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Original Article

Predictor role of fear of COVID-19, e-learning readiness and motivational beliefs on student's satisfaction of virtual education in surgical and trauma wards during the COVID-19 pandemic

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Abstract

Introduction: The prevalence of COVID-19 in the world and the long closure of universities necessitate attention to virtual education, e-learning readiness, and student satisfaction.

Methods: The present study is a descriptive-analytical study of structural equations that was performed on 216 students studying at Alborz University of Medical Sciences during the COVID-19 pandemic. The multi-stage sampling method was determined in the first stage of the schools and the second stage sampling was done randomly. Data were collected by electronic questionnaires of fear of COVID-19, e-learning readiness, motivational belief, and student satisfaction. Data were analyzed by using SPSS and LISREL 8.8 software. Statistical significance was (P-value< 0.05).

Results: The results of study showed fear of COVID-19 had a significant and positive effect on student satisfaction (β = 0.22, P=0.001). Motivational belief also had a significant and positive effect on e-learning readiness (β = 0.76, P=0.001) and also, e-learning readiness had a significant and positive effect on student satisfaction (β = 0.51, P=0.001).

Conclusion: Despite the student's dissatisfaction with the virtual education system, the fear of COVID-19 increases their satisfaction with virtual education, so providing the necessary protocol for virtual education in times of crisis and natural disasters increases students' satisfaction with virtual education.

Keywords: Fear, E-learning Readiness, Motivational Beliefs, Satisfaction, Virtual Education

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Introduction

The COVID-19 virus, which has been known in Wuhan, China since late 2019, has infected almost all countries of the world. In addition to endangering the physical health of humans, the coronavirus imposes irreversible psychological effects on mental health (1). Fear of coronavirus outbreaks has had a profound effect on people's behavior. Conferences and training classes are held virtually (2). In addition to the economic problems, the negative impact of the COVID-19 crisis on education was very severe and unpredictable, and many educations were closed and changed from face-to-face and group discussions to virtual education (3). Limiting the educational process during a pandemic that requires personal distance, long periods of separation, and social commitment to avoid spreading the disease should be considered in the resident's programs (4). Higher education faced difficult conditions due to the spread of the Coronavirus. China was the first country whose government ordered the closure of schools and universities to reduce and combat the outbreak of the disease, and in Iran, it ordered the closure of universities and colleges in late February 2020. Therefore, in times of crisis, the need to pay attention to virtual and e-learning is necessary more than ever (5). Doctors from different medical fields were affected in a different way. The specialties like internal medicine, anesthesia and intensive care medicine were the usual frontline workers to manage the COVID-19 patients in the initial stage. But with the passage of time and increasing number of COVID-19 patient count, doctors from other branches had to step in and surgery was no exception (6). Out-patient services along with elective surgical procedures were rescheduled, ultimately decreasing patient influx to hospitals. The COVID-19 pandemic has significantly affected the personal and professional life of surgical residents. There is a reduction in specialty education for residents, including case presentations. Some residents have started using online platforms to gain skills like attending online classes and webinars, they have been redeployed in COVID care wards and this calls for major steps to be taken to evolve the traditional teaching methods into modern ones (7).

In the pandemic COVID-19, e-learning is the best way to educate because this type of education has been growing for years and provides a new opportunity for teachers, students, professors, educational planners, and educational institutions (8). For the successful implementation of virtual systems in universities, the attitude of students as the main users of this system is very important. On the other hand, if virtual education is chosen as an educational strategy, there is a need to ensure learners' readiness and attitude towards it (9). The determinants of acceptance and application of virtual education need to be identified to achieve the development of this learning system. Motivation, attitude, and understanding of web-based learning have been important factors in e-learning programs (10). Cognitive skills and motivational beliefs in virtual learning are important and effective on students' academic performance, this type of education is student-centered, and students who are more motivated and use a better cognitive approach will be more likely to achieve academic achievement (11). Changes in social relations and emergency virtual education are approaches in response to the pandemic. According to the World Health Organization, the best protocols were to reduce face-to-face classes and use the online system (12). This study aimed to investigate the effect of coronavirus, eLearning readiness, and motivational beliefs on student satisfaction with virtual education based on the following conceptual model.

