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An Investigation of the Status of Student-Student Interaction Element in the Iranian E-Learning System

Abdolkarim Soozanyar[1], Mohammad Rahim Jafarzadeh[2]

[*]- *Faculty Member, Payame Noor University. Corresponding Author, Iran.*

[2]- *Assistant Professor, Payame Noor University, Iran.*

Abstract

This study aimed to investigate the status of student-student interaction element in the Iranian e-learning system. The population of the study consisted of all students studying online at Iran's universities during the academic year 2015-2016. 425 students were selected as the sample size using the snowball sampling method. The research methodology was applied in terms of purpose. It was a survey research in terms of data collection and descriptive evaluative in terms of nature. Data were collected through a researcher-made questionnaire. The reliability of the questionnaire was confirmed based on Cronbach's alpha and the internal correlation coefficient using the AMOS software and the structural equation modeling. The preliminary results of the research indicated that the status of student-student interaction element is significantly undesirable in the Iranian e-learning system. The analytical results of the research indicated that the status of student-student interaction element is significantly different in various groups in terms of university and the field of study.

Keywords: higher education, e-learning, interaction, student-student interaction, evaluation

Introduction

With the advent of the Internet and the World Wide Web, a new learning method was provided for learners, parents and education officials. The emergence of the World Wide Web led to the creation of the newest method of education, which is known as e-learning (Haughey & Muirhead, 2004). Horton and Horton (2004) believed that e-learning is defined as any use of web and internet technologies to create learning experiences. In fact, e-learning is the product of the rapidly changing and evolving cycle of new technologies in its real sense. E-learning refers to a set of activities that are performed using electronic tools such as audio, video, and computer (Ebadi, 2004).

Higher Education Funding Council for England (HEFCE) defined e-learning as any learning experience supported by information and communication technologies (2005: 5). Welsh et al. (2003) defined e-learning as the use of computer network technology, which is mainly done over the Internet. Ebrahimzadeh et al. (2010) stated that e-learning is the use of various components of information and communication technology (especially the Internet) in order to organize and manage teaching and learning processes, as well as transfer of education.

Today, e-learning is recognized as an alternative to practical study in the world. There are many proponents of this kind of education, and the number of countries and institutions offering such training is increasing. With the development of information technology, some universities use e-learning to expand access to higher education (Leary & Bereg, 2007; Caladine, 2008).

Given the global and domestic changes, new needs and demands, challenges such as increasing demand for higher education and inadequate funding, lack of full time faculty and the need to remove geographical constraints, e-learning has been seriously considered in the Iranian higher education system for several years. Most major state universities in Iran have established an electronic learning center within their own colleges, as a result of which the number of students for electronic curriculum has grown from 235 in 2004 to 4,918 in 2007 (Masoumi, 2010). This trend was on the rise so that this number was 19,000 at the end of September 2011 (Institute for Research and Planning in Higher Education, 2011) and more than 30,000 people at the end of September 2014 (ibid, 2015).

E-learning is considered as an open system and its main features are, besides easy access to information, interaction and communication. Interaction is the decisive element in the learning process, and it occurs when students transform information received from others into practical and personal knowledge (Jafarzadeh, 2016). Interaction in the e-learning environment is one of the factors that challenge education professionals since the interaction of e-learning environment is much more complex than traditional education. Boettcher (2007) believed that student engagement with learning content should be considered in designing effective learning environments. Palloff and Pratt (1999) stated that learning communities are the focus of online learning environments. Without interaction, not only learners do not get any incentive to continue the course, but also learning does not occur (Jafarzadeh, 2016). This is just enough to bring education professionals to think more about the issue of interaction in the e-learning environment (Anderson, & Elli, 2006).

The learning process can be considered as the result of the interaction of the three elements of learner, teacher, and content. Considering these main elements in the field of education, six types of interaction are defined: student-teacher interaction, student-student interaction, student-content interaction, teacher-teacher interaction, content-acher interaction, and content-content interaction. In this study, we investigate student-student interaction.

