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# The relationship between the willingness to mobile learning and educational achievements in health-care professional students

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## Abstract:

**BACKGROUND:** The relationship between willingness to mobile learning (m-learning) and educational achievement was examined in health-care professional students.

**MATERIALS AND METHODS:** This is a descriptive correlative study that was conducted from January 2020 to February 2020. A total of 295 students in Saveh University of Medical Sciences in Iran were selected through census method. The data were collected using the standard willingness to m-learning questionnaire. The data collected were analyzed statistically using Pearson's correlation coefficient and concurrent regression analysis.

**RESULTS:** The mean score of willingness to m-learning was  $165.55 \pm 13.4$ , which is an indicative of a higher willingness level in the health-care professional students for m-learning. There was a positive and significant relationship between willingness for m-learning and educational achievement ( $r = 0.77$ ,  $P < 0.01$ ). The predictive variable, i.e., willingness to m-learning, predicted 53.8% of the variance of educational achievement ( $F = 58.801$ ,  $P = 0.00$ ). Among the variables of willingness to m-learning, the regression coefficients of perceived ease, attitude, self-management in learning, educational use, and efficiency of m-learning were significant ( $P < 0.05$ ). This means that these variables are direct predictors of educational achievement.

**CONCLUSIONS:** Willingness to m-learning had a positive and significant relationship with educational achievement. Although this study was performed just before the corona outbreak, paying attention to the results of this study can be helpful for students, faculty members, and policymakers in filling the educational gap during the coronavirus disease 2019 outbreak.

## Keywords:

Educational achievement, health care, mobile learning, student, willingness

## Introduction

Mobile learning (m-learning) is a novel concept that has received a great deal of attention in educational societies as a pivotal point in the 21<sup>st</sup>-century education.<sup>[1,2]</sup> There are several definitions for the term. Harden defines it as acquisition of learning using mobile technology (mobile phone, tablet, laptop, digital assistant, and the like).<sup>[3]</sup> Another definition sounds more complete, which states that m-learning is to acquire

any type of knowledge, attitude, and skill using mobile technologies anytime and anywhere, which leads to a behavioral change.<sup>[4]</sup> M-learning is seen as a paradigm change in e-learning framework.<sup>[5]</sup>

There has been a growing trend of m-learning in medical sciences.<sup>[6,7]</sup> The effects of e-learning technology in medical sciences field are outstanding, and it is imperative to examine all aspects of e-learning in medical sciences.<sup>[8]</sup> Taking into account the importance of m-learning

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in medical sciences, it is important to take investment on m-learning process in medical sciences into consideration.<sup>[9]</sup> M-learning can have a profound effect on the improvement of learning and education outcomes.<sup>[10]</sup> Results of a study have shown that the use of mobile technologies has better results compared to using desktop computers.<sup>[11]</sup> Another study has shown that when students are allowed to use their smartphones in the classroom, they can use it as a learning tool. The authors also concluded that this learning method also improved interaction between students.<sup>[12]</sup> The use of mobile devices for academic and learning purpose in health-care professional education has increased in recent years and has been positively received among health-care professional students.<sup>[13-15]</sup> Capabilities and potentials of mobile technology can facilitate learning process in medical sciences students. Using educational applications about diseases, physical examination, drugs, audio and video clips about medical sciences, medical simulations, different educational and therapeutic games, preparing medical slides, developing medical e-books, saving and retrieving educational materials, membership in social media groups about medical sciences, and the like can have a profound effect on learning in medical sciences students.<sup>[16]</sup> M-learning naturally is motivating for learners as they can enjoy more control over learning goals, joyfulness, connectivity, and learning in a continuous manner.<sup>[17]</sup> Technology and media including the Internet have an extensive role in education and medical education as well. There are several analytical studies on the efficiency and efficacy of e-learning compared to conventional education methods.<sup>[18]</sup> Students' willingness to m-learning is one of the most important factors for successful adoption and acceptance of m-learning in the higher education setting.<sup>[19]</sup>

