Research Article

The comparison of the effect of traditional and off-line electronic educational methods on the knowledge and attitude of the undergraduate dental students of Shiraz University of Medical Sciences

Sara Karanjam[1], Farin Kiany Yazdi[2], Nahid Zarifsanaiey[3]*

Abstract

Introduction: E-learning as one of the new methods of learning makes it possible to achieve skills at higher levels without time and space constraints. The purpose of this research was to compare the effect of case-based learning in two ways of personal and off-line (forum) E-learning on the knowledge and attitudes of undergraduate medical students of Shiraz University of Medical Sciences.

Methods: This is a semi-experimental research, which was conducted on 44 dental students in the academic year of 2014. Sampling was a block randomizing. Both groups were given written exams before and after teaching in order to evaluate the participants' awareness and knowledge of the content, the satisfaction level and attitudes of both groups were questioned by the application of an exam following the Likert scale format of 1-5. In this study, a paired samples t-test was used for comparing students' pretest and posttest scores in each group, and an independent samples t-test was run for comparing the changes in scores, students' attitudes, and satisfaction in both groups. In case of derivation from the normal distribution hypothesis, non-parametric equivalents were used in these tests. The acceptable significant level was $\alpha=0.05$.

Results: The mean score of primary awareness in both groups of personal and E-learning was statistically the same ($p=0.647$). A significant increase was observed in the awareness level of people after the application of learning ($p<0.001$). The awareness of people in personal and E-learning groups before learning (median=2) was significantly increased compared to that after learning (personal: median=5 and electronic: median=6). The increase of awareness in personal and E-learning groups was statistically the same ($p=0.216$). Generally, the increase of awareness level was similar in women and men ($p=0.822$). There was not a significant relationship between people's attitude with the learning method and age of the participants.

Conclusion: Given that the learning and attitudes of students in off-line (forum) E-learning and personal learning was the same, and regarding the effectiveness of E-learning in time reduction and saving of costs and educational facilities, this new method can be used as a part of learning activities in medical learning program.

Keywords

Case Based Learning, Personal Learning, Off-line (Forum) E-learning, Knowledge, Attitudes

[1] M.Sc. Medical, Education Shiraz University of Medical Sciences, Shiraz, Iran.

[2] Assistant professor of periodontology department of Periodontics, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran

[3*] Corresponding author: Associate Professor and Head of Department Department of eLearning planning in Medical Sciences Center of excellence for electronic learning Shiraz University of medical sciences Shiraz, Iran. *sanaieyn@sums.ac.ir*

Received May 05, 2015; received in revised form August 27, 2015; Accepted September 20, 2015

Introduction

One of the very old ways of learning is case study (Case Based Learning) [1]. Teaching and learning based on the case is one of the strategies that enhances active learning and makes students familiar with offering prepared clinical cares and with different situations and challenges of the real world in a secure environment [2]. This method has been first introduced at Harvard University and accepted as a teaching strategy and as a means of problem solving and decision-making by various academic majors [3]. The mentioned method is a way of teaching and learning that is about one case whose most obvious feature is the application of educational tools called "case" and is designed in order to manage students, provide opportunities for them to exercise real cases in a safe and secure situations, accept the required role, and responsibility and make proper decision. A case method is a pedagogical method (dependent on the education science) which is based on the learning from story and is known to be a successful and old educational method [4]. In fact, storytelling is the oldest and most natural form of feeling stimulates which can have numerous functions. In addition, it can be a way to share different experiences [4]. The assumption lying behind such teaching methods is to help the learner to remember similar situations when facing a problem (case). The teacher in this method acts as an initiator, mediator, and facilitator of the learning process, leading the students towards the purpose of session [5]. It can also be one of the methods of teaching for the purpose of education and helping the students learns how to work in a clinical environment and develop the strategy of problem solving [6]. Students in case method face real situation of working and are given the opportunities for analysis, decision-making and the way to put them into practice. This method is based on the Socratic Method, involving questions that guide learners to a logical response and result.

