

A Survey of Graduate and Postgraduate Students' Perspective on the Use of E-learning Technology in Kerman University of Medical Sciences in 2017

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Abstract

Background: E-learning is one of the new methods of education that helps to increase people's knowledge and performance by using new technologies.

Objectives: The purpose of this study was to investigate the attitude of graduate and postgraduate students of Kerman University of Medical Sciences toward using e-learning technology.

Methods: This cross-sectional study was carried out among graduate and postgraduate students of Kerman University of Medical Sciences in autumn 2017. The data were collected by a researcher-made questionnaire whose validity and reliability was verified ($\alpha = 0.82$). Data were analyzed using descriptive and analytical tests (including t-test, ANOVA, and Spearman correlation) to investigate the relationship between the mean score of e-learning usefulness and students' demographic information in SPSS software.

Results: About 80% of e-learning students found it a good tool for the exchange of information and educational content between faculty and students at different universities and more than 40% believed that e-learning could improve the quality of education. About 57% of the participants were interested in using the technology. More than 70% of the students reported e-learning to be useful. Also, there was a significant relationship between the mean score of the usefulness of e-learning with age ($P = 0.049$), computer use skill ($P = 0.025$), and mobile use skill ($P < 0.001$).

Conclusion: From the students' perspective, using e-learning technology is useful and it saves time and costs and improves the quality of their education. It also makes it easier for students to answer their questions later. Therefore, it may be better to use this technology besides the traditional method to make it more effective.

Keywords: Electronic learning, Online education, Perspective, Students

Background

Lifelong learning is one of the educational priorities of the developed countries (1). Today, one of the most important topics in educating different sciences is how educational centers should prepare students for the society that is increasingly becoming information-oriented (2). Information and communication technologies (ICT) have paved the way for new innovations to deliver lifelong learning and can support teaching and learning in a variety of ways (3). The use of e-learning, which is a new teaching approach, is rapidly expanding (4).

E-learning is an educational course part or all of which is delivered through the Internet or in the online environment using ICT tools such as e-books, videos, links, and text

messages (5-7). In the field of health, increased use of the Internet has also provided opportunities for the development of flexible, simple, and interactive education (8-10).

Most countries, for reasons such as increasing demand for education, a shortage of specialist education staff and students, a lack of educational space and limited capacity to accept in-person education systems, are unable to provide extensive education through in-person education (11). Resource-saving is also one of the factors that have led to more attention to e-learning. ICT has facilitated interconnections to educate and expand knowledge and has led educational environments toward virtualization (12); in 2009, the cost of education worldwide was estimated at \$ 90 billion, \$ 20 billion of which was spent for e-learning (13).

E-learning has some benefits. In this type of training, the student can access classes through the website, listen to lectures, and participate in group discussions at the same time. Training materials may also be provided asynchronously (14, 15). Since the introduction of e-learning, there have been challenges. For example, challenges related to technological issues make students tired and require technical support in learning (15, 16). In collective approaches, if the work is not evenly divided or if there is no agreement on the training methods, it may have a negative effect on the training outcomes (7). Numerous studies have been conducted on the effectiveness of e-learning (17-20). The results of a systematic review and meta-analysis by Lahti et al. showed no significant difference between traditional education and e-learning (20). Therefore, it seems that there is still doubt about the effectiveness of this teaching method.

Based on the results of various researches, a set of students' Perspectives, opinions, and feedback should be considered as part of strategies for implementing and developing e-learning in educational institutions (21, 22). In their research, El Gamal and Aziz found that adopting e-learning requires a proper understanding of the characteristics of the students, their perspectives, and their various cultural aspects. They believe that e-learning has a more prominent role in graduate students and that they are more in need of e-learning (23).

Therefore, evaluating the students' perspective should be carefully considered before the implementation of e-learning in a country. Several studies have also been conducted in this area (24-26).

Objectives

Given that e-learning is practiced at Kerman University of Medical Sciences and that students are experienced in using it, better results can be achieved based on their perspectives. Therefore, the present study was conducted to investigate the perspective of Kerman University of Medical Sciences students regarding the use of e-learning technology.

Methods

This cross-sectional study was carried out in the autumn of 2017 for one month. In this year, the total number of graduate and postgraduate students (MSc and Ph.D.) in Kerman University of Medical Sciences was 850. Thus, students who had completed at least one semester of their studies at this university were recruited using the convenience sampling method.

