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RESN-D-20-01082R1

Determining the correlation between attitude toward e-learning and self-assessment of teaching effectiveness in healthcare staff of Bushehr urban healthcare center

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The data analysis method is not in accordance with the research objectives and data characteristics. One of the reviewers showed dissatisfaction about the data analysis method, which is not addresses the revised manuscript.

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Determining the correlation between attitude toward e-learning and self-assessment of teaching effectiveness in healthcare staff of Bushehr urban healthcare center

BMC Research Notes

Dear Dr Akrom,

Thank you very much for your review of manuscript RESN-D-20-01082R1, 'Determining the correlation between attitude toward e-learning and self-assessment of teaching effectiveness in healthcare staff of Bushehr urban healthcare center'.

We greatly appreciate your assistance.

Best wishes,

Muhammad Nazrul Islam

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BMC Research Notes

Determining the correlation between attitude toward e-learning and self-assessment of teaching effectiveness in healthcare staff of Bushehr urban healthcare center

--Manuscript Draft--

Manuscript Number:	RESN-D-20-01082R1
Full Title:	Determining the correlation between attitude toward e-learning and self-assessment of teaching effectiveness in healthcare staff of Bushehr urban healthcare center
Article Type:	Research note
Abstract:	Objectives: Healthcare staff are busy at their workplaces and usually cannot participate in routine educational programs. One of the beneficial solutions to empower healthcare staff and better use of their capabilities is electronic-learning(e-learning). This approach results in significant time and cost savings, because in this method, training items are compiled once and are used repeatedly in different places. In this study, we aimed to measure the correlation between motivation and attitude toward e-learning and teaching effectiveness by self-assessment after the e-learning course for healthcare staff. Results: This research was conducted on 219 healthcare staff working in Bushehr urban healthcare center. Among them, 102(46.6%) were male, and 117 (53.4%) were female. Based on the attitude questionnaire, the participants assigned the highest scores to the items of: “The need to use virtual learning helps me learn computer skills” (3.87 ± 0.65), and “In my opinion, for better learning, it is necessary to develop virtual education” (3.72 ±0.70) while the item “virtual education is useless” with the mean and standard deviation of 2.15 ±0.66 had the least score. The results of our research revealed that there was a significant positive relationship between the participants’ attitudes toward e-learning and their self-assessment of its effectiveness.
Response to Reviewers:	Dear editor, Thank you for giving us the opportunity to submit a revised draft of our manuscript for publication in the "BMC research notes" journal. We appreciate the time and effort that you and the reviewers dedicated to providing feedback on our manuscript and are grateful for the insightful comments to our paper. We have incorporated most of the suggestions made by the reviewers. We have edited the manuscript through track change tool. Please see below, for a point-by-point response to the reviewers’ comments. Reviewer 1: 1)Comment: Data analysis methods need to be synchronized with the data presented. Response: thank you for your comment. There is an edit in the statistical analysis section. 2)Comment: A validated library needs to be added. Response: thank you. References 5, 10, 11 were edited. Reviewer 2: 1)Comment: The author should emphasize the results about the level of education of the healthcare staff of Bushehr. The staff had 87% (190/219) with bachelor, masters, doctoral and above. They would be a decrease of this positive attitude. This way the title could be changed .... the positive attitude regarding e-learning can be influenced by the Staff's level of education? Response: thank you for your comment. Because we wanted to assess the correlation between the attitude toward e-learning and self-assessment, it seems that we cannot change the title. 2)Comment: The author can develop about the participant's age, if they are natives of the media or not. Response: the mean age of participants was 31.6 ± 3.18. It is added to the text in the first paragraph of the results. 3)Comment: The limitation of the present study is that They used self-assessment for

	measuring the teaching effectiveness that may not be as valid as the examination by the external assessors. We agree about this and We suggest that they analyze result of the quiz applied. Response: thank you for your consideration. Since the quiz was only conducted for the formative assessment and delivering the results based on one question and it was not a valid and reliable one, there is not a presentable result for this quiz.

Determining the correlation between attitude toward e-learning and self-assessment of teaching effectiveness in healthcare staff of Bushehr urban healthcare center

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Abstract

Objectives: Healthcare staff are busy at their workplaces and usually cannot participate in routine educational programs. One of the beneficial solutions to empower healthcare staff and better use of their capabilities is electronic-learning (e-learning). This approach results in significant time and cost savings, because in this method, training items are compiled once and are used repeatedly in different places. In this study, we aimed to measure the correlation between motivation and attitude toward e-learning and teaching effectiveness by self-assessment after the e-learning course for healthcare staff.

Results: This research was conducted on 219 healthcare staff working in Bushehr urban healthcare center. Among them, 102(46.6%) were male, and 117 (53.4%) were female. Based on the attitude questionnaire, the participants assigned the highest scores to the items of: "The need to use virtual learning helps me learn computer skills" (3.87 ± 0.65), and "In my opinion, for better learning, it is necessary to develop virtual education" (3.72 ± 0.70) while the item "virtual education is useless" with the mean and standard deviation of 2.15 ± 0.66 had the least score. The results of our research revealed that there was a significant positive relationship between the participants' attitudes toward e-Learning and their self-assessment of its effectiveness.