Students' engagement in learning activities in academic and clinical settings is one of the important factors of students' success and performance.<sup>[20,21]</sup> M-learning can increase students' engagement in learning.<sup>[22,23]</sup>

Identifying the factors in educational achievement of students is a recommendable approach to program, develop, and cover the drawbacks of educational programs.<sup>[24,25]</sup> Through this, the best possible outcomes can be expected both for educational institutes and students. Educational achievement is the pivotal measure to examine students' capability to complete their programs and graduate. It depends on different factors and examining these factors and their contribution leads to a better understanding of the factors in educational performance. Identifying these factors facilitates students' preparation for the future.<sup>[24,26,27]</sup>

Grade point average (GPA) is one of the most common indices in assessing educational performance. Many

universities require a minimum GPA for passing examinations and graduation. This minimum differs between universities and different programs.<sup>[24]</sup> Educational achievement is a variable that highlights learning and cognitive, attitude, and skill changes and it is mostly based on GPA.<sup>[8]</sup> Despite the fact that in previous studies, various aspects of using m-learning on the dimensions of learning have been addressed, but the study of the relationship between willingness to m-learning and academic achievement has received less attention from researchers. Therefore, the present study tries to answer if there is a relationship between the willingness to m-learning and educational achievement in health-care professional students.

## Materials and Methods

### Study design and setting

This is a descriptive correlative study that was conducted from January 2020 to February 2020 at Saveh University of Medical Sciences, Saveh, Iran.

### Study participants and sampling

The study population consisted of undergraduate nursing, operation room, anesthesia, and midwifery students in the second semester and higher ( $n = 328$ ). The participants were selected through census method from the students who met the inclusion criteria, and 295 questionnaires were filled by them. The inclusion criteria were enrollment in the second semester or higher and desire to participate. Exclusion criterion was failure to fill out the questionnaire completely.

### Data collection tool and technique

The study tool was comprised of two sections: (a) personal and educational factors and (b) willingness to m-learning. The tool was designed by Baghcheghi *et al.* who also measured psychometrics of the tool.<sup>[19]</sup> By personal and educational variables, we refer to age, gender, semester, and GPA in the current semester among many. The willingness to m-learning questionnaire contains 45 questions with nine subscales, namely technophilia, perceived attraction, perceived ease, perceived conflict, attitude, self-management in learning, behavioral intention to use, educational use, and learning efficiency. The items are designed based on Likert's five-point scale (completely agree, agree, disagree, completely disagree, and no idea). The score range of the tool is from 45 to 225. Score range 45–81 is interpreted as very low willingness for m-learning, 81–117 as low willingness, 117–153 as moderate willingness, 153–189 as high willingness, and 189–225 as very high willingness. Content validity was done by comments and suggestions of 10 members of faculty board, who were experts in this area of study. Reliability of the questionnaire was measured through

test/retest method ( $r = 0.91$ ) and internal consistency and Cronbach's alpha (0.88).

The questionnaires were administered as online survey technique. The collected information was analyzed using descriptive statistics (frequency distribution, mean, and standard deviation) and inferential statistics (Pearson correlation coefficient and concurrent regression) in SPSS 19 (SPSS, Inc., Chicago, IL, USA).  $P < 0.05$  was considered statistically significant.

### Ethical consideration

The study was approved by the Ethics Committee, Saveh University of Medical Sciences (IR.SAVVEHUMS.REC.1397.008). The ethical concerns observed in this study included securing a permission from the authorities, briefing the participants about the objectives and nature of the study, reminding the participants of their right to willingly participate in the study and leave the study at any stage, assuring the participants of confidentiality of their information, anonymous publication of data, and obtaining permission from the officials.