The work process is divided into four stages through the case: 1) to diagnose the problem: including case studies, data collection, and systematic analysis of scientific situations and detection of communication. 2) To analyze the problem. 3) To provide a variety of solutions and compare them with each other and 4) To equip the learner with decision-making and problem solving strategies [7]. Higher education should be dynamic and offer plans that meet the needs of the society and scientific knowledge of any major in a way that learners of these majors can play their role well to achieve the mentioned purposes and have opportunities of self-education and self-sufficiency in their study [8]. The rapid development of information and communication technologies provides new opportunities in the field of programming and the implementation of new ways of learning [9]. In the new systems of education, it is tried to utilize new ways of teaching-learning and apply various media of teaching-learning process with high efficacy [10].

Achieving different skills, including e-learning, helps students to use new knowledge and also helps medical colleges to manage the use of such skills and knowledge. Generally, knowledge and abilities that are achieved at the end of the academic training of general medical or medical professional are not sufficient for future medical staff [3]. The impact of growth of e-learning technologies in the field of medical science has been very remarkable, making the investigation into aspects of e-learning effects in medical sciences very important [11]. Learning, especially in medical sciences is achieving knowledge and skill and putting them in practice, a practice which is expected to last long [12]. E-learning can be considered as the most important factor in scientific and cultural mutations in the contemporary world [13]. Since there has been an improvement in education and educational needs besides the

improvement in technology, we need methods to satisfy individuals' educational needs regardless of time and place situations. In addition, by the application of e-learning, one can fill the gap between the theory to practice and encourage learners in participation and problem solving [14].

The research done by Zolfaghari in 2007 entitled 'the effect of two methods of e-learning and lecture on learning of mother and child health course in nursing students', showed that e-learning was used as a solution to meet the increasing needs of higher education in case of providing necessary situations and suitable training system in virtual networks [15]. Generally speaking, one of the advantages of e-learning is to encourage the students to participate actively in learning. This has changed learning from the teacher-centered method and mere note taking one to the learner-centered method. Another advantage of this method is spending more time for teaching each student, proving the learner with the opportunity to review the teaching subjects. This method provides people with the application of information without geographical limitations; it is also economical because of providing more time for professors to do research and to teach more people [16]. This method is designed with the purpose of self-direct learning, independence, and learner-centered learning. Case based learning, in fact, is an amalgamation of memory, learning, and reasoning.

From the communicative view, e-learning is divided into asynchronous (offline) and synchronous (online) communications. Offline communications are those activities that do not occur at the same time. Offline communication helps students to access the curriculum at any time according to their job and life situations. By using these facilities, students can have more time to participate in discussions, to pose questions, to give answers, and to do assignments for thinking and to use their learning in real situations. This type of learning let learners enter the learning environment at appropriate time, place, and have access to the educational content and have contact with others.

However, online learning involves activities that happen at the same time. In online learning, learners have contact with teachers, other learners and/or the content of the course at the same time. One of the advantages of online communication of learners with the teacher, other learners, and other learning cases is that the participants feel collective spirit and belongingness to a group, benefit from quick teacher and peers' feedback and, in line with other learners, improve their learning. Another topic of this research is forum that is one of the offline learning methods. According to Williams, forum has been used by group cooperation with the purpose of searching information or solving problems occurring in people's lives. Therefore, online forum is a representative of social context to support learning. This educational method, besides yielding information, causes saving information and improving the application of formal and informal learning environment. Sharing information in forum among learners results in enhancing discussion, interaction, and finally critical thinking. People can define learned concepts again and discuss with each other. Such virtual social communications cause the feeling of achieving knowledge in learners [17]. According to the research conducted by Mohammad et al, the comparison of online forums, contextual chats, and online learning interactions , reported from students' views, reflected learners' more interest in online forum (in comparison with two other methods) [18]. The study of Morrison et.al showed that using forum had useful effects on learning methods and provided grounds for facilitating searching, exchanging information, and having access to tools for special educational data analysis [19].

According to the research done by Kizilex et al, the environment of electronic discussion caused confidence and group cohesion on an academic term [20].

