

Investigating the General Medical Students' Attitudes and Way of Using Smartphones to Learn Their Professional and Educational Issues

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ABSTRACT

Introduction: Due to the popularity of smartphones and given the fact that smartphone-based learning methods are not widely used in the official curriculum of universities, this study was conducted with the aim of evaluating the general medical students' attitudes and way of using smartphones to learn the educational and professional issues.

Materials and Methods: The population of this descriptive study included all of the general medical students. Sampling was performed by simple random sample. A total of 100 students completed these questionnaires. The research tool was a researcher-made questionnaire, which its validity and reliability have been confirmed in two studies among Australian and Iranian dentistry students. For the analysis of the data of the present study, frequency, mean, percentage, Mann-Whitney test and correlation coefficient Spearman in SPSS 22 software were used.

Results: 57% of the students were female and 43% were male. The results of this study showed that medical students used their smartphone facilities for their educational and professional purposes. In this regard, the search of web pages related to the content of the curriculum ranked first (90%), followed by installation of medical-related applications on smartphones (89%). In addition, residential homes, different points of the faculty, and on the route such as in the bus, respectively, were the most commonly used places for students to use smartphones. The results also showed that as students use their phone for more general purposes, the student's desire to learn with the smartphone increases significantly (0.107). Additionally, as the age of people increases, their ability and desire to use it for general and educational purposes through smartphones is reduced significantly (-0.141).

Discussion and Conclusion: Based on the results of this research, it seems necessary to use the capabilities of smartphones to learn medical and professional issues and to improve the medical profession, especially in educational and healthcare settings. It is also necessary to use the smartphones in official university curriculum. However, its disadvantages and threats should not be ignored.

Key words: Smartphones, Mobile learning, Students, Medicine

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INTRODUCTION

Electronic learning refers to a set of educational activities that are carried out by using electronic devices such as audio, visual and computer devices in virtual and network environments. It has brought about a change in education around the world. Nowadays, this type of learning has become widespread with the increasing spread of the

Internet [1]. By blending e-learning and mobile handheld computers, a new form of education has been developed, which is called mobile learning or M-learning. Various definitions have been provided for "mobile learning", some of which has considered this learning based on the Internet and some others has considered it based on wireless. However, in general, this learning can be used at any place and at any time without the need for physical and continuous connection to the network cables and through mobile and portable devices such as portable computers, cell phones, personal digital assistants, etc. [2]. Thus, the most important difference between "mobile

learning" and "e-learning" can be seen in the "mobile learning" capability for providing the conditions to learn at any place and at any time, while "e-learning" limits the mobility of scholar. In fact, in "e-learning", one should sit behind the computer, so at places where the use of computers (and even portable computers) is not possible, the use of this type of learning will not possible. In contrast, "mobile learning", as stated above, eliminates the spatial constraints and enables a person to use this learning method at any place, in travel, or even at daily urban traffic [3]. Many projects have been conducted on the mobile learning with the aim of using the mobile devices for educational progress. One of these projects is the "m-learning.org" project, initiated by the European Union in 2001 and completed in 2004. This project was developed for unemployed, part-time and homeless youths, in which manual devices acted as a telephone were provided for this group of people. Through these devices, a variety of curriculums, such as driving instruction theoretical courses, language learning courses, and so on were provided to young people using SMS. At the end of the project, the findings revealed that mobile learning helps scholars improve their reading and writing skills and find their own weaknesses. In addition, this learning method helps scholars enhance their self-esteem and use communication and information technologies widely [4]. A study conducted among Australian dentistry students indicated the positive role of smartphone capabilities in learning teaching and professional issues [5]. In a similar study conducted among dentistry students in Iran, the students also referred to smartphone capabilities in learning their professional and learning issues [6]. As smartphone-based learning methods to learn educational and professional issues are not used widely in the official curriculum of universities and educational institutions, conducting research on the effectively use and inclusion of them in educational programs seems to be an essential. High flexibility, the potential to implement specific and creative learning strategies, the ever-increasing access to teaching resources and the high speed of transferring the information have made M-learning to be one of the most popular learning methods among the students. For this purpose, researchers from Ahvaz Jundishapur University of Medical Sciences, in Iran, conducted a study to evaluate the general medical students' attitudes and way of using smartphones to learn educational and professional issues.

