

Access this article online
Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_323_18

Comparing the effects of two different educational methods on clinical skills of emergency intermediate technician: A quasi-experimental research

Mohsen Aminizadeh^{1,2}, Seyedeh Moloud Rasouli ghahfarokhi³,
Negar Pourvakhshoori¹, Mehdi Beyramijam¹, Nader Majidi¹,
Mohammad Ali Shahabi Rabori⁴

Abstract:

BACKGROUND: Assessing the clinical skills of prehospital Intermediate technician is considered to be one of the priorities in dealing with diseases, which may provide an appropriate reflection of the training programs. The purpose of this study was to compare the two methods of clinical skills training of emergency intermediate technician.

METHODS: This quasi-experiment was carried out on Kerman's emergency medical technicians in 2017. Operational and clinical skills, such as cardiopulmonary resuscitation (CPR), triage, familiarity with the equipment, and proper patient transportation methods, were taught in both electronic and traditional methods on two groups, each consisting of 30 intermediate technicians. Finally, the personnel's satisfaction level with the two teaching methods was compared and analyzed using IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.

RESULTS: There was no significant difference between the theoretical test scores in both the electronic and traditional methods in all the participants (triage, pulmonary resuscitation, familiarity with equipment, and patient transportation). Furthermore, there were significant differences between the practical test scores in both the electronic and traditional methods, in all the participants except triage. There was a significant difference between learners' satisfaction in both electronic and traditional methods in two areas of teaching and course difficulty in CPR, equipment usage, and methods of transportation.

CONCLUSION: According to the results obtained by the present study, the electronic educational systems due to their inclusive and interactive nature are recommended to be employed in courses that have more theoretical aspects such as triage. The traditional method is suggested in teaching practical courses such as CPR that need more practical and clinical skills.

Keywords:

Electronic training, intermediate technician, traditional education

Introduction

Emergency medical services (EMSs) as the first stage of care and treatment in dealing with emergency patients outside the hospital is of considerable importance in the health-care system. Its main goals are to save lives of the victims, to prevent more severe

disorders, and to provide psychological support for victims and their families so that they can properly deal with the acute situations.^[1] The World Health Organization regards EMS systems as an integral part of any effective and functional health-care system.^[2] Therefore, EMSs have a vital role to play in protecting human lives.^[3]

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Aminizadeh M, Rasouli ghahfarokhi SM, Pourvakhshoori N, Beyramijam M, Majidi N, Shahabi Rabori MA. Comparing the effects of two different educational methods on clinical skills of emergency intermediate technician: A quasi-experimental research. *J Edu Health Promot* 2019;8:54.

¹Health in Emergency and Disaster Research Center, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran, ²Department of Emergency Operation Center, Disasters and Emergencies Management Center, Kerman University of Medical Sciences, Kerman, Iran, ³Department of Nursing and Midwifery, Masjed-Soleiman Branch, Islamic Azad University, Masjed-Soleiman, Iran, ⁴Department of Anatomical Sciences, Afzalipour Faculty of Medicine, Kerman Medical University, Kerman, Iran

Address for correspondence:

Mr. Mohammad Ali Shahabi Rabori, MS in Anatomical Sciences, Department of Anatomical Sciences, Afzalipour Faculty of Medicine, Kerman Medical University, Kerman, Iran.
E-mail: dardestan_shahab@yahoo.com

Received: 30-09-2018

Accepted: 03-11-2018

The more appropriate and faster the services are, the lower the number of deaths will be and the trust of people in the system will increase.^[4] In the prehospital stage, emergency medical technician (EMT) intermediates are responsible for providing basic emergency treatment for respiratory, trauma and cardiac emergencies, obstructed airways as well as needs to have independent judgment, decision-making skills, prioritizing and initiating life-saving cares, and preventative treatments for the uptrend in disorders. Therefore, the training of efficient and practical human resources is one of the most important goals of this system worldwide.^[5]