Keywords: Computer-Assisted Instruction, Self-Assessment, Attitude of Health Personnel, eLearning

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Introduction

Nowadays, electronic-learning (e-learning) has become an essential part of medical education. Though e-learning may have different meanings among people, it merely means the educational uses of technology(1). E-learning is defined as a set of training activities using an electronic tool, including audio, video, computer, and network. Smart and active learning may make evolution in teaching as well as social improvement and stabilization of information technology and communication(2).

Healthcare staff are the population who are busy at their workplace and usually cannot participate in routine educational programs. One of the solutions to educationally empower healthcare staff and better use of their capabilities, is e-learning. This advancement would result in significant time and cost savings, because in this method, training items are compiled once and are used repeatedly in different places. Some studies showed that e-learning is as effective as traditional training and even more efficient, and learners are highly satisfied after education. Benefits of such methods include being available at any time and any place, decreased training costs, higher flexibility, and being coordinated with job responsibilities alongside practical and satisfying training, have recently attracted the attention of many organizations(3, 4).

Deploying new technologies are usually accompanied by tensions and stress, and e-learning is not an exception(1). Students may experience anxiety and bewilderment when no feedback is delivered to them by their tutors as well as encountering ambiguities in instructions. On the other hand, not being nervous about technology's complications can lead to students' positive attitude and their higher satisfaction toward this learning approach (5). ~~A favorable attitude indicated a higher probability that learners will accept the technologies and e-learning. Therefore, the attitude can be positive, if the new form of education fits the learners' requirements, or negative if the learners cannot adapt to the latest technology.~~

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The results of a meta-analysis showed that when the attitude is stable over time, it can affect future behavior. The authors ascertained that being interested in thinking about an issue encourages attitudes associated with the behavior(6). Teaching effectiveness sometimes can be a measure of perfect behavior. Assessing training effectiveness means to determine how training has caused to make the organization's needed skills in the practical and applied form(7). Self-assessment is essential to most evaluation systems and is one of the useful steps that can measure participants' reactions to training

effectiveness(8). Ward et al. suggested that self-assessment is the capability to precisely assess one's strengths and weaknesses (9).

In this study, we want to measure the correlation between attitude and motivation toward e-learning and teaching effectiveness by self-assessment after an e-learning course for healthcare staff.

Main text

Methods

Participants and setting

The study samples include all healthcare staff who were taking continuous professional development courses from April to June 2019 (n = 219) selected by the census method. Eligible subjects in this quasi-experimental research were healthcare staff working in Bushehr urban healthcare center. The inclusion criteria were willing to participate in the research, and living in Bushehr city. Exclusion criteria included unwillingness to continue collaboration in the study. All the participants (219 staff) completed the study, and no missing data was presented during the educational intervention.

Educational intervention

After attaining permission from the university research deputy, researchers entered the study setting. First, the study objectives were explained to participants, and after obtaining written informed consent, eligible subjects completed the attitude to the e-learning questionnaire. After this phase, the usernames and passwords and e-learning continuous education addresses were texted to the participants.

The e-Learning courses included rule and regulation of healthcare systems, poisoning, and introduction to the pre-hospital management system, workplace hazards, infectious control, and psychological wellbeing. The allocated time to study these courses was about one month. Every course was an interactive multimedia module composed of image, animation, voice, text, and quiz. This system was completely asynchronous, and the participants could study in proper time, place with their appropriate speed in a specified time framework. The whole program lasted for six months.

All healthcare workers should participate in continuous professional development workshops for renewing their knowledge and skills as a requirement. Participation in this class is time-consuming. In Bushehr University of Medical Sciences, usually asynchronous method (e-learning material) was

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designed for this purpose. All e-learning sessions lasted 10 hours. After the intervention and studying the e-courses, the participants completed the self- assessment questionnaire about teaching effectiveness.

Data gathering

Two questionnaires were used for this study. The first questionnaire was about attitude to e-learning, which consisted of 20 questions about attitude in three domains, including the use of e-learning, time management in e-learning, enjoying this type of education, anxiety during the education, environment, the effect on critical thinking and other factors.

The participants asked to rate each item based on the lowest 1 to the highest 5. The lowest score of the questionnaire was 20, and the highest score was 100. The validity and reliability of this questionnaire were determined in the previous studies. Attitude considered positive if the mean score of all questionnaires was more than 60. For each item, the mean score of more than three considered positive(10).

This questionnaire was completed by learners before the beginning of that 10 hours e-learning module. After the intervention, another questionnaire for self-assessment of training effectiveness was completed by the learners. The questionnaire contained 35 questions about learning the new concepts in the healthcare system and increasing their knowledge. The participants were asked to rate each item based on the lowest 1 to the highest 5. The lowest score of the questionnaire was 35, and the highest score was 175. The scores between 35-70 were considered low, 71-105 were considered moderate, and more than 105 were considered excellent effectiveness(11).

Statistical analysis

The data were analyzed by SPSS version 21, using the Pearson correlation coefficient, ~~student~~ independent sample T-test, one-way ANOVA, and LSD test.

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Results

This quasi-experimental study was conducted on 219 healthcare staff working in Bushehr urban healthcare center. Among them, the findings showed that 102(46.6%) were male, and 117 (53.4%) were female. The mean work experience was 18 ± 8 years and the mean age of participants was 31.6 ± 3.18 years.