Although practical and effective learning are considered and e-learning provides ground to many of the educational ideals (such as learning at any time and place, cooperative learning, self-assessment and self-direction) in many fields including medical sciences, the need for e-learning to educate the medical community, involving more audience with a wide variety of interests, experiences, and needs, is more tangible [12]. Therefore, considering the shortcomings of the current system of training and traditional methods in preparing dental students for their profession and according to the urgent need of this group to having access to the up-to-date knowledge that includes a set of extensive information, more learner-centered and self-directed learning methods should be investigated and used [8].

Accordingly, in this research, it is tried to investigate the comparison of the effects of the personal and off-line electronic case- based teaching methods with regard to the knowledge and attitudes of dental students on gum disease. It is tried to answer the following questions in this research:

1. Is there any difference between the knowledge of dental students on the gum disease by offline e-learning method (forum) before and after training?
2. Is there any difference between the knowledge of dental students on the gum disease by personal method before and after training?
3. What is the difference between the knowledge of dental students on the gum diseases by electronic and personal methods after training?
4. What is the difference between students' attitudes of e-learning and personal groups?

Methods

This study was quasi-experimental. The study population consisted of dental students of Shiraz University of Medical Sciences in 1393-94 that had the course of Periodontology 4, and already passed practical periodontal units completely.

After releasing the call for participation, 60 students from dental university applied to take part in the research, 44 of whom participated to the end of the study. According to the consultant, the number of samples in each group was 15 people (30 people). Since the number of participants was more, 30 participants were put in both groups equally for block randomization, but some of them failed to participate in the research and hence ultimately the number of participants in the personal group fell to 24 and electronic group to 20. In this study, researchers investigated the effect of an independent variable of educational method on dependent variable of learning on the samples by using case-based learning methods.

The current study was investigated and confirmed by the ethics committee of the Faculty of Medicine, Shiraz University of Medical Sciences with the moral code of CT-9375-7425. All the students participating in this study were informed about the related purposes of this study. They were informed that they could ask any questions from the executives about the implementation of this study and that the obtained results of this research would be kept as a secret and would have no effects on their final exam score. They could leave the study at any time they want. After giving this information to the volunteers, they filled the consent form.

A questionnaire was prepared with 8 written questions with one answer to evaluate students' knowledge about two educational methods. It should be noted that in order to assess the validity of the content of the knowledge questionnaire, the questionnaire

was read and verified by 6 professors, in terms of expressiveness, concept, and scientific suitability. Inappropriate questions were removed or altered by consensus of the judges or based on their comments. Finally, the questionnaire consisting of eight questions were obtained.

For the reliability of questions in the collected questionnaire, questions were codified in the form of true and false (true= 1, false= 0) and Kudar-Richardson coefficient was equal to the acceptable amount of KR-20= 58%.

The pre-test and post-test questionnaires were given to the students with the posttest questions being similar to the pre-test questions.

The students of personal group participated in the research in a traditional method (lecture in class). Students had a pretest and posttest before and after training. After taking the pretest of the students in personal method, the related professor showed the students a number of slides about 8 types of gum diseases. Furthermore, the investigation of the patient's profile was done according to the designed educational process. Students evaluated the designed diseases with the help of a professor. The content of training including curriculum headlines, educational purposes of the chapter were presented to the students. Finally, after training, a test, based on what was taught in the class, was given to the students for the final diagnosis of the type of disease.

For the participants in e-learning group based on the case in forum, first the structure of the process of this e-learning was prepared. Generally, the structure of the process concerned using the processes and different factors to achieve a certain result. The applied process in this research was an educational process for dental students. The process, by using the feedback mechanism, aimed to help learners meet the goal of the study. Each process had three parts; 1) purpose 2) structure and 3) result. The process itself had three steps: 1. exit freezing, 2. behavior change, 3. fossilization of new behavior [21].