Data collection was performed electronically without a paper questionnaire. In this way, the researchers referred to the students available in the campus (colleges, dorms, and laboratories) in person and after identifying the eligible individuals and providing clear explanations about the purpose of the project and obtaining their willingness to participate in the study, we sent the questionnaire via email or social media.

In order to ensure maximum community feedback, each participant was asked to share the questionnaire

via e-mail with other friends as well as postgraduate students who were outside the campus so that in case of consent, they can participate in the research. Finally, the questionnaire's e-mail address was shared in the classroom and university groups of postgraduate students created on online social networks, and the eligible individuals were asked to participate in the study.

Data were collected using a Self-administered questionnaire researcher-made questionnaire. The validity of the instrument was confirmed by two health information management and medical informatics experts. and the reliability of the questionnaire was calculated Cronbach's alpha (0.82). The questionnaire consisted of three sections. The first section included demographic information (age, gender, the field of study, degree, employment, computer and mobile skills based on participants' perspectives), the second section consisted of 13 specific questions related to participants' perspective on e-learning technology. The third part included two open-ended questions about the other pros and cons of this technology from the participants' perspectives. The questions were rated on a seven-point Likert scale from the lowest level of disagreement (score 1) to the highest level of agreement (score of 7). The questionnaire was designed electronically and its website was provided to all the participating postgraduate students.

Data were analyzed using SPSS.22 (IBM Corporation, Armonk, NY) and descriptive statistics in order to report the frequency and percentages. After examining the normality of the data, t-test was used to determine the relationship between the mean score of e-learning usefulness and gender, Spearman's correlation coefficient to determine the relationship between the mean score of e-learning usefulness and age and ANOVA test to determine the relationship between the mean score of the usefulness of e-learning and skill in mobile and computer use. In cases where ANOVA test was significant, Scheffe post hoc test was used to investigate differences in various groups. A *P*-value of less than 0.05 was considered significant.

In data analysis, the lowest and highest scores of the usefulness of e-learning were 13 and 91, respectively. Then, the difference between these two scores was divided by the number of categories (three categories: low, moderate, and high). According to the calculated category length, the total score of e-learning usefulness was considered as low (13-38), moderate (39-64), and high (65-91). The content analysis method was used to analyze open-ended questions. Thus, all responses to the positive and negative aspects of e-learning technology were individually recorded in a single table. Then, the answers with similar concepts were put together and the frequency of each was calculated.

All the data in the present study were analyzed cumulatively and the confidentiality of participants' information was maintained by the researchers. The present research was derived from the research project code 98000066 approved by the Student Research Committee of Kerman University of Medical Sciences with a code of ethics: IR.KMU.REC.1398.069.

Results

In total, 120 postgraduate students of Kerman University of Medical Sciences participated in this study. The mean age of the participants was 28 years and 55% of them were women. About 84% of the students were Masters's students. More than 35% of the students were also employed. The

average level of skill in the use of mobile and computer devices was 52% and 63%, respectively. Less than 25% of the students had ever heard of e-learning technology. About 58% of the students were willing to use e-learning technology concurrently (Table 1).

Table 1. Frequency of participants' demographic and baseline information

Variables		No. (%)
Gender	Female	(55) 66
	Male	(45) 54
Level of education	MSc	(84) 101
	PhD	(16) 19
Employment	Yes	(36) 43
	No	(64) 77
Skill in the use of mobile devices	Elementary	(3) 3
	Intermediate	(52) 63
	Advanced	(45) 54
Skill in the use of computer devices	Elementary	(8) 10
	Intermediate	(63) 75
	Advanced	(29) 35
Familiarity with e-learning technology	Yes	(77) 92
	No	(23) 28
Willingness to get the type of e-learning	Synchronous	(58) 70
	Asynchronous	(41) 49
	Not willing	(1) 1

According to the findings, 47% of the students believed that e-learning could be more effective than traditional and in-person education, but about 55% opposed the mere use of technology instead of attending classes. About 60% of the participants believed that e-learning can help improve the quality of education. Also, more than 40% of the students stated that e-learning can lead to increased efficiency, productivity, and improved learning. More than 80% of the participants considered e-learning as a good tool for the exchange of information and educational content between professors and students of different colleges and universities. About 57% of the sample also believed that e-learning does not harm the interactive and mutual communication between students and teachers.