The hypotheses of the present study were:

H1:Fear of COVID-19 effects on motivational belief.

H2:Fear of COVID-19 effects on e-learning readiness.

H3:Fear of COVID-19 effects on student's satisfaction.

H4:motivational belief effects on e-learning readiness.

H5:E-learning readiness effects on surgical student's satisfaction.

H6: motivational belief effects on surgical student's satisfaction Figure1.

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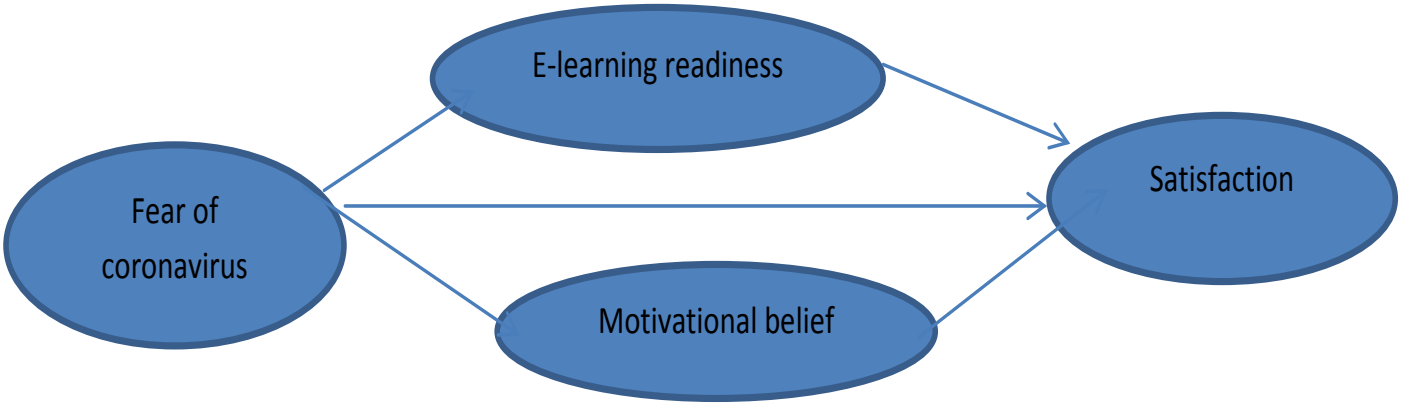


Figure 1. Conceptual Model

Material and Methods

The present study is a descriptive-analytical study of the structural equations model that was performed on 216 students studying at Alborz University of Medical Sciences. The inclusion criteria were:

1-passing at least three units of theory course virtually from February 2020 until September 2020.

Exclusion criteria were:

1. Students who have viewed the uploaded courses.
2. Guest students from other universities.

The sampling method was done in the first stage in a stratified sampling and in the second stage based on the total number of students (1200 students studying), certain ratios of each school are selected randomly. Questionnaire links were competed electronically (Google Form) through social networks and e-mail. Data were transferred from Excel software to SPSS21 and Lisrel 8.8 software was used for analysis.

The sample size is estimated according to Munro's study, the total number of questions in the questionnaire was sixty-one, and three samples were taken for each question (except for questions related to demographic information). Taking into account the 10% dropped out of samples, 203 students were obtained for the sample size (13). In the current study, four types of questionnaires were applied.

A) E-learning readiness: Watkins et al questionnaire was used to assess the e-learning readiness variable. It consists of six parts measuring the technology availability, online communication skills, motivation, and ability to learn through the media, online group chats, and important issues for e-learning success. This questionnaire includes 26 questions answered in form of a 5-point Likert scale ranging from strongly disagrees to strongly agree. Watkins et al have reported a good validity and reliability coefficient for this questionnaire (14).

