



Full Length Article

A model for assessing the impact of e-learning systems on employees' satisfaction



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ARTICLE INFO

Article history:

Received 4 April 2015

Revised 10 July 2015

Accepted 14 July 2015

Available online 30 July 2015

Keywords:

Attitude

Education content

E-learning

Motivation

Satisfaction

Technology

ABSTRACT

In a knowledge and information society, e-learning has built on the extensive use of advanced information and communication technologies to deliver learning and instruction. In addition, employees who need the training do not have to gather in a place at the same time, and thus it is not necessary for them to travel far away for attending training courses. Furthermore, the flexibility allows employees who perform different jobs or tasks for training courses according to their own scheduling. Since many studies have discussed learning and training of employees and most of them are focused on the learning emotion, learning style, educational content, and technology, there is limited research exploring the relationship between the e-learning and employee's satisfaction. Therefore, this study aims to explore how to enhance employee's satisfaction by means of e-learning systems, and what kinds of training or teaching activities are effective to increase their learning satisfaction. We provide a model and framework for assessing the impact of e-learning on employee's satisfaction which improve learning and teaching outcomes. Findings from the study confirmed the validity of the proposed model for e-learning satisfaction assessment. In addition, the results showed that the four variables technology, educational content, motivation, and attitude significantly influenced employee's learning satisfaction.

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1. Introduction

Currently, the Internet makes a huge effect to the society and creates a new revolution in the 21st century where everything and everyone are getting on-line and connected (Dharmawansa, Nakahira, & Fukumura, 2013; Oussalah et al., 2014). The web is more than a simple information search and social contact feature, it is also a learning tool that allows other ways to build and share knowledge (Loureiro & Bettencourt, 2014). Internet and web services as an information hub facilitate information and data transferring and sharing (Jafari Navimipour, Rahmani, Navin, & Hosseinzadeh, 2015; Souri & Jafari Navimipour, 2014). Also, in the past few years, the information, communication technology and the e-learning captured a major role in higher education system (Venkataraman & Sivakumar, 2015). The European

commission describes e-learning as the use of the Internet and new multimedia technologies to advance the quality of learning by providing access to resources and services, as well as enabling remote exchange and collaboration (Dominici & Palumbo, 2013). E-learning is a form of distance learning that is completely virtualized through an electronic channel (medium), like the Internet (Lara, Lizcano, Martínez, Pazos, & Riera, 2014). In a knowledge and information society, e-learning has built on the extensive use of advanced information and communication technologies to deliver learning and instruction. It also facilitates lifelong learning (Chen, 2014) and utilizes electronic communication for teaching and learning from a distance. E-learning can be as effective as the conventional in-class face-to-face teaching and learning, if the techniques are appropriate for the teaching goals with a well-organized student-teacher interaction (Oztekin, Delen, Turkyilmaz, & Zaim, 2013). Online learning is widespread in today's educational environments, supported by Virtual Learning Environments such as Moodle™, Sakai™, or Blackboard™ (Del Blanco, Marchiori, Torrente, Martínez-Ortiz, & Fernández-Manjón, 2013) and also may be referred to as e-learning, e-training, or web-based instruction (Colorado & Eberle, 2010). E-learning is also emerging as a popular learning approach utilized by many organizations (Jia et al., 2011). Learners can access the online resource

Abbreviation: AMOS, analysis of moment structures; ANOVA, analysis of variance; E-learning, electronic learning; ELS, electronic learning satisfaction; GOF, goodness of-fit; HR, human resource; IT, information technology; LMS, learning management system; MELSS, measuring e-learning system success; PLS, partial least squares; SPSS, statistical package social sciences; SEM, structural equation modeling; WWW, World Wide Web.

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and discuss with instructors or members in any location, at any time. Within IT-based systems, students not only download materials, but also can **share relevant experiences and information with other classmates** (Zhang, Ordonez de Pablos, & Zhang, 2012; Zhang, Ordonez de Pablos, & Zhu, 2012). Organizations worldwide prefer e-learning or online learning because they provide a cost-effective and timely learning vehicle to meet the various requirements of continuous education, and train civil agents working at different locations (Chen, 2014). In an e-learning environment, learners supply with learning materials via media, making e-learning systems a cost- and time-effective approach to employee training. Through information technology, learner could not acquire knowledge and skills independently; but they can also have access to material customized to meet their needs without the barriers of time and space.

E-learning, one type of e-services, has been one of the most significant **recent developments in both schools and corporations** (Violante & Vezzetti, 2015). As another hand, employees who need the training do not have to gather in a place at the same time, and thus it is not necessary for them to travel far away for attending training courses (Jafari Navimipour, Navin, Rahmani, & Hosseinzadeh, 2015). Furthermore, the **flexibility** allows employees who perform different jobs or tasks for training courses according to their own scheduling. Moreover, employees can control their own learning speed for the learning process (Chen, 2010). They **are the important assets of organizations and play a significant role in their success** (Jafari Navimipour, 2015; Navin, Navimipour, Rahmani, & Hosseinzadeh, 2014), **so it is essential to satisfaction these people** (Farooqui & Nagendra, 2014). **Managing employees as an organization's primary asset has inspired there to become increasingly more effective for developing programs and policies that leverage talent to align with organizational competencies and at executing organizational strategy** (Capece & Campisi, 2013). **Therefore**, their management is an important challenge in any organization (Navin, Ghabousian, Mirnia & Navimipour, 2012) and staff training and gain their **satisfaction** are the important part of employees management. Users satisfaction is the extent to which users believe the **system** meet their information requirements (Cheok & Wong, 2015). Some researchers have **defined satisfaction** as positive feelings or aggressive responses; whereas others defined it as the gap between expected gain and the actual gain (Tsai, Yen, Huang, & Huang, 2007). Also, **user satisfaction is defined** as the sum of positive and negative responses to **a set of factors** (Najmul Islam, 2014) and it is defined as the pleasurable emotional state of an employee, regarding working situations, supervisor, his or her job duties, and the organization as a whole (Yeh, 2014). **Information systems researchers have revealed that satisfaction** is the most important factors in the success of system implementation and it is influenced by factors attributed to the student, teacher, course design, technology, system design, and environment (Teo, 2014). Recent **researches in e-learning** are highlighted the need to define novel and advanced **support mechanism** for commercial and academic organizations in order to enhance the skills of employees and students to increase the overall competitiveness in the new economy world (Acampora, Gaeta, & Loia, 2011).

