

The Comparative Study of the Effectiveness of Using E-Learning, Blended Learning and Presence Learning in Continuous Medical Education

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Abstract: *Introduction:* Currently information and technology has been accepted as a necessary part of the mainstream medical educational system throughout the globe. This study aimed to compare blended learning, e-learning and the presence education with respect to the general practitioners' learning in Shiraz University of Medical Sciences, Southern Iran. *Methods:* This quasi-experimental research was performed on general practitioners who had participated in continuous medical education (CME) programs about crisis management. All 150 participants randomly divided into three groups after filling a pre-test questionnaire (traditional learning group, blended learning and electronic learning group). 2-4 weeks later, they filled a post-test questionnaire. The data gathering tool was a questionnaire which was completed by the study participants. *Results:* There was no significant difference between three groups (presence education, eLearning, Blended learning). General physicians who participated in blended course were more successful than two other groups ($p=0.004$). However, there wasn't any difference between eLearning and presence groups. The participants in Blended learning group were more satisfied than eLearning and presence education ($p=0.007$). *Conclusion:* The findings generally showed that blended learning is an effective approach to create a deep and long-lasting learning experience in continuous medical education.

Key words: Blended Learning • E-learning • Presence education • Efficacy • Continuous medical education
• General physician

INTRODUCTION

Learning is the initiation of the need for development. It is evident that as human knowledge and science evolves and develops, the necessity for an evolution in learning and its mechanisms will inevitably increase. Nowadays, information and communication technology is an inseparable part of work and class environments and modern business methods have changed communication and learning strategies. The art and science of education has mingled with the work and class environment and a new approach such as eLearning and blended learning. These approaches have transformed the educational system with its various aspects such as learning at any time and place, cooperative learning, self-assessment and self-direct [1, 2]. Horton and Horton believe that in a broader definition, eLearning includes any use of internet and web

technology in order to create learning experiences. In fact, electronic learning is the product of fast and expansive modern technology evolutions [2]. In last years, E-learning was very successful and noteworthy. ELearning is developing and expanding day by day and it is estimated that in recent years half of the post-graduation education of medical students was in the form of electronic learning [3, 4]. When new technologies were extended and developed on the matter of education, new styles of educational activities were appeared that today is called "Blended learning". Blended learning has been defined as a mixture of traditional learning and online learning [5]. It is also defined as the integration of e-learning tools such as virtual learning environment with face to face learning. The aim of this type of learning is to join the advantages of face to face classroom learning with the advantages of e-learning to enhance the learning environment [6].

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Previous studies show that in recent decades more attention has been paid to modern technology in education, especially in medicine [7]. Continuous medical education (CME) is one of those fields that can be done using information and communication technology. The post graduation activities that are designed to increase the knowledge, skill and professionalism of graduates are called continuous education [8]. The continuous education of those in health care is a key element in increasing the quality and effectiveness of health care systems. CME is effective when it is efficient, applicable, accessible and directly related to the clinic. Moreover, CME has to present new information and use real cases and show suitable methods for problem solving. Research has shown that CME courses that encourage learners to participate in the program and provide opportunities for applying the learned skills are very effective. Therefore, learning environments related to the specific job need to be created in order to motivate the learner. Technology can fill the gap between theory and practice and encourage problem solving and interactive experiences. Also, with this method a large number of people can be collectively trained [9, 10]. Long lasting and self-guided learning plays an important role in creating change in health care. In this regard, technology based education such as online online and offline educational methods have been used. These methods can motivate learners to learn more, as well as evaluate them and can substitute traditional methods [11]. Research has shown that collecting basic and clinical sciences in one multimedia compact disc enables the learner to apprehend basic sciences such as anatomy, physiology, pharmacology and pathology in clinical situations and understand the relationship between basic sciences and its clinical application better, as well as enhance the physicians' skills in diagnosing and treating patients. Therefore, when the physician confronts similar cases in the clinic he/she can refer and interpret his/her previously gained knowledge on the subject [5]. Although traditional CME programs increase the knowledge of the participants, some studies showed that they have little effect on the physician's behavior and ultimately on the patients' recovery[12]. The interactive capability of electronic CME programs, along with their time and place flexibility, leads to the higher effectiveness and capacity of electronic courses over the traditional ones. There are some research among CME programs in using e-learning, until now the comparing the effects of