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The results of the mean score of attitude questionnaire were 62.86 ± 6.14 from 100 and for teaching effectiveness was 115.426.75 from 175. The result of both questionnaires was at a reasonable and positive level. The results of the correlation between the mean score, between the motivation questionnaire and the effectiveness of the e-learning questionnaire, illustrated a Pearson correlation coefficient 0.200 and p-value<~~0.003~~0.05. (Table 1).

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The results of each item in the motivation questionnaire are shown in table 2. The results indicated that the total mean of staff attitude toward virtual courses on this scale was 3.15 ± 0.443, which represents their positive view. The results also showed that the staff assigned the highest scores to the items of: "The need to use virtual learning helps me learn computer skills" (3.87 ± 0.65), "In my opinion, for better learning, it is necessary to develop virtual education" (3.72 ±0.70) while the item "virtual training is useless" with the mean, and standard deviation of 2.15 ±0.66 had the least score.

There was no statistically significant relationship between gender, age, and attitude toward e-learning. ($p>0.05$). The relationship with attitude to e-learning and educational level of healthcare staff showed that there is a significant difference between the views of personnel with a different educational degree. ($p<0.01$). LSD test was performed to find in which degree the difference was observed. The test results illustrated that those in possession of a diploma and post-diploma degree have more positive views than those with higher degrees (Table 3).

There was no significant difference between staff attitudes in terms of the variables of gender and marital status.

Discussion

The results of our research revealed that there was a significant positive relationship between the participants' attitudes toward e-learning and their self-assessment of its effectiveness. Other research in this area also emphasizes that e-learning can have an influential role in students' attitudes, motivation, and acceptance toward this teaching method(12, 13). Karanjam et al., in 2014, reported improvements in the knowledge and attitude of dental students, following the training through e-learning(14). Morald et al. concluded that virtual education is an efficient education(15). The results of a study conducted by Al-Omari and Salameh confirmed that the perceived value among undergraduate students gained higher scores compared to traditional learning. In the mentioned study, male students considered e-learning more positive(16).

e-Learning courses are composed of various educational methods, materials, and tools, so it enables learners to achieve mastery in their skills and abilities(17). For example, using social media and online communication tools, students can easily interact with their teachers and coworkers and using educational multimedia, the students can understand and learn better and deeper compared to traditional education. These features would help learners to immerse in the educational process and enhance learning(18).

These factors can have a critical role in increasing students' attitudes toward e-learning. The learners' attitude would make educational programs productive and successful(19). The present research illustrated that there was a significant positive relationship between the health workers' attitudes toward e-Learning and their assessment of its effectiveness. A survey by Cidral et al. showed that people's level of attitude toward e-learning could affect their degree of success(20). Chong et al. concluded that e-learning has a positive and significant effect on learners' approaches toward this educational method. Employing an interactive and flexible method can motivate learners and create a positive view of educational materials (21). Another study stated that Students' perspectives about e-learning have a significant impact on their success in this environment(22).

We also examined demographic factors that could potentially affect the results of the study, including age, gender, and educational level. The results showed that the health workers' educational level had a significant relationship with the perspective of e-learning. Moreover, people with lower degrees of education showed more positive views than participants with higher educational levels. Currently, the rapid growth of e-learning and mobile technology interest in using these methods has increased despite the academic level. In this regard, research has shown that people with lower levels of education are more likely to use e-learning courses. This difference may result from the different expectations from e-learning in context, especially in health workers. It could be due to their desire to increase knowledge in their medical field (23).

Since e-learning is a new approach, and there are many unknowns in this issue, further research is suggested to such an extent as to facilitate the achievement of medical education goals in virtual education. Qualitative research could also identify unknown aspects of the method. Overall, the results of this research proved that paying attention to training and improving human resources and productivity enhancement lead to more efficiency and effectiveness. One of the strengths of the present study is that the study in the field of e-learning is one of the research priorities in Iran and the

Eastern Mediterranean Region(24). Another strength is that integration between health and medical education in Iran provided an excellent environment to use the power of university for educating healthcare staff (25).

Limitations

The limitation of the present study is that we used self-assessment for measuring the teaching effectiveness that may not be as valid as the examination by the external assessors.

Declarations

Ethics approval and consent to participate

This study was approved with ethical approval number IR.SUMS.REC.1397.614 by the ethics committee of Shiraz University of Medical Sciences. Written informed consent to participate was obtained from all participants. All of them were engaged in the study voluntarily, and their names were not mentioned in the scripts.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Funding

This research was funded by the vice-chancellor of research at Shiraz University of Medical Sciences.

Acknowledgments

The present article is part of a student dissertation on project number 16563, was approved by the research deputy of Shiraz University of Medical Sciences. Therefore, we would like to thank the research deputy of Shiraz University of Medical Sciences, Shiraz, Iran. We also thank all healthcare staff of Bushehr urban healthcare center for participating in the present study.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions:

ASH designed the study, gathered the data, and wrote the manuscript. MA designed the study, wrote the manuscript, and supervised the whole project. NZS helped in writing the manuscript, supervising the project, and critically appraising the manuscript. PT contributed to writing, editing, and critically appraising the manuscript. All authors read and approved the final manuscript.

Authors' Information

ASH has a master's degree in medical education. MA is the professor of medical education. NZS is the associate professor of e-learning. PT has a master's degree in medical informatics.