### Results

Out of 328 distributed questionnaires, 295 were returned (response rate = 89.93%). The mean age of the participants was 20.79 years and the mean GPA was  $16.11 \pm 1.58$ . In addition, 110 (37.28%) were boys and 185 (62.72%) were girls. The mean score of willingness to m-learning was  $165.55 \pm 13.4$ , which indicates a high level of willingness for m-learning in health-care professional students. Based on Pearson correlation and concurrent regression analysis, there was a significant and positive relationship between willingness to m-learning and educational achievement ( $r = 0.77$ ,  $P = 0.01$ ). Table 1 lists the correlation coefficients between willingness to m-learning and educational achievement of students.

In addition, multivariate regression with concurrent model was used to check if willingness to m-learning

**Table 1: Correlation coefficient between willingness to mobile learning and educational achievement of health-care professional students**

Variables	Correlation with educational achievement	P
Technophilia	0.44	0.04
Perceived attraction	0.43	0.03
Perceived ease	0.6	0.00
Perceived conflict	0.53	0.00
Attitude	0.51	0.00
Learning self-management	0.56	0.00
Behavioral intention to use	0.3	0.06
Educational use	0.69	0.00
Efficiency of M-learning	0.71	0.00
Total	0.77	0.01

could predict educational achievement. Table 2 lists the results of analyses of predictability of educational achievement based on the aspects of willingness to m-learning. Clearly, 53.8% of the variance in educational achievement is attributed to the predicting variables, which is a significant value ( $F = 51.8$ ;  $P = 0.00$ ).

Regression coefficient of perceived ease of m-learning, positive attitude to m-learning, learning self-management, educational use (use of mobile technology as a learning tool), and positive attitude about efficiency of m-learning on educational achievement were significant. This indicates that these variables directly predict educational achievement. The efficiency of m-learning had the highest ability to predict educational achievement ( $\beta = 0.324$ ).

### Discussions

In general, the results of the present study showed that the willingness to m-learning promotes academic achievement. As far as the authors know, there is no similar study published in the literature. Of course, various studies have been conducted in the field of m-learning that have examined the issue of m-learning from other aspects. The results of the present study showed that the health-care professional students' desire for m-learning is very high. The results of a study that used a different tool, also showed that resident doctors have a positive attitude toward m-learning and were consistent with the results of the present study.<sup>[28]</sup>

Other studies have supported the positive effect of m-learning on students' learning performance. For instant, a qualitative study on m-learning experience in students showed that along with facilitating learning process, it improved learning in medical sciences students.<sup>[29]</sup> Studies have shown that m-learning can have positive effects on three fields of learning including attitude, cognitive, and psychomotor fields.<sup>[30]</sup> In addition, a study on e-learning showed that e-learning had a significant relationship with educational achievement in students. Of course, this study was in the field of e-learning, which is different from the present study.<sup>[31]</sup>

Perceived ease was one of the variables that predicted educational achievement. This concept in the questionnaire indicates how easy is to use a specific technology. In addition, it refers to accessibility anywhere and anytime, ease of carrying it, and ability to access information and have educational communication with instructors and classmates.<sup>[19]</sup> Using e-books and software-based books instead of physical book, in clinical situation in particular, can motivate students to shift toward m-learning. The ease of using mobile internet, working with mobile application, and communicating

**Table 2: Regression coefficients of the prediction of educational achievement based on the aspects of willingness to mobile learning**

Predictor variable	Nonstandardized coefficients		Standardized coefficients	t	P
	SE	B	β		
Constant	0.821	7.364		9.297	0.00
Technophilia	0.038	0.031	0.048	0.793	0.428
Perceived attraction	0.047	0.049	0.069	1.048	0.296
Perceived ease	0.037	0.123	0.218	3.335	0.01
Perceived conflict	0.034	0.008	0.014	0.244	0.808
Attitude	0.012	0.038	0.137	3.073	0.002
Learning self-management	0.011	0.053	0.248	4.700	0.00
Behavioral intention to use	0.034	0.012	0.018	0.358	0.720
Educational use	0.036	0.105	0.206	2.940	0.004
Efficiency of m-learning	0.081	0.081	0.324	4.381	0.000

Adjusted R<sup>2</sup>=0.538, F=51.8, P=0.00. SE=Standard error

with instructors and classmates<sup>[32]</sup> are the factors that add to the attraction of m-learning.