On the other hand, 41% of the students agreed that using e-learning may be easier to answer their questions later. About 70% of the participants found e-learning useful and believed it would save time (60%) and reduce costs (80%). About 57% of the students were interested in using the technology. More than 60% of the respondents also stated that they were prepared to adopt and use e-learning technology.

The overall score of the students' perceptions of the usefulness of e-learning was 58.40 ± 10.09 , which was in the moderate range. As illustrated in Figure 1, 65% of the students have a moderate score regarding the usefulness of e-learning.

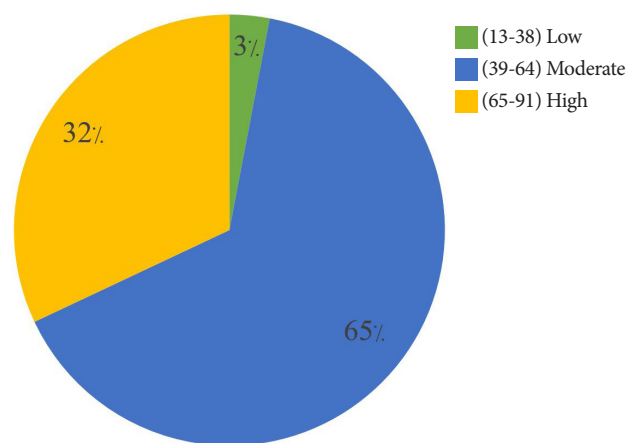


Figure 1. The frequency of the participants' overall score in perceptions of the usefulness of e-learning

Table 2 shows the mean score of students' perceptions of the usefulness of e-learning in terms of demographic and baseline information. Accordingly, there was a significant relationship between the mean score of e-learning usefulness and age ($P = 0.049$), computer use skills ($P = 0.025$) and mobile use skills ($P < 0.001$); e-learning technology was found to be more useful for younger students and more proficient in mobile and computer use.

The results of the Scheffe post hoc test also showed that participants with advanced skill levels in using mobile

phones and computers found e-learning technology to be significantly more useful than other participants (with elementary and intermediate skill levels). No significant

relationship was observed between gender, educational level, and employment of students and their perspective about e-learning ($P < 0.050$).

Table 2. Mean score of participants' perceptions of the usefulness of e-learning by demographic information

Demographic information		Mean score of the usefulness of e-learning (mean ± SD)	P-value
Age		58.40 ± 10.10	0.049
Gender	Female	56.72 ± 10.42	0.670
	Male	60.46 ± 9.30	
Educational level	MSc	58.79 ± 10.01	0.970
	PhD	56.36 ± 10.50	
Employment	Yes	62.62 ± 8.23	00.140
	No	65.05 ± 10.31	
Skill in using a mobile phone	Elementary	44.00 ± 10.53	0.001
	Intermediate	65.44 ± 10.12	
	Advanced	61.50 ± 8.86	
Skill in using computer	Elementary	56.50 ± 12.01	0.025
	Intermediate	56.85 ± 9.75	
	Advanced	62.28 ± 9.39	
Familiarity with e-learning technology	Yes	56.96 ± 9.91	0.850
	No	58.84 ± 10.16	

Based on the findings of the open-ended questionnaire survey, the ability to repeat teaching and recording and access to content at any time or place (10 views), decreased relationship of students and professors with each other, and lack of or delayed response from the professor (8 views) limitations in student troubleshooting

and practice, and a definite need for the Internet (5 views), and sometimes diminishing student motivation and lack of collective sense of responsibility (3 views) were some of the advantages and disadvantages of this technology that many students pointed out (Table 3).

Table 3. Positive and negative aspects of using e-learning based on participants' perspective

Advantages	Disadvantages
<ul style="list-style-type: none"> • Ability to repeat teaching and recording and access to content anytime or anywhere (10 views) • Saving time and money due to reduced commute (6 views), • Accessing and communicating with a larger range of faculty outside and inside the university (5 views) • Diversifying learning methods, retaining more of the content in memory, increasing focus so that the student can use educational content when focused and ready for learning (4 views) • Reducing the need for physical space to hold classes, making individuals more inclined to use different technologies (2 views) 	<ul style="list-style-type: none"> • Decreasing student-faculty relationship with each other and not receiving or receiving late responses from professors (8 views) • Restrictions on student troubleshooting and practice, a definite need for the Internet (5 views) • Sometimes a decrease in student motivation and lack of sense of collective participation and responsibility (3 views) • Lack of proper infrastructure for simultaneous communication, inactivity, fatigue and visual impairment (2 views)

Discussion

The results of this study showed that from the students' perspective, e-learning is beneficial and students expressed interest in using this method. The ability to repeat instruction and access content at any time (which makes this course more flexible) was among the benefits that students noted. On the other hand, the decrease in student and faculty relationships and students' lack of or delayed response from professors were among the concerns of the students.