Since many studies have discussed learning and training of employees and most of them are focused on the learning emotion, learning style, educational content, and technology, there is limited research exploring the relationship between the e-learning and employee's satisfaction. Therefore, this study aims to explore how to enhance employee's satisfaction by means of e-learning **systems**, and what kinds of training or teaching **activities** are effective to increase their learning satisfaction. Briefly, the research question is **"Which factors are significant in satisfaction of employees using e-learning systems?"**. Furthermore, the contributions of this paper are as follows:

- Furthering our understanding of **how to define, and assess** employee satisfaction of e-learning **systems**.
- Providing a model and framework for assessing the impact of E-learning on employee's satisfaction.
- Helping to a better understanding of instructional strategies for **designing and promoting e-learning systems** in the organizations.
- Improving learning and teaching **outcomes**.
- Exploring future **challenges** for electronic learning.

The rest of this paper is structured as follows. The previous researches, related literature, and factors influencing employee satisfaction in e-learning are provided in the next section. A research design based on an integrated model proposed by this study is described and examined in Section 3. Section 4 presents the analysis of the data. Finally, conclusions and future works are provided in Section 5.

2. Literature review **通过文献归纳出四个方面**

E-learning has become an important trend in the recent years. The advocacy of learner-centered training and the emergence of digital classrooms lead to the demand for transformation of pedagogical design that supports the development of 21st century skills through domain knowledge learning (Kong et al., 2014). In addition, to providing richer resources than the traditional classroom to facilitate learning, e-learning also overcomes the limitations of time and space of traditional teaching. e-learning allows learners to learn independently, meaning that it lacks the supervision and enforcement mechanisms of traditional teaching (Wang, 2014). The use of information technology in current era is considered as a solution for multinational organizations or educational institutions' for their expense and quality issues (Malik, 2010). The importance of the Internet as an information hub to facilitate data transfer and sharing has increased dramatically in the last decade because of its convenience in accessing both professional services and entertainment (Jafari Navimipour & Sharifi Milani, 2015). Based on these technologies, e-learning has caused many changes in higher education, as it emerged as a new paradigm of modern education and has changed previous learning concept (Dominici & Palumbo, 2013). E-learning generally refers to the use of computer network technology, primarily over an intranet or through the Internet, to deliver information and instruction to individuals. It allows training to reach diverse and geographically dispersed workforces in a cost-efficient manner, and can take place on-demand and at a lesser cost than on-site training (Lee, Hsieh, & Ma, 2011).

In the last decade, organizations are frequently using technology to deliver training programs for their employees due to its beneficiary effects such as cost reduction in travel expenses and training time, flexibility in the pace and delivery of training, and boost worker productivity (Ozturan & Kutlu, 2010). Application of online learning technology not only enhances teaching effectiveness but also makes up for the inadequacies of traditional education (Shih, Chen, Chen, & Wey, 2013). Based on the Zhang, Ordonez de Pablos, and Zhang (2012) and Zhang, Ordonez de Pablos, and Zhu (2012) findings, IT capabilities of virtual world are generally related to users' digital options, and then improve the individual and team knowledge work. Also, in a well-developed learning community, learners collaboratively communicate during their educational experience to construct knowledge (Yeh & Lin, 2015). Furthermore, Alkhalaf, Drew, and Alhussain (2012) have showed that the use of e-learning systems significantly and positively impact on student learning satisfaction. Also, Yengin, Karahoca, and Karahoca (2011) showed that the

Table 1
The indicators to measure the educational technology.

Indicators	References
Learning system quality	Muñoz Organero and Kloos (2007) and Capece and Campisi (2013)
Availability of systems	Farrell, Cubit, Bobrowski and Salmon (2007) and Nicoleta-Magdalena (2011)
Knowledge use of the system	Holsapple and Lee-Post (2006) and Pituch and Lee (2006)
Technical support system	Alsabawy, Cater-Steel, and Soar (2013) and Rubin et al. (2013)
Easy to use system	Ozkan and Koseler (2009), Rubin et al. (2013) and Capece and Campisi (2013)
User friendliness	Holsapple and Lee-Post (2006) and Malik (2009)

Table 2
The indicators to measure the educational content.

Indicators	References
Content quality	Piccoli et al. (2001) and Oztekin, Nikov, and Zaim (2009)
Content quantity of learning	Keegan and Turner (2001) and Roach and Lemasters (2006)
Spatial and temporal flexibility	Sun et al. (2008) and Arbaugh and Duray (2002)
Effectiveness of content	Van Raaij and Schepers (2008) and Rubin et al. (2013)
Working group	Attaran (2012)

satisfaction is one of the factors that affect usability of the system which also directly affect instructors' performance. Based on (Mohammadi & Fadayian, 2014), e-learners' satisfaction is significantly concerned by computer and instructor characteristics and technology. Also, de Melo Pereira, Ramos, Gouvêa, and da Costa (2015) have suggested that the satisfaction is a key factor for the purpose of continuous use intention. As another research in this scope, Kong and Yan (2014) have found that there was a positive relationship between experiential learning and learning satisfaction, and learning satisfaction contributed positively to career competencies.

