

The association between online self-regulated learning and E-learning acceptance among medical sciences students during the COVID-19 pandemic

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Abstract

Context: Self-regulated learning is a process by which learners choose goals for themselves and then try to regulate, control and manage their cognition, motivation, and behavior. The COVID-19 pandemic faced students to numerous educational challenges. Rapid transition of the traditional classroom to the virtual environment affected E-learning acceptance of the students in the age of the COVID-19 pandemic.

Aim: The present study aimed to determine the relationship between online self-regulated learning and E-learning acceptance among Mazandaran University of medical sciences during the COVID-19 pandemic.

Settings and Design: This descriptive-analytical study was conducted on 234 Mazandaran University of medical sciences students.

Materials and Methods: The nonprobability quota sampling method was used for data collection. Inclusion criterion was experience E-learning at least one semester in the age of COVID-19 pandemic. Internship medical sciences students were excluded. The online questionnaire consisted of three parts: Sociodemographic questionnaire, online self-regulated learning and E-learning acceptance.

Statistical Analysis Used: Descriptive statistics, one-way ANOVA, Pearson test, and univariate and multivariate linear regression model were utilized.

Results: According to the univariate linear regression model, E-learning acceptance explored 19.8% variance of the online self-regulated learning. The multivariate linear regression showed age, gender, marital status, medical students, another job and E-learning acceptance explored 47.1% variance of the online self-regulated learning.

Conclusion: The results showed that E-learning acceptance was correlated with online self-regulated learning. The faculty members and university managers can use strategies to enhance the E-learning acceptance to improve online self-regulated learning and facilitate barriers in the age of mandatory online learning.

Keywords: COVID-19 pandemic, E-learning, Acceptance, Learning, Medical, Self-regulation, Student, Virtual

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INTRODUCTION

The increasing development of the internet technology has made E-learning to one of the most common educational approach recently.^[1] E-learning creates an effective and flexible learning environment and enhances learners' cognitive abilities, and also helps educators create interactive learning environments that foster creativity and learning.^[2]

A concept in contemporary cognitive psychology is self-regulated learning. Self-regulated learning is an active and organized process by which learners choose goals for themselves and then try to regulate, control and manage their cognition, motivation, and behavior.^[3] Self-regulated plays an important role in the learning processes and outcomes. Researchers have found that high-achieving learners are often self-regulated learners. Today, learners prefer to use a learning system that improves their interaction in the learning process.^[4,5] The goal of medical universities is to train graduates who can adjust their learning. Given that these skills are expected to be useful for more effective learning, determining whether these skills are related to academic performance is of particular importance.^[6] The results of the study showed online self-regulated learning could influence the learning attitude and course completion in online learning situation.^[7] The results of the previous studies on nursing students showed they had moderate level of the online self-regulated learning.^[5,8] However, it was higher in medical students during the COVID-19 pandemic.^[9,10] Previous study showed many of the learners do not complete the E-learning courses.^[11] The successful E-learning approach depends on several factors including acceptance of students.^[12] Although, the internet is universal, but different factors affect the E-learning acceptance.^[13] Rapid transition of the traditional classroom to the virtual environment affected E-learning acceptance of the students rapid transition of the traditional classroom to the virtual environment affected E-learning acceptance of the students.^[14] The results of the study in South Korea showed that COVID-19 pandemic altered the E-learning acceptance of the management program students.^[15] Only one study assessed E-learning acceptance and self-regulated learning during the COVID-19 pandemic in online English course in China.^[16]

The COVID-19 pandemic faced students to numerous educational challenges. Despite the challenges faced by students and the importance of accepting E-learning in an era when E-learning is no longer optional and students have to accept it and also considering whether students have been able to adapt to these conditions, the present

study aimed to determine the relationship between online self-regulated learning and E-learning acceptance among Mazandaran university of medical sciences students during the COVID-19 pandemic.

MATERIALS AND METHODS

This descriptive-analytical study was conducted on Mazandaran University of medical sciences students 1 year after beginning the COVID-19 pandemic in Iran, September to November 2021. The nonprobability quota sampling method was used for data collection. Inclusion criterion was experience E-learning at least one semester in the age of COVID-19 pandemic. Internship medical sciences students were excluded. The sample size was calculated 234 students according to the results of the study entitled Students' acceptance and readiness for E-learning in Northeastern Thailand ($r = 0.28$)^[17] and $d = 0.12$, $\alpha = 0.05$. During the sampling, the ratio of students in each faculty considered.