Table 1: Demographic information of students

Variables		n	%
Gender	Male	43	43%
	Female	57	57%
Age (years)	21-25	35	35%
	26-30	59	59%
	31-35	2	2
	36-40	0	0

MATERIALS AND METHODS

This descriptive study was conducted in 2019 to evaluate the general medical students' attitude and way of using smartphones to learn the educational and professional issues. The research population included all general medical students in Ahvaz Jundishapur University of Medical Sciences, southwest of Iran. A total of 100 students completed these questionnaires. The research tool was a researcher-made questionnaire used by Rung et al. among Australian dentistry students [5]. For the analysis of the data of the present study, frequency, mean, percentage, Mann-Whitney test and correlation coefficient Spearman in SPSS 22 software were used. Sampling was performed by simple random sample. 100 students completed these questionnaires. The research tool is a researcher-made questionnaire used in the study of Rung et al. among Australian dental students [5]. The validity and reliability of this questionnaire were re-confirmed after standardizing it and applying minor modifications in it. It was also used in Iran in the study conducted by Shooriabi et al. and by the Cronbach's alpha coefficient of 81% [6].

The first section of the questionnaire provides the demographic information of students. The second section of the questionnaire includes 13 questions asked about the students' use of smartphones for educational and professional issues. The third section of the questionnaire includes seven questions asked about the places where students use their smartphones mostly for their educational and professional purposes. The fourth section of the questionnaire includes students' general opinions about smartphone capabilities and their impact on learning and educational issues by using 5 questions. To analyze the data, frequency, mean, percentage, Mann-Whitney test and Spearman correlation coefficient in SPSS 22 software were used.

RESULTS

Table 1 presents the students' demographic information. It shows that 100 general medical students participated in this study, of which 57% were female and 43% were male. In addition, 77% of them were single and 23% were married. Other demographic characteristics of them are shown in Table 1.

	41-45	4	4
	1	10	10
	2	2	2
	3	1	1
	4	1	1
Education history (years)	5	2	2
	6	29	29
	7	47	47
	8	8	8
Marital status	Single	77	77
	Married	23	23

Table 2 shows the questions asked about students' use of smartphone capabilities for learning. 82% of the students used their smartphone capabilities to search for their courses and 83% of the students used their smartphone capabilities to search for educational announcements. 65% of the students used smartphone capabilities to send email to classmates and university employees, 57% of the students studied the text of classroom lectures using smartphone capabilities, 65% of the students used smartphone capabilities to see classroom lectures, and 79% of the students used smartphone capabilities to see educational videos. In addition, 71% of students used their smartphone capabilities to search for library

resources and texts content, 90% of students used their smartphone internet environment to search for educational materials, 81% of students used their smartphone capabilities to share their courses notes with their classmates, and 67% of students used their smartphones to take photos of their work in the faculty and hospital. Moreover, 55% of students used their smartphones to do their work in the department and the hospital, 88% of students use their smartphone capabilities to use other educational issues that are not included in the list of this questionnaire. Additionally, 89% of students had medical or educational applications on their phone.