In this method, the complete electronic content of the unit was loaded in accordance with the content of personal class, the required documentation such as questions and intended pages of the reference book, and images related to the disease on the forum. Only virtual classes were held for this group of students. There were also instructions for students about educational activities before entering the system. A user name and password were prepared for each student to access this system. A nickname user name (in order for the students to write the answers to their comment easily without being known) was considered for each student and before entering the system, this information (username, password, nickname, and address of website) was given to them.

After taking the pretest from the students participated in the study in e-learning method, the professor, in order to teach them to diagnose and ultimately to treat related diseases, presented photos and backgrounds of 8 cases of disease in a cyberspace. This is considered for interacting and sharing people's experiences, comments, and discussion of a disease in forum. Students were given 48 hours to participate in any part of this forum, interacting with each other, and sharing experiences. Finally, a questionnaire was given to them to determine the attitudes of the students after electronic teaching. A questionnaire with 14 questions was prepared by Naghavi [22] to collect data for evaluating students' attitudes toward two personal and electronic methods. The reliability of this questionnaire was reported equal to the acceptable amount of α=0.92. The questionnaire given to the students followed the Likert scale format, starting from 1 indicating "completely disagree" to the 5 indicating "completely agree".

A paired-samples t-test was run for comparing students' scores in each group before and after training, and an independent samples t-test was run for the changes in score and students' attitudes in both groups. In case of deviation from normality, non-parametric equals of these tests were used. To analyze data, SPSS software version 18 was applied. The significant level was equal to 0.05. Students were assured that the obtained scores in the test of knowledge would remain secret and would not have any effects on their final score to observe moral purposes.

In order to compare the effect of two educational methods, the rate of change in each person's score was calculated in the form of "pre-training score- post-training score = Δ".

Results

Overall mean of participants' ages was (23.11±1.57) with the range of 22-32. The mean age of personal education (2.04 ± 23.21) and electronic (0.72 ± 23) one was not significantly different (p =0.546). The sex ratio (proportion of women) in both personal education (66.7%) and electronics (75%) was similar (p =0.546). The mean knowledge score of both personal education (median = 2, 1.13 ± 1.831) and e-learning groups (median = 2, 1.63 ± 2.15) were not significantly different (p = 0.647).

Table 1: Results related to the comparison demographic variables and primary scores of people between the two educational groups

group variable		personal education	e-learning	p	Total
ages		2.04 ± 23.21	0.72± 23	0.667	1.57 ± 23.11
gender	Male	33.3 (%8 person)	25 (%5 person)	0.546	29.5 (% person13)
	Female	66.7 (%16 person)	75 (%15 person)	0.546	70.5 (% person31)
The primary knowledge score		1.13± 1.83	1.63 ± 2.15	0.647	1.37± 1.98

Table 2: Comparison of knowledge scores before and after the intervention and the amount of its change between educational groups and two genders

knowledge group		Before intervention	after intervention	P*	**(Δ)	P***
group	personal education	1.83±1.13	1.68 ± 4.67	<0.001	1.20 ± 2.83 (3)	0.216
	e-learning	2.15±1.63	1.1 ± 5.5	<0.001	1.75 ± 3.35 (3)	
gender	Male	1.61±1.32	4.85±1.51	<0.001	1.92 ± 3.23 (3)	0.822
	Female	2.13±1.38	5.12±1.49	<0.001	1.29 ± 3 (3)	

* Wilcoxon test

** Change in score of knowledge as: difference of pre-calculated post score (pre-score – post-score = Δ). The values of this column are median (mean ± SD).

*** Mann – Whitney test

There was no significant difference between the amount of change (Δ) in the knowledge score in personal education (median = 3), and electronic learning (median=3) (p= 0.216).

In general, there was no significant difference between the two groups with regard to the rate of changes in the level of knowledge for women (median = 3) and men (median = 3) (p =0.822). Table 2 showed the results related to the comparison of pre and post-tests scores in each group separately based on the marked ratings of the

Wilcoxon test. In both groups, a significant increase was observed in the level of knowledge after training (Both $p<0.001$).

Since the change in the knowledge score (Δ) was not significantly different between the two groups, the comparison of genders in two groups was conducted separately for each group.

