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# EVALUATING ATTITUDES REGARDING E-LEARNING AND THE PROSPECT OF ITS COMPLEMENTARY USE IN THE FUTURE FROM THE PERSPECTIVE OF STUDENTS AND FACULTY MEMBERS

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## *ABSTRACT*

*Considering the forced experience of e-learning during the pandemic, it is crucial to obtain the information required for proper planning of e-learning in the future as a complementary method of. This was an analytical cross-sectional study. The first questionnaire was a researcher-made that consisting of two parts, including the students' demographic characteristics and their attitude toward e-learning that included 38. The second questionnaire was a test of the faculty members' attitudes and performance that consisted of 23 items related to attitude and 3 items related to performance. The collected data was analyzed using the mean and frequency; and the independent t-test, one-way analysis of variance (ANOVA), and Pearson correlation coefficient. the students' satisfaction levels in all areas were higher than 50%. The areas of emotion and support had the highest and lowest score, respectively. Moreover, the mean score of students' attitudes was 113.14 ± 21.48. In General, 64.20% of the facuqwlty members agreed or strongly agreed with the implementation of e-learning, whereas 20.03% of them disagreed or strongly disagreed with this method. 77.19% of the faculty members had a very positive opinion about their performance in e-learning.*
*having a lesson plan to clarify the teaching process and the evaluation method, conducting evaluations in accordance with the level of teaching, having access to professors to ask questions, providing courses and contents similar to in-person classes, and proving simulation-based learning for a more dynamic education are essential factors in improving the quality of e-learning.*

***Keywords:*** *Electronic education, Students, Nursing Faculty Practice, Coronavirus.*

## INTRODUCTION

At the end of the second decade of the twentieth century, in December 2019, several cases of a highly contagious pneumonia-like disease were reported in Wuhan, China. The disease was later named COVID-19 by the World Health Organization (WHO) and was later announced a global pandemic (Biswas *et al.*, 2020). As a result, different countries quickly shut down schools, colleges, universities, and other educational centers and were forced to switch to electronic learning.

E-learning, first proposed by Cross, is one of the most important applications of information technology and is considered the use of information technology for learning. Moreover, this type

of learning includes a wide range of processes and practices such as web-based education, computer-based education, virtual classes, and digital collaboration, and includes content delivery through the Internet, intranet, extranet, satellite broadcasting, video and audio tapes, television, and compact discs (Fathi *et al.*, 2011). Before the pandemic, e-learning received limited attention as merely a complementary method accompanying in-person learning (Mirzaei *et al.*, 2012). However, during the pandemic, it proved to be a good substitute for in-person learning (Suppan *et al.*, 2020).

E-learning has various advantages, such as enhancing efficient time management and improving students' motivation (Gharib *et al.*, 2020). Using this method also results in a reduction in costs (Doshmangir *et al.*, 2020). Accessing educational content from anywhere and the possibility of having virtual group discussions outside the classroom are among its other benefits. The use of E-learning, moreover, results in personalized and flexible education, better opportunity to revise the content compared with in-person learning, virtual formative and periodical assessment of assignments, the possibility of asking questions, and creating concise and efficient content (Mosalanezhad *et al.*, 2021).

On the other hand, problems related to hardware, software, telecommunication infrastructure, and bandwidth, The lack of necessary facilities for online classes, limited access to the system through different browsers, the systems' lack of smartphone compatibility, and frequent internet disconnections, resulting in the design of non-interactive courses are the most significant barriers to e-learning as observed in previous studies (Yazdaninejad *et al.*, 2020). The creation and management of educational content in conformity with learners' social, psychological, and educational characteristics, as well as considering their interests, study style, and knowledge levels in addition to providing high quality, up-to-date, and renewable educational material are among the most important concerns of e-learning (Taghiyar *et al.*, 2020).

A study conducted at Guilan University of Medical Sciences in 2017 revealed that the possibility of implementing virtual education systems in terms of conditions, capabilities, applications, and facilitators is at a favorable level. However, limitations were higher than average at that university (Saberi *et al.*, 2018). Due to the association between education and culture, it is necessary to examine the factors affecting education in different cultures and conditions. Considering the forced experience of e-learning during the pandemic, it is crucial to obtain the information required for proper planning of e-learning in the future as a complementary method of education by a thorough examination of its dimensions and the factors affecting it. Therefore, the present study aimed to investigate faculty members' and students' attitudes toward e-learning in addition to the factors affecting their attitudes.

## MATERIALS AND METHODS

This was an analytical cross-sectional study. The study population consisted of all students and faculty members of the Nursing and Midwifery School of Guilan University of Medical Sciences. The inclusion criteria were having completed one semester in person for students and having teaching experience in both virtual and in-person courses for faculty members. The exclusion criteria were students' or faculty members' unwillingness to participate or not completing the questionnaires. Samples were collected using convenience sampling in April 2022.