B)Motivational belief questionnaire: The motivational beliefs questionnaire is a valid and reliable questionnaire used for the evaluation of the students' motivational beliefs. This questionnaire is designed by Pentrich et al. Motivational belief consisting of 25 items was used, in which results are scored using 5 -point Likert scale. Pintrich et al have reported a Cronbach's alpha of 0.79 for this subscale (15).

C) Fear of COVID-19 scale (FCV-19S): Fear of the COVID-19 Scale (FCV-19S) consists of 7 items measuring the emotional fear reactions toward the COVID-19 pandemic, and its scoring is on a five-point Likert-type scale from 1 to 5. The sum of the scores of these items shows a higher level of fear (7–35). Designing and testing the validity and reliability of this tool were done by Ahorsu et al. (16)

D) Student's satisfaction: To assess the students' satisfaction with virtual education, a valid and reliable questionnaire was used, which was designed to assess students' satisfaction with the learning management system, and students' satisfaction was measured as a four Likert point. The validity and reliability of the questionnaire were determined by content validity. Confirmatory factor analysis was identified and none of the questions were removed from the questionnaire. Also, the reliability of the questionnaire

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was determined by Cronbach's coefficient (0.83). Test re-test was used for external reliability items and the Interclass correlation coefficient (ICC) was 0.7.

We used SPSS (Version 21) to calculate the mean and standard deviation, and also skewness and kurtosis index was applied to identify the normality of the data And then we used LISREL (Version 8.8) which is covariance-based structural equation modeling (SEM) to assessed measurement and structural models of e-learning readiness, motivational belief, Fear of COVID -19, and student satisfaction variables.

The study protocol was approved by the Ethics Committee of Virtua University of Medical Sciences with code (IR.VUMS.REC.1400.003).

The researcher explained the purposes of the study to all participants and electronic written informed consent was obtained from them. The researcher assures participants that the Information collected from them is kept confidential.

Results

In this study, skewness and kurtosis ration were between (-2, +2) for all variables and all of them were distributed normal.63.6% of the participants were female and 46% were medical students.

28.2% of the participants were in the first semester and 22.6% were in the fourth semester Table1. 5.1% of the participants were married, 61.6% of students were at a good socio-economic level. The mean and standard deviation of fear of COVID-19, e-learning readiness, motivational beliefs, and virtual education satisfaction total score are mentioned in Table 1.

After performing confirmatory factor analysis, the conceptual model fit was determined. Modified model fit indices are presented in Table 2.

Table 1: Demographic characteristic of students

	Variables	N (%)
Gender	boy	79(0.36)
	Girl	138(0.63)
Field of study	Medical	100(0.46)
	Midwifery	32(0.10)
	Nursing	74(0.33)
Semester	1	61(0.28)
	2	41(0.19)
	3	28(0.13)
	4	49(0.22)
	5	7(0.03)
	6	15(0.06)
	7	3(0.013)
	8	5(0.023)
	9	7(0.032)

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Table 2: Mean and standard deviation of Latent variables

Latent variables	Mean ± SD
fear of COVID-19	15.5±5.3
e-learning readiness	82.6±15.9
motivational beliefs	86.2±11.6
Virtual education satisfaction	7.4±3.2

One hundred twenty students had moderate anxiety. The average score of the total preparation for electronic learning and all the fields of the students is more than average.

The average score of the total preparation for electronic learning and all the fields of the students is more than average.

The average believability score was 86.2. After performing confirmatory factor analysis, the conceptual model fit was determined. Modified model fit indices are presented in Table 3.

The modified measurement model showed an acceptable fit. Path coefficients of the modified model are presented in Table 4 and Figure 2.

The results of the structural model showed no significant effects of Fear of COVID-19 on the student's motivational belief. The result of the structural model revealed no significant effects of fear of COVID-19 on e-learning readiness.