Most students found e-learning useful and believed that taking classes offline would save time and money. The usefulness and satisfaction with e-learning from the

students' perspective have been confirmed in numerous studies (27-29). In a systematic review study, Voutilainen et al. found that e-learning had no significant effect on nursing education compared to traditional education. They argued that the effectiveness of this method depends on many conditions and confounding factors (30).

The meta-analysis of Lahti et al. (20) also confirmed the results of the study by Voutilainen et al. Given that technology infrastructure in our country is not very robust, despite the positive perspective of students, it may cause students' dissatisfaction due to weak infrastructure after applying this method. Therefore, it is necessary to

ensure the provision of appropriate technical requirements and background before applying e-learning.

From the students' perspective, e-learning can improve the quality of education. Yanuschik et al.'s research found that e-learning can improve the learning process by enabling reviewing educational content as well as highlighting the content needed for the student and may lead to improved quality of education. They also stated that the use of electronic courses would increase the efficiency of classroom work. Pre-classroom theory tests make the student not only better at tracking, but also at remembering new materials, and thus answering the teacher's questions better and improving their problem-solving skills (31).

In contrast, Salter et al. in their study reported limited evidence on the effectiveness of e-learning in improving the skills of individuals in the field of pharmacy. Also, there is no evidence that e-learning is effective in enhancing pharmacists' knowledge over the long term (32). These results may be due to the nature of practical work in the field of pharmacy but may be different in disciplines and courses that are more theoretical in nature. The results of one study showed that postgraduate students had a positive view of e-learning and 82% believed that this method was very useful (33). Therefore, the difference can be due to the discrepancy of the educational level in the study population.

In e-learning, a student can access classes through the website, listen to lectures, and participate in group discussions at the same time, depending on their schedule. Training materials may also be provided asynchronously (14, 15). This method allows the student to participate in the session and improve learning with an initial understanding of the teaching material, but lack of face-to-face communication with the instructor may reduce student focus and may be considered a challenge. Therefore, to meet this challenge, it may be better to hold meetings concurrently to reduce the learning challenges while maintaining bilateral communication. Internet-related problems should be considered as well. Other research suggests that the combination of face-to-face education and e-learning offers a more flexible way of teaching (34, 35).

The results showed that students who are more proficient in using computers and mobile phones hold a more positive perspective regarding e-learning technology. Kvasnica, Hrmo (36), and Link and Marz (37) also believe that computer literacy is one of the factors that influence e-learning. The results of the Link and Marz study indicated that in addition to computer literacy, there was a significant relationship between students' perspectives and their age and previous exposure to the computer (37). Therefore, it is necessary to know the level of computer literacy of students before implementing e-learning and to provide the necessary training if necessary.

The present study was conducted at the largest medical university in the southeast of Iran, which also has a virtual education unit. Although the small number of participants is considered as a limitation of the study, we tried to enroll postgraduate students of all fields who participated in the study with complete willingness. It is suggested to conduct

this study in other universities and geographical areas, as well as in larger groups students in order to obtain more generalizable results.

One of the limitations of the present study was to investigate the level of computer and mobile skills based on students' personal perspectives. In future studies, it is recommended that these skills be measured using more reliable tools to obtain more reliable results. Another limitation of this study was establishing the reliability of the questionnaire by Cronbach's alpha coefficient, which was better than other test-retest methods to ensure the reliability of the tool. The results of this study can help policymakers in e-learning and non-formal education, university managers as well as e-learning and distance education authorities in different universities. They can decide on the successful implementation of this technology by considering the advantages and disadvantages of this technology and examining the students' willingness, interest and readiness to use it, eliminating the disadvantages or limitations of e-learning.

Conclusions

From the students' perspective, the use of e-learning technology is useful and can save time and costs and improve the quality of education, but using them alone can damage the interactive communication between faculty and students and may also lead to a delayed response to students. Therefore, it may be better to use this technology in the traditional way to make it more effective. It is suggested that this approach be applied to disciplines that are of a theoretical nature to further their effect. E-learning decision-makers and executives at ministry and university levels can consider the benefits and disadvantages of this technology and devise strategies to reduce its limitations and barriers to develop e-learning and produce content for the effective and successful implementation of this technology.