The main key to the learning process in e-learning systems is student-student interaction, student-teacher interaction, and participation in learning as the result of these types of interaction. Thus, lack of such interaction causes learners not to have enough incentive to do their assignments (Camrochero, 2006). Teachers and learners, in doing so, will effectively interact with each other through psychosocial support. They create ideas and thoughts by learning from each other's culture, which results in the development of their intellectual horizons. Students do not just learn from their teacher, but they also learn by discussing their problems, beliefs and expectations (Zofen, 2004). Adults, and especially professional learners benefit greatly from interacting with those who have common professional concerns. Today's technology provides social and group learning through computer conferences. Participation in the group and practice activities for learning leads to a human and collective effort for meaningful learning (Zamani & Azimi, 2008). Communication and information technology quickly connects the learning and learning process with the vast world outside of the classroom. This makes the classroom more exciting and provides the learners with the opportunity to engage with a wider world (Collis & Moonen, 2003).

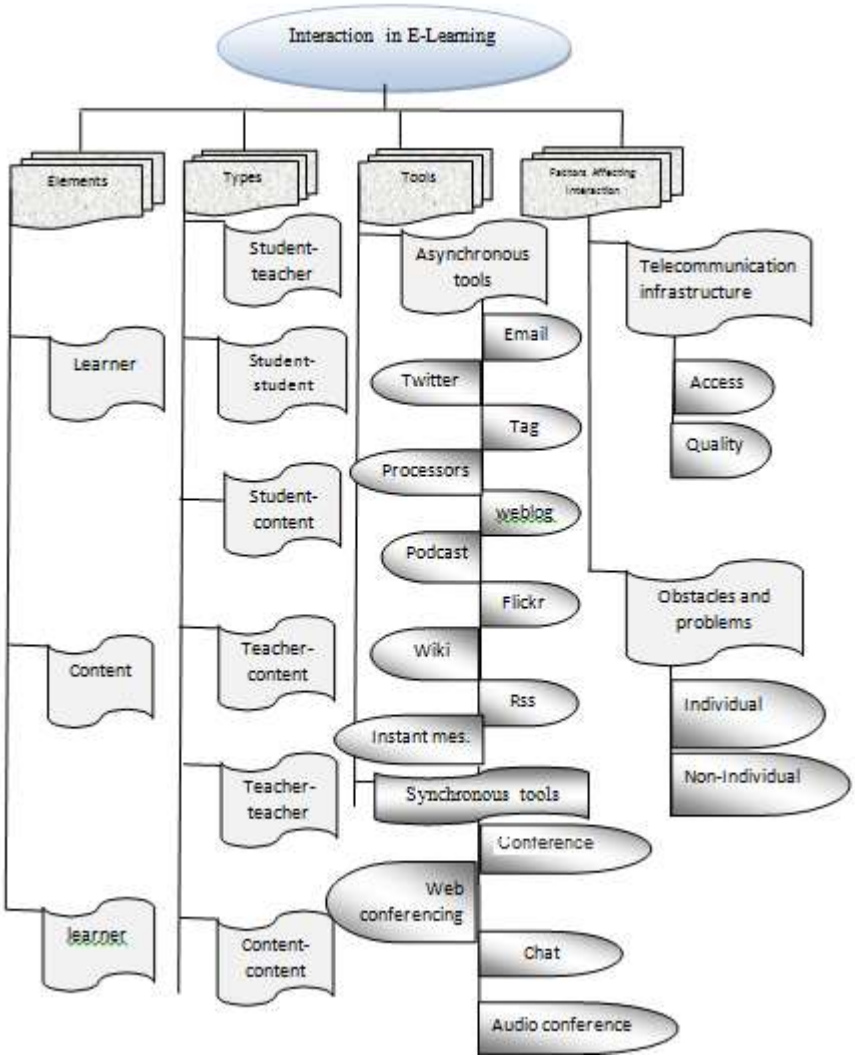
The problem with all types of student-student interaction is that people in the same time domain are thought to be interested in the same content. Some students use distance education, such as e-learning, which allows them to study independently of the compact calls and passing constraints that are arranged with difficulty and are teaching oriented interactions (Grison & Anderson, 2005). It should be noted that the concentration of the entire group at one time is not on the same course unit (McDonald, 2009).