The results of the structural model showed that Fear of COVID-19 had a significant direct positive effect on student's satisfaction with virtual education (β = 0.22). The results of the structural model showed that motivational belief had a significant direct positive effect on student's e-learning readiness (β=0.76). The results of the structural model showed that E-learning readiness had a significant direct positive effect on student's satisfaction with virtual education (β = 0.51). The results of the structural model showed that no significant effects of motivational belief on student's satisfaction with virtual education (Table 4 and Figure 2).

Table 3: Modified model fit indices

Fit Indices	Allowable amount	The obtained value
chi-square/ degrees of freedom (df)	lower than 3	2.45
RMSEA	Lower than0.8	0.07
GFI	Greater than 0.8	0.85
AGFI	Greater than 0.8	0.82

Table 4: Coefficients of the model in standard and non-standard models

Variables	path coefficient	T-value	P-value
Fear of COVID19-------->Motivational belief	0.09	-1.04	-0.03
Fear of COVID19-------->E-learning readiness	-0.08	-1.32	-0.01
Fear of COVID19-------> Students satisfaction	0.22	3.35	0.001
Motivational belief------> E-learning readiness	0.76	4.37	0.001
E-learning readiness----> Students satisfaction	0.51	3.84	0.001
Motivational belief------> Students satisfaction	0.22	1.94	0.1

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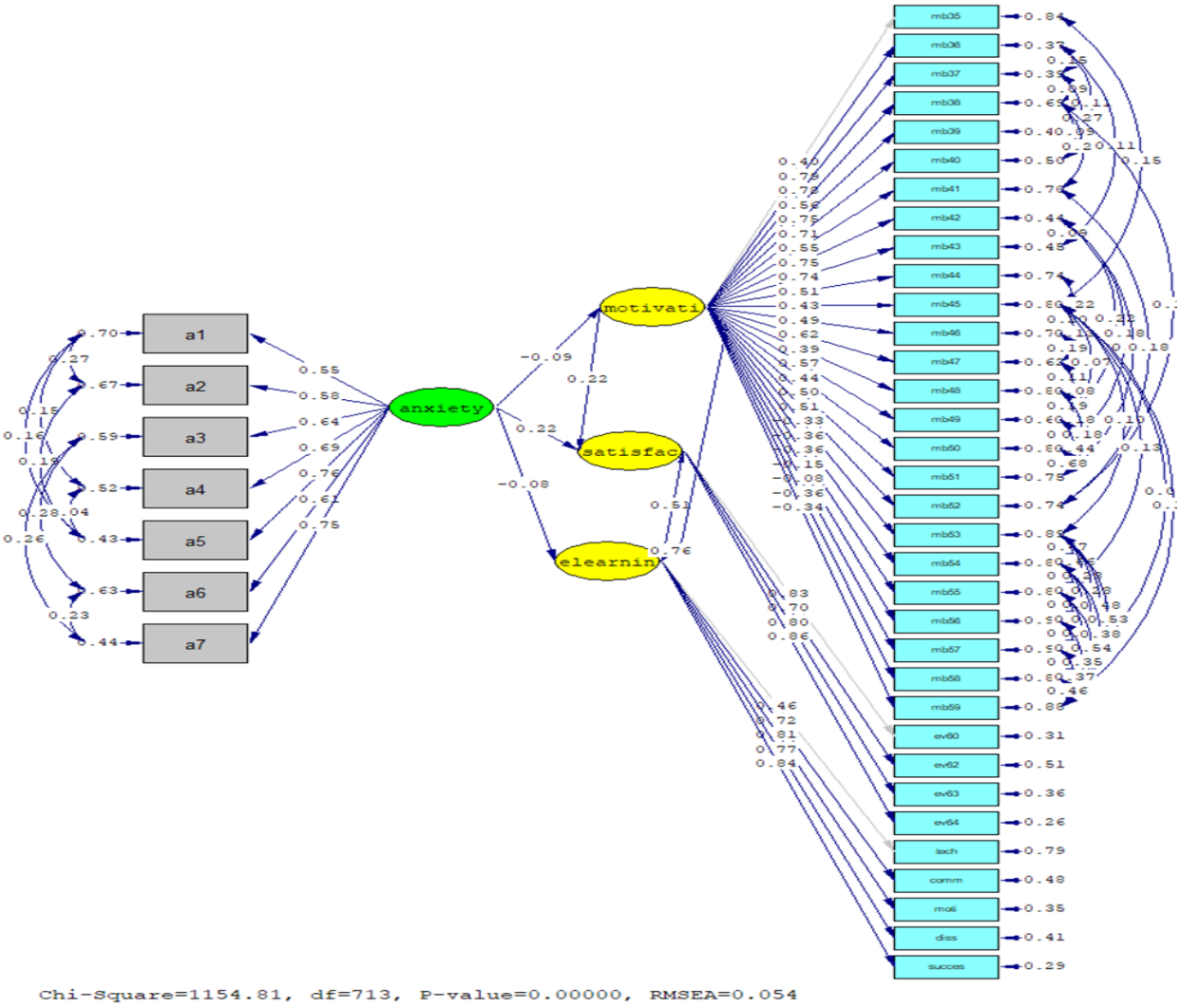