EMTs provide critical emergency care until a victim can reach a hospital, typically in an ambulance and one of the most important characteristics of the personnel employed in this system is their potential and ability, especially in clinical matters, they must also be completely familiar with participants such as internal-surgical problems, aging, children, psychology, infants, and even natural disasters, terrorism, and bioterrorism, and how they are controlled before reaching to a health-care center.^[6] The US Emergency Committee has divided its personnel into four groups to provide prehospital services, and out of all the four groups, those who work at intermediate level have possess the knowledge, skills, and attitudes consistent with the expectations of the public and the profession and recognize that they are an essential component of the continuum of care and serve as a link for emergency patients to acute care resources and the primary roles and responsibilities of EMT-intermediates are to maintain high quality, out-of-hospital emergency care.^[7]

Since these people are permitted to perform extensive activities such as advanced cardiopulmonary cerebral resuscitation, prescribing of certain drugs, control of cardiac rhythms, and other advanced skills in assessment and treatment; they are therefore considered the heart of the prehospital services system and have a great responsibility.^[8] Furthermore, due to the special working condition in prehospital emergency section and the need for large amount of information over a short period of time, working in prehospital emergency section needs quick reactions from the emergency medical team.^[9] Therefore, it is necessary for them to act based on universal standards and to have up-to-date knowledge, which would be possible to acquire through standard and constant training methods.^[10]

On the other hand, education is a predetermined process with specific goals that is conducted between a scientifically and practically trained person in a specific context and a number of learners.^[11] In all countries, effective learning of the theoretical discussions and clinical skills is a very challenging issue for the students.^[12] In the previously mentioned method,

individuals learn a huge amount of content but forget them quickly.^[13] Various studies have suggested that if learners go through the training in a tangible and realistic way, they will understand it better and it will be more effective comparing to other methods, and their skills in that specific field will increase as well.^[14,15]

There are various methods of training and the most important method among all of them is the traditional method consisting of group discussions and workshops. In this method, because of the interactions between the trainer and the personnel, the possibility of learning is high, and when they face problems in using particular equipment, the personnel can ask the trainer for solutions.^[16] In spite of the fact that in this method an individual is pushed into discussions and even though it is a suitable method for solving problems, it is certainly limited to specific time and place; hence, it can prevent the learner from having an active participation.^[17] With the rapid pace of science and technology advancement, new educational methods such as electronic training can be beneficial. Electronic training is a type of individual training method in which learners can achieve educational goals dependent on their talents.^[18] However, due to the individuality of this training method, there is no possibility of group discussions and collaboration, which can be considered as a limitation.^[19]

Numerous international studies have investigated the impact of information technology on the curriculum,^[20,21] the impact of electronic training models such as simulation on the students of prehospital emergency care, and the impact of individual training among the personnel working in the EMS system.^[22,23] According to some of these studies, learning outcomes have been the same in both methods. In some other studies, one of the electronic or traditional methods has been more effective than the other.^[21,23]

Considering the fact that people working in Iran's emergency medical care system have come from different backgrounds such as nursing, operating room, anesthesia, and medical emergency technicians, and the lack of a similar education system for all the prehospital emergency personnel throughout the country and low-quality training during academic studies due to the anonymity of work area at the time of education, lack of paying enough attention toward the prehospital emergency services even for graduates of medical emergencies, and lack of a work assessing and level determining system for technician with different degrees, causes many challenges regarding work, education, and skill among the personnel of EMS in Iran.

To update personnel's information and skills in the prehospital section, monthly classes are held in most

centers in the form of workshops. Due to the wide range of urban and roadside emergency care stations in Iran, to learn all these skills, the personnel of such stations have to visit the training sections of the disaster and emergency medical management center of each province which again has many challenges such as the distance, high costs of traveling, and lack of physical security, and there will also be a huge financial burden on the emergency organization. For this purpose, the pilot electronic training website was launched at the Kerman's Disaster and Emergency Management Center with the aims of providing an effective and efficient teaching method for medical emergency personnel, enhancing personnel's skill and training functionality, and reducing training costs. Due to the lack of a registered study based on the comparison between the usage of these two educational methods in the training of intermediate technician of EMS and to improve the effectiveness of this new educational system compared with the traditional method, in this study, the electronic and traditional educational methods have been compared regarding practical and essential skills acquisition by the emergency medical personnel.

