



Applicability and Necessity of E-Learning Courses Based on Participants' Viewpoints in a Summer School

Zahra Karimian^{1,*}

¹Virtual School and Center of Excellence in Electronic Learning, Shiraz University of Medical Sciences, Shiraz, Iran

*Corresponding author: PhD in Higher Education Administration, Assistant Professor of Virtual School and Center of Excellence, Electronic Learning Virtual School, Shiraz University of Medical Sciences, Shiraz, Iran. Tel: +98-7132300037, Email: z_karimian_z@yahoo.com

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Abstract

Background: The purpose of this study was to investigate the applicability and necessity of e-learning courses based on the participants' viewpoints in an e-learning Summer School.

Methods: The research was conducted in 2017 with a descriptive cross-sectional design. The statistical population consisted of 33 students from universities of medical sciences that attended in the first e-learning Summer School and the research was done on all of them. A researcher-made questionnaire with a 5-point Likert scale was used that consisted of 40 questions including 25 questions in the knowledge section with five fields (concepts and theories, instructional design, virtual class, multimedia principles, and new approaches in e-learning) and 15 questions in the skills section with two fields (e-content development and learning management system). Content validity of the questionnaire was approved based on five expert's opinions and reliability was 94% based on Cronbach's alpha. The data were analyzed by using SPSS 16 with one-sample *t*-test, independent *t*-test, and ANOVA test. Student's individual experiences were also evaluated by one open-ended question.

Results: All topics significantly were applicable and necessary from the participants' viewpoints in both knowledge and skills sections ($P < 0.001$). The dimension of e-content development had the highest mean score (4.46).

Conclusions: E-learning can provide better and easier learning experiences by eliminating the time and space constraints and being adapted to learner conditions. Short-term e-learning courses can create new ideas for the use of technology in the educational process.

Keywords: E-Learning, Virtual Education, Course, Medical Students

1. Background

In recent years, the development of virtual education and e-learning is one of the main concepts that has been considered with the increasing expansion of teaching and learning processes, especially in medical education (1). The acceleration of knowledge development in the world has been so rapid that in the near future, e-learning is not only a possible choice but also an essential element in the educational development (2-4).

E-learning is the learning process with an interaction between electronic content, support services, trainers, and facilitators based on a computer-based environment with flexible, individual, self-regulated, and participatory acts for students and instructors, and it requires different skills for adaptation with this new environment (4). E-learning, sometimes referred to as online learning, is a computer-based or network-based learning, which has a positive impact on human life in all aspects of economics, govern-

ment, politics, industry, and the development of information and knowledge (5). New technologies such as the internet have created new ways to access resources, education, and research, and share the information between learners and instructors, and have dramatically changed the human resources development at various levels of education, including higher education (6-8).

Many studies showed e-learning not only is applied in virtual courses and disciplines but also is frequently integrated with face-to-face teaching as blended learning format, especially in health care professions with a wide range of fields of study, such as, medicine, dentistry, nursing, pharmacology, bioinformatics, medical basic sciences, etc. (9-38).

To the extent that e-learning is expected to be transformed by the use of new ICT-based teaching methods and by focusing on the person as an active learner, they can transform education and learning approaches in the 21st century and challenge the result of the amount of social

demand for education and the lack of adequate educational resources (39).

In recent years, medical education innovations and reform in Iran (Mediran) in medical universities have emphasized the virtual education as one of the main infrastructures for the development of medical education. Using e-logbooks, e-portfolios, e-examination, e-content, and new technologies in medical education, and performing the electronic infrastructure such as LMS, LCMS, Moocs, and so on are some educational development indicators in Mediran (40). Students have the main role in virtual education development, but they need to train on the concepts and applications of e-learning methods to adapt to the new learning environment. Despite the fact that various types of informal methods of virtual education such as email, social networking, and blogging are widely used by students in scientific and entertainment applications, this is a necessity to develop formal virtual education and interactive e-learning tools. The purpose of this study was to investigate the applicability and necessity of e-learning courses based on participants' viewpoints in an e-learning Summer School, and to answer three main questions:

What are the participants' viewpoints about the applicability of the course in the knowledge section?

What are the participants' viewpoints about the applicability of the course in the skills section?

Which dimensions of the course are more important from the participants' viewpoints?

2. Methods

The research was conducted in 2017 with a descriptive cross-sectional design. The statistical population consisted of students from medical universities that attended the e-learning course in the first Summer School of Shiraz University of Medical Sciences. The research sample included all 33 participants who were selected by the census method. More than 85% of the participants did not have any primary knowledge or experience about e-learning. Thus, the design of the research was based on their own opinions and experiences after being involved in the course. The curriculum was developed by five e-learning experts.