According to table 3 showing the results of comparing the students' attitude between the groups of participants, it was observed that the mean score of attitude in the personal way (8.95 ± 55.04) and electronics (7.018 ± 54.95) was not significantly different (p=0.971). There was no significant difference between the attitude of women (8.29 ± 55.68) and men (7.70 ± 52.38) in educational methods (p=0.398).

Table 3: Comparison of attitude scores between educational groups and both genders

educational groups		Mean ± SD	P*
group	personal education	8.95±55.04	0.971
	e-learning	7.18±54.95	
gender	Male	7.18 ±54.95	0.938
	Female	8.95±55.04	

* Independent t-test (Student's t-test)

There was neither significant relationship between the age of the participants with their attitude score (p= 0.573, r= 0.087), and nor with the change score in their knowledge (p= 0.551, r= 0.092).

Since the change score in attitude (Δ) was not significantly different between the two groups, the comparison of two genders in both groups was done separately for each group.

Conclusion

This study was conducted to compare case-based education in personal, offline electronic (forum) methods, and their effects on the knowledge and attitudes of general dental students in dental university of Shiraz. The results of this study showed that there was no significant difference between the mean of gender and age distribution in personal and electronic educational groups. The present research showed a significant increase in awareness level and individual's knowledge (in both men and women groups). These findings were in line with the findings of other research that compared traditional and modern methods of education. According to the research by Morrison et.al, who compared the methods of self-study education and forum-based education (in relation to the way of using forum), the obtained results of data content analysis indicated the useful effect of forum-based education compared to the self-study education [19]. The other research done by Mohammad et.al to identify the best option for learners among three different methods of e-learning (forum, textual chat, online interactions) exhibited that forum was the learners' priority [18]. In Sitamerajo's study, the effectiveness of educations involving online discussions and case studies was investigated and after the qualitative and quantitative analysis, they concluded that using these two methods at the same time enhanced the quality of education [23]. In the present study, there was a significant increase in the awareness level and individual's knowledge (for men and women) in both groups after education. Education was the same in both groups and no significant difference was observed. The findings in Abbaszade et al's research also indicated the same effect of

multimedia-based education and traditional education [24]. Hugan Holtez et.al in the research conducted in 2008 showed that both methods of multimedia education and traditional education were effective in individual's awareness and there was no significant difference between them [25]. In the obtained survey of the present study, there was no significant difference in students' attitudes in periodontology course in both personal and electronic case-based methods. Woo et.al in their research concluded that students' attitudes that passed research method course with both multimedia and personal methods did not have any differences [26].

There were also some studies that showed the priority of e-learning over traditional methods from two aspects of knowledge and attitude. In the study by Zarif Sanaei et.al, for example, the average score of satisfaction in multimedia group was significantly higher than that in the traditional group [14].

Furthermore, Wayman et.al in their research pointed out that e-learning in the web environment works as a site with the data base connected to the sets of communicative channels. In that study, they used the evaluative way of "intensive term with open e-learning" which consisted of sets of required topics to enhance the quality of education and then compared this with traditional method of education. After applying this analytical tool, they showed that e-education in web environment was a practical solution to make and reform cooperative educational environment [27].

In Suk Song's study, e-learning method based on cellphone was investigated as a "ubiquitous" educational method. In this research, this method was considered as a supplementary method for learners in traditional education and after the evaluation it was observed that this method supported education and made students' supervision easier; it also enhances interactions among students, boosting the learning level [13] as well.

Fani et al in their research concluded that the knowledge in multimedia-based group is significantly more than traditional group. However, according to the results of this study, there was no significant difference between the average score of satisfaction and retention of both groups.

In their research, Saedi Nezhad et.al concluded that one of the reasons for indifference in satisfaction in both educational methods might be the inadequate use of creative educational method and innovativeness of e-learning for students [28].

In this research, it was tried to apply the attractiveness and creativity in e-learning method; however, this new method of education requires more work and creativity.