Methods

The research population comprised 500 operative personnel of the Disaster and Emergency Medical Management Center of Kerman University of Medical Sciences that 60 among them were qualified as intermediate technician (those who have bachelor's degree in nursing, medical emergencies, anesthesia, and operating room with a minimum experience of 2 years working in a prehospital emergency center), and exclusion criteria in the study are first responders, basic technicians, and staff with <2 years experiences. The purpose of the investigation was explained to the participants and attention was paid to the fact that they were willing to participate. Furthermore, it was explained to the participants that they had the right to withdraw from the investigation, and then they were placed in two random groups of 30 individuals and were taught practical skills such as basic and advanced cardiovascular resuscitation, triage, familiarity with emergency equipment, and proper patient transportation through two training methods during a 2-month semester. Instructors in the traditional educational group taught theoretical materials through lectures and practical units using mannequins, moulage, etc., in this case, the teacher first explains the process and then practically represents it in a proper way.

The students then started repeating and practicing, and in the electronic educational group, the theoretical and practical materials were taught by the same instructors

using the electronic educational software, which has the ability to upload topics in the form of movies, PowerPoint and Word, and at the desired time and place, students using this electronic training website could utilize the computer system to conduct their lesson fast, individually, and completely independent.

The intention was to utilize the practicable features of the classroom such as class goals, quiz questions in each section, final examination in written form, summarizing, and introducing resources as much as possible. Therefore, all the selected personnels were registered their names, as samples of the research, at the electronic educational website, and each of them were given a personal username and password. Subsequently, the instructors assigned to each participant registered their names at the electronic educational website. They had to upload the contents of each participant which was going to be electronically presented, in the form of PowerPoint, Word, PDF, and video tutorials. After the content being uploaded by the instructors, the learners had to login to the electronic educational website with their personal username password and study the material. The two groups of learners were integrated regarding theoretical and practical content as well as goals of education. Finally, both groups were being tested through a final semester written examination based on educational objectives to evaluate the theoretical part of training. The learners' practical skills were assessed through the objective structured clinical examination (OSCE) test using observation checklists for the participants of triage, cardiopulmonary resuscitation (CPR), familiarization with the equipment, and proper patient transportation methods.

Finally, the scores obtained from the theoretical exam and the OSCE test results were assessed as the learning criterion. Descriptive statistics (mean, standard deviation, and percentage) and inferential statistics of independent and paired *t*-test were used for data analyzing. To assess the learners' satisfaction about the educational method, the standardized questionnaire of the Individual Development and Educational Assessment along with the Likert scale was used that evaluated four areas including teaching method with 20 questions (with options of rarely, sometimes, often, very often, and always), educational content with 12 questions (with choices of none, some, moderate, extreme, and all) and difficulty of the content with three questions, and final perception and judgment with seven questions.^[22] To determine the validity, the content validity method was used and the results were confirmed by 10 well-known experts and the correlations were made based on their views. The reliability of the questionnaire was determined to be 0.94 using Cronbach's alpha.

Results

The demographic characteristics of the study showed that among 60 participants in this research, 75% (45 individuals) were male and 25% (15 individuals) were female, and most of the personnel (80%) (48 individuals) had a bachelor's degree, and according to work experience, 58.33% (35 individuals) of the participants which is the majority had from 5 to 10 years of work experience and 66.66% of them (40 individuals) were staff personnel and 33.33% (20 individuals) were operational personnel. Findings of the research showed that there was no significant difference between the theoretical test scores in both the electronic and traditional training methods in all the participants (triage, CPR, familiarity with the equipment, and proper patient transportation methods), even the mean scores of theoretical courses of the students learning through electronic education method were higher than learners of traditional method. The practical scores of traditional and electronic learners were evaluated using the OSCE method. The findings of the research showed that there was a significant difference between the practical test scores in all participants except for triage in both electronic and traditional methods [Table 1].