Abbreviations

E-learning: Electronic learning

References

1. Ellaway R, Masters K. AMEE Guide 32: e-Learning in medical education Part 1: Learning, teaching and assessment. Medical teacher. 2008;30(5):455-73.
2. Mayer R. The Cambridge Handbook of Multimedia Learning. Cambridge: Cambridge University Press; 2005.
3. Feng JY, Chang YT, Chang HY, Erdley WS, Lin CH, Chang YJ. Systematic review of effectiveness of situated e-learning on medical and nursing education. Worldviews on evidence-based nursing. 2013;10(3):174-83.
4. Ruiz JG, Mintzer MJ, Leipzig RM. The impact of E-learning in medical education. Academic medicine : journal of the Association of American Medical Colleges. 2006;81(3):207-12.
5. Omar ND, Hassan H, Atan H. Student Engagement in Online Learning: Learners Attitude Toward E-Mentoring. Procedia - Social and Behavioral Sciences. 2012;67:464-75.
6. Glasman LR, Albarracín D. Forming attitudes that predict future behavior: a meta-analysis of the attitude-behavior relation. Psychological bulletin. 2006;132(5):778-822.
7. Steinert Y, Mann K, Centeno A, Dolmans D, Spencer J, Gelula M, et al. A systematic review of faculty development initiatives designed to improve teaching effectiveness in medical education: BEME Guide No. 8. Medical teacher. 2006;28(6):497-526.
8. Colthart I, Bagnall G, Evans A, Allbutt H, Haig A, Illing J, et al. The effectiveness of self-assessment on the identification of learner needs, learner activity, and impact on clinical practice: BEME Guide no. 10. Medical teacher. 2008;30(2):124-45.
9. Ward M, MacRae H, Schlachta C, Mamazza J, Poulin E, Reznick R, et al. Resident self-assessment of operative performance. American journal of surgery. 2003;185(6):521-4.
10. VatanParast M, Royani Z, Ghasemi H. The survey of kerman Nursing Student`s Attitudes toward Virtual Learning in 2009. J-Nurs-Edu. 2016;5(1):53-61.[Article in Persian]

Commented [RI1]: In previous revision. Reference 5 was: "Khirade S. A study of an attitude towards e-learning among the graduate students. Review of Research 2017;6(12):1-4." Which is now : "Omar ND, Hassan H, Atan H. Student Engagement in Online Learning: Learners Attitude Toward E-Mentoring. Procedia - Social and Behavioral Sciences. 2012;67:464-75."

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11. Fathi Vajargah K, Pardakhtchi MH, Rabiei M. Effectiveness evaluation of virtual learning courses in high education system of Iran (Case of Ferdowsi University). Information and Communication Technology in Educational Sciences. 2011;1(4):5-21.[Article in Persian]
12. Adewole-Odeshi E. Attitude of Students Towards E-learning in South-West Nigerian Universities: An Application of Technology Acceptance Model. Library Philosophy and Practice. 2014.
13. Yakubu MN, Kah MMO, Dasuki SI, editors. Student's Acceptance of Learning Management Systems: A Case Study of the National Open University of Nigeria. Sustainable ICT, Education and Learning; 2019; Cham: Springer International Publishing.
14. Karanjam SS, Karanjam S, Zarifsanaiey N. Designing a Comprehensive Organizational E-Learning Model Using the Meta-Synthesis Method. Interdisciplinary Journal of Virtual Learning in Medical Sciences. 2017;8(3).
15. Kathryn AM, Gwynne L, Abel M. Web-Based Learning: Is It Working? A Comparison of Student Performance and Achievement in Web-Based Courses and Their In-Classroom Counterparts. In: Mehdi Khosrow-Pour DBA, editor. Web-Based Instructional Learning. Hershey, PA, USA: IGI Global; 2002. p. 179-89.
16. Al-Omari AA, Salameh KM. E-learning versus Traditional Learning as Perceived by Undergraduate Students in Jordanian Universities. E-Learning and Digital Media. 2012;9(2):223-31.
17. Tichavsky L, Hunt A, Driscoll A, Jicha K. It's Just Nice Having a Real Teacher": Student Perceptions of Online versus Face-to-Face Instruction. International Journal for the Scholarship of Teaching and Learning. 2015;9(2):2.
18. Caporarello L, Manzoni B, Bigi M, editors. E-learning Effectiveness from a Students' Perspective: An Empirical Study. Digital Technology and Organizational Change; 2018; Cham: Springer International Publishing.
19. Rukavina P, Langdon J, Greenleaf C, Jenkins J. Diversity Attitude Associations in Pre-service Physical Education Teachers. JTRM in Kinesiology. 2019.
20. Cidral WA, Oliveira T, Di Felice M, Aparicio M. E-learning success determinants: Brazilian empirical study. Computers & Education. 2018;122:273-90.
21. Chong MC, Francis K, Cooper S, Abdullah KL, Hmwe NT, Sohod S. Access to, interest in and attitude toward e-learning for continuous education among Malaysian nurses. Nurse education today. 2016;36:370-4.
22. Quadri NN, Muhammad A, Sanober S, Rafik M, Shah A. A Mixed Method Study for Investigating Critical Success Factors (CSFs) of E-Learning in Saudi Arabian Universities. International Journal of Advanced Computer Science and Applications. 2017;8.
23. Podsiadło P, Kosiński S, Darocha T, Sałapa K, Sanak T, Brugger H. The Use of E-Learning in Medical Education for Mountain Rescuers Concerning Hypothermia. High altitude medicine & biology. 2018;19(3):272-7.
24. Amini M, Kojuri J, Lotfi F, Karimian Z, Abadi AS. Research priorities in medical education in the Eastern Mediterranean Region. Eastern Mediterranean health journal = La revue de sante de la Mediterranee orientale = al-Majallah al-sihhiyah li-sharq al-mutawassit. 2012;18(7):687-92.
25. Salehi A, Harris N, Lotfi F, Hashemi N, Kojouri J, Amini M. Reform in medical and health sciences educational system: a Delphi study of faculty members' views at Shiraz University of Medical Sciences. Eastern Mediterranean health journal = La revue de sante de la Mediterranee orientale = al-Majallah al-sihhiyah li-sharq al-mutawassit. 2014;20(3):151-61.

