

Attitudes and Perceptions of Medical Undergraduates Towards Mobile Learning (M-learning)

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ABSTRACT

Introduction: Mobile technology is one of the latest extensions of technological innovations that can be integrated into medical education. With the aid of these devices, students learn faster outside the classroom by having quick access to the internet and easy retrieval of required health related learning resources to keep alongside of recent trend and development. In medicine practice one has to continuously update his/her medical knowledge and mobile learning will serve as a tool for self-directed learning.

Aim: To explore the attitudes and perceptions of undergraduate students towards M-learning.

Materials and Methods: This educational research included 90 third year MBBS students having clinical posting under the Department of Community Medicine from tertiary healthcare institute in Nashik. Students learning approach was studied with the help of pre-validated questionnaire to know whether they have deep or surface approach to learning. M-learning group was formed on mobile social app to supplement conventional teaching-learning. One subject topic (Tuberculosis, Dengue fever/DHF, Hypertension and Diabetes Mellitus etc.) per week was allotted and after conventional teaching on first day of week the learning materials for the topic chosen for that week were uploaded on the group and students could download as well as share their ideas, learning resources, ask doubts and answer questions at least twice weekly through this mobile platform

anytime, anywhere. At the end of three months students attitudes and perceptions towards M-learning were studied by pre-validated structured questionnaires. A five point Likert scale was used (5= strongly agree to 1= strongly disagree) for answering each item of all three questionnaires. The score of 60% (90 out of 150) and the score of 75% (30 out of 40) for each item was considered as the measure that indicates whether or not the student had a positive attitude and perceived the importance of M-learning respectively. Utilisation of M-learning was also studied.

Results: It was found that 47 (52.2%) students had deep learning approach, 10 (11.1%) students had surface learning approach. An 80% of students had positive attitude towards M-learning and 76.7% students had perceived the importance of M-learning. A 52.2% of students were actively involved in M-learning group for learning purpose. But 57.8% students did not download (at least twice weekly) the shared reference material, 38.9% students never read and/or replied to the questions asked and 60.0% students never asked any doubts/questions related to the discussion.

Conclusion: Students had positive attitude and perceived the importance of M-learning. But when they were provided with the opportunity, they did not show appreciable M-learning utilization. This could be because, M-learning was not implemented by all departments; also it was not the part of student's regular assessment and probably a lesser study duration.

Keywords: Cell phones, Educational technology, Social media, Undergraduate medical education

INTRODUCTION

Medical students need to take and understand considerable new information during their studies especially with the need for evidence based healthcare and they should develop skills for life-long learning, keeping their knowledge updated [1]. There has been a rapid growth in the development of new teaching methods and learning resources and considerable advances in the availability of electronic and mobile resources. Mobile technology is one of the latest extensions of technological innovations that can be integrated into medical education [2]. With the aid of these devices, students learn faster outside the classroom by having quick access to the internet and easy retrieval of required medical and health related learning resources while lecturers/teachers also keep alongside of recent trend and development as it affects their medical teaching and research needs. Also, use of mobile technology will especially help medical students, as in the medical practice learning is a continuous and life-long [3].

There is need of integrating new technology in teaching-learning to identify and comprehend key concepts, receive feedback as well as apply concepts to relevant situations in medical practice

[4]. Current mobile device technology show promise as an instructional tool, more so because mobile handheld devices are user friendly and more widespread in use. Thus, the concept of M-learning could be introduced as a strategy in learner-centered education. Introducing M-learning may improve ability of teachers and students to adapt to the new technology as a method of teaching-learning [4]. Hence, the use of mobile technology can improve quality of content delivery in educational setting.

Impact on students: Mobile technology promotes construction and sharing of knowledge which in turn help students' learning by activating their cognitive processes; explaining and elaborating their own understanding [5]. A research conducted at Taibah University by Khaleel M. Al-Said revealed that there were preferential perceptions (mean of overall fields of perceptions scale was 136.19- "High" level) of students towards M-learning [6]. Several studies found that M-learning was effective, flexible, generated strong interest and positive reaction for integration in classroom teaching-learning [7-11]. However, Waycott and Kukulcsa-Hulme indicated the difficulty in using a mobile phone in medical education where students particularly faced the difficulty

in retaining the sent and exchanged data by these devices [12]. The use of mobile technologies to support content with social communication features can lead to a more interactive and collaborative learning environment [13]. This may make learning more interesting and also reduce the stress.

Specifically, through interactions with social networks and peers students are encouraged to ask questions, get feedbacks, conduct conversations, obtain helps, explain to others towards a specific problem based on their understanding and discuss with their peers during learning process. Hence, this study tried to understand attitudes and perceptions of medical students towards mobile learning through the use of social application for teaching-learning.

AIM

To explore the attitudes and perceptions of undergraduate students towards M-learning.

MATERIALS AND METHODS

It was an educational research (Prospective) conducted in Department of Community Medicine of tertiary teaching institute in Nashik. The study duration was 6 months (from September 2015 - February 2016) and included 90 MBBS students who were posted in the Dept. of Community Medicine.

Inclusion criteria

A 3rd year MBBS students having own mobile were included in the study.