Furthermore, the level of students' satisfaction in both electronic and traditional methods was studied in four areas. In the areas of teaching and difficulty of the content in participants of CPR, familiarity with equipment and proper patient transportation method, and in the areas of perception and final judgment for all the participants in both the teaching methods, there was a statistically significant difference among these two educational methods ($P < 0.001$) [Table 2].

Discussion

The findings of the study showed that there was no significant difference between the scores of theoretical

test in all skills (triage, CPR, familiarity with the equipment, and proper patient transportation method) in both electronic and traditional educational methods, meaning that, abilities and skills in both traditional and electronic learning groups were similar with respect to the theoretical part of these participants and they all have earned good grades in the final examinations; even in the field of triage, the mean score was higher in the electronic teaching method, which could be due to the Student's activeness, time-saving, and a learner-centered teaching method through which, the learner is forced to learn individually without relying on the instructor and causes a deeper learning progress. The results of the present study were similar to the study of Nourian (2012). In his study, Nourian studied the comparison between electronic and traditional classroom instruction of 70 dental public health for dental students. The results of his study showed that there was not any significant difference among these two teaching methods. It was mentioned in this study that the traditional method of teaching could be replaced by the low-cost electronic educational method to teach such participants.^[19] According to the findings of Khatuni's research (2011), there was no significant difference between the electronic and traditional educational methods in learning the principles of caring HIV-positive patients by nurses.^[20,24] Furthermore, the results of the present study were opposite to the study of Aminizadeh (2015). In his study, Aminizadeh studied the evaluation and comparison of electronic learning and traditional education methods regarding the practical skills of paramedic technicians. According to the findings, the mean theory scores of all courses were significant.^[21] There are also studies that show electronic learning method is preferred to lecture method. In this regard, we can mention the study of Noohi *et al.* (2011) who investigated nursing care training through traditional and electronic training methods. The results of their study showed that the traditional teaching can be replaced by electronic teaching in nurse education.^[25]

Table 1: The comparison of scores in traditional and electronic groups

Educational type	Clinical skill	Educational groups	Mean±SD	t	P
Theory	Triage	Traditional	12.6±1.57	1.065	0.345
		Electronic	13.4±2.20		
	CPR	Traditional	12.55±1.89	2.18	0.314
		Electronic	14.35±1.36		
	Emergency equipment's and patient transfer proper techniques	Traditional	13.65±2.73	3.450	0.283
		Electronic	14.34±1.23		
Practical	Triage	Traditional	13.63±1.24	0.544	0.695
		Electronic	14.30±1.14		
	CPR	Traditional	13.75±1.13	2.14	0.001*
		Electronic	12.65±1.17		
	Emergency equipment's and patient transfer proper techniques	Traditional	14.09±1.43	2.015	0.031*
		Electronic	13.65±1.19		

* Significant, SD=Standard deviation, CPR=Cardiopulmonary resuscitation

Table 2: Comparison of the mean and standard deviation of satisfaction in triage, cardiopulmonary resuscitation, emergency equipment, and proper patient transfer techniques in traditional and electronic groups