Using E-learning, Blended Learning and presence Learning in continuous medical education has not been evaluated. Consequently, this implies that more experimental studies are needed regarding the comparing impact of modern technology such as elearning and blended learning on education especially in areas such as CME. The current study was conducted to compare the Effectiveness of Using E-learning, Blended Learning and presence learning in continuous medical education. The following questions are assessed in this study:

- What was the difference in the level of learning among the general practitioners participating in electronic and blended learning programs?
- What was the difference in the level of learning among the general practitioners participating in blended learning and presence education programs?
- What was the difference between the level of learning among the general practitioners participants participating in elearning and presence education programs?
- What was the difference in the level of attitude among the general practitioners participating in elearning, blended learning and presence education programs?

MATERIALS AND METHODS

This study was a semi-experimental study with posttest-pretest assessment. The study environment included continuous medical education center affiliated to Shiraz University of Medical Sciences. The study population consisted of all general practitioners applying for continuous disaster management, education program in the second half of 2012. All participants were informed about the research and had not previously participated in similar studies. There aren't any restrictions on the choice of subjects matched for age and sex. The course initiation date was announced to all general practitioners prior to the study. Upon registration, the participants were informed about our study. The current research involves three equivalent groups, two experimental groups and one control group. All research groups were given a pre-test achievement, then the two experimental groups were exposed to the independent variable; the first group was taught by e-learning method and the second group by blended learning, while the control group received the

usual treatment which was the presence teaching method. The differences between the three groups were then identified.

All participants who were interested in the study (150 people) were randomly divided into three groups after completing a questionnaire. For one group (n=50) the traditional education method was used (12 hours classroom lectures) and for the other group (n=50) the eLearning method (received an educational multimedia compact disk and participated in 6 hours online virtual class only) and the third group (n=50) blended learning method (received an educational multimedia compact disk and participated in 3 hours online virtual class besides one session presence class) was used. 2-4 weeks after education, the participants completed a post-test. The data collection tool was a questionnaire that was completed by the participants. The content validity of the questionnaire was assessed by experts in the field. In order to assess the reliability of the questionnaire, repeated measure test and Cronbach's alpha coefficient (86%) were used. This questionnaire assessed the level of learning and of the participants. Data were analyzed using SPSS software, version 16. Data analysis was obtained through descriptive statistics, mean and standard deviation, one-way Analysis of Variance for comparing three means. A significance level of <.05 was considered.

RESULTS

150 general practitioners participated in our study. 90 (60%) were men and 60 (40%) were women. The mean age of the participants was 38 years. Regarding their occupational status, 66% were working under contract agreements, 22% were officially employed and 12% were working in the non-governmental section. The main goal of the current study was to compare the Effectiveness of Using E-learning, Blended Learning and presence learning in continuous medical education. For analysis the statistical findings, pre-test scores are decreased of post-test scores and mean differences of groups were compared with using one-way Analysis of Variance (Table 1, Table 2).

The test results showed that there was the significant difference between three groups (presence education, eLearning, Blended learning). In order to understand which groups were more successful than others, Tukey's test was used (Table 3).

The results showed that there was the significant difference between Blended learning group with other groups (presence and eLearning). Thus, Students who participated in blended course were more successful than two other groups. However there wasn't any difference between eLearning and presence groups.

Table1: Descriptive characteristics of the scores in the three groups

Method of Education	Number	Mean±SD	Standard Error	Minimum	Maximum
Face-to-face	50	15±4.2	0/4185	8	20
Electronic	50	14.8 ±4.1	0/372	11	20
Blended learning	50	16/5± 4/42	0/632	2	20
Total	150	15/47±3/49	0/285	2	20

Table 2: The results of one way ANOVA test for comparing the mean scores of the three groups

	Sum Square	Df	Mean square	F	Sig.
Between groups	134/9	2	66/98	6/498	0.001
Intergroups	1524/5	147	10/310		
Total	1650/4	149			