The rest of this section provides a brief review on the most important state of the art researches to identify the affecting factors on employee's satisfaction in the e-learning systems. Based on the previous studies, seventeen dimensions within four variables (technology, educational content, motivation, and attitude) are discussed in the rest of this section (see Tables 1–4).

2.1. Educational technology

Educational technology is the effective use of technological tools in learning. As a concept, it concerns an array of tools, such as media, machines and networking hardware's, as well as considering theoretical perspectives for their effective application (Richey, Silber, & Ely, 2008). Several researchers indicate that educational technology quality significantly affects satisfaction in e-learning (Piccoli, Ahmad, & Ives, 2001; Rubin, Fernandes, & Avgerinou, 2013; Sun, Tsai, Finger, Chen, & Yeh, 2008). The definition of technology quality is the learners' perceived quality of IT applied in e-learning (such as microphones, earphones, and electronic blackboards). Thus, educational technology refers to the use of both physical hardware and educational theoretic. Educational technology includes the following dimensions: learning system quality, availability of systems, knowledge use of the system, technical support system, easy to use system, user friendliness. Table 1 shows the indicators to measure the educational technology.

Table 3
The indicators to measure the motivation.

Indicators	References
Organizational promote	Keller and Suzuki (2004) and Holsapple and Lee-Post (2006)
Internal knowledge promote	Barolli, Koyama, Durreesi, and De Marco (2006) and Muñoz Organero and Kloos (2007)
Financial motives	Tsai et al. (2007)

Table 4
The indicators to measure the attitude.

Indicators	References
Internet use skills	Pituch and Lee (2006), Sun et al. (2008) and Huang et al. (2012)
Personal experience	Malik (2010)
Self-confidence and anxiety	Barbeite and Weiss (2004), McLean (2006) and Malik (2009)

- **Learning System Quality:** In an e-learning formation process the quality of training can be influenced by the adopted technology (Capece & Campisi, 2013). To achieve successful implementation and learner satisfaction toward e-learning, quality of technological attributes need to be excellent. The more will be the best quality server more will be the loading speed of online interface (Malik, 2009).
- **Availability of Systems:** The use of distributed databases in e-learning systems improves access to information and offer rapid data collection. Distributed databases have appeared as a necessity, because they improve availability and reliability of data and offer high performance in data processing by allowing parallel processing of queries, and also reduce processing costs (Nicoleta-Magdalena, 2011).
- **Knowledge Use of the System:** Knowledge is a familiarity, awareness or understanding of someone or something, such as facts, information. We concluded that theories and knowledge accumulated on the topic of information systems can be beneficial in user satisfaction in e-learning (Holsapple & Lee-Post, 2006).
- **Technical Support System:** The technology used to support an online course may affect the frequency and manner in which users and masters interact with one another, provide and receive feedback, and interact with course materials (Rubin et al., 2013).
- **Easy To Use System:** This is defined as the degree to which a person believes that using a particular system would be easy to use (Capece & Campisi, 2013). previous studies have found that students' perceptions of the overall ease of use of the LMS predict their satisfaction with online learning (Rubin et al., 2013).
- **User Friendliness:** The user-friendly interface of the online course will effect user satisfaction. The easygoing interface of online course will attract the user to take class via internet, when he has the time and place flexibility. The result of user friendly interface will directly influence user satisfaction toward e-learning (Malik, 2009).

2.2. Educational content

In fact, education content is the quality of system output and measures semantic success (Hassanzadeh, Kanaani, & Elahi, 2012). Some researchers suggest that educational content significantly affects satisfaction in e-learning (Petter & McLean, 2009; Wang & Wang, 2009). Educational content includes the following dimensions: content quality, content quantity of learning, spatial and temporal flexibility, effectiveness of content, working group. Table 2 shows the indicators to measure educational content.

- **Content Quality:** Quality of course content is the most important attribute that leads toward user satisfaction and successful implementation of e-learning. The quality of well-designed e-learning programs is the precedent factor for learners when considering e-learning (Piccoli et al., 2001). It is particularly important that the e-learning systems are able to integrate different paces of content and navigation in order to be able to respond to diverse needs of the learners and to avoid the cognitive overload (Ruiz, Díaz, Soler, & Pérez, 2008).
- **Content Quantity of Learning:** Adaptability in the face of variation in quantity and quality of project is important in terms of survival and success in project based organizations even though not all firms react in the same way. Quantity of practices, particularly in the area of retention, does not necessarily mean high quality of practices in promoting learning through projects (Keegan & Turner, 2001).
- **Spatial and Temporal Flexibility:** The most attractive feature of e-learning according to student and teacher both is its flexibility of location and time. Commuting was the main problem for students in traditional classes. E-learning come with new virtual (anywhere, anytime, anyplace) class concept (Arbaugh & Duray, 2002). Also, the flexible nature of online learning environment increase learner satisfaction (Sun et al., 2008).
- **Effectiveness of Content:** A related though distinct concept regarding the effectiveness of learning technologies is called usability, which has been defined as how well “a system allows for the accomplishment of a set of tasks in an efficient and effective way that satisfies the user” (Rubin et al., 2013). In addition, understanding self-efficacy in online learning is critical to improve online education (Shen, Cho, Tsai, & Marra, 2013).
- **Working Group:** Working group refers to a method in that all learners at different levels of performance work with each other in small groups toward a common goal. In collaborative learning, participants share their understanding of subject learning with others and, support, cooperate with each other. Collaborative tools consist of email, computer networks, electronic whiteboard, discussion boards, chat, audio conferences, video conferences, instant messages, etc. (Attaran, 2012).