The e-learning environment has a variety of communication tools. Chat room, visual-audio conference, whiteboard tools and online sessions are examples of synchronous communication tools. E-

mail, discussion page, wiki, newsgroups, podcast and YouTube are examples of asynchronous communication tools. The set of these facilities provides synchronous communication with several people, flexible communication in terms of time and space, and face-to-face communication opportunities (Wang & Soong, 2008: 511). E-learning creates a kind of group engagement that helps learners to grow in the area of the topics in which they engage (Sayed Nagavi, 2007).

Therefore, it is quite obvious that e-learning courses can be called effective and successful provided that there has been an acceptable level of interaction among the elements in those courses. In e-learning, there are different types of interaction among learning elements, and the amount of this interaction depends on various factors, including tools, infrastructures, problems and barriers that constitute, accelerate and explain it . The literature can be summarized as follows:

Figure (1): Different Dimensions of Interaction in the E-Learning



Research questions

The present study investigated the status of student-student interaction element in the Iranian e-learning system in order to find an answer to the following research questions:

- What is the status of student-student interaction element in the Iranian e-learning system?
- Is there a significant difference between various groups in terms of university and the field of study?

Research Methodology

This study was a survey research, and the data were collected using a questionnaire. In addition, it was a descriptive evaluative research in terms of nature because of judging on the desirability of a phenomenon or a desired program (Zohori, 2008). The population of the study consisted of all students (50,000 people) studying online at universities of Hadith and Sciences, Shiraz, Amir Kabir, Khaje Nasir Toosi, Isfahan, Tehran, Mehr Alborz, Shahid Beheshti, Islamic Azad, Sahand, Science and Technology, Tehran Non-Profit Institute of Higher Education, and Payame Noor during the academic year 2015-2016. 425 students were selected as the sample size using the snowball sampling. Snowball sampling is a recruitment technique in which research participants are asked to assist researchers in identifying other potential subjects.

A researcher-made questionnaire was used to collect data. After investigating the required resources in the field of research, the criteria and indicators comprising student-student interaction were identified to formulate the questions of the questionnaire. The main part of the questionnaire consisted of 93 questions based on the five point Likert Scale (never used, once a day, once a week, once a month, once a semester, once every few semesters). The intermediate choices were not used to avoid the center-oriented errors. The validity and reliability of the questionnaire were examined to ensure the utilization of the tool. The reliability of the questionnaire was examined using Cronbach's alpha. Then, the internal correlation coefficient of the evaluation indices for each factor was confirmed through the AMOS* software and the structural equation modeling. The Cronbach's alpha of each part of the questionnaire is presented in Table (1).

Table 1: Cronbach's alpha for different parts of the questionnaire

Description	Number of questions	Alpha coefficient
Entire questionnaire	93	0.954
Index of access to network infrastructure	4	0.907
Index of the quality of network infrastructure	6	0.959
Factor of network infrastructure	10	0.964
Index of synchronous interaction tools	32	0.946
Index of asynchronous interaction tools	35	0.923
Factor of interaction tools status	67	0.953

*- AMOS is statistical software and it stands for analysis of a moment structures. It is specially used for Structural Equation Modeling, path analysis, and confirmatory factor analysis

Index of personal barriers to using interaction tools	10	0.879
Index of impersonal barriers to using interaction tools	6	0.782
Factor of obstacles and problems with using interaction tools	16	0.867

The validity of the instrument, based on the factors used to measure the status of the student-teacher interaction, is as follows:

(A) The factor of the network infrastructure (communication and Internet): two components and nine indicators were extracted to evaluate the interaction based on this factor. Validation of this factor is as follows.

Table 2: goodness of fit indicators of the questionnaire for the factor of network infrastructure

	Absolute Fit Indices				Comparative Fit Indices				Parsimonious Fit Indices	
Statistic	*Chi*	*Df*	*Chi/ Df*	*RMSEA*	*GFI*	*NFI*	*CFI*	*RMR*	*PCFS*	*PNFI*
Value	111.91	27	4.145	0.09	0.933	0.974	0.978	0.015	0.733	0.731

The results of the output of AMOS software for the network infrastructure showed that the absolute fit indices, such as x2 / Df, and other indices such as the root mean square error based on the 90% confidence interval, the comparative fit indices with a cutoff point of 90%, and the parsimonious fit indices with a cutoff point of 0.5 are in a very good condition. Thus, they were valid and could weigh the network infrastructure well.