In this study, students' preferences and perspectives toward e-learning and its effectiveness and students' interest and willingness to adopt and use this technology were identified to some extent. It is hoped that the results of the research will be of interest to directors and developers of e-learning and virtual and non-formal education institutions.

Supplementary Material

Supplementary material(s) is available [here](#) [To read supplementary materials, please refer to the journal website and open PDF/HTML].

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References

1. Commission E. Communication from the Commission Europe 2020. A strategy for smart, sustainable, and inclusive growth. Brussels. [Cited 2010 Oct]. Available From: <http://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf>.
2. Njenga JK, Fourie LCH. The myths about e-learning in higher education. *Br J Educ Technol*. 2010;41(2):199-212. doi:10.1111/j.1467-8535.2008.00910.x
3. I Union. Communication from the Commission to the European Parliament, the Council, the European Economic and social committee and committee of the regions. Commission E. [Cited 2010 Oct]. Available From: <http://www.w.xploit-eu.com/pdfs/Europe%202020%20Flagship%20Initiative%20INNOVATION.pdf>.
4. Digital Agenda Assembly. Report from the workshop 08. "Mainstreaming e-Learning in education and training" DAE action 6. Brussels. 2011; 16-177.
5. Ruiz JG, Mintzer MJ, Leipzig RM. The impact of E-learning in medical education. *Acad Med*. 2006;81(3):207-12. doi:10.1097/00001888-200603000-00002
6. Martínez-Torres MR, Toral SL, Barrero F. Identification of the design variables of eLearning tools. *Interacting with Computers*. 2011; 23 (3): 279-88.
7. Evans AM, Ellis G, Norman S, Luke K. Patient safety education - description and evaluation of an international, interdisciplinary e-learning program. *Nurse Educ Today*. 2014;34(2): 248-51.
8. Cook DA, Levinson AJ, Garside S, Dupras DM, Erwin PJ, Montori VM. Instructional design variations in internet-based learning for health professions education: a systematic review and meta-analysis. *Academic medicine*. *Acad Med*. 2010;85(5):909-22.
9. Belcher JV, Vonderhaar KJ. Web-delivered research-based nursing staff education for seeking Magnet status. *J Nurs Adm*. 2005;35(9):382-6. doi:10.1097/00005110-200509000-00004
10. Cook DA, Levinson AJ, Garside S, Dupras DM, Erwin PJ, Montori VM. Internet-based learning in the health professions: a meta-analysis. *JAMA*. 2008;300(10):1181-96.
11. Sife A, Lwoga E, Sanga C. New technologies for teaching and learning: Challenges for higher learning institutions in developing countries. *International Journal of Education and Development using ICT*. 2007;3(2):57-67. doi:10.3917/rdes.057.0067
12. Ahadiyan M. Introduction to Instructional Technology. 25th ed. Tehran: Nashr va Tabligh Boshra Pub; 2004. [In Persian]
13. Garavan TN, Carbery RO, Malley G, O'Donnell D. Understanding Participation in E-learning in Organizations: A Large-Scale Empirical Study of Employees. *International Journal of Training & Development*. 2010;14(3):155-68.
14. Simpson BP. Web-based and computer-assisted instruction in physical therapy education. *J Physical Therapy Education*. 2003;17(2):45-9. doi:10.1097/00001416-200307000-00007
15. Bloomfield JG, Jones A. Using e-learning to support clinical skills acquisition: exploring the experiences and perceptions of graduate first-year pre-registration nursing students - a mixed-method study. *Nurse Educ Today*. 2013;33(12):1605-11. doi:10.1016/j.nedt.2013.01.024
16. Fernández Alemán JL, Carrillo de Gea JM, RodríguezMondéjar JJ. Effects of competitive computer-assisted learning versus conventional teaching methods on the acquisition and retention of knowledge in medical-surgical nursing students. *Nurse Educ Today*. 2011;31(8):866-71. doi:10.1016/j.nedt.2010.12.026
17. Beeckman D, Schoonhoven L, Boucqué H, Van Maele G, Defloor T. Pressure ulcers - e-learning to improve classification by nurses and nursing students. *J Clin Nurs*. 2008;17(13):1697-707.