The first questionnaire used in the present study was a researcher-made questionnaire consisting of two parts, including the students' demographic characteristics (age, sex, semester, GPA, household monthly income, field of study, city of residence, type of residence, marital status, occupation, e-learning experience, and the equipment used to attend classes) and their attitude toward e-learning. The questionnaire included 38 items divided into 6 areas (1. e-learning, 2. e-learning system, 3. the quality of courses, 4. emotional and cultural factors, 5. support, tests, and 6.assignments). the questionnaire was a 5-point Likert scale (Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree). The scores ranged from 0 (strongly disagree) to 4 (Strongly agree), and higher scores indicated a more positive attitude. The scores ranged between 38 and 190. The questionnaire was reviewed and approved by 10 faculty members with PhDs in nursing in terms of validity using content validity ratio (CVR) and content validity index (CVI). Regarding reliability, Cronbach's alpha was estimated to be 0.88. Test-retest was used to confirm the stability of the questionnaire items over a 2-week period, and the intracluster correlation coefficient (ICC) was 0.92, which indicates acceptable reliability. The second questionnaire was a test of the faculty members' attitudes and performance related to e-learning. The tool consisted of 23 items related to attitude and 3 items related to performance. The attitude section was a 4-point Likert scale (Strongly disagree, Disagree, Agree, and Strongly agree), while in the performance section, the answers were in the form of yes, neutral, and no. In the attitude section the scores ranged from 0 (Strongly disagree) to 4 (Strongly agree), and in the performance section the scores ranged from 1 (No) to 3 (Yes). In both sections, higher scores indicated a more positive attitude. The scores ranged between 0 and 92 in the attitude, and 3 and 9 in the performance sections. The validity of this questionnaire was also assessed and confirmed by 10 faculty members of the university. The reliability was estimated at 0.85 using Cronbach's alpha coefficient. After obtaining the code of ethics from Guilan University of Medical Sciences and the students' and faculty members' verbal consent, the objectives of the study were explained, and a written questionnaire was given to them between classes. The collected data was analyzed using the mean and frequency; moreover, for univariable analysis, the independent t-test, one-way analysis of variance (ANOVA), and Pearson correlation coefficient were utilized. The data were analyzed using SPSS version 16.0. The significance level was considered $P < 0.05$.

## RESULTS AND DISCUSSION

211 questionnaires were completed by students and 19 were completed by faculty members. The students' mean age and GDP were 23.15 ± 3.31 and 16.68 ± 1.43, respectively. The faculty members' mean age and work experience were 47.73 ± 7.75 and 20.02 ± 9.46, respectively. Other demographic characteristics are presented in Table 1.

**Table 1.** Demographic information of students and faculty members

| | | | |
|---|---|---|---|
| Students information | | | |
| Age | 23.15 ± 3.31 | | |
| Grade Point Average | 16.68 ± 1.43 | | |
| Gender | | | |
| Female | 128 (60.7) | Means of participating with e-learning | 124 (58.8) |
| Male | 83 (39.3) | Mobile | 75 (35.5) |
| Semester | | Laptop | 3 (1.4) |
| 6 | 91 (43.1) | Tablet | 9 (4.3) |
| 7 | 47 (22.3) | Personal computer | |
| 8 | 73 (34.6) | | |
| Family income | | Faculty member information | |
| Not enouph | 15 (7.1) | | 47.73±7.75 |
| Enouph | 186 (88.2) | Age of faculty members | 20.02±9.46 |
| More than enouph | 10 (4.7) | Workexperience | |
| Major | | Gender of faculty members | |
| Nursing | 179 (84.8) | Men | 6(31.6) |
| Midwifery | 32 (15.2) | Female | 13 (68.4) |
| Address | | Department of faculty members | |
| Rasht | 98 (46.4) | Nursing | 12 (63.2) |
| Guilan (except rasht) | 77 (36.5) | Midwifery | 3 (15.8) |
| Other province | 36 (17.1) | Other | 4 (21.1) |
| type of residence | | Education of faculty members | |
| With family | 107 (50.7) | Bachelor's degree | 0 (0.0) |
| Student house | 33 (15.6) | Master | 3 (15.8) |
| Dorm | 71 (33.6) | Phd | 16 (84.2) |
| Marrage | | | |
| Single | 191 (90.5) | | |
| Marred | 20 (9.5) | | |
| Employee | | | |
| Yes | 39 (18.5) | | |
| No | 172 (81.5) | | |

| | |
|---|---|
| Experience Using the E-learning portal | |
| Yes | 65 (30.80 |
| No | 146 (69.2) |

Table 2 shows the results of the analysis of students' responses to the e-learning-related attitude scale, which was divided into 6 areas:

*1. E-learning*

From the students' point of view, the benefits of e-learning included making healthy technical progress, getting more familiar with the digital world, managing the lessons better, feeling more comfortable, lower stress levels, and lower costs compared to in-person classes. An average of 52.74% of the students were agree with these items.