(B) The factor of interaction tools: two components and eleven indicators were extracted to evaluate the interaction based on this factor. Validation of this factor is as follows.

Table 3: goodness of fit indicators of the questionnaire for the factor of interaction tools

	Absolute Fit Indices				Comparative Fit Indices				Parsimonious Fit Indices	
Statistic	*Chi*	*Df*	*Chi/ Df*	*RMSEA*	*GFI*	*NFI*	*CFI*	*RMR*	*PCFS*	*PNFI*
Value	686.84	42	6.83	0.09	0.925	0.888	0.902	0.021	0.689	0.678

The results of the output of AMOS software for the interaction tools showed that the absolute fit indices, such as x2 / Df, and other indices such as the root mean square error based on the 90% confidence interval, the comparative fit indices with a cutoff point of 90%, and the parsimonious fit indices with a cutoff point of 0.5 are in a very good condition. Thus, they were valid and could weigh the network infrastructure well.

(C) The factor of obstacles and problems with using interaction tools: two components and sixteen indicators were extracted to evaluate the interaction based on this factor. Validation of this factor is as follows.

Table 4: goodness of fit indicators of the questionnaire for the factor of obstacles and problems with using interaction tools

	Absolute Fit Indices				Comparative Fit Indices				Parsimonious Fit Indices	
Statistic	*Chi*	*Df*	*Chi/ Df*	*RMSEA*	*GFI*	*NFI*	*CFI*	*RMR*	*PCFS*	*PNFI*
Value	513.8	98	5.345	0.05	0.795	0.935	0.943	0.018	0.765	0.744

The results of the output of AMOS software for the obstacles to using interaction tools showed that the absolute fit indices, such as x2 / Df, and other indices such as the root mean square error based on the 90% confidence interval, the comparative fit indices with a cutoff point of 90%, and the parsimonious fit indices with a cutoff point of 0.5 are in a very good condition. Thus, they were valid and could weigh the network infrastructure well.

Findings

The one-group t-test was used to find an answer to the first research question on the status of student-student interaction in the Iranian e-learning system and to compare it with the desired status. Table 5 shows the descriptive results of the status of student-student interaction. As it is displayed, the observed mean-value for the student-student interaction is lower than the expected mean-value.

Table 5: descriptive results of the status of student-student interaction in the Iranian e-learning system

Description	Statistic					
	Number	observed mean value	expected mean value	Variance	Minimum score	Maximum score
student-student interaction	425	1.995	2.50	0.454	0.67	3.78

The one-sample t-test was used to determine the significant difference. The results of the one-sample t-test showed that there is a significant difference between the observed mean-value and the expected mean-value of the student-student interaction at the error level below 1% and the 99% confidence level. Forasmuch as the observed mean-value (1.995) was less than and the expected mean-value (2.50), the status of student-student interaction in the e-learning environment was unsatisfactory ($p<0.01$, $t= 61.096$).

Table 6: The results of the one-group t-test for comparing the mean value of the current and desired status of the student-student interaction

Description	Statistic					
	Number	Mean	standard error	t-statistic	Degrees of freedom	Significance level
student-student interaction	425	1.995	0.673	61.096	424	0.000

Independent T-test, ANOVA and Tukey's test were used to find an answer to the second research question on the significant difference between various groups in terms of such variables as gender, university, and the field of study. Comparison of the student-student interaction in different groups indicated that there is no difference between the student-student interaction status in terms of gender. The independent t-test was used to determine the significant difference between the mean values of the student-student interaction status among male and female respondents.

The results of the independent t-test for comparing the mean value of the student-student interaction status among male and female respondents indicated that there is no significant difference between the student-student interaction status among male and female respondents at the error level below 1% and the 99% confidence level. Forasmuch as the mean-value for the female respondents (2.029) was slightly

greater than the mean-value for the male respondents (1.977), there was no significant difference between the student-student interaction status among male and female respondents; it was unsatisfactory for both groups ($p<0.01$, $t= 0.758$).