2.3. Motivation

The success also failure of e-learning courses depends not only on the design and quality of the learning materials but on the ability to motivate students to study them (Muñoz Organero & Kloos, 2007). Working with an easy-to-use 3D graphics environment is attractive and highly motivating to today's generation of media-conscious students (Zhang, Liu, Ordonez de Pablos, & She, 2014). Motivation is a theoretical construct, used to explain behavior. It is the scientific word used to represent the reasons for our actions, desires, needs, etc. Motives are hypothetical constructs, used to explain why people do what they do. A motive is what prompts a person to act in a certain way or at least develop an inclination for specific behavior (Wigfield, Guthrie, Tonks, & Perencevich, 2004). It is the self-desire to seek out new things and new challenges, to analyze one's capacity, to observe and to gain knowledge. The employee has the intrinsic motivation to gain more knowledge (Deci & Vansteenkiste, 2004). In addition, the research results showed that extraversion and conscientiousness affected positively on learners' online learning motivation. In addition, online learning can activate their learning motivation (Shih et al., 2013). Motivation variable includes the following dimensions: organizational promote, internal knowledge promote, financial motives. In Table 3, the indicators to measure the motivation variable are presented.

- **Organizational Promote:** In the literature, economic exchange has been represented by organizational reward, reflecting the explicit benefits of knowledge contribution. Organizational reward involves explicit and enforceable terms which organizations can provide directly (Zhang, De Pablos, & Zhou, 2013). Other motivational concepts that help explain relevance are motives such as the needs for achievement, affiliation and power, competence and flow. Learner goals can be extrinsic to the learning in that it is necessary to pass a course to be eligible for a desired opportunity, but a stronger level of motivation to learn is achieved when the learner experiences intrinsic goal orientation, i.e. when the learner is engaged in actions that are personally interesting and freely chosen (Keller & Suzuki, 2004).
- **Internal Knowledge Promote:** Intrinsic motivation has been studied since the early 1970s. Intrinsic motivation is the self-desire to seek out new things and new challenges, to analyze one's capacity, to observe and to gain knowledge (Ryan & Deci, 2000).
- **Financial Motives:** Workers in any organization need something to keep them working. Most of the time, the salary of the employee is enough to keep him or her working for an organization. An employee must be motivated to work for a company or organization. If no motivation is present in an employee, then that employee's quality of work or all work in general will deteriorate.

2.4. Attitude

Much research indicates that learner attitude toward computers or IT is an important factor in e-learning satisfaction (Arbaugh & Duray, 2002; Huang, Huang, Huang, & Lin, 2012; Sun et al., 2008). The definition of learner attitude is learners' impression of participating in e-learning activities through computer usage. Positive attitudes toward computers increase the chances of successful computer learning, and negative attitudes reduce interest. Therefore, this research considers learners' attitude toward computers an important factor in learning satisfaction. According to previous research, we define the attitude by the following dimensions: Internet using skills, personal experience, self-confidence, and anxiety. Table 4 shows to the indicators measuring attitude.

- **Internet Use Skills:** E-learning depends mainly on the use of computers as assisting tools (Sun et al., 2008). If users think that the technology is easy to use, they will find the technology to be useful (Huang et al., 2012).
- **Personal Experience:** If the user has positive personal experience about technology then he would definitely participate in online course environment effectively (Malik, 2010).
- **Self-confidence and Anxiety:** Satisfaction of user toward e-learning is very much influenced from the computer anxiety. In e-learning environment computer is the main part and the student who feel reluctant in using computer and feel anxiety will definitely negatively influence user satisfaction (Malik, 2009).

3. Methodology

The design and implementation of e-learning (web-based education) systems have grown exponentially in the last years, motivated by the fact that neither students nor teachers are bound to a specific location (Hogo, 2010). E-learning can be defined as a distributed and Internet-based learning environment that utilizes educational tools to facilitate learning and knowledge building through meaningful action and interaction (Dabbagh, 2005). Students' initial perceived satisfaction with technology-based

e-learning will determine whether they will use the system continually. This section recognizes critical factors influencing e-learners' satisfaction and in order to measure employee satisfaction in e-learning, we present a new model (illustrated in Fig. 1) based on the MELSS model (Hassanzadeh et al., 2012) and the presented model by Sun et al. (2008). The rest of this section describes the measurement tools, component model, research hypotheses, target population, and measurement model, respectively.

3.1. Measurements

For measuring the elements of the proposed model, a questionnaire is designed. The core of the questionnaire was a set of items relating to issues that have been proposed in the literature to influence the employee satisfaction. The respondents indicated their agreement or disagreement with the above items using a five-point Likert scale (Likert, 1932) with 1 representing exceptionally disagree and 5 representing exceptionally agree. Questionnaires were revised with help from experts (including academics and practitioners) with significant experiences in e-learning. The questionnaire was presented to employees the Telecommunication Company of East Azerbaijan, Iran.¹ For statistical analysis of questionnaires, we have used of the SPSS² 22 and SMART-PLS³ 2.0 software package.