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Tables:

Table 1. The correlation between attitude toward e-learning and training effectiveness

Variables	Number	Mean	Standard deviation	Correlation coefficient	P-value
View toward virtual training	217	62.86 (out of 100)	6.14	0.200	0.003
Training effectiveness	217	115.4 (out of 175)	26.75		

Table 2. The results of the attitude questionnaire toward virtual education

Row	Questions	Mean ± SD From 5
1	Virtual education can be an excellent alternative to traditional education.	3.44±.89
2	I feel that nothing can replace the presence of a teacher in the classroom.	3.67±.86
3	If appropriate content is provided, learning is possible even without the presence of a teacher.	3.54±.86
4	The need to use virtual learning helps me learn computer skills.	3.87±.65
5	I like to learn many lessons in a virtual way.	3.27±.88
6	I enjoy online communication with the instructor.	3.43±.79
7	I learn less with virtual education.	2.91±.87
8	Virtual education is more complicated than in face-to-face classes.	3.07±.92

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9	I am not comfortable with virtual education, and I become anxious.	2.59±.80
10	If the training is proper, it does not matter if it is virtual or face-to-face.	3.28±.89
11	Virtual education has no application in the medical sciences.	2.59±.81
12	Virtual education is useless	2.15±.66
13	Virtual education requires many facilities.	3.02±.89
14	The accuracy of the content in the virtual method is more than the traditional method.	2.91±.83
15	Virtual education is just an imitation of the new methods that are common in other parts of the world.	2.89±.85
16	Virtual education wastes more of my time than the traditional method.	2.61±.83
17	I understand the teacher's words in the classroom more than the virtual method.	3.51±.84
18	In my opinion, learning in the virtual method happens actively.	3.16±.80
19	Virtual education further enhances thinking skills.	3.29±.82
20	In my opinion, for better learning, it is necessary to develop virtual education.	3.72±.70

Table 3. The correlation between the level of education in participants and their views

Degree	N.	Mean	Standard error	Standard deviation
diploma and sub-diploma	7	67.28	2.83	7.49
post-diploma	14	68.57	0.959	3.58
bachelor	83	62.49	0.721	6.56
masters	93	62.53	0.586	5.65
doctoral and above	14	60.14	1.17	4.40
Total	211	62.92	0.423	6.15

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Abstract

Objectives: Healthcare staff are busy at their workplaces and usually cannot participate in routine educational programs. One of the beneficial solutions to empower healthcare staff and better use of their capabilities is electronic-learning (e-learning). This approach results in significant time and cost savings, because in this method, training items are compiled once and are used repeatedly in different places. In this study, we aimed to measure the correlation between motivation and attitude toward e-learning and teaching effectiveness by self-assessment after the e-learning course for healthcare staff.

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Introduction

Nowadays, electronic-learning (e-learning) has become an essential part of medical education. Though e-learning may have different meanings among people, it merely means the educational uses of technology(1). E-learning is defined as a set of training activities using an electronic tool, including audio, video, computer, and network. Smart and active learning may make evolution in teaching as well as social improvement and stabilization of information technology and communication(2).

Healthcare staff are the population who are busy at their workplace and usually cannot participate in routine educational programs. One of the solutions to educationally empower healthcare staff and better use of their capabilities, is e-learning. This advancement would result in significant time and cost savings, because in this method, training items are compiled once and are used repeatedly in different places. Some studies showed that e-learning is as effective as traditional training and even more efficient, and learners are highly satisfied after education. Benefits of such methods include being available at any time and any place, decreased training costs, higher flexibility, and being coordinated with job responsibilities alongside practical and satisfying training, have recently attracted the attention of many organizations(3, 4).

Deploying new technologies are usually accompanied by tensions and stress, and e-learning is not an exception(1). Students may experience anxiety and bewilderment when no feedback is delivered to them by their tutors as well as encountering ambiguities in instructions. On the other hand, not being nervous about technology's complications can lead to students' positive attitude and their higher satisfaction toward this learning approach (5).

The results of a meta-analysis showed that when the attitude is stable over time, it can affect future behavior. The authors ascertained that being interested in thinking about an issue encourages attitudes associated with the behavior(6). Teaching effectiveness sometimes can be a measure of perfect behavior. Assessing training effectiveness means to determine how training has caused to make the organization’s needed skills in the practical and applied form(7). Self-assessment is essential to most evaluation systems and is one of the useful steps that can measure participants’ reactions to training effectiveness(8). Ward et al. suggested that self-assessment is the capability to precisely assess one’s strengths and weaknesses (9).

In this study, we want to measure the correlation between attitude and motivation toward e-learning and teaching effectiveness by self-assessment after an e-learning course for healthcare staff.