On the other hand, the disadvantages of this method included a decrease in motivation, interaction with instructors, interaction with students, and involvement with the university, along with feeling confused, not understanding the topics discussed, doing less practice, and not having access to the required infrastructures. On average, 56.35% of the students raised these issues by choosing disagree or strongly disagree in the questionnaire. 16.1% of students disagreed with access to sufficient facilities, and in line with the main objective of the study, it should be stated that 54.1% of students agreed with the continuation of e-learning.

*2. E-learning system*

34.6% of students agreed with the good quality and adequacy of the NAVID LMS, while 34.1% of the students disagreed with this. 50.3% of students reported that attending classes and accessing the content was easy; moreover, 36.5% of the students considered their professors' and other students' skills in presenting the material favorable, whereas 38.9% of them disagreed.

*3. The Quality of Courses*

55.3% of the students believed that using PowerPoint slides is not enough to convey information. 49.5% of them believed that the objectives were not achieved at the end of the class, and 47.4% had unanswered questions at the end of the class. 40.2% claimed that they had enough time to take notes after classes and 41.2% reported the amount of content and duration of the class was appropriate. 42.3% believed that the classes were not tiring. 66.2% were able to re-access the material at the right time, and 40.9% reported that in addition to the PowerPoint slides, the content was also provided in the form of simulated videos or images. Overall, 40.6% of the students stated that the presented content was concise, useful, and effective.

*4. Emotional and cultural factors*

64% of students considered e-learning a cause of concern regarding occupational skills and 41.2% considered it a cause of self-efficacy. 64.2% believed that lack of eye-contact negatively affected learning. 54.5% of the students were stressed because of not being able to access the

library, and 58.4% believed that e-learning decreased their academic motivation and class attendance hours.

### *5. Support*

46.4% of the students disagreed with the item related to the possibility of easy access to and interaction with professors. 54.4% were not satisfied with their professors' support and response to their problems. Moreover, 52.8% of the students expressed dissatisfaction with the faculty's supportive measures.

### *6. Tests and assignments*

45.9% of the students agreed with the clearness of the evaluation method, assignments, and their responsibilities. 40.7% of the students believed that the assignments were checked at the right time and 49% of them claimed that there was no balance between the level of education and test difficulty. 61.3% of the students believed that it was not possible to differentiate hardworking students from others through online tests.

According to Table 2, the students' satisfaction levels in all areas were higher than 50%. The areas of emotion and support had the highest and lowest score, respectively. Moreover, the mean score of students' attitudes was 113.14 ± 21.48.