Table 2: Questions on using smartphone in educational and professional issues

Row	Questions	Yes (%)	No (%)
1	Do you search for educational and professional timetable?	82	18
2	Do you search for announcements of educational and professional issues?	83	17
3	Do you send email for professors, students and university employees?	65	35
4	Do you study the text of educational and professional lectures?	57	43
5	Do you see educational and professional lectures?	65	35
6	Are you watching the educational and professional videos?	79	21
7	Do you search in library sources and content of the texts?	71	29
8	Do you search educational and professional materials in the web sites?	90	10
9	Do you share your experiences and educational and professional ideas with your classmates and professors?	81	19
10	Do you take photos of your works in the environment and university?	67	33
11	Do you record video of your works in the hospital and university?	55	45
12	Other works	88	12
13	Do you have any application related to your field of study and medicine profession on your phone?	89	11

Table 3 presents the places where students use smartphone capabilities for their educational purposes. Based on the opinion of the students, residential home (93%), different points of the faculty (92%), on the route,

for example in bus (84%), in library (58%), in amphitheatre (21%), laboratory (28%), other places (78%), respectively, obtained the highest score.

Table 3: Places where students use smartphone capabilities for their educational and professional purposes

Row	Places	Regularly (%)	Usually (%)	Rarely (%)	Never (%)	Percentage of consensus (%)
1	In library	10	48	34	8	58
2	In Amphitheatre	5	16	50	29	21
3	In laboratory	4	24	43	29	28
4	Different points of hospital and university	27	65	8	0	92
5	On the route, for example in bus	24	60	13	3	84
6	At home	53	40	6	1	93
7	Others	7	71	11	11	78

Table 4 presents the general opinions of students about smartphone capabilities and their impact on learning and education. Accordingly, 98% of students believed that the smartphone had improved their access to educational and professional materials. In addition, 96% of students believed that the smartphone help them to have a more independent learning process, 96% of students believed that it is better to use smartphone capabilities for

students' professional and educational purposes, and 86% of the students believed that smartphone capabilities should be used more in medical education and it should replace the traditional methods. Finally, 94% of students believed that it is better to blend the educational capabilities of the smartphones with those of traditional methods.

Table 4: General opinion of the students

Row	General opinions	Strongly agree (%)	Agree (%)	Strongly disagreed (%)	Disagreed (%)
1	Smartphone has improved my access to educational and professional materials	53	45	0	4
2	Smartphone has improved my knowledge on professional and educational materials	56	42	0	2
3	Smartphone has helped me to have a more independent learning process	43	53	0	4
4	It is better for university officials to use smartphone capabilities for students' professional and educational purposes	42	54	2	2
5	Smartphone capabilities should be used more in medical education and it should replace the traditional methods	39	47	2	12
6	It is better to blend the educational capabilities of the smartphones with those of traditional methods.	40	54	0	6

In this research, Spearman correlation test showed a positive correlation between the use of smartphones for general purposes and the use of smartphones for learning (0.107). In other words, as students use their phone for general purposes more, their desire to use smartphones for learning will also increase ($p < 0.05$). There was also a negative correlation between age and use of the phone for general purposes and between age and use of the phone for learning (-0.141). It means that with increasing the age of students, their ability and desire for general use of smartphone and for learning will reduce significantly ($p < 0.05$). Additionally, Mann-Whitney test was used to compare two groups of girls and boys as well as single and married groups in terms of using smartphones for general and learning purposes, which the difference between the groups was significant in terms of gender ($p = 0.005$) and non-significant in terms of marriage ($p = 0.348$).

DISCUSSION

The results of this study showed that medical students use their smartphone facilities for their educational and

professional purposes. In this regard, the search for web pages related to the courses content was the first option and installation of applications related to medicine on the smartphone of the students was their second option. In the study conducted by Shooriabi et al. on Iranian dentistry students [6] in the study conducted by Rung et al. among Australian dentistry students [5], the effective role of smartphone capabilities in learning texts was reported. The study conducted by Loreda et al. to investigate the use of smartphones in for educational purposes as well as Internet addiction and its impact on superficial and in-depth learning and its comparison in various stages of medical student education showed that almost all students had smartphones and a total of 96.8% of them used the smartphone in lectures, classes, and meetings. Less than half of the students (47.3%) used a smartphone for educational purposes for more than 10 minutes [7]. Various studies, conducted on the benefits of smartphone capabilities to improve the medical profession and accelerate the diagnosis and treatment of diseases, have referred to its significant role [8-11]. Some of them are referred as follows:

Valerie et al. used smartphone capabilities to support recovery in people with severe mental illness in their studies [8]. Benjamin et al. showed that smartphone capabilities can be used to help improvement in preparation of colonoscopy surgery [9]. Susan et al. conducted a study on cognitive testing in people at risk for diabetes using smartphone capabilities [10]. In a systematic review study, Cédric et al. found that smartphone capabilities could be used for early diagnosis of melanoma [11]. The installation of medical-related applications on students' smartphones ranked first, followed by use of the smartphones in educational and professional issues. In the study by Gilavand et al. among dentistry students in Iran, it was found that using mobile applications increases the knowledge of dentistry students on systemic [12]. In addition, in two other studies conducted by Gilavand et al. among the students of different disciplines of Ahvaz Jundishapur University of Medical Sciences, in southwestern Iran, it was found that educating the proper habits of the studying through the educational mobile application improved their knowledge, followed by academic achievement [13,14]. Another study conducted by Gilavand et al. also found that teaching administrative and employment regulations for students through the mobile applications improved their knowledge of traditional learning methods of education [15]. Another study conducted by Gilavand et al. also found that the first aid training to high school students in Iran through the mobile applications improved their knowledge of the first aids [16]. In the study conducted by Babazadeh et al. in Iran, it was found that teaching pathology course content to dentistry students using mobile applications was more effective than traditional methods [17]. A study conducted by Kenny et al. showed that Canadian students and professors welcome m-learning in their clinical setting for learning [18]. Montrieux et al. also suggested that learning methods using smart tablets, due to their varied capabilities, could be considered in educational settings [19]. The results of all these studies are consistent with those of current study. Some studies also found that some physicians use less mobile smartphone applications in their careers. Sung et al. in China showed that a large number of physicians have smartphones, but few of them use their applications related to medicine [3]. Their results are not consistent with those of our study. Moreover, residential homes in the different points of the faculty and on the route (for example, "in the bus") were the most common places where students used their smartphones for this purpose. At the end of the study, students' general opinions on the capabilities of smartphones and their impact on learning and education were asked. Accordingly, majority of students believed that the smartphone had improved their access to educational and professional issues and smartphones helped them to develop an independent learning process.

The majority of students also believed that it is better for officials of the universities to use smartphone capabilities for educational and professional purposes and they recommended the use of smartphones in medical education. They also believed that this learning method

to be used instead of traditional methods or it is blended with traditional methods. These results are consistent with those of the studies conducted by Loredó et al. [7], Gilavand et al. [12-16], Kenny et al. [18] and Montrieux et al. [19], Learning using smartphone capabilities enhances the learner mobility.

CONCLUSION

In this method, educator and course contents are available at any place where the learner is located. This kind of learning will eliminate the need for educator physically and learning continues even where the educator is not present, so it creates same educational opportunities for the students. It is predicted that mobile learning and the use of capabilities of smartphones to be an integral part of the learning process in the future and there is no need for learning in fixed environments, but learners responds to their immediate educational needs by using mobile learning devices. As a result, learners can learn at any time and place they want. They can also achieve valuable educational materials that enhance their learning quality. Using this method, justice and equal opportunity can be provided for the learners. With spread of technological tools, mobile learning can lead to equal educational opportunities. However, any new technology has its own disadvantages and advantages that having knowledge on its disadvantages and advantages can play a key role in the proper using of that technology. Based on the results of this study, it seems necessary to use the capabilities of smartphones and other mobile devices to learn educational and professional issues of medicine to improve the medical profession, especially in educational and healthcare settings and to be taken into consideration in the official curriculum of the universities. However, its disadvantages and threats should not be ignored.

ETHICAL CONSIDERATIONS

Ethical issues were completely observed by the authors.

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CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

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