Main text

Methods

Participants and setting

The study samples include all healthcare staff who were taking continuous professional development courses from April to June 2019 (n = 219) selected by the census method. Eligible subjects in this quasi-experimental research were healthcare staff working in Bushehr urban healthcare center. The inclusion criteria were willing to participate in the research, and living in Bushehr city. Exclusion criteria included unwillingness to continue collaboration in the study. All the participants (219 staff) completed the study, and no missing data was presented during the educational intervention.

Educational intervention

After attaining permission from the university research deputy, researchers entered the study setting. First, the study objectives were explained to participants, and after obtaining written informed consent, eligible subjects completed the attitude to the e-learning questionnaire. After this phase, the usernames and passwords and e-learning continuous education addresses were texted to the participants.

The e-Learning courses included rule and regulation of healthcare systems, poisoning, and introduction to the pre-hospital management system, workplace hazards, infectious control, and psychological wellbeing. The allocated time to study these courses was about one month. Every course was an interactive multimedia module composed of image, animation, voice, text, and quiz. This system was completely asynchronous, and the participants could study in proper time, place with their appropriate speed in a specified time framework. The whole program lasted for six months.

All healthcare workers should participate in continuous professional development workshops for renewing their knowledge and skills as a requirement. Participation in this class is time-consuming.

In Bushehr University of Medical Sciences, usually asynchronous method (e-learning material) was designed for this purpose. All e-learning sessions lasted 10 hours. After the intervention and studying the e-courses, the participants completed the self- assessment questionnaire about teaching effectiveness.

Data gathering

Two questionnaires were used for this study. The first questionnaire was about attitude to e-learning, which consisted of 20 questions about attitude in three domains, including the use of e-learning, time management in e-learning, enjoying this type of education, anxiety during the education, environment, the effect on critical thinking and other factors.

The participants asked to rate each item based on the lowest 1 to the highest 5. The lowest score of the questionnaire was 20, and the highest score was 100. The validity and reliability of this questionnaire were determined in the previous studies. Attitude considered positive if the mean score of all questionnaires was more than 60. For each item, the mean score of more than three considered positive(10).

This questionnaire was completed by learners before the beginning of that 10 hours e-learning module. After the intervention, another questionnaire for self-assessment of training effectiveness was completed by the learners. The questionnaire contained 35 questions about learning the new concepts in the healthcare system and increasing their knowledge. The participants were asked to rate each item based on the lowest 1 to the highest 5. The lowest score of the questionnaire was 35, and the highest score was 175. The scores between 35-70 were considered low, 71-105 were considered moderate, and more than 105 were considered excellent effectiveness(11).

Statistical analysis

The data were analyzed by SPSS version 21, using the Pearson correlation coefficient, independent sample T-test, one-way ANOVA, and LSD test.

Results

This quasi-experimental study was conducted on 219 healthcare staff working in Bushehr urban healthcare center. Among them, the findings showed that 102(46.6%) were male, and 117 (53.4%)

were female. The mean work experience was 18 ± 8 years and the mean age of participants was 31.6 ± 3.18 years.

The results of the mean score of attitude questionnaire were 62.86 ± 6.14 from 100 and for teaching effectiveness was 115.426.75 from 175. The result of both questionnaires was at a reasonable and positive level. The results of the correlation between the mean score, between the motivation questionnaire and the effectiveness of the e-learning questionnaire, illustrated a Pearson correlation coefficient 0.200 and p-value<0.05. (Table 1).

The results of each item in the motivation questionnaire are shown in table 2. The results indicated that the total mean of staff attitude toward virtual courses on this scale was 3.15 ± 0.443, which represents their positive view. The results also showed that the staff assigned the highest scores to the items of: "The need to use virtual learning helps me learn computer skills" (3.87 ± 0.65), "In my opinion, for better learning, it is necessary to develop virtual education" (3.72 ±0.70) while the item "virtual training is useless" with the mean, and standard deviation of 2.15 ±0.66 had the least score.

There was no statistically significant relationship between gender, age, and attitude toward e-learning. ($p>0.05$). The relationship with attitude to e-learning and educational level of healthcare staff showed that there is a significant difference between the views of personnel with a different educational degree. ($p<0.01$). LSD test was performed to find in which degree the difference was observed. The test results illustrated that those in possession of a diploma and post-diploma degree have more positive views than those with higher degrees (Table 3).

There was no significant difference between staff attitudes in terms of the variables of gender and marital status.

Discussion

The results of our research revealed that there was a significant positive relationship between the participants' attitudes toward e-learning and their self-assessment of its effectiveness. Other research in this area also emphasizes that e-learning can have an influential role in students' attitudes, motivation, and acceptance toward this teaching method(12, 13). Karanjam et al., in 2014, reported improvements in the knowledge and attitude of dental students, following the training through e-learning(14). Morald et al. concluded that virtual education is an efficient

education(15). The results of a study conducted by Al-Omari and Salameh confirmed that the perceived value among undergraduate students gained higher scores compared to traditional learning. In the mentioned study, male students considered e-learning more positive(16).

e-Learning courses are composed of various educational methods, materials, and tools, so it enables learners to achieve mastery in their skills and abilities(17). For example, using social media and online communication tools, students can easily interact with their teachers and coworkers and using educational multimedia, the students can understand and learn better and deeper compared to traditional education. These features would help learners to immerse in the educational process and enhance learning(18).

