Original Article

Evaluation of Web-Based Teaching of Anatomy Course in Medical Students of Kermanshah University of Medical Sciences

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(Received: 17 Aug 2014 Accepted: 16 Dec 2014)

Abstract

Introduction: The increasing development of software in e-learning has opened a new horizon in education. The current research was conducted to assess the effect of web-based teaching of anatomy course on medical students' attitude, perceived ease of use, perceived benefit and satisfaction with teaching method at Kermanshah University of Medical Sciences.

Methods: The present study was an interventional quasi-experimental study that was carried out on medical students at Kermanshah University of Medical Sciences. The students were divided into two groups, one group was taught through web-based teaching method and the other one was taught via traditional teaching method. Data were collected by a researcher-made questionnaire with confirmed validity and reliability using self-report technique. The questionnaires were collected from the groups at the beginning and end of the semester. Data were analyzed by SPSS-21 software using chi-square, t-test and regression analysis and $p<0.05$ was considered significant.

Results: The age range of the participants was 18-38 (19.82±2.06). The findings showed that 40.2% of the participants had experienced web-based learning. After intervention, the mean scores of perceived ease of use, perceived benefit, attitude and satisfaction with teaching method among the students receiving web-based teaching were significantly higher than the control group ($p<0.05$).

Conclusion: The results of the current study indicated higher perceived ease of use and perceived benefit, more favorable attitude and higher satisfaction with the teaching method among the students taught through web-based teaching method, which might promote the quality of learning.

Keywords: Web-Based Teaching, Anatomy, Medical Students.

Citation: Karami Matin B, Jalilian F, Jalili P, Memar Eftekhary L, Mirzaei Alavijeh M. salahshoor MR. Jalili C. Evaluation of web-based teaching of anatomy course in medical students of Kermanshah University of Medical Sciences. Educ Res Med Sci. 2014; 3(2): 2-8.

Introduction

In recent years medical education has gone through numerous changes. Invention of new teaching methods along with their development is one of the main objectives of organizations involved in education (1, 4). On the other hand, the content of learning materials in medical sciences often involves multimedia components such as text, audio, and still and moving pictures. Also, given the increasing pace of knowledge in the realm of natural sciences as well as development of novel technologies in the arena of experimental sciences with all complexities, diversity and expansion are the main concerns of educational authorities (5).

Among medical courses, anatomy, as one of the branches of biological and medical sciences, is the primary cornerstone of medical sciences that has experienced dramatic advancements in recent years (6, 7). In conventional teaching of anatomy, education is based on theoretical materials followed by anatomy of different body organs (8, 9). The education process has been revolutionized along with rapid developments in teaching techniques and skills, (10).

Owing to widespread communication networks such as internet, distance learning has developed along with other sciences and technologies. It has been extended to using different kinds of technologies and products like computer, telecommunication and digital networking technologies and has resulted in the formation of such concepts as electronic learning and teaching. These concepts, considered as signs of application of technology in education, have drawn the attention of educational authorities and systems (11, 12).

New teaching methods, known as e-learning, virtual learning or e-learning and teaching, are currently regarded as a novel educational system which make use of such advanced technologies as internet networks, databases and knowledge management through which educational materials are presented via electronic services (13, 14). The students' learning style is a preferred natural, spontaneous, unique and rather fixed method that is used for absorbing, processing and maintaining information (15), and incongruous learning and teaching style can lead to inappropriate learning (16). Thus, a teaching method should be selected that is well coordinated with the students' learning style. This coordination between teaching and learning will have a close relationship with the content of the courses (17).

Most of the studies have shown that proper coordination between the teachers' teaching method and students' learning style ignites increasing motivation for learning, which is consequently be followed by better academic achievement (18). Several studies have investigated medical anatomy course through web-based teaching (19, 21). For example, Hu et al. (2010) evaluated teaching larynx anatomy via three-dimensional and web-based techniques. Their results indicated that the majority of students reported three-dimensional model as a very effective and enjoyable method (19).

Anatomy is one of the most important courses of medical sciences that contain a large bulk of information which need to be deposited in the memory. Hence, the quality of teaching anatomy is of paramount importance. Based on the aforementioned discussion, the present study was aimed to evaluate the effect of web-based teaching of anatomy on medical students' satisfaction and learning at Kermanshah University of Medical Sciences.

Methods

This interventional quasi-experimental study was conducted among medical students of Kermanshah University of Medical Sciences. To perform the study, the whole anatomy course was classified into different sections, and the visual and three-dimensional content of the course were prepared using flash software, fully describing every organ of various body systems, so that it was possible to test the materials taught at every stage of study.