Figure 2. standardized path coefficients of the structural model

Based on the value of the variance determined, three variables Fear of COVID-19, Motivational belief, E-learning readiness could predict 49% of student's satisfaction with virtual education.

Discussion

The results of the present study showed that 55.6% of students had moderate levels of anxiety and 1.4% had severe anxiety. The COVID-19 pandemic had changed the university education system and posed many challenges to students who are principal members of the education system, which affected both their mental health and their education competency (5). The result of a study in the United States showed that the COVID19 pandemic negatively affected the well-being of medical students (17).

The mean and standard deviation of the total score of e-learning and all domains was higher than the average level. The results of a study in Turkey show that human resources should be a priority in the development of e-learning education (18).

The results of a study by Ciron et al 2020 showed that students' intention to use e-learning is influenced by several variables including perceived pleasure, student experiences, computer use anxiety, and perceived self-efficacy, as well can indicate students' intention to use e-learning (19).

The result of the study showed mean and standard deviation of motivational belief was 86, which was a good level. Motivational belief has a significant effect on learner's attitudes and learning behavior in educational environments (20).

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The results of the study showed that 65.3% of students were dissatisfied with virtual education. Results of the study showed that students are not satisfied with virtual education and one of the most important factors affecting student satisfaction is the virtual construct, the most important of which is the quality of the Internet, this index has not reached the desired level (21).

The results of the present study showed that fear of COVID-19 had no significant effect on motivational belief. Cassady et al showed that the anxiety of and motivational belief did not have a significant relationship he results of the present study were consistent with Cassady 's study (20). Also, the study of Chapel et al showed a significant and inverse relationship between exam anxiety and motivational belief (22). The results of the study showed that fear of COVID-19 did not affect e-learning readiness. A study showed that virtual education requires special necessity. On the other hand, some policymakers have considered COVID-19 to be an opportunity. And also the view of the COVID-19 in education is corrective that could have a positive effect on virtual education (23).

The results of a study in 2020 showed that online learning has increased depressive disorders, anxiety among students and there is a significant relationship between student satisfaction and the prevalence of anxiety, stress, and depression (24).The results of a study also showed that e-learning readiness has a positive effect on students' psychological distress and fear of losing academic years is a principal factor for mental health problems during the COVID-19 pandemic (25). The results of the study showed that fear of COVID-19 had a significant effect on students' satisfaction with virtual education. That is if fear changes by 1 unit, student satisfaction changes by 0.22 units and in the same direction. In a study of 1207 students in Pakistan, the results showed that the majority of students were dissatisfied with virtual education and its management by the university. First-year students were dissatisfied with the effectiveness of online classes and the least interaction between professor and students are mentioned in virtual education (26).

The results of the study showed that motivational belief has a significant effect on e-learning readiness. That is if the motivation changes by 1 unit, the e-learning readiness changes by 0.76 units and in the same direction. In one study, the direct effect of positive motivational beliefs on e-learning readiness was shown to be statistically significant (27). This finding is consistent with the results of studies by Demir and Horzum and Yilmaz (28, 29).