**Table 2.** Analysis of the questionnaire of students' attitudes toward e-learning (n = 211)

| Question | Totally agree | Agree | Neither agree nor disagree | Disagree | Totally disagree | Mean and standard deviation | possible domain | Viewed domain |
|---|---|---|---|---|---|---|---|---|
| | | | No (%) | | | | | |
| E-learning | | | | | | 41.04 ± 11.17 | 14-70 | 16-66 |
| 1. E-learning has increased my motivation and developed my thinking process. | 7.1 | 20.9 | 22.3 | 27 | 22.7 | | | |
| 2. E-learning has increased my interaction with the professors. | 6.2 | 9 | 16.6 | 31.3 | 37 | | | |
| 3. E-learning has increased my interaction with other students. | 6.6 | 18 | 18.5 | 29.9 | 27 | | | |
| 4. E-learning has increased my involvement with education and the university. | 5.7 | 15.2 | 19.9 | 32.2 | 27 | | | |
| 5. E-learning has led to healthy progress in my technical knowledge and familiarity with the digital world. | 7.6 | 37 | 30.8 | 10.4 | 14.2 | | | |
| 6. I had access to the required equipment during e-learning. | 19.5 | 45.7 | 18.6 | 9 | 7.1 | | | |
| 7. I feel I have better management of my lessons and time with online teaching. | 18.5 | 27 | 18.5 | 16.1 | 19.9 | | | |
| 8. I feel more comfortable with online classes. | 22.3 | 31.8 | 15.6 | 17.1 | 13.3 | | | |
| 9. I experienced lower levels of stress in online classes. | 25.6 | 36 | 15.6 | 9.5 | 13.3 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10. I had problems understanding the content in e-learning and felt confused. | 12.3 | 30.3 | 27 | 22.7 | 7.6 | | | |
| 11. Online classes led to frequent use of the provided content and more practice. | 12.8 | 22.3 | 18 | 29.9 | 17.1 | | | |
| 12. The costs of the internet and necessary equipment for online classes have been lower than the costs of commuting. | 26.1 | 31.8 | 18 | 13.7 | 10.4 | | | |
| 13. Overall, I prefer online classes as a complement to in-person classes. | 22.3 | 31.8 | 19.4 | 10 | 16.6 | | | |
| 14. I think Guilan University has the infrastructure needed for e-learning. | 6.2 | 13.7 | 21.3 | 22.7 | 36 | | | |
| E-learning system | | | | | | 8.74 ± 1.83 | 3-15 | 3-15 |
| 1. I think the Navid system has the quality and facilities required for e-learning. | 4.3 | 30.3 | 31.3 | 19.9 | 14.2 | | | |
| 2. The methods for holding and attending the classes, and using the contents were easy and accessible. | 6.2 | 44.1 | 23.7 | 17.5 | 8.5 | | | |
| 3. The professors and students had sufficient skills to teach and learn in the Navid system. | 4.8 | 31.7 | 24.5 | 24 | 14.9 | | | |
| The quality of the courses | | | | | | 27.39 ± 6.78 | 9-45 | 9-45 |
| 1. I think interactive discussions and PowerPoint presentations are enough for teaching the content. | 6.3 | 21.6 | 16.8 | 32.2 | 23.1 | | | |
| 2. I think the objective of each class was achieved. | 4.4 | 21.8 | 24.3 | 32.5 | 17 | | | |
| 3. At the end of the sessions, I had unanswered questions about the content. | 11.5 | 35.9 | 32.5 | 14.4 | 5.7 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4. I had enough time for note-taking during the classes. | 12.9 | 27.3 | 23.4 | 24.4 | 11 | | | |
| 5. The amount of information given in each session was in accordance with the class time. | 9.1 | 32.1 | 27.3 | 20.6 | 11 | | | |
| 6. The length of the classes was appropriate, and they were not tiring. | 10.1 | 32.2 | 28.4 | 21.6 | 7.7 | | | |
| 7. After the classes, I had access to the contents at the proper time. | 17.4 | 48.8 | 15.5 | 14 | 4.3 | | | |
| 8. In addition to PowerPoint presentations and the professors' discussions, the content was provided as films or simulated pictures. | 7.2 | 33.7 | 22.6 | 20.7 | 15.9 | | | |
| 9. Overall, the contents were concise and useful. | 6.8 | 33.8 | 28 | 18.4 | 13 | | | |
| Emotional and cultural | | | | | | 15.81 ± 2.24 | 5-25 | 9-21 |
| 1. I think e-learning has created concerns about my qualifications and professional future. | 35.4 | 28.6 | 18.4 | 11.7 | 5.8 | | | |
| 2. I think e-learning has increased my self-efficacy. | 6.8 | 25.2 | 26.7 | 25.2 | 16 | | | |
| 3. I think the lack of visual contact and body language negatively affects learning in e-learning. | 25.1 | 39.1 | 18.8 | 12.6 | 4.3 | | | |
| 4. I believe I was stressed about the lack of access to adequate resources such as the library. | 14.8 | 39.7 | 22 | 18.2 | 5.3 | | | |
| 5. I believe e-learning has decreased my motivation regarding education and my attendance hours. | 19.6 | 38.8 | 14.4 | 21.1 | 6.2 | | | |
| Support | | | | | | 7.66 ± 3.14 | 3-15 | 3-15 |
| 1. Interaction with and access to the professors were provided in e-learning. | 6.7 | 20.1 | 26.8 | 27.3 | 19.1 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2. I think the professors answered our questions in the shortest possible time and supported the students. | 5.3 | 16 | 24.3 | 31.1 | 23.3 | | | |
| 3. The faculty has acted in time to solve the students' problems regarding e-learning. | 4.3 | 20.7 | 22.1 | 26.4 | 26.4 | | | |
| Tests and assignments | | | | | | 12.46 ± 3.26 | 4-20 | 4-20 |
| 1. Since the beginning of the course, assessment, assignments, and students' responsibilities have been clear. | 9.1 | 36.8 | 25.4 | 21.5 | 7.2 | | | |
| 2. Checking the assignments and responding to them was done in time. | 9.1 | 31.6 | 24.4 | 24.4 | 10.5 | | | |
| 3. I think the difficulty level of the tests was in accordance with the level of education. | 5.3 | 23.6 | 22.1 | 24.5 | 24.5 | | | |
| 4. I think the online tests have failed to distinguish the hardworking students from the others. | 31.6 | 29.7 | 15.8 | 12.9 | 10 | | | |
| Total score | | | | | | 113.14 ± 21.48 | 38-190 | 45-174 |

**Table 3.** The results of the analysis of the open-ended questions questionnaire for assessing students' attitudes toward e-learning (n = 211)

| | | |
|---|---|---|
| Appropriate courses for e-learning | A) General<br>B) Non-clinical<br>C) Basic medical sciences | • General courses such as Islamic Education and Family studies<br>• Courses that are not directly related to the clinic.<br>• Courses Such as Parasitology, Microbiology, and Physiology |
| Advantages of e-learning | A) Time management | • Having enough time to review books and lessons and do non-curricular activities<br>• Reducing commuting time and wasted time between classes<br>• The possibility of having a part-time job while studying |
| | B) Cost reduction | • Reducing the cost of commuting to the university<br>• Reducing accommodation costs and other expenses related to living in the city where they study |
| | C) Easy access | • The possibility of re-accessing videos and lessons<br>• The ease of attending the classes |
| | D) Self-efficacy | • Priority management<br>• Increased concentration and self-efficacy<br>• Increased skills in learning through the internet |
| | E) Electronic approach | • Increased learning<br>• Video and 3D education material<br>• Improved quality |
| Disadvantages of e-learning | A) The Internet | • Low speed or interruption of the internet to attend classes |
| | B) Electronic approach | • Decreased motivation, attention, and effort<br>• Lack of students' interactions with their professors and other students<br>• Lack of opportunity to ask questions and get the answers<br>• Reduced information exchange |