	Variable	Clinical skill	Educational method	Mean±SD	P
Satisfaction	Teacher training	Triage	Traditional	2.75±0.34	0.334
			Electronic	2.65±0.44	
		CPR	Traditional	3.65±0.64	0.025*
			Electronic	2.36±0.45	
		Emergency equipment and patient transfer proper techniques	Traditional	3.47±0.65	0.042*
			Electronic	2.60±0.16	
	Educational content	Triage	Traditional	2.45±0.24	0.441
			Electronic	2.34±0.63	
		CPR	Traditional	2.45±0.43	0.358
			Electronic	2.33±0.24	
		Emergency equipment's and patient transfer proper techniques	Traditional	2.44±0.35	0.632
			Electronic	2.15±0.45	
	Lessen difficulty	Triage	Traditional	2.92±0.65	0.11
			Electronic	1.36±0.74	
		CPR	Traditional	2.65±0.24	0.004*
			Electronic	1.45±0.44	
		Emergency equipment and patient transfer proper techniques	Traditional	2.64±0.24	0.036*
			Electronic	2.11±0.54	
	Final perception and judgment	Triage	Traditional	2.25±0.54	0.024*
			Electronic	2.70±0.44	
		CPR	Traditional	3.25±0.36	0.018*
			Electronic	2.85±0.64	
		Emergency equipment and patient transfer proper techniques	Traditional	2.35±0.87	0.003*
			Electronic	2.10±0.35	

* Significant, SD=Standard deviation, CPR=Cardiopulmonary resuscitation

Findings of the study showed that there was a significant difference between the practical test scores in both electronic and traditional teaching methods in the participants of CPR, familiarity with equipment, and patient transportation, which could represent the extensive experience and acquisition of operational skills through participating in workshops. Moreover, participating in discussions and exchanging information between the instructor and the learner, problem-solving and the existence of a well-trained instructor due to operational nature of such participants can play an important role in proper transference of these skills to the learners. The results of the present study were similar to the study of Aminizadeh (2015). On the other hand, using a combined (traditional-electronic) teaching method in courses such as CPR, which has more clinical aspects than other participants, not only causes the learners to learn the participant theoretically but also the proper implementation of such techniques in the presence of an instructor can play a significant role in increasing the potential and aptness of emergency intermediate personnel when confronting emergencies. In a study, Karamizadeh 2012 have reported that employing a combined traditional-electronic training method in learning nursing course lessons was satisfactory.^[26]

According to another finding of the research, there was no significant difference between the practical test scores

of the triage participant in both electronic and traditional teaching methods, and both groups were similar in demonstrating the practical skills and capabilities of this participant. With respect to the theoretical nature of the courses such as triage, those who learn such participants theoretically can successfully implement them in the practical stage. This is similar to the study carried out by Shahsavari Isfahani *et al.* and Aminizadeh *et al.* (2015), which indicated that there was no significant difference between the practical scores in electronic and traditional training groups, and both the groups were similar regarding theoretical skills as well as the ability to perform them.^[21,27]

Furthermore, the level of students' satisfaction in both electronic and traditional methods was studied in four areas as follows: teaching, difficulty of the content, perception, and final judgment. There was a significant difference in the former two areas except in the triage lesson and in the latter two, in all the courses. These results were in good agreement with the study carried out by Khatouni (2011), which affirmed that in several practical participants, the traditional training courses were more successful compared to electronic training courses which could be due to the differences between the learners' emphasis and their interest toward the participants as well as their fields of study.^[24] The significance of instructor-led training

may be due to the determining role of the instructor in learners' proper usage of their skill and abilities in the traditional teaching method. Due to the practical nature of such participants, the learners will have more improvements in their performance and skills so that they will have more satisfaction. Regarding perception and final judgment, the quality of electronic education in classrooms was measured and compared with that of traditional teaching.

The results showed that learners prefer the distance training method for lessons such as triage which could be due to spending less time and money and having less economic problems and less commuting charges. On the other hand, the interaction between the instructor and the learners would not completely dissociate, and the learners attend practical classes in the presence of the instructor. According to the opinion of Browne (2004), which was quoted from Al-Taie, the interaction between the learners and the trainer in electronic training courses causes the efficacy of such courses to increase, and its learner-oriented nature plays an important role as well.^[28]

The use of electronic educational systems was also suggested by Shahsavari^[27] due to its active and comprehensive way of training, and therefore, it is recommended for medical science teachings. Although for various practical skills, using the traditional teaching method, along with the modern ways of training, such as electronic education, is beneficial for a deeper skill acquisition.