3.2. Conceptual model

Advances in information and communication technologies, and specifically in multimedia, networking and software engineering have promoted the appearance of a huge amount of learning resources (Jerman-Blažič & Klobučar, 2005). The new technology has transformed the learning and instructing method in the organizations. This is the information age and e-learning has emerged as a new interactive learning environment. The efforts in the field of e-learning are receiving colossal interest around the globe (Malik, 2010). Based on the previous studies, a new framework was designed to guide this study. Seventeen dimension within four variables are discussed where are discussed in the rest of this section. These variables are educational technology, educational content, motivation, and attitude. Under the four variables previously identified, seventeen dimensions were involved. In the educational technology variables, those factors are learning system quality, availability of systems, knowledge use of the system, technical support system, easy to use system, user friendliness. The dimension of content quality, content quantity of learning, spatial and temporal flexibility, effectiveness of content, working group were identified in the educational content variable, and organizational promote, internal knowledge promote, financial motives in the motivation variable. Finally, internet use skills, personal experience, self-confidence, and anxiety were identified in attitude variable. These variables discussed by previous researchers cover nearly every aspect of e-learning environments; however, they have never been integrated into one framework subject to examination for validation and relationship. This research develops such a framework including those variables shown in Fig. 1.

3.3. Research hypotheses

Seventeen dimensions within four variables are presented and discussed in the previous section. In this section, four hypotheses for testing the relationships among the demetias of the

framework are presented. The general and specific study hypotheses are as follows:

A number of studies have shown that the educational technology has an important effect on e-learning satisfaction. The definition of quality of educational technology is the learners' perceived quality of IT applied in e-learning (such as microphones, earphones, and electronic blackboards). Since e-learning is more dependent on the used technologies, we consider the technology as an important factor in satisfaction. Hypothesis 1 will test this assumption:

H1. There is a significant positive relationship between satisfaction and educational technology.

Many articles showed that learner education content is an important factor in satisfaction. Education content is important for learners, because it should be according with the experience, needs, requests, and their ability. We consider the education content as one of the factors influencing the satisfaction. Hypothesis 2 will test this assumption:

H2. There is a significant positive relationship between satisfaction and educational content.

Motivational factors are the uppermost importance in e-learning courses since the motivational impact of the student-teacher proximity obtained in face to- face education is normally not achievable. Motivation is one of the factors that is effective in the use of the educational system and can cause be satisfaction. The definition of motivation is the self-desire to seek out new things and new challenges, to analyze one's capacity, to observe and to gain knowledge. Thus, the assumption 3 of this study is as follows:

H3. There is a significant positive relationship between employee satisfaction and motivation.

Much research indicates that learner attitude toward e-learning is an important factor in satisfaction. Learner attitude is learners' impression of participating in e-learning activities through computer usage. E-learning depends mainly on the use of computers as assisting tools. A more positive attitude toward e-learning increase the chances of successful computer learning, and negative attitudes reduce interest. Therefore, this research considers employee attitude toward computers as an important factor in learning satisfaction. Hypothesis 4 will test this assumption:

H4. There is a significant positive relationship between employee satisfaction and attitudes.

Measuring employee satisfaction offers an indication of how successful the organization is at presenting effective training and benefits to its employees and offers additional insights regarding retention efforts. The wide use of satisfaction measurements employed by training managers suggests that e-learner satisfaction deserves more attention (Ahmad & Tarmudi, 2012). Based on the presented assumptions and the possibility of a relationship between educational technology, education content, motivation, attitude, and employee satisfaction, we discussed the results in the next section.

3.4. Target population

The target samples of this study are employees the Telecommunication Company of East Azerbaijan.⁴ The total volume of the sample was 240 person. According to Morgan table (Appendix A), the target population was selected. Thus, 148 cases were

¹ <http://www.eatc.ir/>.

² <http://www-01.ibm.com/software/analytics/spss/>.

³ <http://www.smartpls.com/>.

⁴ www.eatc.ir.

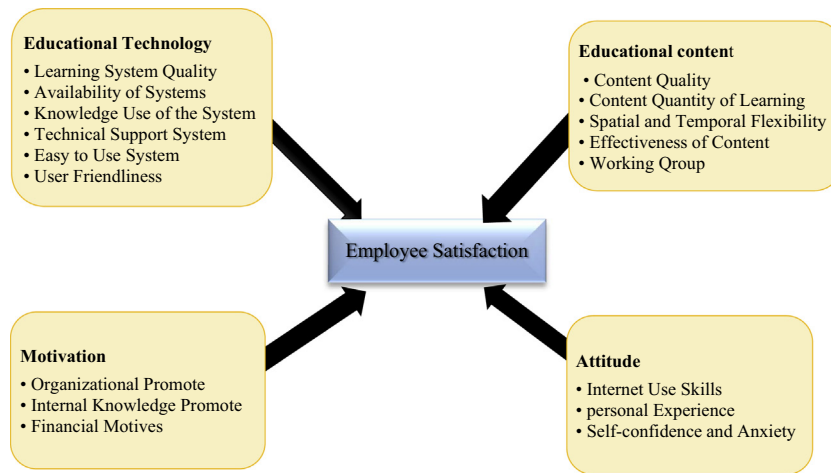


Fig. 1. The proposed conceptual model for assessing the impact of e-learning on employee's satisfaction.

randomly selected. Of the 135 questionnaires returned from employees, 7 were deemed unusable (incomplete) resulting in 128 employee's questionnaires for analysis.