| | |
|---|---|
| | • Stress<br>• High costs of the internet<br>• Decreased self-confidence |
| C) Contents | • Reduced quality of presentation<br>• Unintelligibility of some content<br>• Presenting a large amount of content only through powerpoint slides |
| D) Infrastructures | • The system's inefficient infrastructure<br>• Low quality of some files (audio)<br>• difficulties downloading some files<br>• Lack of chat rooms<br>• Offline classes |
| E) Professors | •Online presentation skills<br>• Delay in uploading material<br>• Not answering students' questions |
| F) Other problems | • Inappropriate evaluation without differentiating students<br>• Time limit and stress of tests<br>• Planning problems<br>• Lack of access to library resources<br>• Students' lack of access to equal electronic facilities<br>• Decreased learning |

Table 4 presents the general attitude of faculty members toward the implementation of virtual education at Guilan University of Medical Sciences. In General, 64.20% of the faculty members agreed with the implementation of e-learning, whereas 20.03% of them disagreed with this method. 77.19% of the faculty members had a very positive opinion about their performance in e-learning.

**Table 4.** The analysis of the faculty members' attitude and performance questionnaire toward the implementation of the virtual education system at Guilan University of Medical Sciences (n = 19).

| Question | Totally agree | Agree | Neither agree nor disagree | Disagree | Totally disagree | Mean and standard deviation |
|---|---|---|---|---|---|---|
| | | | No (%) | | | |
| **attitude** | | | | | | |
| 1. I agree with e-learning. | 10.5 | 63.2 | 21.1 | 5.3 | . | 3.78 ± 0.71 |
| 2. the created content should be monitored by professors. | 21.1 | 57.9 | 5.3 | 15.8 | . | 3.84 ± 0.95 |
| 3. It is better to use in-person education method together with e-learning until the necessary conditions are reached. | 31.6 | 63.2 | . | . | 5.3 | 4.15 ± 0.89 |
| 4. In order to teach online in the future, it is necessary to dedicate more course units to this method. | 15.8 | 47.4 | 5.3 | 21.1 | 10.5 | 3.36 ± 1.30 |
| 5. Training workshops about electronic content creation should be held for faculty members. | 31.6 | 63.2 | 5.3 | . | . | 4.26 ± 0.56 |
| 6. The type of learning medium is effective in learning. | 63.2 | 36.8 | . | . | . | 4.63 ± 0.49 |
| 7. The teaching method is effective in learning. | 47.4 | 47.4 | 5.3 | . | . | 4.31 ± 0.94 |
| 8. learning through e-learning methods leads to independence and self-learning in students. | 10.5 | 47.4 | 10.5 | 31.6 | . | 3.36 ± 1.06 |
| 9. the use of innovative teaching methods such as e-learning facilitates learning. | 26.3 | 42.1 | 21.1 | 10.5 | . | 3.84 ± 0.95 |
| 10. If the course content is provided to students, there is no need to attend the class. | . | . | 10.5 | 36.8 | 52.6 | 1.57 ± 0.69 |
| 11. E-learning methods lead to more flexibility in teaching methods. | 26.3 | 68.4 | . | 5.3 | . | 4.15 ± 0.68 |
| 12. e-learning is more economical. | 15.8 | 21.1 | 15.8 | 47.4 | . | 3.05 ± 1.17 |
| 13. Considering that we are in the information age, there is no need to | | 5.3 | 26.3 | 42.1 | 26.3 | 2.10 ± 0.87 |