Table 7: Independent T-test results for comparing the mean values of the student-student interaction status in terms of gender

Indicator	Gender	Descriptive statistics		Levene's test for the uniformity of variances		T-test for equality of means		
		Mean	Standard deviation	F ratio	significance level	T-statistic	Degrees of freedom	Significance level
Student-student interaction	Male	1.977	0.647	0.911	0.340	0.758	423	0.449
	Female	2.029	0.719					

The analysis of variance (ANOVA) was used to compare the mean value of the student-student interaction status among respondents in different universities. The results indicated that there is a significant difference between the mean values of the groups at the 1% significance level and the 99% confidence level ($p<0.01$, $f= 8.051$). Also, the results of the Tukey's test indicated that the interaction status at the universities of Shiraz (mean-value: 2.512), Khajeh Nasir (mean-value: 2.432), and Amir Kabir (mean-value: 2.290) is in the best condition, while it is in the worst condition at the universities of Hadith and Sciences (mean-value: 1.476), Payame Noor (mean-value: 1.572) and Shahid Beheshti (mean-value: 1.744).

Table 8: Analysis of variance for comparing the student-student interaction status in the Iranian e-learning system in terms of university

Indicator	Source of change	Sum of squares	Degrees of freedom	Mean Square	F ratio	Significance level
Student-student interaction	Intergroup	36.531	12	3.044	8.015	0.000
	Intragroup	155.785	412	0.412		
	Total	192.315	424	-		

Table 9: Tukey's test for comparison of student-student interaction status in the Iranian e-learning system in terms of university

Tukey's Test				
University	Number	Comparison of alpha mean= 0.05		
		1	2	3
Hadith and Sciences	17	1.476		
Payame Noor	80	1.572	1.572	
Shahid Beheshti	10	1.744	1.744	1.744
Tehran	81	1.960	1.960	1.960
Tehran Non-Profit Institute of Higher Education	3	2.018	2.018	2.018
Sahand	16	2.040	2.040	2.040
Isfahan	22	2.053	2.053	2.053
Science and Technology	12	2.061	2.061	2.061
Mehr Alborz	22	2.086	2.086	2.086

Islamic Azad University	95	2.122	2.122	2.122
Amir Kabir	10		2.290	2.290
Khaje Nasir Toosi	14			2.432
Shiraz	43			2.512
Significance level		0.237	0.115	0.063

The analysis of variance (ANOVA) was used to compare the mean value of the student-student interaction status among respondents in terms of the field of study. The results indicated that there is a significant difference between the mean values of the groups at the 1% significance level and the 99% confidence level ($p<0.01$, $f= 7.741$). Also, the results of the Tukey's test indicated that the interaction status of the engineering group (mean-value: 2.270) is in the best condition, while it is in the worst condition for the humanities group (mean-value: 1.874).

Table 10: Analysis of variance for comparing the student-student interaction status of the Iranian e-learning system in terms of the field of study

Indicator	Source of change	Sum of squares	Degrees of freedom	Mean Square	F ratio	Significance level
Student-student interaction	Intergroup	10.053	3	3.351	7.741	0.000
	Intragroup	182.262	421	0.433		
	Total	192.315	424			

Table 11: Tukey's test for comparison of student-student interaction status in the Iranian e-learning system in terms of the field of study

Tukey's Test			
Field of study	Number	Comparison of alpha mean= 0.05	
		1	2
Humanities	118	1.874	
Interdisciplinary	175	1.915	
Basic Sciences	40	2.072	2.072
Engineering	92		2.270
Significance level		0.230	0.226

Comparing and prioritizing student-student interaction variables indicated the difference between the ranks of variables. The results of Friedman nonparametric test for comparing and prioritizing student-student interaction variables indicated that the value of Friedman test (859.137) is significant at the 1% significance level and the 99% confidence level. Therefore, it should be noted that there was a significant difference between the variables of the student-student interaction status in the Iranian e-learning system. According to the results, the variable of personal barriers to interaction (mean-value: 2.270) was in the best condition, while the variable of asynchronous interaction tools (mean-value: 1.96) was in the worst condition.

