	AGFI	IFI	TLI	CFI	NFI	RMSEA
Fitted model	55.71	47	1.19	58	0.180	0.98	0.96	0.99	0.99	0.99	0.97	0.022
Acceptable range	df	-	<3	-	<0.05	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.08

Results

The collected data were analyzed with SPSS-23 software. The demographic data (Table 7) were

analyzed using descriptive statistics. Moreover, the research hypotheses were tested using structural equation modeling (SEM) with AMOS-23 software and the bootstrap technique.

Table 7. The distribution of participants by gender, academic degree and faculty

Variable	Categories	Population frequency	Sample frequency	Percentage
Academic level	Ph.D.	1139	31	68.2
	Master's degree	3450	92	23.8
	Bachelor's degree	9507	264	8.0
Faculties	Literature & Humanities	2093	58	15.0
	Physical Education & Sports Sciences	422	15	3.9
	Law & Theology	933	27	7.0
	Veterinary Medicine	427	18	4.7
	Mathematics & Computer	918	29	7.5
	Basic Sciences	1287	37	9.5
	Technical & Engineering	3733	101	26.1
	Physics	428	12	3.1
	Agriculture	1365	37	9.5
	Management & Economics	934	27	7.0
	Art & Architecture	914	26	6.7
Gender	Female	8550	202	52.2
	Male	5546	185	47.8

Structural equation modeling (SEM) was used to develop a model to investigate the mediating role of technology acceptance in the relationship between e-assessment and the satisfaction of students at Shahid Bahonar University of Kerman. Thus, several assumptions of structural equation modeling were checked:

1. The distribution of the scores of the participants for the three main variables (satisfaction, e-assessment and technology acceptance) and their components was analyzed using descriptive statistics such as mean, standard deviation and distribution indices such as skewness and kurtosis. Since the skewness and kurtosis values for the research variables and their components were smaller than ±2, the distribution of these data was normal, and thus parametric tests and structural equation modeling were used for data analysis.
2. The critical chi-square value was 10.83 (df = 1). According to the Mahalanobis test, since none of the values were greater than or equal to the chi-square value (P = 0.001), there were no multivariate outliers.
3. The validity of the model was assessed using factor loadings and the model fit was checked based on goodness of fit indices.

Testing the research hypotheses

Hypothesis 1. There is a significant relationship between e-assessment and the satisfaction of students at Shahid Bahonar University of Kerman.

As shown in Table 8, there is a significant and positive relationship between e-assessment and the satisfaction of students at Shahid Bahonar University of Kerman ($\beta = 0.78$, $t = 6.19$, $P < 0.05$). Following these data, the first hypothesis is confirmed at a 99% confidence interval. E-assessment has a significant relationship with the satisfaction of students at Shahid Bahonar University of Kerman. Moreover, given the coefficient of determination ($R^2 = 0.61$), it can be argued that for one unit of change in e-assessment, the satisfaction of students will increase by 0.61 units.

Table 8. Direct and overall effects of the latent variables on each other

Paths	Path coefficients				P-value
	Standardized parameter	Non-standardized parameter	R^2	t	
E-assessment → Satisfaction of Students	0.78	1.29	0.61	6.19	0.001

Hypothesis 2. There is a significant relationship between e-assessment and technology acceptance of students at Shahid Bahonar University of Kerman.

As can be seen in Table 9, there is no significant relationship between e-assessment and technology acceptance of students at Shahid Bahonar University of Kerman ($\beta = 0.01$, $t = 0.20$, $P > 0.05$). Thus, the second hypothesis is rejected at a 99% confidence interval, indicating that e-assessment has no significant relationship with technology acceptance.

Table 9. Direct and overall effects of the latent variables on each other

Paths	Path coefficients				P-value
	Standardized parameter	Non-standardized parameter	R^2	t	
E-assessment → Technology Acceptance	0.014	0.02	0.001	0.20	0.844

Hypothesis 3. There is a significant relationship between e-assessment and the satisfaction of students at Shahid Bahonar University of Kerman with the mediation of technology acceptance.