| | | | | | | |
|---|---|---|---|---|---|---|
| create content in the university education system. | | | | | | |
| 14. Students and professors' experiences can be used during in-person courses. | 31.6 | 63.2 | . | . | 5.3 | 4.15 ± 0.89 |
| 15- Using e-learning methods enhances the quality of learning. | 10.5 | 5.3 | 10.5 | 63.2 | 10.5 | 2.42 ± 1.12 |
| 16. E-learning is more effective than in-person methods in changing the learners' attitude | 15.8 | . | 26.3 | 47.4 | 10.5 | 2.63 ± 1.21 |
| 17. Easy access to a large amount of information provided by professors increases the quality of learning. | 10.5 | 10.5 | 36.8 | 26.3 | 15.8 | 2.73 ± 1.19 |
| 18. The implementation of virtual education requires the establishment of motivational mechanisms for teachers. | 36.8 | 47.4 | 10.5 | 5.3 | . | 4.15 ± 0.83 |
| 19. With the help of technology, it is possible to have quick and timely access to the necessary information | 42.1 | 52.6 | 5.3 | . | . | 4.36 ± 0.59 |
| 20. Creating electronic content is time-consuming. | 52.6 | 36.8 | . | 5.3 | 5.3 | 4.26 ± 1.09 |
| 21. The content is more accurate with electronic methods. | 10.5 | 36.8 | 42.1 | 5.3 | 5.3 | 3.42 ± 0.96 |
| 22. E-learning provides equal learning opportunities for all learners. | 5.3 | 47.4 | 26.3 | 21.1 | . | 3.36 ± 0.89 |
| 23. The use of this educational method is a strategic goal in the developed world. | 15.8 | 63.2 | 21.1 | . | . | 3.94 ± 0.62 |
| Total Attitude Score | 24.16 | 40.04 | 12.75 | 16.55 | 6.48 | 81.98 ± 8.17 |
| Performance | **Yes** | **neutral** | **No** | | | |
| 1. The content I created in the e-learning course was complete and covered all the material related to the curriculum. | 84.2 | 15.8 | . | | | 2.84 ± 0.37 |
| 2. The content I created was useful and effective and had the ability to convey concepts in an effective and understandable way. | 84.2 | 15.8 | . | | | 2.84 ± 0.37 |

| | | | | |
|---|---|---|---|---|
| 3. I had enough skills to create content, use the electronic system, and hold online classes. | 63.2 | 31.6 | 5.3 | 2.68 ± 0.47± |
| Total Performance Score | 77.19 | 21.05 | 1.75 | 8.36 ± 0.89± |

In Table 5 the relevant information obtained from the two open-ended questions of the questionnaire were divided into six areas.

**Table 5.** The results of the analysis of the open-ended questions questionnaire for assessing Faculty members' attitudes toward e-learning (n = 211)

| | | |
|---|---|---|
| Advantages of e-learning | A. E-learning method | • Providing a large amount of content without time and place limitations<br>• Providing equal education for a large number of students at the same time<br>• Flexibility in teaching methods<br>• Concise and efficient material<br>• Increased motivation and more interesting teaching material |
| | B) Development of skills and capacities | • Developing electronic skills and familiarity with software in education and evaluation<br>• Enhancing the use of content creation and presentation capabilities |
| | C) opportunities associated with e-learning | • Saving students' time and money<br>• Re-accessing presented content<br>• Using content in accordance with individual talent<br>• Suitable for teaching subjects that students did not face during the course.<br>• Suitable for basic medical sciences<br>• Students' participation in the electronic teaching-learning process<br>• Possibility of use in special conditions<br>• Access to national and international courses<br>• Reducing psychosocial costs associated with being away from family and hometown |
| Disadvantages of e-learning | A) Infrastructures, internet, software | •inappropriate infrastructures<br>•internet limitations<br>•insufficient equipment<br>• Lack of class facilities<br>• File size limit |

| | |
|---|---|
| B) preparation of the content | • Lack of familiarity with various electronic educational programs and lack of supervision of electronic educational content<br>• Time-consuming preparation of files<br>• Incomplete content creation like merely adding sound to files |
| C) E-learning method | • Lack of monitoring of students' activities by professors<br>• Failure to convey values to students through the hidden curriculum<br>• Failure to monitor the regular implementation of e-learning<br>• Some students' lack of access to electronic equipment<br>• Professors' incomplete teaching<br>Lack in acquiring effective social and communication skills<br>• Lack of differentiation of professors based on the quality of education provided<br>• Lack of mutual interaction and response to students' questions |

Based on the results of the Pearson correlation coefficient parametric test, the independent t-test and the one-way analysis of variance (ANOVA) were conducted, considering the normality of the data. There was a weak statistically significant relationship between the students' age and attitude score ($P = 0.039$, $r = 0.143$). Moreover, there was a statistically significant difference ($P = 0.003$) between the students' experience of using e-learning and their attitude scores. However, there was no statistically significant difference between the students' attitude score and their other demographic characteristics ($P > 0.05$). Furthermore, there was no statistically significant difference between the faculty members' demographic variables and their attitude and performance score ($P > 0.05$). (Table 6)

**Table 6.** The univariable analysis for students (n = 211) and faculty members' (n = 19) attitude questionnaires

| Variable | Mean ± SD or No (%) | p* | Variable | Mean ± SD or No (%) | p* |
|---|---|---|---|---|---|
| Students information | | | Employee | | 0.394 |
| Age | | | Yes | 39 (18.5) | |
| | | 0.039 | No | 172 (81.5) | |
| Grade Point Average | 23.15 ± 3.31 | 0.913 | Experience Using the E-learning portal | | 0.003 |
| Gender | 16.68 ± 1.43 | 0.113 | | | |
| Female | | | Yes | 65 (30.80 | |
| Male | 128 (60.7) | 0.080 | No | 146 (69.2) | 0.672 |