3.5. Measurement model

The measurement model was assessed using item loadings, convergent validity, reliability of measure, and discriminate validity. An item was considered to be reliable if its loading was greater than 0.7. The convergent validity was assessed through using average variance extracted (AVE), which must exceed a standard minimum level of 0.5 (Fornell & Larcker, 1981). The reliability of the measures was examined through the use of composite reliability and Cronbach's alpha. In general, the minimum value of composite reliability is 0.7 (Nunnally, 1978), and the minimum value of Cronbach's alpha is 0.7 (Cronbach, 1951). The discriminate validity was assessed by using the square root of average variance extracted and latent variable correlations. The square root of average variance extracted of each construct should exceed the correlation shared between one construct and other constructs in the model (Huang et al., 2012). Tables 5 and 6 show the results of

Table 5
The convergent validity and reliability of measure for the measurement model.

	AVE	Composite reliability	Cronbach's Alpha
Educational technology	0.63	0.89	0.85
Educational content	0.58	0.89	0.85
Motivation	0.59	0.87	0.82
Attitude	0.66	0.90	0.86
Employee satisfaction	0.54	0.92	0.91

Table 6
The discriminant validity for the measurement model.

	Educational technology	Educational content	Motivation	Attitude	Employee satisfaction
Educational technology	0.79^a				
Educational content	0.58	0.76^b			
Motivation	0.40	0.70	0.77^c		
Attitude	0.37	0.75	0.68	0.81^d	
Employee satisfaction	0.57	0.67	0.73	0.66	0.74^e

^a √0.63.
^b √0.58.
^c √0.59.
^d √0.66.
^e √0.58.

the measurement model to be acceptable, since all the values met the standard levels.

This study adopted the criteria evaluation measurement model suggested by Fornell and Larcker (1981): (1) the Cronbach's alpha should be significant and greater than 0.7; (2) the composite reliability (CR) should be greater than 0.7; (3) the average variance extracted (AVE) should be greater than 0.5. The Cronbach's a coefficient of each dimension is greater than 0.7, including technology (0.85), educational content (0.85), motivation (0.82), attitude (0.86), and employee satisfaction (0.91), conforming to the high reliability required by Cronbach (1951). This indicates that the measurement variable items of this study are coincident. The CR values within 0.87–0.92 are greater than 0.7. The AVE values within 0.54–0.66 are greater than 0.5. The three conditions of this study are coincident with good convergent validity.

Table 7 presents every construct's AVE values, and the square of the estimated correlations for each pair of constructs. This information confirms the existence of discriminate validity between the constructs, since the AVE values are higher than the squared estimated correlations.

4. Results and discussion

In this paper, the partial least squares approach was used to analyze the questionnaire data, due to the small sample size. PLS is a component-based approach that assesses construct reliability and validity and estimates the relationships among constructs (Cheng & Yang, 2014). The partial least squares approach is frequently used as an alternative to structural equation modeling. In contrast to the structural equation modeling, the partial least squares is capable of treating a small sample (minimum sample

Table 7
Summarization of the results and hypothesis tests.

Variables	Path coefficient	T-value	Level of significance	Effect
Educational technology → Employee satisfaction	0.60	5.63**	Significant	Strong
Educational content → Employee satisfaction	0.93	9.24**	Significant	Strong
Motivation → Employee satisfaction	0.90	9.33**	Significant	Strong
Attitude → Employee satisfaction	0.91	7.02**	Significant	Strong

** $p < 0.01$.

size = 20). Therefore, partial least squares were thus adopted to conduct data analyses. In this paper, Smart PLS 2.0 was used to assess the measurement and structural models (Huang et al., 2012). The rest of this section describes the structural model (the R^2 value and path coefficients index, The GOF index, and T-test results) and discussion.

4.1. Structural model

The SEM analysis procedure is applied in two stages based on related noticeable literatures. The first stage involves performing the reliability analysis and confirmatory factor analysis specific to dimensions and items. The second stage entails verification of all assumptions of the study through SEM (Chen & Tseng, 2012). This study used PLS 2.0 for analysis, and applied the maximum likelihood method to evaluate the measurement model and the structure model, so as to check whether the path coefficient of variable is significant, and validate the hypothesis. The measurement model is described in the previous section and the structural model is described in this section. The study employed the following three indexes to evaluate the fit of model: the R^2 value and path coefficients index, the GOF index, and the T-values.

4.1.1. The R^2 value and path coefficients index

The structural model was used to verify the hypotheses by using path coefficients and R^2 value. The R^2 was used to assess the ability of the model to explain the variance in the dependent variables (Chin, 1998). The path coefficients were used to assess the statistical significance of the hypotheses (Chin, Marcolin, & Newsted, 2003). Fig. 2 shows the results of the structural model.

According to the effect sizes defined for R^2 by Chin (1998), these effects can be classified as large (R^2 small: 0.19; medium: 0.33;

large: 0.67). The transformation probability for the selected model was ($R^2 = 0.71$) indicated a good fit for the selected independent variables. Four path coefficients are also given in Fig. 2. The standardized path coefficients reveal the relative strength of the effect of each antecedent. First, the path coefficient between educational technology and employee satisfaction was 0.60, which indicates that technology had a positive and significant influence on employee satisfaction. Second, the path coefficient between educational content and employee satisfaction was 0.93, which indicates that educational content had a positive and significant influence on employee satisfaction. Third, the path coefficient between motivation and employee satisfaction was 0.90, which indicates that motivation had a positive and significant influence on employee satisfaction. Fourth, the path coefficient between attitude and employee satisfaction was 0.91, which indicates that attitude had a positive and significant influence on employee satisfaction. The results showed that all 4 of the hypothesis is confirmed.