The online questionnaire consisted of three parts: Sociodemographic questionnaire, online self-regulated learning, and E-learning acceptance. The sociodemographic questionnaire included age, gender, marital status, faculty, semester, experience online E-learning, internet availability, job, and the daily time of internet using. The second part was online self-regulated learning questionnaire. This 5-point Likert scale was design by Barnard *et al.* and included 24 questions in 6 subscales: Goal setting (questions 1–5), environment structuring (questions 6–9), task strategies (questions 10–13) time management (questions 14–16) help seeking (questions 17–20), and self-evaluation (21–24). Barnard *et al.* reported the total reliability of this questionnaire 0.90.^[18] In Iranian study on postgraduate students, it was 0.94.^[19] The third questionnaire was E-learning acceptance scale. This scale was design by Poon *et al.* in 2004.^[20] Then, it was used by Yiong *et al.* among Malaysian students.^[21] The E-learning acceptance scale is scored based on a 5-point Likert scale and included 49 items. The Persian psychometric of this scale was done by Seyedian and Salehi for the first time and 8 items deleted. The Persian version of this questionnaire included 41 items in 5 subscales: students' behaviors and attitudes (Questions 16-18-27-30-33-34-35-36-39-40-41), technology and system (2-3-11-12-19-20-23-25-26-28-29-32), interactive applications (1-5-6-7-13-14-21-22), institutional factors (8-9-10-15-24), and instructors' characteristics (4-17-31-37-38). The reliability of this questionnaire reported 0.93 among virtual students at the medical universities in Iran.^[12]

This research project was approved by the Ethics Committee of Mazandaran University of medical sciences (IR.MAZUMS.REC.1400.012). At the initial part of the online questionnaire, purpose of the research project introduced and participants were asked to continue response to questions if they had consent. Furthermore, confidentiality of the data was explained. The researchers distributed the online questionnaires through E-mail, telegram, and WhatsApp. Furthermore, the link of the questionnaire was provided to the students through the representative of the each class.

Data analysis was performed using the SPSS software version 21 (version 24; Chicago, IL). To describe the quantitative and qualitative variables, descriptive statistics such as mean, standard deviation, and frequency were used. To assess the association between variables *t*-test, one-way ANOVA and Pearson test was utilized. Univariate linear regression was used to assess the relationship between online self-regulated learning and E-learning acceptance. Furthermore, to explore the predictors of online self-regulated learning such as age, gender, marital status, medical students, another job, and E-learning acceptance, multivariate regression model was used. Furthermore, $P < 0.05$ was considered statistically significant.

RESULTS

Among the total of 234 students, 141 were female (60.3%) and 93 were male (39.7%). The average age was 21.11 (1.72) years and the average of diary internet use was 5.02 (2.94) hours. According to the Table 1, most of the students were single (90.6%), had good internet availability (50.4%) and experience two semester online E-learning (62.4%).

According to the Table 2, the average score of online self-regulated learning was 79.45 (16.25) (total score). Furthermore, the average score of E-learning acceptance was 142.84 (20.10).

The regression model was selected by enter method and the model was suitable ($F = 58.50$, $P < 0.001$). According to the univariate linear regression model, E-learning acceptance explored 19.8% variance of the online self-regulated learning. To assess the association between online self-regulated and other variables, *t*-test, one way ANOVA and Pearson test was utilized. Then, variables with $P < 0.2$ selected to assess in regression model. The results of the regression model provide in Table 3. The association between online self-regulated learning and other variables had been assessed by multivariate linear regression according to the enter method. The results showed that this

Table 1: Sociodemographic characteristics of medical students

Variables	n (%)
Gender	
Female	141 (60.3)
Male	93 (39.7)
Marital status	
Single	212 (90.6)
Married	22 (9.4)
Faculty	
Nursing and midwifery	64 (27.4)
Medical	45 (19.2)
Paramedical	44 (18.8)
Pharmacy	35 (15.0)
Health	20 (8.5)
Dentistry	26 (11.1)
Semester	
2	103 (44.0)
3	29 (12.4)
4	45 (19.2)
5	46 (19.7)
6≤	11 (4.7)
Experience online e-learning (semester)	
2	146 (62.4)
3	82 (35.0)
4	6 (2.6)
Internet availability	
Good	118 (50.4)
Relatively good	89 (38.0)
Poor	27 (11.5)
Another job	
Yes	46 (19.7)
No	188 (80.3)
Total	234 (100)

Table 2: The score of online self-regulated learning and e-learning acceptance of students

Dimensions	Mean (SD)	The score range of scale
Online self-regulated learning		
Goal setting	15.09 (2.76)	5-25
Environment structuring	16.16 (4.86)	4-20
Task strategies	12.62 (3.40)	4-20
Time management	9.08 (2.84)	3-15
Help seeking	13.56 (3.27)	4-20
Self-evaluation	12.94 (2.75)	4-20
Total score	79.45 (16.25)	24-120
E-learning acceptance		
Students' behaviors and attitudes	37.86 (5.81)	11-55
Technology and system	43.20 (7.15)	12-60
Interactive applications	27.81 (5.07)	8-40
Institutional factors	16.93 (3.31)	5-25
Instructors' characteristics	17.03 (1.72)	5-25
Total score	142.84 (20.10)	41-205

SD: Standard deviation

model is suitable ($F = 8.423$, $P < 0.001$) and these variables including age, gender, marital status, medical students, another job, and E-learning acceptance explored 47.1% variance of the online self-regulated learning.