Content and methods were designed in blended learning by a combination of workshops and face-to-face education, using the learning management system (LMS), delivering the offline content, and practicing with virtual class interactive tools such as, forum, course wiki, and chat room. The course was designed in four long days. The main titles of the course included the knowledge and skills domains as follows:

Knowledge: Concepts and theories, instructional design, virtual class, multimedia principles, and new approaches in e-learning.

Skills: Learning management system and virtual class, e-content development.

In sum, 25 titles in the field of e-learning knowledge and 15 items in e-learning skills were taught.

At the end of the course, students' viewpoints were evaluated to indicate the level of applicability and the necessity of the courses. The research instrument was a researcher-made questionnaire with a five-point Likert scale that consisted of 40 questions including 25 questions in the knowledge section with five fields (concepts and theories, instructional design, virtual class, multimedia principles, and new approaches in e-learning), and 15 question in the skill section with two fields (e-content development and learning management system). The scale of the questionnaire included: Very essential = 5, essential = 4, relatively essential = 3, low essential = 2 and very low essential = 1.

Content validity of the questionnaire was approved based on five expert opinions, and reliability was 94% based on Cronbach's alpha. The data were analyzed using SPSS16 software with one-sample *t*-test, independent *t*-test, and ANOVA test. Student's individual experience was also evaluated by one open-ended question.

3. Results

Thirty-three students from 10 universities of medical sciences attended the e-learning course. Academic disciplines of participants included medicine, dentistry, pharmacy, public health, occupational health, health education, nutrition, medical education, educational technology, psychiatric nursing, biochemistry, English language learning, auditory, nursing, health technology, healthcare management, anatomy, and biochemistry. 73% (24) of the participants were female and 27% (8) were male. Academic degrees included 17.9% (5) BSc, 28.6% (10) MSc, 26.7% (9), and 23.3% (8) Ph.D. The obtained results of the participants' viewpoints about the applicability of the course in the knowledge section are shown in Table 1, analyzed by one-sample *t*-test.

According to Table 1, all topics significantly were necessary and applicable ($P < 0.001$) and the mean scores of forum topic (4.57), virtual classroom tools (4.47), e-logbook and e-portfolio (4.47), blended learning (4.33), familiarity with audio recording software (4.30), interactive tools in the learning management system (4.30), and familiarity with Articulate Studio software (4.30) had the highest level.

The obtained results of the participants' viewpoints about the applicability of the course in the skills section

Table 1. Participants' Viewpoints About the Applicability of the Course in the Knowledge Section Analyzed by One-Sample *t*-Test

Items	Mean \pm SD	t	P Value
Concepts and theories			
Theories and concepts of e-learning	3.90 \pm 1.06	4.64	< 0.001
Blended learning and flip classroom	4.10 \pm 1.09	5.50	< 0.001
E-assessment techniques	4.33 \pm 0.75	9.63	< 0.001
Virtual class			
Learning management system tools	4.43 \pm 0.72	10.78	< 0.001
Virtual classroom tools	4.47 \pm 0.81	9.80	< 0.001
Wiki and e-learning	4.30 \pm 1.02	6.96	< 0.001
Forum in e-learning	4.57 \pm 0.62	13.70	< 0.001
Instructional design			
Instructional design in e-learning	4.13 \pm 0.93	6.62	< 0.001
Multimedia principles and standards	4.17 \pm 0.98	6.48	< 0.001
SCORM standards in e-content	4.10 \pm 0.99	6.05	< 0.001
Principles of designing the Powerpoint presentation	4.23 \pm 1.16	5.79	< 0.001
Multimedia principles			
Familiarity with Audio Recording software	4.33 \pm 0.844	8.65	< 0.001
Familiarity with the Camtasia software	4.30 \pm 0.952	7.47	< 0.001
Introducing Adobe Audition	3.90 \pm 0.96	5.13	< 0.001
Familiarity with the Studio Articulate software	4.30 \pm 0.70	10.14	< 0.001
Familiarity with Ispring software	4.07 \pm 0.74	7.89	< 0.001
E-widgets [JING, podcast, vodcast, survey monkey, etc.]	4.13 \pm 1.04	5.95	< 0.001
New approaches			
Intelligent medical education	3.97 \pm 1.12	4.69	< 0.001
New technologies in medical sciences	4.10 \pm 1.06	5.67	< 0.001
Mobile learning	4.27 \pm 0.82	8.38	< 0.001
Micro learning	3.90 \pm 0.84	5.83	< 0.001
The concept of MOOCs in e-learning	3.87 \pm 1.00	4.70	< 0.001
Learning Path application in e-learning	3.53 \pm 1.00	2.89	< 0.007
Introduction to TRIZ and its application in e-learning	4.17 \pm 0.87	7.30	< 0.001
E-logbook and e-portfolio	4.47 \pm 0.77	10.35	< 0.001

are shown in [Table 2](#), analyzed by one-sample *t*-test.