4.1.2. The GOF index

Recently, a global fit measure for PLS path modeling has been suggested, GOF ($0 < GOF < 1$), defined as the geometric mean of the average communality and average R^2 . $GOF_{small} = 0.1$, $GOF_{medium} = 0.25$, and $GOF_{large} = 0.36$; These may serve as baseline values for validating the PLS model globally (Wetzels, Odekerken-Schröder, & Van Oppen, 2009). The GOF index was calculated by formula:

$$GOF = \sqrt{AVE \times R^2} \tag{1}$$

Calculate the AVE average value. The equation is shown in Eq. (2):

$$\mu_{AVE} = \frac{1}{n} \cdot \sum_{i=1}^n X_i \tag{2}$$

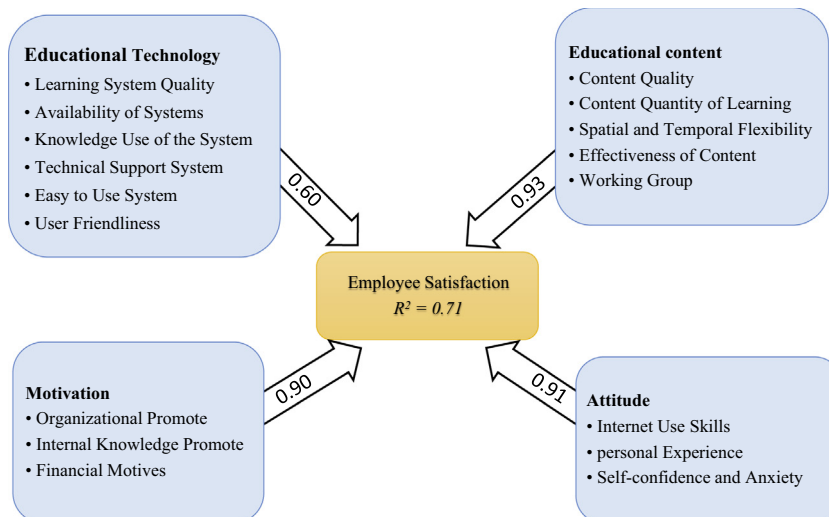


Fig. 2. The structural model for the employee's satisfaction.

$$\mu_{AVE} = \frac{AVE_{\text{technology}} + AVE_{\text{educationcontent}} + AVE_{\text{motivation}} + AVE_{\text{attitude}} + AVE_{\text{employee satisfaction}}}{5}$$

$$\mu_{AVE} = \frac{0.63 + 0.58 + 0.59 + 0.66 + 0.54}{5}$$

$$\mu_{AVE} = 0.60$$

The results of the baseline model using an inner model path weighting scheme show a substantial R^2 of 0.71 for employee satisfaction. The R^2 average value is calculated as follows:

$$\mu_{R^2} = \frac{1}{n} \cdot \sum_{i=1}^n x_i \tag{3}$$

$$\mu_{R^2} = 0.71$$

Substituting (2) and (3) into (1), the GOF value obtained:

$$GOF = \sqrt{0.60 \times 0.71} = 0.65$$

We obtained a GOF value of 0.65, which exceeds the cut-off value of 0.36 for large effect sizes of R^2 and allows us to conclude that our model performs well compared to the baseline values defined above. Therefore, the structure of model had a good fit with the data.

4.1.3. T-test results

We wanted to test whether or not the e-learning system can provide improved results in employee satisfaction. PLS statistical software was used to analyze the questionnaire results. Paired t-test results in Fig. 3 indicate that the e learning system yields better employee satisfaction. The statistically significant loadings are at the 99 percent significance level. The results demonstrate that the e-learning improved the effectiveness of employee learning.

4.2. Discussion

The learning process in e-learning environments, as discussed, is expected to consider a key element for increasing the employee's satisfaction conducive to 21st century skills development. To this aim, we presented a research model and assessed its applicability to examine user satisfaction in exploiting e-learning technology. The model was evaluated by means of a questionnaire

administered to 148 employees of a Telecommunication Company of East Azerbaijan.⁴ The aim of the questionnaire was to understand the e-learners' satisfaction on e-learning technology usage. In detail, as expected, educational technology, education, motivation, attitudes were found to be as important variables influencing satisfaction. As indicated in Table 7, the obtained results from the sample t-test and path coefficient implied that technology has a significant and positive effect on employee satisfaction (T -value = 5.63, path coefficient = 0.60). In addition, the effect of interdependence between the educational content and the employee satisfaction is significant and positive (T -value = 9.24, path coefficient = 0.93). Furthermore, the effect of the motivation on employee satisfaction is significant and positive (T -value = 9.33, path coefficient = 0.90). The effect of the attitude on employee satisfaction is also significant (T -value = 7.02, path coefficient = 0.91).

At first stage, technical attributes affect employee's satisfaction. Learning via internet involves many other tools like video conferencing, audio and text based chat. To achieve successful implementation and employee's satisfaction toward e-learning, quality of technological attributes need to be excellent. In addition, knowledge of using computers significantly affects learner satisfaction. Also, in educational technology dimension the results showed that availability of systems, technical support, easy to use system, user-friendly increase learner satisfaction. At next stage, Content Quality and Quantity in educational content dimension significantly influence employee's satisfaction toward e-learning. In it dimension, Spatial and temporal flexibility attribute is the one of factor affecting employees satisfaction. E-learning has removed the barrier of physical class attendance. The most attractive feature of e-learning according to employees is its flexibility of location and time. The flexible nature of online learning increase learner satisfaction. Also, effectiveness of content and working group is proved to be an essential factor for learning satisfaction.