It seems that one of the reasons for the lack of differences in learning and attitude of the two groups in this study is the short duration of the course for both groups. Researchers believe that this difference in students' learning might be greater and the participants could better judge and provide a more accurate attitude toward both teaching methods if the periodontology course was offered in a complete semester and compared with each other instead of one session for traditional method and an e-learning course through the forum.

Regarding that medical education centers are always looking for new and various educational methods with higher efficiency and effectiveness than other methods used in education, the result of the present study has showed that case-based education in both methods of personal and electronic can have positive effects on learning and knowledge enhancement.

There are more interactions among learners in forum and they benefit from feedback mechanism in their interactions for constant evaluation of learning level. As the result of this study has showed, forum can be as effective as face to face and

personal discussion sessions. It also seems that in education through forum, inactive students in personal classes can express their ideas and give comments easier and also can have more interactions with their peers. It is also observed that e-learning through forum needs time [29] and is less costly for study and learning [30] than personal education. Participants in e-learning through forum can determine their favorable time (in this educational method, there is a possibility of using repeated educational information during different times) and location of their learning. In this educational method, people's implicit knowledge is converted to explicit knowledge and learners can use their knowledge in the real world while refraining from the occurrence of possible damage in clinical work place [31]. By using this method, learners have more freedom and independence and learners are usually encouraged to think creatively and be innovative. [30]. Finally, the results of the study have indicated that student's learning in e-learning method through forum is the same as personal education method. Furthermore, the attitudes of learners in both groups are noticed to be similar. Concerning the effectiveness of e-learning in time reduction and cost-saving it is suggested for educational institute provide educational facilities for students and professors. This method is now included in medical curriculum as a part of education.

Acknowledgements

This article is extracted from the thesis of Sara Karanjam with project No 7425 and the moral code of CT-9375-7425 in Shiraz University of Medical Sciences. The clinical trial code is IRCT2015041221709N1. I acknowledge Doctor Mehrdad Vosoughi that did statistical procedures and Doctor Ali Gulkari who did the design processes in the research development center of Dentistry College. I also thank the president of e-learning center of Shiraz University of Medical Sciences because of providing necessary facilities and electronic content of science that provided forum environment.

References

1. Suliman WA. Critical thinking and learning styles of students in conventional and accelerated programmes. International nursing review. 2006 Mar;53(1):73-9. PubMed PMID: 16430764.
2. Chen FC, Lin MC. Effects of a nursing literature reading course on promoting critical thinking in two-year nursing program students. Journal of Nursing Research. 2003;11(2):137-47.
3. Kaddoura MA. Critical thinking skills of nursing students in lecture-based teaching and case-based learning. Learning. 2011;5(2):20.
4. Frank C. Conceptual design of the web based case method: a pedagogical perspective. **(**Paderborn, Univ., Diss., 2003**)**: Citeseer; 2004.
5. Stjernquist M. Applying the case method for teaching within the health professions-teaching the students. Education for Health. 2007;20(1):15.
6. Luck L, Jackson D, Usher K. Case study: a bridge across the paradigms. Nursing inquiry. 2006;13(2):103-9.
7. Patsula PJ. Web design for effective online training and instruction. Athabasca, Alberta: Athabasca University; 2001.
8. Fani MM, Mehravar S, Mehrabi M. Level of Learning and Satisfaction through Traditional Methods and the Use of Multimedia: A Comparative Study. Magazine of E-learning Distribution In Academy. 2014;5(2):72-8.
9. Moore MM, Tait A, Resta P, Rumble G, Zaparovanny Y. Open and distance learning: Trends, policy and strategy considerations. Unesco; 2002.