The results of the study showed that e-learning readiness affects students 'satisfaction, if e-learning readiness changes by 1 unit, students' satisfaction changes by 0.51 units and in the same direction. In a study in Indonesia, it was shown that there is a positive relationship between students' satisfaction quality of e-learning portal, and also user satisfaction was significantly related to the quality of educational content and Internet service (30).

Results of the study showed the direct effect of COVID 19 on student satisfaction of virtual education. Baber in a study showed instructor attitude, competency, student motivation and perceived usefulness and perceived ease of use effect on intention to use e-learning and its acceptance by students during pandemic of COVID-19.

A perceived severity of COVID-19 has a significant influence on the intention to use e-learning during the pandemic (31). Results of the study showed the direct effect of COVID 19, e-learning readiness, and motivational beliefs on student satisfaction, the results showed that these three variables predicted 49% of student satisfaction.

This result can be due to the crisis and emergency conditions that exist as a result of the pandemic so that it is suggested to identify more variables to explain students' satisfaction with virtual education in normal conditions.

Conclusion

Results of the study showed that despite the dissatisfaction with virtual education, fear of COVID-19 increases the satisfaction with virtual education, so providing the appropriate protocol for e-learning during a crisis and catastrophic disasters is necessary. E-learning readiness had an impact

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on student satisfaction, it can suggest that students' e-learning readiness screened before virtual education and students that had a problem being identified and supported. Improving communication skills and increasing students' feasibility to technology, and also increasing the e-learning readiness of others including professors and staff of universities can affect the quality of electronic educational content. And also improve student satisfaction with virtual education.

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Conflicts of Interest

None declared.

References

1. Choi EPH, Hui BPH, Wan EYFJIjoer, health p. Depression and anxiety in Hong Kong during COVID-19. 2020;17(10):3740.
2. Daniel JJP. Education and the COVID-19 pandemic. Prospects. 2020;49(1):91-96.
3. Calhoun KE, Yale LA, Whipple ME, Allen SM, Wood DE, Tatum RPJTAJoS. The impact of COVID-19 on medical student surgical education: implementing extreme pandemic response measures in a widely distributed surgical clerkship experience. 2020;220(1):44-47.
4. Hellewell J, Abbott S, Gimma A, Bosse NI, Jarvis CI, Russell TW, et al. Feasibility of controlling COVID-19 outbreaks by isolation of cases and contacts. 2020;8(4):488-496.
5. Salimi S, Fardin MAJRiS. The role of corona virus in virtual education, with an emphasis on opportunities and challenges. Learning V. 2020; 8(2):49-60. (Persian)
6. Upadhyaya GK, Jain VK, Iyengar KP, Patralekh MK, Vaish A. Impact of COVID-19 on post-graduate orthopaedic training in Delhi-NCR. J Clin Orthop Trauma. 2020;11(5):687-695.
7. Moldovan, F.; Gligor, A. Moldovan, L.; Bataga, T. The Impact of the COVID-19 Pandemic on the Orthopedic Residents: A PanRomanian Survey. Int J Environ. Res. Public Health 2022;(19):9176.
8. Mayadas AF, Bourne J, Bacsich P. Online education today. Science. 2009;323(5910):85-89.
9. Seraji F, Attaran M, Azizi SM. Blended learning researches in Iran: several fundamental criticisms. Digital Education Review. 2019(36):190-206.
10. Nichols M. Student perceptions of support services and the influence of targeted interventions on retention in distance education. Distance education. 2010;31(1):93-113.
11. Porasghar N, Kiamanesh A, Sarmadi M. The prediction model of academic performance of students of distance education based on individual variables self-regulation strategies and motivational beliefs. Research in School and Virtual Learning. 1970;4(14):7-22.
12. Murphy MP. COVID-19 and emergency eLearning: Consequences of the securitization of higher education for post-pandemic pedagogy. Contemp Secur Policy. 2020;41(3):492-505.
13. Munro BH. Statistical methods for health care research: lippincott williams & wilkins; 2005.
14. Watkins R, Leigh D, Triner D. Assessing readiness for e-learning. Performance Improvement Quarterly. 2004;17(4):66-79.
15. Pintrich PR. A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ). 1991.
16. Ahorsu DK, Lin C-Y, Imani V, Saffari M, Griffiths MD, Pakpour AHJIjomh, et al. The fear of COVID-19 scale: development and initial validation. Int J Ment Health Addict. 2020:1-9
17. Sanghavi PB, Au Yeung K, Sosa CE, Veesenmeyer AF, Limon JA, Vijayan VJJome, et al. Effect of the coronavirus disease 2019 (COVID-19) pandemic on pediatric resident well-being. J Med Educ Curric Dev. 2020;(7):1-5.
18. Aydın CH, Tasci DJJoET, Society. Measuring readiness for e-learning: Reflections from an emerging country. J Educ Techno Soc. 2005;8(4):244-257.
19. Siron Y, Wibowo A, Narmaditya BSJJJoT,