The findings also showed no significant relationship between the areas of teacher training and difficulty of the content in triage participant and the area of curriculum content in any of the participants, which could be due to the theoretical nature of the participants; hence, there would not be much need for an instructor. Satisfaction mean scores in both traditional and electronic training groups were high and similar which was similar to the study of Hale *et al.* and Reime *et al.*,^[29,30] according to which, the satisfaction level was reported to be similar in both electronic and traditional education groups, and the students were satisfied with both the methods.

Conclusion

The results obtained in this study indicated that both electronic education and traditional education methods had a great impact on promoting the knowledge level of intermediate technician. Considering the similarities between traditional and electronic education methods in teaching theoretical participants, electronic education can be used in teaching basic theoretical participants such as triage which is very important in training an intermediate technician. The electronic education method is preferred because it is a learner-oriented method, consists of

interactive training courses, is available anytime and anywhere, can be used individually or in a collaborative way, as well as providing an equal learning opportunity for intermediate technician which is one of the important goals of training in EMS system. Therefore, due to spending lower cost and less time e-learning, besides the usual training could be used for the intermediate technician. A combination of traditional and electronic education can be used for teaching practical participants such as CPR and familiarity with equipment, and patient transportation which requires more clinical skills. Using electronic education as a training method combined with the traditional method can play an important role in determining the skills of the personnel in the intermediate technician.

Limitations

Delimitations of this study, the statistical community was limited to a province, and it is recommended that future sampling be done from a larger community and inappropriate speed of internet for access internet network and electronic education system. It caused disruptions in the implementation of e-learning.

Acknowledgments

The authors would like to acknowledge all intermediate technicians participating in this study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Bigham BL, Jensen JL, Tavares W, Drennan IR, Saleem H, Dainty KN, *et al.* Paramedic self-reported exposure to violence in the emergency medical services (EMS) workplace: A mixed-methods cross-sectional survey. *Prehosp Emerg Care* 2014;18:489-94.
2. Varghese M, Sasser S, Kellermann A, Lormand J-D, Organization WH. *Prehospital trauma care systems*: Geneva: World Health Organization; 2005.
3. Newgard CD, Schmicker RH, Hedges JR, Trickett JP, Davis DP, Bulger EM, *et al.* Emergency medical services intervals and survival in trauma: Assessment of the "golden hour" in a North American prospective cohort. *Ann Emerg Med* 2010;55:235-46.e4.
4. Blackwell TH, Kaufman JS. Response time effectiveness: Comparison of response time and survival in an urban emergency medical services system. *Acad Emerg Med* 2002;9:288-95.
5. Arreola-Risa C, Vargas J, Contreras I, Mock C. Effect of emergency medical technician certification for all prehospital personnel in a Latin American city. *J Trauma* 2007;63:914-9.
6. Timmermann A, Russo SG, Hollmann MW. Paramedic versus emergency physician emergency medical service: Role of the anaesthesiologist and the European versus the Anglo-American concept. *Curr Opin Anaesthesiol* 2008;21:222-7.
7. Al-Shaqsi S. Models of international emergency medical service (EMS) systems. *Oman Med J* 2010;25:320-3.