10. Lepionka ME. Writing and developing your college textbook: a comprehensive guide to textbook authorship and higher education publishin.: Atlantic Path Publishing; 2008.
11. Ruiz JG, Mintzer MJ, Leipzig RM. The impact of e-learning in medical education. Academic medicine. 2006;81(3):207-12.
12. Nasiri F, Ghanbari S, Ardalan M, Karimi I. Effect of Infrastructure and Faculty Readiness in Effective Implementation of e-Learning Based on Technology Acceptance Model (TAM). Education Strategies in Medical Sciences. 2014;7(5):329-8.
13. Sung JS. U-learning model design based on ubiquitous environment. International Journal of Advanced Science and Technology. 2009;13(December):77-88.
14. Zarif Sanaiey N, Karamizadeh Z, Faghihi AA, Mohammadi H. The comparison study of Knowledge and skill of physicians before and after contribution in traditional and electronic continuous Medical Education Diabetic course. Magazine of E-learning Distribution In Academy. 2012;3(1):21-30.
15. Hjeltnes TA, Hansson B. Cost effectiveness and cost efficiency in e-learning. QUIS-Quality, Interoperability and Standards in e-learning. Norway: Mid Sweden University; 2005.
16. Khoshsima S, Salari MM, Tadrisi D, Daneshmandi M, Mahdizade S. Comparison of nurses learning level by multimedia and web-based methods in teaching nursing care of chemical accident. Quaretly of education strategic in medical sciences. 2013;6(3):129-34. [In Persien[
17. Williams IM. Informal Social Learning: An Examination of Teaching and Social Presence on a Photoshop® for Beginners Internet Discussion Forum [PhD Thesis[. United States: Arizona State University; 2014.
18. Mohamad AM, Yusof FM, Aris B. Students View on Text Chats (CH), Forum Discussion (FR), and Online Learning Interaction (LI). Jurnal Teknologi. 2014;69(1):31-38.
19. Morrison D, Seaton JX. Exploring self-directed learning in an online "do-it-yourself" forum. International Journal of Self-Directed Learning. 2014;11(2):29-45
20. Kizilcec RF, Schneider E, Cohen GL, McFarland DA. Encouraging Forum Participation in Online Courses with Collectivist, Individualist and Neutral Motivational Framings. Experiences and best practices in and around MOOCs. 2014;March 37;13-:17.
21. Pivec M, Dziabenko O, Schinnerl I, editors. Aspects of game-based learning. The 3rd International Conference on Knowledge Management.2003 July;216-225; Graz, Austria. 2003. P.
22. Naghavi M. 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. 2007;13(1):157-76.
23. Seethamraju R. Effectiveness of using online discussion forum for case study analysis. Education Research International [Internet]. 2014 [2014 Sep 29]. Available from: http://www.hindawi.com/journals/edri/2014/589860/
24. Abbaszadeh A, Sabeghi H, Borhani F, Heydari A. A comparative study on effect of e-learning and instructor-led methods on nurses' documentation competency. Iranian journal of nursing and midwifery research. 2011;16(3):235.
25. Hugenholtz NI, De Croon EM, Smits PB, Van Dijk FJ, Nieuwenhuijsen K. Effectiveness of e-learning in continuing medical education for occupational physicians. Occupational Medicine. 2008;58(5):370-2.
26. Woo MA, Kimmick JV. Comparison of Internet versus lecture instructional methods for teaching nursing research. Journal of Professional Nursing. 2000;16(3):132-9.
27. Waßmann I, Schönfeldt C, Tavangarian D. Wiki-learnia: social e-learning in a web 3.0 environment. Engineering Sciences & Technologies/Nauki Inzynierskie i Technologie. 2014;4(1).

28. Saeedinejat S, Vafaeenajar A. The Effect of E-Learning on Students' Educational Success. Iranian Journal of Medical Education. 2011;11(1):1-9.
29. Elahi Sb, Kanaani F, Shayan A. Designing a Framework for Effective Factors on Virtual Students' Tendency to the Electronic Learning and its Assessment. Quarterly journal of Research and Planning in Higher Education. 2011;17(2):59-80.
30. Bhatti I, Jones K, Richardson L, Foreman D, Lund J, Tierney G. E-learning vs lecture: which is the best approach to surgical teaching? Colorectal Disease. 2011;13(4):459-62.
31. Borhani F, Vatanparast M, Abbaszadeh A, Seyfadini R. The Effect of Training in Virtual Environment on Nursing Students Attitudes toward Virtual Learning and its Relationship with Learning Style. Iranian Journal of Medical Education. 2012;12(7):508-17.