[Downloaded from jsurgery.bums.ac.ir on 2026-11-10]

[DOI: 10.61186/jsurgtrauma.11.2.66]

Education S. Factors affecting the adoption of e-learning in Indonesia: Lesson from Covid-19. JOTSE. 2020; 10(2):282-295.
20. Fairchild AJ, Horst SJ, Finney SJ, Barron KE. Evaluating existing and new validity evidence for the Academic Motivation Scale. Contemp Educ Psychol. 2005;30 (3):331-58.
21. Ali A, Bhasin J. A Model of Information System Interventions for e-Learning: An Empirical Analysis of Information System Interventions in e-Learner Perceived Satisfaction. Springer;2020;597:909-920.
22. Cassady JC. The influence of cognitive test anxiety across the learning–testing cycle. Learning and instruction. 2004;14(6):569-592.
23. Chapell MS, Blanding ZB, Silverstein ME, Takahashi M, Newman B, Gubi A, et al. Test anxiety and academic performance in undergraduate and graduate students. J Educ Psychol.2005;97(2):268-274.
24. Fawaz M, Samaha A, Editors. E-learning: Depression, anxiety, and stress symptomatology among Lebanese university students during COVID-19 quarantine. Nursing Forum Wiley Online Library; 2021.
25. Hasan N, Bao YJC, Review YS. Impact of "e-Learning crack-up" perception on psychological distress among college students during COVID-19 pandemic: A mediating role of "fear of academic year loss". 2020;(118).
26. Sarwar H, Akhtar H, Naeem MM, Khan JA, Waraich K, Shabbir S, et al. Self-reported effectiveness of e-Learning classes during COVID-19 pandemic: A nation-wide survey of Pakistani undergraduate dentistry students. Eur J Dent. 2020; 14(1):34-43.
27. Vahedi MJESiMS. The Effect of E-Learning Readiness on Self-Regulated Learning Strategies and Students' Behavioral Tendency to Web-based Learning: The Mediating Role of Motivational Beliefs. Educ Strategy Med Sci. 2020;13(2):133-142. (Persin)
28. Demir Kaymak Z, Horzum MB. Relationship between online learning readiness and structure and interaction of online learning students. Educational Sciences: Theory and Practice. 2013;13(3):1792-1797.
29. Yilmaz RJCiHB. Exploring the role of e-learning readiness on student satisfaction and motivation in flipped classroom. Comput Human Behav. 2017;(70):251-260.
30. Shahzad A, Hassan R, Aremu AY, Hussain A, Lodhi RNJQ, quantity. Effects of COVID-19 in E-learning on higher education institution students: the group comparison between male and female. Qual Quant. 2020:805-826.
31. Baber HJTIJoME. Modelling the acceptance of e-learning during the pandemic of COVID-19-A study of South Korea. 2021;19(2):100503.

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[DOI: 10.61186/jsurgtrauma.11.2.66]