The results showed that the success or failure of e-learning courses depends not only on the design and quality of the learning materials but on the ability to motivate learners to study them. The next attribute is the attitude. Employee's attitude toward of the e-learning significantly influences employee's satisfaction toward

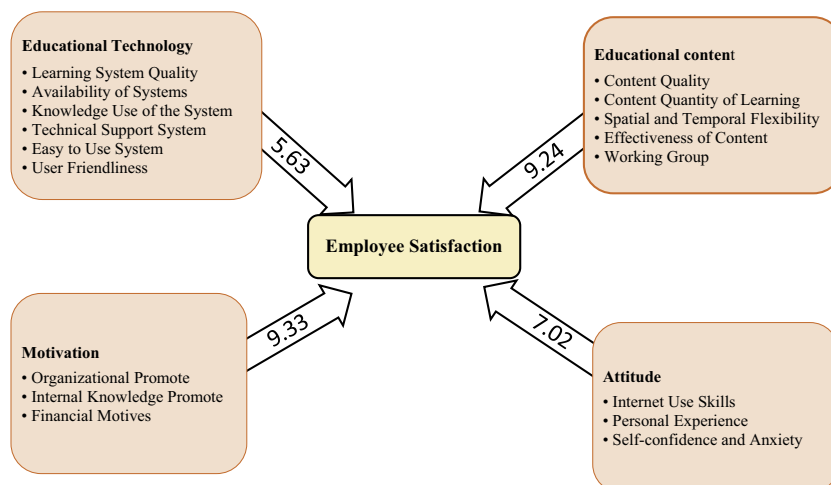


Fig. 3. T-test results.

e-learning and it has been referred to as the most important element for successful e-learning. Due to this reason, instructional design according employees attitude is proved an essential factor for learning satisfaction and success. Also, internet use skills, personal experience and self-confidence and anxiety is proved to be an essential factor for learning satisfaction. The results indicate that the use of e-learning system positively affects the employee's satisfaction. In addition, importantly, the findings supported a number of results reported in previous literature regarding the impact of e-learning systems on employee's satisfaction.

5. Conclusions and limitations

The technology advancement has changed the learning methodologies throughout the world. E-learning is emerging as a popular learning approach utilized by many organizations. Organizations worldwide prefer e-learning or online learning because they provide a cost-effective and timely learning vehicle to meet the various requirements of continuous education, and train civil agents working at different locations. E-learning can be defined as an open and distributed learning environment that utilizes pedagogical tools, enabled by Internet and Web-based technologies, to facilitate learning and knowledge building through meaningful action and interaction. In an e-learning system, learner satisfaction is very important and plays a crucial role for the organizational learning effectiveness, since it is able to raise the synergy between the use and the acceptance of e-learning technology. Learner satisfaction is a learners' general idea about the system. **In this paper, factors related to employees' satisfaction in e-learning systems have been investigated.** A primary contribution of our work was to have in furthered our understanding of how to define, and assess employee satisfaction of e-learning systems and provide a model and framework for assessing the impact of e-learning on employees satisfaction. The measurement of the employee's satisfaction had been provided by means of four research hypotheses supported by a meticulous analysis. While information systems success/effectiveness models have received much attention among researchers, little research has been conducted to assess the satisfaction of e-learning systems in the context of an organization. **This study found that** the educational technology used to teach online courses is important to the employee's satisfaction. Educational Technology dimensions included the learning system quality, availability of systems, and knowledge use of the system, technical support system, easy to use system, and user friendliness. The findings also show that, educational content is viewed as an important factor in e-learning satisfaction. Educational content includes the dimensions of content quality, content quantity of learning, spatial, and temporal flexibility, effectiveness of content, and working groups. One of the advantages of online education is its educational content in which learners choose the most suitable learning content to accommodate their needs. Furthermore, our research showed that the effect of the motivation variable (organizational promotes, internal knowledge, promote, financial motives) on employee satisfaction is significant and positive. Another important finding is that employee attitude toward e-learning system is very important, their reluctance in downloading course material, taking online classes effect learner satisfaction. Attitude includes the dimensions of internet use skills, personal experience, self-confidence, and anxiety. All of these factors provided in a comprehensive model. The generality of this proposed model provides a common framework for the comparative analysis of results from various research. We recommend that practitioners and researchers use this model in various contexts of enterprise e-learning systems. More specifically, employees indicated an increased belief that, an e-learning

training program could be utilized to enhance skill, motivation, and knowledge. Satisfaction deriving from using e-learning technology plays a crucial role for the organizational learning effectiveness, since it is able to raise the synergy between the use and the acceptance of e-learning technology. Finally, this paper helps provide basic information, which, in turn, helps organizations take important decisions effectively and accurately, thus increasing the overall productivity of the process of teaching and learning. The main limitation of this study is that the sample of the study is limited to one company. Conducting the study in many different institutions would be prohibitively costly and time-consuming, but is a good choice for future research. In addition, by working with cross-sectional data, the information collected refers to a single moment in time, so that it is impossible to be sure whether or not the causal relationships will change as time passes. In the future work, we want to deal with the following problems:

- Improving the management of the e-learning system.
- Protecting the learner's privacy.
- Designing the learning system based on the needs of employees.
- Increasing the security e-learning system.

Appendix A

The Morgan Table

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10,000	373
65	56	210	136	480	214	1700	313	15,000	375
70	59	220	140	500	217	1800	317	20,000	377
75	63	230	144	550	225	1900	320	30,000	379
80	66	240	148	600	234	2000	322	40,000	380
85	70	250	152	650	242	2200	327	50,000	381
90	73	260	155	700	248	2400	331	75,000	382
95	76	270	159	750	256	2600	335	100,000	384

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