DISCUSSION

The present study showed the significant relationship between online self-regulated learning and E-learning

Table 3: The association between online self-regulated learning and E-learning acceptance and demographic variables based on regression model

Variables	β	SE	Standardized coefficients β	t	P
Constant coefficient	-18.882	23.889		-0.790	0.430
Medical students	-31.884	11.398	-0.794	-2.797	0.006
E-learning acceptance	0.396	0.045	0.490	8.793	<0.001
Another job	-10.149	2.176	-0.249	-4.665	<0.001
Age	1.910	0.696	0.203	2.745	0.007
Gender	5.790	1.847	0.175	3.134	0.002
Marital status	8.878	3.134	0.160	2.833	0.005
Experience online E-learning	3.714	2.824	0.124	1.315	0.190

SE: Standard error

acceptance among Mazandaran University of medical sciences during the COVID-19 pandemic by univariate linear regression model. The present study showed the level of online self-regulated learning was above the average score of the scale, which is similar to the study conducted in South Korea on nursing student.^[8] Furthermore, an Iranian study on nursing students showed they had online self-regulated learning above the average score of the scale.^[5] However, an Indonesian study showed the high score of the online self-regulated learning among early career medical doctors during the COVID-19 pandemic.^[9] Another Indonesian study conducted on students enrolled in an accounting education study program during the COVID-19 pandemic showed that 57.7% of the participants had high level of the online self-regulated learning.^[10] The results of the previous studies showed students had acceptable level of online self-regulated learning that was higher during the COVID-19 pandemic.

The result of the present study showed the level of E-learning acceptance was above the average score of the scale. A study in Jeddah on medical students showed moderate level of E-learning acceptance during the COVID-19 pandemic.^[22] Furthermore, the result of another study on medical students in COVID-19 pandemic showed that they had moderate level of the E-learning acceptance.^[23] The present study showed E-learning acceptance was correlated with online self-regulated learning. The students with higher E-learning acceptance score had higher online self-regulated score. A study in Thailand on undergraduate students showed that self-regulated had a significant positive correlation with E-learning acceptance.^[17]

The finding of the present study showed that age, gender, marital status, medical students, another job, and E-learning acceptance explored 47.1% variance of the online self-regulated learning by multivariate linear regression. In

the present study, age was significant correlated with online self-regulated learning. Similar to the Iranian study on nursing student^[5] and contrary to the study on university students of the E-learning courses of Engineering Sciences.^[24] The effect of the age on self-regulated learning is unexplored. Some studies showed that older people had lower level of the task management.^[25,26] In the current study, gender was correlated with online self-regulated learning. The female students had higher online self-regulated learning score. Similar to the present result, a study that conducted on the students during the COVID-19 pandemic in Indonesia showed self-regulated learning of female students was better than male students.^[27] The studies showed not only developmental of the frontal lobe, implicated in self-regulated, appeared one to 2 years earlier in females versus males but also this development is slower in males than females.^[28-31] Furthermore, in the current study, medical students had significant higher online self-regulated learning score. The higher online self-regulated learning score among medical students may be due to the different teaching approach and curriculum comparison to other students.^[32] For example, the results of the study on clinical medical students showed that problem-based learning had positive influence on the self-regulated learning.^[33] Furthermore, another study conducted on the medical students showed high performing students set goals, regulated evaluated performance, and used coping mechanism. Hence, they had higher self-regulated learning.^[34] In the present study, experience online E-learning was not related to the online self-regulated learning, but in a study showed that students with more online E-learning experience had higher self-regulated learning.^[35] The reason for the difference could be that the students may had different experience (satisfaction vs. dissatisfaction) of online class usefulness such as use of the learning strategies that could alter online self-regulated.^[36]

CONCLUSION

The results showed that E-learning acceptance explored 19.8% variance of the online self-regulated learning based on the univariate linear regression model. Furthermore, the result of the multivariate linear regression showed that this model is suitable and variables including age, gender, marital status, medical students, another job, and E-learning acceptance explored 47.1% variance of the online self-regulated learning. The faculty members and university managers can use strategies to enhance the E-learning acceptance to improve online self-regulated learning and facilitate barriers in the age of mandatory online learning.

Conflicts of interest

There are no conflicts of interest.

Authors' contribution

MK collected the data and prepared the manuscript draft. MB-N analyzed the data and supervised the process of the study. Both of the authors read and approved the final manuscript.

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