Also, everyone was able to frequently perform self-evaluation regarding the names and specifications of different organs. It should be noted that all these activities were carried out as supplementary teaching materials for anatomy course, and the teacher taught the materials through common lecture method using power point.

This study was performed during the first semester in the academic year 2013-2014 among 102 medical students that were randomly divided into two equal groups of 51

students, experimental group taught via web-based teaching method and control group taught through conventional teaching method. The experimental group received web-based training by logging to the e-learning site of university using their personal IDs. The questionnaires were collected from the groups at the beginning and end of the semester.

Data collection instrument: the instrument for data collection in this study was a self-report questionnaire that was divided into two sections:

First section- background and demographic information: it included 6 items that gathered the participants' information about age (years) gender (male/female) marital status (single/married), familiarity with e-learning (very little, little, average, much, very much), history of education through e-learning (yes/no) and familiarity with pentathlon computer skills (very little, little, average, much, very much).

Second section- perceived ease of use and benefit, attitude and satisfaction with teaching method: it was a researcher-made questionnaire that was designed based on the standard questionnaires used in other studies (22-24). The validity of questionnaire was confirmed by a panel of specialists and reliability of the given questionnaire was approved by Cronbach's alpha, whose results are presented afterwards.

Perceived ease of use: this part included 3 items. For instance, "this teaching method facilitates learning", which was measured according to 5-point Likert scale from 1 (completely disagree) to 5 (completely agree). A higher score indicated higher perceived ease of use for the teaching method (conventional/web-based). The estimated alpha coefficient in the pilot study was 0.67.

Perceived benefit: this part consisted of 4 items. For example, "this teaching method can reduce the teaching costs", which was measured according to 5-point Likert scale from 1 (completely disagree) to 5 (completely agree). A higher score indicated higher perceived benefit of the teaching method (conventional/web-based). The estimated alpha coefficient in the pilot study was 0.74.

Attitude toward teaching method: this section included 5 items. For instance "this teaching method can increase students' motivation for learning", which was scored according to 5-point Likert scale from 1 (completely disagree) to 5 (completely agree). A higher score indicated better attitude toward the teaching method (conventional/web-based). The estimated alpha coefficient in the pilot study was 0.83.

Satisfaction with the teaching method: this section comprised of 4 items. For instance "this teaching method can increase satisfaction with learning", which was scored according to 5-point Likert scale from 1 (very little) to 5 (very much). A higher score indicated higher satisfaction with the teaching method (conventional/web-based). The estimated alpha coefficient in the pilot study was 0.80. All data analyses were performed by SPSS-21 software using chi-square, Fisher's exact test, t-test and regression analysis.

Results

The age range of the samples was 18-38 with the means and standard deviations of 19.96±2.74 and 19.69±1.01 in the experimental and control groups, respectively (p=0.50). No significant difference was observed between groups in terms of background and demographic variables, except in gender (Table 1).

The data presented in Table 2 show the mean scores of perceived benefit, perceived ease of use, attitude and satisfaction with teaching method (conventional/web-based) variables after intervention. According to the findings, the mean scores for the studied constructs among the medical students taught through web-based teaching method were higher than those of the control group. It should be pointed out that the normality of the data was analyzed by Kolmogorov-Smirnov test and the requirements for performing the t-test were verified

Table 1. Comparative analysis of background and demographic variables between experimental and control groups

Variables		Total		Groups		P Value
		Number	Percentage	Web-based number (%)	Conventional number (%)	
Gender	Male	44	43.1	39 (88.6%)	5 (11.4%)	0.001
	Female	58	56.9	12 (20.7%)	46 (79.3%)	
Marital status	Married	2	97.1	2 (100%)	0 (0%)	2430.*
	Single	99	2	48 (48.5%)	51 (51.5%)	
Familiarity with e-learning	Very little	27	26.5	12 (44.4%)	15 (55.6%)	0.191
	Little	29	28.4	13 (44.8%)	16 (55.2%)	
	Average	35	34.3	17 (48.6%)	18 (51.4%)	
	Much	9	8.8	8 (88.9%)	1 (11.1%)	
	Very much	2	2	1 (50%)	1 (50%)	
Familiarity with heptathlon computer skills	Very little	26	25.5	13 (50%)	13 (50%)	0.093
	Little	21	20.6	7 (33.3%)	14 (66.7%)	
	Average	43	42.2	21 (48.8%)	22 (51.2%)	
	Much	10	9.8	8 (80%)	2 (20%)	
	Very much	2	2	2 (100%)	0 (0%)	
History of e-learning	Yes	41	40.2	19 (46.3%)	22 (53.7%)	0.0658
	No	59	57.8	30 (50.8%)	29 (49.2%)	