Table 3: Multiple Comparison between the Mean of three learning groups

Group 1	Group 2	Mean difference 2 groups	Standard Error	Sig Level
Blended	Presence	1.9000	0.654	0.001
Electronic	Presence	0.1600	0.654	0.09
Blended	Electronic	2.0800	0.654	0.004

Table 4: Frequency of students' satisfaction about teaching method in the Lecture and Blended groups

Group	Satisfaction			P-value
	I'm satisfied	I'm partly satisfied	I'm not satisfied	
Presence education	22 %44	13 %26	15 %30	P=0.007
Elearning	28 %56	12 %24	10 %20	
Blended learning	36 %72	10 %20	4 %8	

The first aim of our study was to compare the level of learning of participants in electronic and blended learning programs. As seen in the Tukey's table, the level of learning of practitioners who participated in blended learning program was higher than elearning group (the Mean difference=2.0800 and p=0.004).

The second aim of our study was to compare the level of learning of participants in blended learning and presence education programs. As seen in the Tukey's table, the level of learning of participants in blended learning program was higher than presence group (the Mean difference=-1.9000 and p=0.001).

The other aim of this study was to compare the level of learning of participants in elearning and presence education programs. As seen in the Tukey's table, there was no significant relationship between elearning and presence group (the Mean difference= 0.1600 and p=0.09).

The other special goal of this research was to determine the satisfaction of the research samples toward the elearning, blended learning and presence education programs (Table 4.)

The results showed that participants in Blended learning group more satisfied (%72) than elearning group (56%) presence education(44%). Variance analysis showed a significant relationship between the method of education and the satisfaction of the participants (P=0.007)

The relationship between age and satisfaction was assessed in all groups. In the presence education and blended learning groups no significant relationship was seen between age and satisfaction. However, Pearson's correlation coefficient showed a positive and significant relationship between age and satisfaction in the elearning group. With an increase in age, the satisfaction score increase in this group (P<0.001). Moreover, no significant relationship was seen between the sex of the participants and their satisfaction level.

DISCUSSION

This study has compared the effectiveness of presence education, elearning; blended learning on

physician's who participated in a continuous medical education program. In general, the results showed that the level of learning of the participants regarding crisis management increased significantly after blended learning (at the 0.05 level) than other groups. The obtained quantities suggest that this educational strategy is an effective method in making profound and permanent learning of the subject matters. In view of Singh (2003), Blended learning has different advantages because it uses different learning instruments. It potentially causes a save in costs and an improvement in the persons' learning program. The approaches which are completely figurative may involve lots of expenses [13]. Lim and Yoon (2008) would suggest that in case of blended learning, learners tend to show more positive perceptions in terms of instructor support and learning activities [14]. Pereira and his colleagues did a research to study the effectiveness of the blended learning and the traditional learning on the teaching and learning anatomy of the human being. The results showed that blended learning is a more effective strategy for the teaching and learning anatomy of the human being than the traditional learning [15].

Moreover, the results of current study seem to be inconsistent with the results of Banks (2004), who finds that there are no significant differences between e-learning, blended learning and traditional classroom learning in terms of their effect on students' achievement. These results may be due to the characteristics of the participants [16].

The other aim of this study was to compare the level of learning of participants in elearning and presence education programs. There was no significant relationship between elearning and presence group. The results obtained from other studies that are consistent with this study [17, 18].

This should indicate similarity between learning method and the traditional method regarding their respective effects on participants learning. Hugenholtz also showed that both e-learning and traditional methods have been effective in raising knowledge of learners and there was no significant difference between them [19].

The results obtained from other studies that are consistent with this study further confirm the effectiveness of this method.

The learners' satisfaction is one of the factors which make educational programs effective and successful [11, 12]. The results showed that the student's had a positive attitude towards blended learning. The results showed that there was a positive and significant relationship between age and the level of satisfaction and by an increase of age, the level of satisfaction increased ($P=0.007$). Blended learning is efficiently capable of creating flexibility regarding the time, place and speed of learning and provided independency for the learner which is consistent with self leadership feature in adults. In conclusion, based the present study, more attention needs to be paid to modern educational approaches using information technology in order to improve CME.

Conflict of Interest: The author declares that there is no conflict of interests regarding the publication of this article.

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