18. Bloomfield J, Roberts J, While A. The effects of computer-assisted learning versus conventional methods on the acquisition and retention of handwashing theory and skills in pre-qualification nursing students: a randomized controlled trial. *Int J Nurs Stud*. 2010;47(3):287-94.
19. Cega L, Norman IJ, Marks I. Computer-aided vs. tutor-delivered teaching of exposure therapy for phobia/panic: a randomized controlled trial with pre-registration nursing students. *Int J Nurs Stud*. 2007; 44(3):397-405.
20. Lahti M, Hatonen H, Valimäki M. Impact of e-learning on nurses' and student nurses' knowledge, skills, and satisfaction: a systematic review and meta-analysis. *Int J Nurs Stud*. 2014;51(1): 136-49.
21. Martínez-Argüelles M, Castán J, Juan A. How do students measure service quality in e-learning? A case study regarding an internet-based University. Proceedings of 8th European Conference on E-Learning; 2009 Oct 29-30; Italy: University of Bari; 2009. doi:10.1016/j.compedu.2009.10.016
22. Jara M, Mellar H. Quality enhancement for e-learning courses: The role of student feedback. *Computers & Education*. 2010;54(3):709-14.
23. El Gamal S, Aziz A. The perception of students regarding E-learning implementation in Egyptian Universities: The case of Arab Academy for Science and Technology. Proceedings of The Third International Conference on Mobile, Hybrid, and On-line Learning; 2009 Aug 16-18; Beijing, China; 2010.
24. Khodadad Hoseiny SH, Noori A, Zabihi MR. E-learning acceptance in higher education: Application of flow theory, technology acceptance model & e-service quality. *J Research and Planning in Higher Education*. 2013; 19(1): 111-36. [In Persian]
25. Zolfaghari M, Negarandeh R, Ahmadi F. The Evaluation of a Blended E-learning Program for Nursing and Midwifery Students in Tehran University of Medical Sciences. *Iran J Med Educ*. 2011; 10(4) :398-409. [In Persian]
26. Yasini A, Taban M. Study of virtual learning courses effectiveness from the perspective of faculty members and students. *J Iranian Higher Education Association*. 2015;7(4):175-98. [In Persian]
27. Mcvey G, Gusella J, Tweed S, Ferrari M. A controlled evaluation of web-based training for teachers and public health practitioners on the prevention of eating disorders. *Eat Disord*. 2009;17(1):1-26.
28. Tsai SL, Tsai WW, Chai SK, Sung WH, Doong JL, Fung CP. Evaluation of computer-assisted multimedia instruction in intravenous injection. *Int J Nurs Stud*. 2004;41(2):191-8.
29. Curran VR, Fleet L. A review of evaluation outcomes of web-based continuing medical education. *Med Educ*. 2005;39(6):561-7. doi:10.1111/j.1365-2929.2005.02173.x
30. Voutilainen A, Saaranen T, Sormunen M. Conventional vs. e-learning in nursing education: A systematic review and meta-analysis. *Nurse Educ Today*. 2017;50:97-103. doi:10.1016/j.nedt.2016.12.020
31. Yanuschik OV, Pakhomova EG, Batbold K. E-learning as a Way to Improve the Quality of Educational for International Students. *Procedia Soc Behav Sci*. 2015;215:147-55.
32. Salter SM, Karia A, Sanfilippo FM, Clifford RM. Effectiveness of E-learning in pharmacy education. *Am J Pharm Educ*. 2014;78(4):83. doi:10.1016/S1350-4789(12)70319-7
33. Mehra V, Omidian F. Examining Students' Attitudes Towards E-learning: A Case from India. *Malaysian Journal of Educational Technology*. 2011;11(2):13-8. doi:10.1016/j.iheduc.2004.02.001
34. Garrison D, Kanuka H. Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education*. 2004;7(2):95-105.
35. Reichelmayer T. Enhancing the student project team experience with blended learning techniques. Proceedings of the 35th Annual Conference Indianapolis; 2005 Oct 19-22; Indianapolis, IN, USA. 2005.
36. Kvasnica O, Hrmo R. Importance of computer literacy for e-learning education. Proceedings of the Joint International IGIP-SEFI: Annual Conference 2010. Diversity unifies - Diversity in Engineering Education, 19th - 22 th September 2010, Trnava, Slovakia. Brussel: SEFI, 2010
37. Link TM, Marz R. Computer literacy and attitudes towards e-learning among first-year medical students. *BMC Med Educ*. 2006;6:34.