This hypothesis was tested using the bootstrap technique with AMOS-23 software. The results showed no significant relationship between e-assessment and the satisfaction of students mediated by technology acceptance ($P = 0.797$). Thus, the hypothesis is rejected at a 0.99 confidence level, indicating no significant relationship between e-assessment and the satisfaction of students with the mediation of technology acceptance:

Table 11. Direct and overall effects of the latent variables on each other

Paths	Path coefficients		P-value
	Standardized parameter	Non-standardized parameter	

E-assessment → Satisfaction mediated by technology acceptance	0.002	0.004	70.97

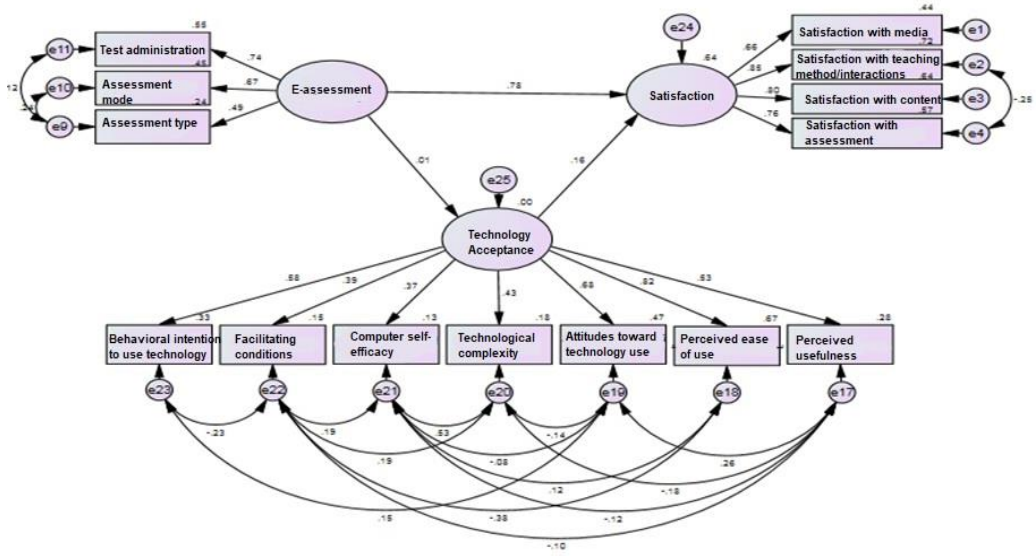

Figure 6. The conceptual model of the study

Figure 6 shows the relationships between predictor, criterion and mediator variables. The numbers shown in the figure are regression values, indicating the path from the predictor variable to the criterion variable. Table 12 shows the fit indices of the model. As can be seen, the factor analysis model has a good fit for testing the research hypotheses.

Table 12. The goodness of fit indices of the structural model

Fit indices	CMIN	DF	CMIN/DF	NPAR	P	GFI	AGFI	IFI	TLI	CFI	NFI	RMSEA
Fitted model	89.64	49	1.83	56	0.001	0.97	0.93	0.98	0.96	0.98	0.96	0.046
Acceptable range	df	-	<3	-	<0.05	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.08

As shown in the table above, e-assessment has a direct and positive impact on student satisfaction ($\beta = 0.78$, $t = 6.19$, $P<0.05$). However, e-assessment has no direct and positive impact on technology acceptance ($\beta = 0.02$, $t = 0.20$, $P>0.05$). The results also confirmed that technology acceptance has a direct and positive impact on student satisfaction ($\beta = 0.16$, $t = 3.03$, $P<0.05$).

Hypothesis 4. There is a significant relationship between e-assessment and technology acceptance with the mediation of student satisfaction at Shahid Bahonar University of Kerman.