These factors can have a critical role in increasing students' attitudes toward e-learning. The learners' attitude would make educational programs productive and successful(19). The present research illustrated that there was a significant positive relationship between the health workers' attitudes toward e-Learning and their assessment of its effectiveness. A survey by Cidral et al. showed that people's level of attitude toward e-learning could affect their degree of success(20). Chong et al. concluded that e-learning has a positive and significant effect on learners' approaches toward this educational method. Employing an interactive and flexible method can motivate learners and create a positive view of educational materials (21). Another study stated that Students' perspectives about e-learning have a significant impact on their success in this environment(22).

We also examined demographic factors that could potentially affect the results of the study, including age, gender, and educational level. The results showed that the health workers' educational level had a significant relationship with the perspective of e-learning. Moreover, people with lower degrees of education showed more positive views than participants with higher educational levels. Currently, the rapid growth of e-learning and mobile technology interest in using these methods has increased despite the academic level. In this regard, research has shown that people with lower levels of education are more likely to use e-learning courses. This difference may result from the different expectations from e-learning in context, especially in health workers. It could be due to their desire to increase knowledge in their medical field (23).

Since e-learning is a new approach, and there are many unknowns in this issue, further research is suggested to such an extent as to facilitate the achievement of medical education goals in virtual

education. Qualitative research could also identify unknown aspects of the method. Overall, the results of this research proved that paying attention to training and improving human resources and productivity enhancement lead to more efficiency and effectiveness. One of the strengths of the present study is that the study in the field of e-learning is one of the research priorities in Iran and the Eastern Mediterranean Region(24). Another strength is that integration between health and medical education in Iran provided an excellent environment to use the power of university for educating healthcare staff (25).

Limitations

The limitation of the present study is that we used self-assessment for measuring the teaching effectiveness that may not be as valid as the examination by the external assessors.

Declarations

Ethics approval and consent to participate

This study was approved with ethical approval number IR.SUMS.REC.1397.614 by the ethics committee of Shiraz University of Medical Sciences. Written informed consent to participate was obtained from all participants. All of them were engaged in the study voluntarily, and their names were not mentioned in the scripts.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions:

ASH designed the study, gathered the data, and wrote the manuscript. MA designed the study, wrote the manuscript, and supervised the whole project. NZS helped in writing the manuscript, supervising the project, and critically appraising the manuscript. PT contributed to writing, editing, and critically appraising the manuscript. All authors read and approved the final manuscript.

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Abbreviations

E-learning: Electronic learning

References

1. Ellaway R, Masters K. AMEE Guide 32: e-Learning in medical education Part 1: Learning, teaching and assessment. Medical teacher. 2008;30(5):455-73.
2. Mayer R. The Cambridge Handbook of Multimedia Learning. Cambridge: Cambridge University Press; 2005.
3. Feng JY, Chang YT, Chang HY, Erdley WS, Lin CH, Chang YJ. Systematic review of effectiveness of situated e-learning on medical and nursing education. Worldviews on evidence-based nursing. 2013;10(3):174-83.
4. Ruiz JG, Mintzer MJ, Leipzig RM. The impact of E-learning in medical education. Academic medicine : journal of the Association of American Medical Colleges. 2006;81(3):207-12.
5. Omar ND, Hassan H, Atan H. Student Engagement in Online Learning: Learners Attitude Toward E-Mentoring. Procedia - Social and Behavioral Sciences. 2012;67:464-75.
6. Glasman LR, Albarracín D. Forming attitudes that predict future behavior: a meta-analysis of the attitude-behavior relation. Psychological bulletin. 2006;132(5):778-822.
7. Steinert Y, Mann K, Centeno A, Dolmans D, Spencer J, Gelula M, et al. A systematic review of faculty development initiatives designed to improve teaching effectiveness in medical education: BEME Guide No. 8. Medical teacher. 2006;28(6):497-526.