In the skills section, the students described all the skills presented in the course as necessary and applicable ($P < 0.001$). According to [Table 2](#), the highest average scores were related to working in the virtual classroom (4.57), practicing with audio recording and editing software in e-content software (4.57), using online chat in the virtual classroom (4.53), practicing with the Camtasia software (4.47), and creating e-tests (4.47).

The results of the last question of the questionnaire in [Table 3](#) show which dimensions of the course are more im-

portant from the participants' viewpoints.

The mean score of the different areas of the program indicated that all items were scored more than expected. The highest average was related to the e-content development (4.46). In addition, the ANOVA test showed there was no significant difference between the participants' viewpoints in terms of gender and academic degree ($P > 0.05$).

The analysis of students' feedback from their first experiences in the e-learning course showed that they described e-learning as a suitable method for use in the classrooms. All 33 participants believed that the course was use-

Table 2. The Participants' Viewpoints About the Applicability of the Course in the Skills Section Analyzed by One-Sample *t*-Test

Items	Mean \pm SD	t	P Value
Practicing with LMS and virtual class			
Performing computer settings	4.20 \pm 1.09	6.00	< 0.001
Installing e-learning software	4.33 \pm 1.06	6.88	< 0.001
Logging and presenting into the virtual class	4.57 \pm 0.77	11.08	< 0.001
Answering the questions through the online chat	4.53 \pm 0.73	11.50	< 0.001
Creating or responding to LMS exercises	4.47 \pm 0.90	8.93	< 0.001
Uploading the contents on LMS	4.33 \pm 0.84	8.65	< 0.001
Creating a forum on LMS	4.27 \pm 0.98	7.07	< 0.001
Create an electronic test in LMS	4.27 \pm 0.90	7.64	< 0.001
Creating wiki on LMS	4.23 \pm 0.93	7.22	< 0.001
E-Content development			
Providing the e-content with Camtasia	4.47 \pm 0.73	11.00	< 0.001
Sound in the Articulate Studio or Ispring	4.57 \pm 0.56	15.09	< 0.001
Synchronizing the sound and text in Articulate Studio or Ispring	4.57 \pm 0.62	13.70	< 0.001
Performing the Scos, titles, and subtitles in Studio or Ispring	4.40 \pm 0.77	9.95	< 0.001
Colorizing and setting the display format in Studio or Ispring	4.30 \pm 0.75	9.49	< 0.001
Building an electronic test in Studio or Ispring	4.47 \pm 0.57	14.06	< 0.001

Table 3. Participant's Viewpoints About More Important Dimensions of the Course Based on One-Sample *t*-Test

Dimensions	Mean \pm SD	t	P Value
Knowledge			
Concepts and theories	4.11 \pm 0.69	8.73	< 0.001
Virtual class	4.44 \pm 0.67	11.69	< 0.001
Instructional design	4.15 \pm 0.72	8.69	< 0.001
Multimedia principles	4.17 \pm 0.57	11.13	< 0.001
New approaches	4.03 \pm 0.62	9.00	< 0.001
Skills			
Practicing with LMS and virtual class	4.35 \pm 0.78	9.46	< 0.001
E-content development	4.46 \pm 0.54	14.65	< 0.001

ful, practical, with a warm, fun, and joyous atmosphere, and described that the most important point was familiarity with other students, team working, and interdisciplinary approach in the course.

Indeed, students wrote their opinions in Persian language and they were translated into English. We tried to translate the sentences in closer meaning to the main purposes. Some comments from the participants are as follows:

One of the Ph.D. students in health management said: "... This course was a very good and memorable period for me. My most lasting memory was the team working with different students from other disciplines, and I found the opportunity to

experience a real teamwork. During this period, teachers were allowed to express their thoughts and opinions, and there was a very intense and instructional atmosphere between teachers and students."

The other student in medicine believed: "...*Practical work experience was very valuable in this period, and I was less experienced before in the formal education courses. It was especially interesting for me to be in the team of different disciplines. The communication and interaction of the professors and students were very good and the questions were answered very well."*

One of the BSc students in audiology said: "...*The training course was very fruitful. I had already attended other work-*

shops, but the atmosphere of this course was very sincere and scientific. The relationship between the organizers of the course and the students was very good and the most important point of the course was the teamwork.”

A BSc student in nutrition wrote: “...Participating in this course and getting acquainted with electronic software were very interesting for me. I think it is necessary to hold these courses at different universities in order to identify the impact of new technologies in further education and to use more professors and students.”

An MA student in educational technology said: “...For me, the participation in this period was very memorable. I found new friends, and shared the experiences with other university students. I became familiar with software that I did not know about them before, and now I know how technology can be used in practice. I learned how to teach, how to shape a teamwork, and how to motivate students. I would like to hold this course again and I will certainly hold this course in my university.”