Students' attitude toward m-learning is one of the factors in the desire of students for m-learning. The participants' attitude toward virtual education program has a profound role in its success. Attitudes are also good predictors of one's professional behavior.<sup>[33]</sup>

The results also showed that self-management in m-learning was a predictor of educational achievement. Capabilities and options of mobile phones provide a condition for self-management of learning for students. Mobile technology acts as a catalyzer of learning and plays a key role in this regard. Acceleration of educational connections and doing some of homework and repeatability of learning opportunity<sup>[19]</sup> are among the items that help learning management. In addition, studying and learning in the preferred situation, choosing the path and pace of learning, monitoring and observing educational progress, time management for educational tasks, saving and retrieving information in clinical situations, recording educational materials, and instant access to information using mobile technology<sup>[3,19]</sup> are of other factors that help self-management in learning.

The results showed that educational use of m-learning was a strong predictor of educational achievement. Mobile technologies cover a wide range of educational performance in educational and clinical situations. Clearly, given the capabilities and potential uses of mobile technologies (educational applications about diseases, physical examinations, drugs, video and audio clips in medical sciences, photography and filming capabilities, medical simulation, variety of educational and therapeutic games, slides, e-books, saving and retrieving educational materials, and membership in medical social media), mobile gadgets can facilitate learning process in medical science students.<sup>[19,30]</sup>

Learning efficiency was the strongest predictor of educational achievement. In other words, the students who stated that m-learning was effective in their learning, had a better educational achievement. Education can be more attractive using multimedia technologies including mobile technologies, so that learners can have a more active participation in education process. In general, students tend to be more active in multimedia educational environment and play a more active role rather than being mere receivers of educational materials.<sup>[34]</sup>

The results of this study can be used as baseline information for researchers, faculty members, education administrators, and policymakers. Higher education institutes and universities should be able to demonstrate the advantages of mobile technologies for learning to students and prepare the ground for the implementation of m-learning.<sup>[16]</sup> Education policymaker as well as the educational institutions should look for ways to use the latest technologies and incorporate m-learning technology for the whole system to facilitate learning in students. Designing and implementing user-friendly mobile-based educational software can be improved the acceptability of m-learning by the students.<sup>[35]</sup>

One of the strengths of this study is that it is the first study to investigate the relationship between learning enthusiasm and academic achievement in medical students. In addition, one of the other strengths of this study is the application of the results of this study during the corona outbreak. Availability of mobile devices among students is paving the way for changing focus to m-learning to continue their learning and education, especially<sup>[19]</sup> in an unexpected situation such as coronavirus disease 2019 (COVID-19) pandemic. During the COVID-19 outbreak that has affected higher education all over the world, m-learning may help the students to fulfill the education gap.<sup>[36]</sup> This study was conducted before the corona outbreak in Iran. However, due to the closure of universities during the corona, the



results of this study become more important. Closure of universities and the circumstances of restriction caused by the COVID-19, and to ensure continuity of teaching and education for students, m-learning is an essential educational technology component. It allows students to learn, collaborate, and share ideas.<sup>[37,38]</sup>

### Limitation and recommendation

Small sample group and selecting the participants through census rather than sampling are some of the limitations of this study. Future study with larger sample groups on other fields of study during corona outbreaks is recommended.

### Conclusions

Overall, health-care professional students had a strong willingness to m-learning, which indicated that they had a positive perception toward m-learning. There was a positive and significant relationship between the willingness to m-learning and educational achievement. Therefore, students' high willingness for m-learning helps them to have a better learning and enjoy higher educational achievements. Although this study was performed just before the corona outbreak, paying attention to the results of this study can be helpful for students, faculty members, and policymakers in filling the educational gap. Given the key role of m-learning in education, officials and instructors in medical sciences universities are recommended to adopt proper ways of showing the advantages of m-learning to students and improving the students' capability to use m-learning in the right and efficient way.

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### Conflicts of interest

There are no conflicts of interest.

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