8. Colthart I, Bagnall G, Evans A, Allbutt H, Haig A, Illing J, et al. The effectiveness of self-assessment on the identification of learner needs, learner activity, and impact on clinical practice: BEME Guide no. 10. Medical teacher. 2008;30(2):124-45.
9. Ward M, MacRae H, Schlachta C, Mamazza J, Poulin E, Reznick R, et al. Resident self-assessment of operative performance. American journal of surgery. 2003;185(6):521-4.
10. VatanParast M, Royani Z, Ghasemi H. The survey of kerman Nursing Student`s Attitudes toward Virtual Learning in 2009. J-Nurs-Edu. 2016;5(1):53-61.[Article in Persian]
11. Fathi Vajargah K, Pardakhtchi MH, Rabiei M. Effectiveness evaluation of virtual learning courses in high education system of Iran (Case of Ferdowsi University). Information and Communication Technology in Educational Sciences. 2011;1(4):5-21.[Article in Persian]
12. Adewole-Odeshi E. Attitude of Students Towards E-learning in South-West Nigerian Universities: An Application of Technology Acceptance Model. Library Philosophy and Practice. 2014.
13. Yakubu MN, Kah MMO, Dasuki SI, editors. Student's Acceptance of Learning Management Systems: A Case Study of the National Open University of Nigeria. Sustainable ICT, Education and Learning; 2019; Cham: Springer International Publishing.
14. Karanjam SS, Karanjam S, Zarifsanaiey N. Designing a Comprehensive Organizational E-Learning Model Using the Meta-Synthesis Method. Interdisciplinary Journal of Virtual Learning in Medical Sciences. 2017;8(3).
15. Kathryn AM, Gwynne L, Abel M. Web-Based Learning: Is It Working? A Comparison of Student Performance and Achievement in Web-Based Courses and Their In-Classroom Counterparts. In: Mehdi Khosrow-Pour DBA, editor. Web-Based Instructional Learning. Hershey, PA, USA: IGI Global; 2002. p. 179-89.
16. Al-Omari AA, Salameh KM. E-learning versus Traditional Learning as Perceived by Undergraduate Students in Jordanian Universities. E-Learning and Digital Media. 2012;9(2):223-31.
17. Tichavsky L, Hunt A, Driscoll A, Jicha K. It's Just Nice Having a Real Teacher": Student Perceptions of Online versus Face-to-Face Instruction. International Journal for the Scholarship of Teaching and Learning. 2015;9(2):2.
18. Caporarello L, Manzoni B, Bigi M, editors. E-learning Effectiveness from a Students' Perspective: An Empirical Study. Digital Technology and Organizational Change; 2018; Cham: Springer International Publishing.
19. Rukavina P, Langdon J, Greenleaf C, Jenkins J. Diversity Attitude Associations in Pre-service Physical Education Teachers. JTRM in Kinesiology. 2019.
20. Cidral WA, Oliveira T, Di Felice M, Aparicio M. E-learning success determinants: Brazilian empirical study. Computers & Education. 2018;122:273-90.
21. Chong MC, Francis K, Cooper S, Abdullah KL, Hmwe NT, Sohod S. Access to, interest in and attitude toward e-learning for continuous education among Malaysian nurses. Nurse education today. 2016;36:370-4.
22. Quadri NN, Muhammad A, Sanober S, Rafik M, Shah A. A Mixed Method Study for Investigating Critical Success Factors (CSFs) of E-Learning in Saudi Arabian Universities. International Journal of Advanced Computer Science and Applications. 2017;8.
23. Podsiadło P, Kosiński S, Darocha T, Sałapa K, Sanak T, Brugger H. The Use of E-Learning in Medical Education for Mountain Rescuers Concerning Hypothermia. High altitude medicine & biology. 2018;19(3):272-7.
24. Amini M, Kojuri J, Lotfi F, Karimian Z, Abadi AS. Research priorities in medical education in the Eastern Mediterranean Region. Eastern Mediterranean health journal = La revue de sante de la Mediterranee orientale = al-Majallah al-sihhiyah li-sharq al-mutawassit. 2012;18(7):687-92.
25. Salehi A, Harris N, Lotfi F, Hashemi N, Kojouri J, Amini M. Reform in medical and health sciences educational system: a Delphi study of faculty members' views at Shiraz University of Medical Sciences.

Eastern Mediterranean health journal = La revue de sante de la Mediterranee orientale = al-Majallah al-sihhiyah li-sharq al-mutawassit. 2014;20(3):151-61.

Tables:

Table 1. The correlation between attitude toward e-learning and training effectiveness

Variables	Number	Mean	Standard deviation	Correlation coefficient	P-value
View toward virtual training	217	62.86 (out of 100)	6.14	0.200	0.003
Training effectiveness	217	115.4 (out of 175)	26.75		

Table 2. The results of the attitude questionnaire toward virtual education

Row	Questions	**Mean ± SD** From 5
1	Virtual education can be an excellent alternative to traditional education.	3.44±.89
2	I feel that nothing can replace the presence of a teacher in the classroom.	3.67±.86
3	If appropriate content is provided, learning is possible even without the presence of a teacher.	3.54±.86
4	The need to use virtual learning helps me learn computer skills.	3.87±.65
5	I like to learn many lessons in a virtual way.	3.27±.88
6	I enjoy online communication with the instructor.	3.43±.79
7	I learn less with virtual education.	2.91±.87

8	Virtual education is more complicated than in face-to-face classes.	3.07±.92
9	I am not comfortable with virtual education, and I become anxious.	2.59±.80
10	If the training is proper, it does not matter if it is virtual or face-to-face.	3.28±.89
11	Virtual education has no application in the medical sciences.	2.59±.81
12	Virtual education is useless	2.15±.66
13	Virtual education requires many facilities.	3.02±.89
14	The accuracy of the content in the virtual method is more than the traditional method.	2.91±.83
15	Virtual education is just an imitation of the new methods that are common in other parts of the world.	2.89±.85
16	Virtual education wastes more of my time than the traditional method.	2.61±.83
17	I understand the teacher's words in the classroom more than the virtual method.	3.51±.84
18	In my opinion, learning in the virtual method happens actively.	3.16±.80
19	Virtual education further enhances thinking skills.	3.29±.82
20	In my opinion, for better learning, it is necessary to develop virtual education.	3.72±.70

Table 3. The correlation between the level of education in participants and their views

Degree	N.	Mean	Standard error	Standard deviation
diploma and sub-diploma	7	67.28	2.83	7.49
post-diploma	14	68.57	0.959	3.58
bachelor	83	62.49	0.721	6.56
masters	93	62.53	0.586	5.65
doctoral and above	14	60.14	1.17	4.40
Total	211	62.92	0.423	6.15

response to reviewers