An MSc student of public health said: “...After attending this course, I am very interested in participating in research projects on e-learning. I would like to use the software I learned to build educational content, especially in health education. I have come up with a lot of good ideas that I hope to do in the future.”

One of the MD students in dentistry said: “...This was the first time I came out of my field and I became familiar with other areas. Being alongside other disciplines was a great experience for me. Familiarity with creative teaching methods, new and applied content, and interaction with other students, teamwork, and excellent communication with faculty members were the interesting and remarkable experiences of the course.”

4. Discussion

E-learning as a new approach to educational development affects educational environments, instructors, students, and educational contents from different perspectives. Since students are the core of all learning processes, acquiring the knowledge and skills of using modern technologies is essential for educational planning in schools and universities. Based on the results of the present study, students after the e-learning experiences believed that e-learning is effective and useful in the learning process. In previous studies, the usefulness, effectiveness, and necessity of e-learning and its impact on increasing knowledge, satisfaction, motivation, and performance have been confirmed (11-38, 41-47). The research by Lim et al. showed a positive feedback of bioinformatics students regarding the usefulness of the learning activity management system (LAMS) and e-learning tools in guiding discussion process in problem-based learning (12). Karaman in a sur-

vey found that nurses believed online learning is a suitable way, leading to making opportunities for their working conditions and needs (15). Dunham et al. also showed that students' scores on online quizzes after the implementation of virtual laboratories improved. In addition, students' perception of the course improved significantly after the introduction of the tools and a new teaching model (16). George et al. in a systematic review found that some studies in medical sciences faculties such as medicine, dentistry, nursing, physical therapy, and pharmacy showed student's knowledge, skills, and satisfaction levels were higher in online education than in traditional models (17). Gaikwad and Tankhiwale reported that in medical colleges of India, students accepted e-learning activity well as they perceived it to be innovative, convenient, flexible, and useful, and they believed e-learning module in pharmacology was moderately effective and encouraged self-directed learning and active-learning in the students (18). Aryal and Pereira found that e-learning has shown to be more effective, less costly, and more satisfying than the traditional methods from the students' viewpoints (19). Salter et al. in a systematic review of the literature in pharmacy education found that e-learning effectively increases knowledge of pharmacists and pharmacy students and is a highly acceptable instructional format from their viewpoints (20). Some research showed that e-learning encourages students' learning with a higher level of students engagement (44, 45). In the research by Warriner et al., medical students reported that they found a positive experience and interesting environment by e-learning models and there was a statistically significant improvement in the students' performance in learning the cardiovascular system (32). Asiry found that dental students have a high agreement with online learning, and they reported that online flash lectures and procedural videos were helpful to their learning, in sequence (20). Zand et al. explored the implication of e-learning to the teaching of anatomy. Given the need for observation and practical work on the cadavers in medicine and the possibility of their destruction and erosion over the time, the use of e-simulated models in the field of anatomy is very necessary (46). Cost-effectiveness, ease of use, and resolving the time and space limitations are the other advantages of e-learning implication in medical education (24, 35, 45). Much recent research about the implication of new technologies in medical education such as augmented reality (AR) and virtual reality (VR) confirmed their necessity and effectiveness and suggested the implication of AR and VR to the education of anatomy, surgical environment, and post-operative rehabilitation (25), neurology (29), urology (30), plastic surgery (33), and neuropsychiatric disease (34). In addition, in non-medical fields, the study of Zaraii Zavaraki

and Rezaei on engineering students showed the use of e-logbook had a positive effect on the students' motivation and their academic achievement (47). Miyazoe and Anderson, in a semi experimental study, examined the effectiveness of e-learning tools in the English language at Japanese universities, and the results showed that forum, wikis, and blogs from the students' viewpoints are applicable and useful (13).

Overall, the analysis of the quantitative and qualitative results of the present research and previous studies in different aspects shows that the use of e-learning tools in educational processes has positive effects on students' learning. e-learning will provide a better and easier learning experience by eliminating the time and space constraints, and being tailored to the learner conditions. Short-term e-learning courses such as summer schools, especially in an informal climate, with a happy and fun atmosphere and teamwork with other students, have a positive effect on the students' motivation and behavior. In addition, the applicability of courses is more attractive to students and it is better to design the courses in practical and student-centered methods.

It is suggested that familiarity with virtual education and e-learning software is considered in short-term e-learning courses and workshops or included in the syllabus of the curriculum of medical disciplines.

Research limitations: Although students attending this course were from different universities of medical sciences, due to the limited number of participants, more research should be done to generalize the results. In addition, the needs of students at different educational levels might be varied. Therefore, the examination of this issue also requires research on a larger number of participants.

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