8. Adnet F, Lapostolle F. International EMS systems: France. *Resuscitation* 2004;63:7-9.
9. Reddy M, Spence PR. Finding answers: Information needs of a multidisciplinary patient care team in an emergency department. *AMIA Annu Symp Proc* 2006;649-53.
10. Roudsari BS, Nathens AB, Arreola-Risa C, Cameron P, Civil I, Grigoriou G, et al. Emergency medical service (EMS) systems in developed and developing countries. *Injury* 2007;38:1001-13.
11. Wanwipa T. A Comparison of E-Learning and Traditional Learning: Experimental Approach. Proceedings of the International Conference on Mobile Learning, E-Society and E-Learning Technology (ICMLEET), 6-7 November, 2013. Singapore; 2013.
12. Hare D. Challenges in clinical education. *Can Vet J* 2007;48:121-3.
13. Kordi M, Fakari FR, Mazloun SR, Khadivzadeh T, Akhlaghi F, Tara M, et al. Comparison of the effect of web-based, simulation-based, and conventional training on the accuracy of visual estimation of postpartum hemorrhage volume on midwifery students: A randomized clinical trial. *J Educ Health Promot* 2016;5:22.
14. Kardong-Edgren SE, Oermann MH, Odom-Maryon T, Ha Y. Comparison of two instructional modalities for nursing student CPR skill acquisition. *Resuscitation* 2010;81:1019-24.
15. Saraç L, Ok A. The effects of different instructional methods on students' acquisition and retention of cardiopulmonary resuscitation skills. *Resuscitation* 2010;81:555-61.
16. Nourian A, Nourian A, Ebn Ahmadi A, Akbarzadeh AR, Khoshnevisan MH. Comparison of E-learning and traditional classroom instruction of dental public health for dental students of Shahid Beheshti Dental School during 2010-2011. *J Dent Sch* 2012;30:174-83.
17. Abolhasani SH, Haghani F. Problem-based learning in nursing education: A review article. *Iran J Med Educ* 2011;10:726-34.
18. Zolfaghari M, Mehrdad N, Parsa Yekta Z, Salmani Barugh N, Bahrani N. The effect of lecture and E-learning methods on learning mother and child health course in nursing students. *Iran J Med Educ* 2007;7:31-9.
19. Olmstead C. Using Technology to Increase Parent Involvement. California: California State University; 2012.
20. Goodarzvand M, Esmaeili M. Information technology impression on education quality. *J New Approaches Educ Adm* 2012;2:1-24.
21. Aminizadeh M, Saberinia A, Kohan S, Shokohi I, Faghihi A, Aminizadeh E. Evaluation and comparison of electronic learning and traditional education methods in terms of practical skills of parametric technicians in pre-hospital emergency care. *Strides Dev Med Educ* 2015;12:388-98.
22. Boyle M, Williams B, Burgess S. Contemporary simulation education for undergraduate paramedic students. *Emerg Med J* 2007;24:854-7.
23. David G, Brachet T. Retention, learning by doing, and performance in emergency medical services. *Health Serv Res* 2009;44:902-25.
24. Khatoni A, Dehghan Nayery N, Ahmady F, Haghani H. The effect of web-based and traditional instructions on nurses' knowledge about AIDS. *Iran J Med Educ* 2011;11:140-8.
25. Noohi E, Khandan M, Mirzazadeh A. Effective of electronic education on knowledge attitude and self-care in patient's diabetic type 2 refer to diabetic center of Kerman University of Medical Sciences. *Iran J Nurs Res* 2011;6:73-80.
26. Karamizadeh Z, Zarifsanayei N, Faghihi AA, Mohammadi H, Habibi M. The study of effectiveness of blended learning approach for medical training courses. *Iran Red Crescent Med J* 2012;14:41-4.
27. Shahsavari Isfahani S, Mosallanejad L, Sobhanian S. The effect of virtual and traditional methods on students learning and competency – Based skills. *J Hormozgan Univ Med Sci* 2010;14:184-90.
28. Al-Taie N. The Effect of Using E-Learning Curriculum and Traditional Classroom Curriculum: Comparison and Merits, ICIT 2013. Proceedings of the 6th International Conference on Information Technology, 8-10 May, 2013. Amman, Jordan; 2013.
29. Reime MH, Harris A, Aksnes J, Mikkelsen J. The most successful method in teaching nursing students infection control – E-learning or lecture? *Nurse Educ Today* 2008;28:798-806.
30. Hale LS, Mirakian EA, Day DB. Online vs. classroom instruction: Student satisfaction and learning outcomes in an undergraduate allied health pharmacology course. *J Allied Health* 2009;38:e36-42.