The results (Table 13) showed e-assessment has an indirect and positive impact on technology acceptance in students ($\beta = 0.32$, $P < 0.05$). Thus, the hypothesis is confirmed at a 0.99 confidence level.

Table 13. Direct and overall effects of the latent variables on each other

Paths	Path coefficients		P-value
	Standardized parameter	Non-standardized parameter	
E-assessment → Technology acceptance mediated by student satisfaction	0.32	0.46	0.010

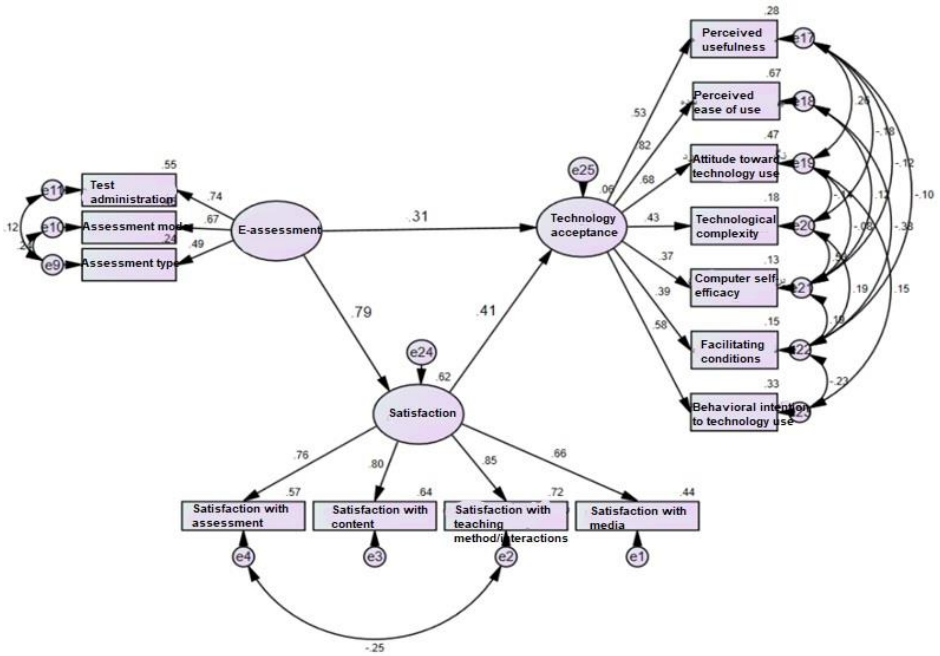

Figure 7. The structural model of the study

Figure 6 shows the relationships between the research variables. The numbers shown in the figure are regression values, indicating the path from the predictor variable to the criterion variable.

Table 14 shows the fit indices of the model. As can be seen, the factor analysis model has a good fit for testing the research hypotheses. In other words, given the acceptable fit indices of the model, it can be used to account for the relationship between e-assessment and students' technology acceptance mediated by student satisfaction.

Table 14. The goodness of fit indices of the structural model

Fit indices	CMIN	DF	CMIN/DF	NPAR	P	GFI	AGFI	IFI	TLI	CFI	NFI	RMSEA
Fitted model	53.11	42	1.26	63	0.117	0.98	0.95	0.99	0.99	0.99	0.97	0.026

Acceptable range	df	-	< 3	-	<0.05	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.08

Conclusion and Suggestions

There are extensive endeavors all over the world for more extensive online education due to its numerous advantages such as generalizability, reduced costs, improved learning, improved teacher-student interaction, access to various resources, etc. However, these factors can be improved when more attention is paid to the quality of online education and the effective factors for maintaining the survival and success of this educational system are identified. Meanwhile, the satisfaction of students as the main audience of any educational system is of great importance. In fact, without paying attention to the satisfaction of students in online education and the factors affecting it, this type of education cannot be considered desirable or its quality cannot be improved. Examining student satisfaction is not only a measure to check the quality of the education system but also helps to improve it by revealing the weaknesses of the system. The assessment method is one of the most important factors influencing the satisfaction of students that can contribute to improving the quality of higher education systems. Effective online education requires an efficient assessment process and the biggest concern of electronic education systems is to realistically assess what learners have acquired using effective e-assessment techniques. Another factor affecting the satisfaction of students and ultimately the success of online education is the technology acceptance by students. In other words, success in online education settings depends to a large extent on its acceptance by the student and the use of the electronic education system. Thus, the level of technology acceptance and the factors affecting it should be taken into account.