Fisher's Exact Test

Table 2. Statistical indices for the studied constructs after intervention in both groups

	Web-based teaching M±SD	Conventional teaching M±SD	Test statistics	p	P after the effect of intervening variable (gender) by regression analysis
Perceived benefit	2.17 ± 16.83	2.38 ± 13.02	8.331	0.001	0.001
Perceived ease of use	1.76 ± 11.98	1.70 ± 9.52	7.132	0.001	0.001
Attitude	3.31 ± 19.58	3.09 ± 16.06	5.531	0.001	0.001
Satisfaction	2.49 ± 16.62	2.49 ± 12.64	8.023	0.001	0.001

Discussion

The results of this study showed that only 10.8% of students were much and very much familiar with e-learning. 11.8% of students reported they were much and very much familiar with pentathlon computer skills, and most of them (42.2%) had average familiarity with these skills. The study carried out by Kumar et al among dental students in India indicated that more than half (55.5%) of the students did not use the internet academically (25). Universities are an important environment to help students learn how to use computer and internet (26). Since the findings of the current study are indicative of poor familiarity of the students with pentathlon computer skills, training courses of computer skills are suggested to be held for students.

Attitude originates from positive or negative beliefs of a person about a specific behavior (27). The results of the present study revealed that after intervention the mean score of attitude in experimental group was higher than the control group. In line with this, Maleki et al. conducted a study on students of dentistry at Mashhad University of Medical Sciences and reported that students had a positive attitude toward application of internet (28). On the other hand, the more the training programs are run

as self-learning and more online learning is implemented as an educational method, the more students and teachers are encouraged to use computer and internet for learning (29, 30). Given the general advantages of e-learning and rapid developments of virtual education, it is necessary to take it seriously into account in all educational centers.

Perceived benefit is a degree to which the person believes using a special system improves his/her performance. Perceived ease of use is also a scale in which the user expects using the given system requires no attempts (31). In the present study, the mean score of perceived ease of use and perceived benefit among students was higher among experimental group after intervention. Various studies have been carried out on the role of perceived ease of use and perceived benefit in e-learning. For example, Fahami and Zare conducted a study on the administrative staff and faculty members of Isfahan Payam-e-Noor University and reported perceived ease of use and perceived benefit as the effective factors in application of distance education (22).

Further, Khorasani et al. performed a study among students of Tehran University of Medical Sciences and introduced perceived benefit and perceived ease of use as the factors influencing the acceptance of e-learning (23). Also, numerous studies have proposed perceived ease of use and perceived benefit as the factors affecting the acceptance of information technology (31-34). In their study, Hosseini et al. argued that to accept a new technology, users need to have a positive attitude toward it and using the new technology should be easy in their opinion (31). As the results of the current study showed that students had higher perceived ease of use in e-learning and considered this method more useful, it would be a good idea to use this opportunity and encourage teachers to plan the courses based on e-learning.

Comparison of the scores related to satisfaction with teaching method between the two groups demonstrated that after intervention the students' satisfaction score in web-based group was higher than that of the conventional group. In line with this, the results of Safaei et al. study on candidates of continuing education showed favorable satisfaction on the part of the participants in distance learning programs of Semnan University of Medical Sciences (35). Moreover, Sharifi et al. carried out a study to investigate the effect of virtual and in-person teaching of physiopathology on medical students' knowledge and satisfaction with teaching method and reported higher satisfaction with virtual teaching in the opinion of students. In addition, female students paid more heed to the issue that virtual education could be used at any time, and considered it an advantage in this kind of education (36).

However, it should be pointed out that if the training program and selected materials are not attractive for the users of e-learning and are not chosen according to their needs, they cause dissatisfaction. Improving the quality of images, applied media and how the program is run are the factors that are highly important in enhancing e-learning. One of the strengths of the present study was using web-based teaching of anatomy that can be regarded a guidance in planning other courses for students. However, this study had weaknesses such as lack of attention to homogeneity of groups before intervention and using self-report questionnaire, which may interfere with accuracy of the collected data.

Conclusion

The findings of this study showed that students taught through web-based teaching method reported higher perceived ease of use and perceived benefit, more favorable attitude and higher satisfaction with teaching method, which might lead to promotion of learning quality among students.

Acknowledgments

This article was taken from a research proposal (No. 92400) approved by the center for research and development of medical education at Kermanshah University of Medical Sciences, sponsored financially by deputy of research. Thereby, the authors would like to pay their gratitude to all the people and students who helped to conduct this study. There is no conflict of interest in this study.

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