Table 12: Comparing and prioritizing the variables of student-student interaction element

Factors	Mean rank	Rank
Access to network infrastructure	4.20	3

Network infrastructure quality		3.91	4
Synchronous interaction tools		2.10	5
Asynchronous interaction tools		1.96	6
Personal Barriers to interaction		4.52	1
Impersonal barriers to interaction		4.31	2
SIG	DF	N	Chi-Square
0.000	5	425	859.137

Discussion and conclusion

E-learning is a new paradigm emerging in the field of education and creates a flexible, distributed and efficient system based on a well-designed, interactive and student-centered learning environment, in line with other types of educational environments. Interaction is an essential element to achieve this mission. It is the key to the learning process in e-learning systems in that the main feature of this educational system is its being interactive. Among the various types of interaction, the student-student interaction is important because of providing specific learning communities. However, there is ambiguity about its quality and effectiveness.

The results of this study indicated that the general status of student-student interaction in the Iranina e-learning system is not suitable and is significantly below the desired conditions. Although there is no study which is quite similar to this one in terms of the extent of the dimensions and the study population to compare the results, the findings of this study are consistent with those of the studies conducted by Qaedi (2007), Jafarifar (2009), Zarei et al. (2013), Hakimzadeh and Bafandeh (2014), Zarri and Baldwin (2003), and Reister and Boris (2004). However, the obtained results are not consistent with the results of the studies conducted by Badrian (2008), Momeni Rad (2009), Dadashzadeh (2010), and Akbari Burang et al. (2012). The results of the present study indicated that there is a difference between the statuses of student-student interaction in the Iranian e-learning system in terms of university and field of study in a way that the interaction status in Shiraz University and Khajeh Nasir Toosi University of Technology was significantly better than other universities. The interaction status in the University of Hadith and Sciences and Payame Noor University was the worst among other universities. The results of the student-student interaction status among respondents in terms of the field of study indicated that the interaction status of the engineering group is significantly better than that of the humanities group. This finding confirmed the impact of curriculum on student success and interaction improvement in the e-learning environment. Further examination of the student-student interaction in different groups indicated that there is no significant difference in this type of interaction status in terms of the gender.

Suggestions

Considering the experiences and results of the research and the constraints such as the extent and dispersion of the statistical population, the nature of e-learning and virtual universities and the impossibility of the direct contact between the researcher and the statistical population, the following suggestions are presented:

- Providing the necessary technology infrastructure before launching e-learning courses and avoiding rush in implementing this type of training
- Considering the research results and the experiences of successful universities in providing a suitable context for student-student interaction
- Admitting students and professors by applying criteria for entry of qualified people in this type of education because many aspects of e-learning, such as interaction, are heavily influenced by the characteristics of both teachers and students.

In conclusion, it should be noted that this study does not claim that all factors affecting the evaluation of student-student interaction in Iran's e-learning centers have been fully identified. However, by taking the initial steps with a comprehensive look at the evaluation of the e-learning interaction, it has been tried to pave the way for the researchers interested in the evaluation of the e-learning interaction in universities at the micro level.

References:

Akbari Burang, M., Jafari Sani, H., Ahanchian, M., & Karshki, H. (2012). Evaluating the Quality of Electronic Learning in Iranian Universities based on Curriculum Orientation and Experience of Instructors. Journal of Research and Planning in Higher Education, No. 66, pp. 75-97.

Anderson, T., & Elwy, F. (2006). E-Learning from Theory to Practice. Translated by Bibi Eshrat Zamani and Seyed Amin Zamani, Tehran: Smart Schools Publications.

Badriyan, M. (2008). Evaluation of Electronic Curriculum in Computer Engineering of Khaje Naseerdin Toosi University Based on Rodriguez Sims Model. MSc Thesis, Allameh Tabatabaie University, Faculty of Psychology and Educational Sciences.

Boettcher JV. (2007). Ten core principles for designing effective learning environments: insights from brain research and pedagogical theory. Innovate Journal of Online education [Internet], 3(3). Available from: http://www.innovateonline.info/index.php.

Caladine, R. (2008). Taxonomies for Technology, In Lawrence A, Tomei, Encyclopedia of Information Technology Curriculum Integration. New York: Information Science reference.

Collis, B., & Moonen J. (2003). Flexible Learning in a Digital Word: Experiences and Expectations, London: Kogan Page.

Comerchero, M. (2006). What is E-learning? In Pamela Berman(Ed), E-learning concepts and techniques, USA: Bloomsburg University of Pennsylvania's, Department of Instructional Technology.

Dadaszadeh, M. (2010). Evaluation of the E-Learning Program of Medical Engineering at Amir Kabir University of Technology in the academic year 2009-2010. Master thesis, Allameh Tabataba'i University, Faculty of Psychology and Educational Sciences.