The findings from testing the first hypothesis indicated no significant relationship ($\beta = 0.01$, $t = 0.20$, $P > 0.05$) between e-assessment and the degree of technology acceptance by students at Shahid Bahonar University of Kerman. Accordingly, e-assessment type, mode and administration during and at the end of the semester had no significant associations with perceived usefulness, perceived ease of use, attitude towards technology use, technological complexity, computer self-efficacy, facilitating conditions and behavioral tendency toward the application of technology. Contrary to this finding, Karibyan and Sabnis (2021) showed that the students with a lower level of technology acceptance had more negative attitudes towards electronic tests and their effect on their grades than the students classified as technology fans, and the students' inherent bias toward technology plays an important role in their perceptions of computer-based tests. Students' comfort with technology and taking measures to help students become familiar with new technology can help them accept the educational technology used for assessment. This disparity in the findings can be attributed to the difference in the research population. The participants in Karibyan and Sabnis' (2021) study were the students of the West Coast University of the United States, whose principles, culture, experience, etc., are different from the Iranian universities and the participants in the present study. The two studies also used different instruments to collect the required data.

The results from testing the second hypothesis indicated a positive relationship ($\beta = 0.78$, $t = 6.19$, $P < 0.05$) between e-assessment and the satisfaction of students studying at Shahid Bahonar University of Kerman. Indeed, the used e-assessment methods have a positive and significant effect on the satisfaction of students at Shahid Bahonar University of Kerman. Moreover, given the coefficient of determination ($R2 = 0.61$), it can be argued that for one unit of change in e-assessment, the satisfaction of students will increase by 0.61 units. This finding was consistent with the findings of other studies. For example, Ranjdoust (2018) and Zarabiyan

and Ranjbar (2016) showed that electronic tests compared to traditional tests have a significant effect on the satisfaction of students. Moreover, Ganji Arjenaki (2017) reported that electronic tests have a significant positive relationship with student satisfaction.

The results of the study also showed no significant relationship between e-assessment and the satisfaction of students mediated by technology acceptance ($\beta = 0.002$; $P = 0.797$). Thus, technology acceptance cannot play a mediating role in the relationship between e-assessment and the satisfaction of students. However, to the best of our knowledge, no study has yet investigated the relationship between these three variables.

Finally, the findings from this study indicated that there is a significant relationship between e-assessment and technology acceptance mediated by student satisfaction. In line with these findings, the following suggestions are offered:

1. To improve the level of technology acceptance and as a result the satisfaction of students, it is essential to raise students' awareness and induce positive attitudes in them toward the use of information and communication technology and the necessity of using technology in the academic curricula. Furthermore, possible prejudices and resistance to technological change should be eliminated by holding workshops and training courses.
2. Information and communication technology (ICT) skills should be developed in students and professors by holding effective workshops and training courses with the help of ITC specialists.
3. Before selecting and applying various types of information technologies in education, the technology in question should be assessed from different aspects to confirm its usefulness. This encourages students to use that technology and improves their satisfaction.
4. To enhance students' satisfaction, teachers should be familiar with various evaluation methods including self-evaluation, electronic portfolios, consolidated evaluation, etc., and be encouraged to use these methods.
5. University officials and planners should provide the required hardware and software infrastructures and facilities for the use of the desired e-assessment system by strengthening network and internet infrastructures.
6. Students' needs and their characteristics and differences should be identified, and evaluation strategies should be selected in a manner to meet the student's needs in achieving educational goals and content to improve their satisfaction.

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