| | | | | | |
|---|---|---|---|---|---|
| Semester | 83 (39.3) | | Means of participating with e-learning | | |
| 6 | | | | | 0.362 |
| 7 | 91 (43.1) | | Mobile | | 0.217 |
| 8 | 47 (22.3) | 0.174 | Laptop | 124 (58.8) | 0.789 |
| Family income | 73 (34.6) | | Tablet | 75 (35.5) | |
| Not enouph | | | Personal computer | 3 (1.4) | 0.517 |
| Enouph | 15 (7.1) | 0.560 | Faculty member information | | |
| More than enouph | 186 (88.2) | | | | |
| Major | 10 (4.7) | | Age of faculty members | 9 (4.3) | |
| Nursing | | 0.063 | Workexperience | 47.73±7.75 | |
| Midwifery | 179 (84.8) | | Gender of faculty members | 20.02±9.46 | 0.165 |
| School | 32 (15.2) | | | | |
| Rasht | | 0.213 | Men | | |
| Langrud | 167 (79.1) | | Female | 6(31.6) | |
| Address | 44 (20.9) | | Department of faculty members | 13 (68.4) | |
| Rasht | | 0.254 | | | |
| Guilan (except rasht) | 98 (46.4) | | Nursing | | |
| Other province | 77 (36.5) | | Midwifery | 12 (63.2) | |
| type of residence | 36 (17.1) | 0.198 | Other | 3 (15.8) | |
| With family | | | Education of faculty members | 4 (21.1) | |
| Student house | 107 (50.7) | | | 0 (0.0) | |
| Dorm | 33 (15.6) | | Bachelor's degree | 3 (15.8) | |
| Marrage | 71 (33.6) | | Master | 16 (84.2) | |
| Single | | | Phd | | |
| Marred | 191 (90.5) | | | | |
| | 20 (9.5) | | | | |

Considering the fact that e-learning had not been widely used in universities of medical sciences before the COVID-19 and the novelty of using this type of learning, it is necessary to investigate the possibility of its further use as a complementary method.

According to students and faculty members, the possibility of re-accessing learning materials, increase in self-efficacy, time and cost management, easy access, equal access to education, development of electronic and study skills, and familiarity with new educational methods and

software were the most significant advantages of e-learning. These results were in line with the results of other studies.

According to the results of the present study, non-clinical and basic medical sciences tended to be the most suitable courses to be delivered online. Yazdani Nejad argued that this method is only suitable for theoretical courses (Yazdaninejad *et al.*, 2020).

Furthermore, the findings of the present study revealed that both the students' and faculty members' skills in using e-learning methods needed to be improved. According to Lalita, using this method requires professors to be more proficient and to acquire more skills (Lalita, 2011). Our investigations indicated that there were limited or no training courses during the pandemic to make these individuals familiar with the method. This issue can be easily resolved by establishing training workshops. It was also found that the students were not satisfied with the use of PowerPoint slides as the only tool for presenting educational material and believed that it reduced the quality of education. Additionally, in the study conducted by Yazdani Nejad, the quality of the uploaded content was not satisfying from the students' point of view. Therefore, it is crucial that experts in creating educational content and using new technologies help faculty members increase their skills (Ayoub *et al.*, 2020). Other drawbacks of using this method in the present study included a lack of proper support and problems related to tests and planning, which were emphasized in other studies (Onyema *et al.*, 2020). Accordingly, providing training courses and having a professional support team familiar with e-learning to solve problems and respond to students and faculty members before and during the implementation of this method can alleviate the mentioned challenges.

The emotional and cultural issues raised included increased motivation, interaction, and self-confidence. Furthermore, students believed that this method could cause further occupational issues due to shortcomings such as not addressing students' questions, lack of access to the library, and lack of understanding of the topics discussed. Sood and Onyema also confirmed the association between these issues and e-learning. However, using e-learning as a complementary method can reduce its disadvantages (Doshmangir *et al.*, 2020; Mosalanezhad *et al.*, 2021).

The results revealed that the most significant difficulties associated with e-learning were related to internet connections and existing infrastructures, which disrupted proper access to the systems and the creation of quality content. Jafari and Moslinejad also confirm the existence of these issues in other universities. Moreover, in their study investigating e-learning in India during the COVID-19 pandemic, Singh argued that the process of knowledge transfer has hugely changed the development of technology and has affected all aspects of society. They also considered the need for a higher level of technology infrastructure and more teacher training to be the most significant challenges of using this method (Saini *et al.*, 2021). Allocating more funds and giving more consideration on the part of universities as well as higher levels of management and planning seem to have the potential to resolve the mentioned drawbacks.

Considering the aim of the present study, more than half of the students and a higher percentage of professors agreed with the continued use of e-learning.

Mohideen concluded that a significant disruption has occurred in medical education and clinical learning and argued that the clinical experience of working in different departments and

interaction in the form of small groups are not easily replaceable. Mohideen also argued that the major challenge is to have an innovative program for medical education to guarantee scientific competence as well as provide continuous learning (Mohideen, 2020) As a result of the e-Learning revolution, universities must create e-learning materials to improve their students' learning experience, knowledge, and skills. It is necessary for universities around the world to learn from this experience and prioritize planning for e-learning in the future.