Ebadi, R. (2005). E-learning and Education. Cultural Research Institute of Aftab Mehr.

Ebrahimzadeh, I., Zandi, B., AliPour, A., & Yazdani, F. (2010). Types of e-learning and different forms of interaction in it. Journal of Electronic Learning (MEDIA), Volume 1, Issue 1.

Hakimzadeh, R., & Bafandeh, N. (2014). Evaluating the quality of e-learning; Tehran University of Medical Sciences, Tehran, Iran. Journal of Medical Education Strategies, Volume 7, Number 4, pp. 264-257.

Haughey, M., & Muirhead, W. (2004). Managing Virtual school: The Canadian Experience. Development and Management of Virtual schools: Issuse and Trends. Idea Group publishing. USA.

Higher Education Funding Council for England (2005). HEFCE Strategy for ELearning, HEFCE, JISC, HEA, London.

Horton, W., & Horton, k. (2003). E learning Tools and Technologies, Wiley publishing, First edition.

Institute for Research and Planning in Higher Education (2015).

Jafarifar, H. (2009). A review on students and professors's use of interactive tools in the learning system of University of Hadith Sciences and proposing a suitable solution in this regard. Master's Thesis, Allameh Tabataba'i University, Faculty of Psychology and Educational Sciences.

Jafarzadeh, M., Saeedipour, B., Sarmadi, M., & Esmaeili, Z. (2016). An Analysis on the Status of Student-Teacher Interaction in the E-Learning System of Iran. Journal of Educational Evaluation Studies, Vol. 6, No. 13, pp. 109-131.

Leary, J., & Bere, Z. (2007). Successful distance education programs in sub- saharan Africa, Turkish Online Journal of Distance Education-TOJDE ISSN8 (2). pp 78-90.Marsh,

Masoumi, D. (2010). E-learning in Iran-I a breakthrough to ICT-based initiatives in an educational system, University of Gothenburg.pp:229- 250. In: Demiray.

McDonald, J. (1950). A Guide to Integrated Learning and Teaching. Translated by Ismail Zarei Zarkaki and Vahid Salehi (2009), Tehran: Allameh Tabataba'i University Publications.

Momeni Rad, A. (2009). A review on the quality of IT courses in e-learning course of Khaje Nasir Toosi University of Technology based on e-learning standards. Master's thesis, Allameh Tabatabaei University.

Palloff, R., & Prati, K. (1999). Building Learning Communities in Cyberspace, San Francisco: Jossey-Bass.

Qaedi, B. (2006). Assessment of Virtual Curriculum from the Perspective of Students and Professors of Computer Engineering (Information Technology) at the University of Science and Technology. Master's Thesis, Tehran Teacher Training University (Kharazmi), Faculty of Psychology and Education.

Reisetter, M., & Greg, B. (2004). What Works: Student Pereptions of Effective elements in Online Learning, Quarterly Review of Distance Education.

Sabry, K., & Lynne, B. (2003). Web-Based Learning Interaction and Learning Styles, British Journal of Educational Technology, pp: 443-454.

Seyde Naghavi, M. (2007). Study of Teachers and Students Attitude toward E-learning: Surveying in Iran's E-learning Universities, Quarterly Journal of Research and Planning in Higher Education, Vol. 13, No. 1, pp. 157 – 176(in Persian).

Wang, S., & Song, H. (2008). Learning community and networked learning community, In Lawrence A, Tomei, Encyclopedia of information technology curriculum integration, Hershey: Information Science reference.

Welsh, E.T., Wanberg, C. R., Brown, K. G., & Simmering, M. J. (2003). Learning: emerging results and future directions, International Journal of Training and Development,7, 4, 245–58.

Zahiri, Q. (2008). Application of Social Science Research Methods in Management, Tehran: Mir Publications.

Zarei Zavarki, E., & Seyedi Nazarlo, T. (2013). Measuring the Interaction in Electronic Curriculum of Khaje Naseerdin Toosi University. Journal of Educational Measurement, No. 11, Volume 4, pp. 147-163.

Zofan, S. (2004). Application of New Technologies in Education, Tehran: SAMT Publications.