## CONCLUSION

Consequently, it is necessary to conduct more investigations regarding the strengths and weaknesses of e-learning and the factors that facilitate its improvement. According to the results, having a lesson plan to clarify the teaching process and the evaluation method, conducting evaluations in accordance with the level of teaching, having access to professors to ask questions, having access to fast internet, providing courses and contents similar to in-person classes, scheduling classes during office hours, and proving simulation-based learning for a more dynamic education and creating motivation are essential factors in improving the quality of e-learning and, subsequently, increasing learners' satisfaction.

This study also has some limitations that need to be considered. This educational method was implemented during the Corona virus, which was accompanied by urgency and coercion, and no previous preparation and training for fully electronic education was provided to students and professors, which can have negative effects on the quality of the implementation of this method.

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## References

Biswas, A., Bhattacharjee, U., Chakrabarti, A. K., Tewari, D. N., Banu, H., & Dutta, S. (2020). Emergence of Novel Coronavirus and COVID-19: whether to stay or die out?. *Critical reviews in microbiology*, *46*(2), 182-193.

Fathi Vajarkhah, K., Hassan Pardakhtchi, M., Rabie, M. (2011). Evaluating the Effectiveness of Virtual Education Courses in Iran's Higher Education System (Case Study: Ferdowsi University of Mashhad). *Journal of Information Communication Technology in Educational Sciences*, 1(4), 5-21.

Mirzaei, M., Ahmadipour, F., & Azizian, F. (2012). Viewpoints of students of Shahid Sadoughi University of Medical Sciences towards e-Learning in teaching clinical biochemistry. *The Journal of Medical Education and Development*, *7*(2), 67-74.

Suppan, L., Abbas, M., Stuby, L., Cottet, P., Larribau, R., Golay, E., ... & Suppan, M. (2020). Effect of an e-learning module on personal protective equipment proficiency among prehospital personnel: web-based randomized controlled trial. *Journal of medical Internet research*, *22*(8), e21265.

Gharib, M., & Hosseini, S. A. (2020). One semester of occupational therapy passed virtually: What experiences did we learn from COVID-19?. *Journal of Mazandaran University of Medical Sciences*, *30*(190), 178-179.

Doshmangir, L., Ahari, A. M., Qolipour, K., Azami, S., Kalankesh, L., Doshmangir, P., ... & Khodayari-Zarnaq, R. (2019). East Asia's strategies for effective response to COVID-19: Lessons learned for Iran. *Quarterly Journal of Management Strategies in Health System.*, 4(4), 370-3.

Mosalanezhad, L., Atashpoor, S., & Kalani, N. (2021). What do medical students want to learn in the Corona Crisis Curriculum? Expressing Students' Expectations and Strategies. *Education and Ethics in Nursing*, *10*(1-2), 4-11.

Yazdaninejad, H., Eslami, K., Arjmand, R., Shakerian, N., Tork Shirazi, N., Abuali, R., & Barg Bidvandi, M. (2020). Evaluation of e-learning in the Covid 19 epidemic crisis and the prospect of its complementary use in the post-crisis period from the perspective of medical students. *Educational Development of Judishapur*, *11*(3), 554-571.

Taghiyar, F., Siadati, M., & Oruji, F. (2009). Evaluating the Efficiency of Jackson Model in the Learning of the Learners in an Adaptive Learning System. *Technology of Education Journal (TEJ)*, *3*(4), 235-246.

Saberi, A., Kazempour, E., & Porkar, A. (2018). Feasibility of utilizing virtual education from the viewpoints of professors, students and information technology staff (IT) in Guilan University of Medical Sciences. *Research in Medical Education*, *10*(1), 29-21.

Rajasingham, L. (2011). New Challenges Facing Universities in the Internet-Driven Global Environment. *European journal of open, Distance and E-learning*.

Ayoub, F., Moussa, M., Papatsoris, A. G., Abou Chakra, M., Chahine, N. B., & Fares, Y. (2020). The online learning in medical education: A novel challenge in the era of COVID-19 pandemic. *Hellenic Urology*, *32*(2), 89-96.

Onyema, E. M., Eucheria, N. C., Obafemi, F. A., Sen, S., Atonye, F. G., Sharma, A., & Alsayed, A. O. (2020). Impact of Coronavirus pandemic on education. *Journal of education and practice*, *11*(13), 108-121.

Saini MK, Shelly BJ, Singh A. A Cross Sectional Study "Impact of Corona Virus Pandemic on Nursing Education: A Paradigm Shifting or Sustaining the Roots? . (2021). *Indian Journal of Forensic Medicine & Toxicology*, *15*(2), 336-346.

Mohideen, M. R. (2020). Engaging Medical Students During Covid-19–Challenges and Novel Opportunities for Clinical Training. *South-East Asian Journal of Medical Education*, *14*(2), 23.