Exclusion criteria

Students who did not have internet connection on mobile phone and those who did not give consent were excluded.

The institutional ethics committee approval and informed consent of the student was taken for the study. Students who were eligible to participate in the study were given a pre-validated (Cronbach's alpha values- 0.73 for Deep approach and 0.64 for Surface approach) structured Revised Study Process Questionnaire 2 Factors (R-SPQ-2F) which was suitable for use by teachers in studying the learning approaches of their students [14].

Learning approaches or approaches to learning can be defined as "the ways in which students go about their academic tasks, thereby affecting the nature of the learning outcome" [15]. An approach to learning embeds the intention of the student when starting a task and the corresponding strategies used to complete the tasks [16]. There are two common approaches to learning [17] namely 'surface' and 'deep'. Students who take a 'deep approach' have the intention of understanding, engaging with, operating in and valuing the subject. While students who take a 'surface approach' tend not to have the primary intention of becoming interested in and of understanding the subject, but rather their motivation tends to be that of jumping through the necessary hoops in order to acquire the mark, or the grade, or the qualification. The questionnaire to measure students' learning approach contained 20 items, where 10 items were used to measure surface learning and deep learning approach respectively. Students were provided with a five-point Likert scale ranging from 1 to 5 to reflect their true feeling about their leaning approach. After identifying students overall learning approach they were sensitised and motivated to develop deep learning approach with the help of blended learning (conventional face-to-face learning + M-learning).

For M-learning, students were told to install "HIKE" messenger app which was free social network app available from Google PlayTM, iOS App StoreTM, Windows Phone StoreTM, etc. The students group was formed and two teachers from department of Community Medicine were appointed as administrator for the groups.

Then students underwent conventional face-to-face learning for four (one per week) subject topics of Community Medicine (Tuberculosis, Dengue fever/DHF, Hypertension and Diabetes Mellitus etc.) for three months. On the first day of every week, the learning materials (reference materials/web-links from WHO, UNICEF, MOHFW etc.) for the topic allotted for that week were uploaded on the mobile and students could download as well as share their ideas, doubts and learning resources through this mobile platform anytime, anywhere throughout the week. Students were asked to respond twice weekly (at least) for answering the questions (concept oriented, application oriented) based on that weeks' topic. There was one (researcher) record keeper and two teachers were moderator/facilitator for the same. At the end of three months the students' attitudes and perceptions towards M-learning was ascertained by administering pre-validated structured questionnaire. The attitudes questionnaire consisted of 30 positively and negatively framed statements to impede any response set. A five point Likert scale was used (5= strongly agree to 1= strongly disagree) for answering each item. The score of the survey ranged from 30-150, which was the number of items multiplied by the lowest grade (1= strongly disagree) and by the highest grade (5= strongly agree) on each item. The score of 90 out of 150 (60%) for each statement was considered as the measure that indicates whether or not the student had a positive attitude. Perceptions questionnaire carried 8 items to answer on a five point Likert scale (1-strongly disagree to 5-strongly agree). The score of 30 out of 40 (75%) for each item was considered as the measure that indicates whether or not student had perceived the importance of M-learning.

Attitude: Is a hypothetical viewpoint that represents an individual's like or dislike for an item. Attitudes are positive, neutral or negative way of thinking of an "attitude object" or settled way of feeling about something. Validity of the instrument used in present study was assessed. Initially, the instrument consisted of 65 items and was reviewed by group of 10 faculty members of the Department of Community Medicine who hold master degree in this specialty. They were asked to give their judgments on the suitability of the items of the instrument to measure what they have been designed for. They were also asked to check the language of the items and clarity of their meaning, and to delete, add or modify any items as they perceive. Based on the suggestions of the faculties, some questions were modified and some questions were deleted. The final version of the questionnaire consisted of 58 items. Reliability of the instrument was also checked by giving instrument to an exploratory sample of 20 MBBS students chosen from outside of the sample of the study. Cronbach's alpha equation was applied and the reliability coefficient for the internal consistency was calculated and found above 0.70 for various sections of the instrument [Table/ Fig-1]. The Cronbach's alpha [18] is generally acceded upon the level of 0.70 shows an existence of solid internal relationships of all measurements statements characterising the mobile learning, and this result gives credence that statistical results produced are coming from well constructed measurement source.

STATISTICAL ANALYSIS

Analysis of data was done by using SPSS 18.0 version software. Cronbach's alpha was calculated for all questionnaires using reliability analysis. Unpaired t-test and Paired t-test were used for analysis.

RESULTS

Ninety students participated in present study which included 49 (54.4%) male and 41(45.6%) female students. All of them were third year MBBS students and in the age group of 20-22years. All the participants had their own smartphones or tablets with internet connection. All of them had installed necessary application for forming M-learning group.

Analysis of learning approach of the participants revealed that mean score for deep learning approach items was significantly higher than the mean score for surface learning approach items [Table/Fig-2]. It was also found that 47(52.2%) students had deep learning approach, 10(11.1%) students had surface learning approach and 33(36.7%) had neither deep nor surface learning approach.

The analysis of students' attitudes (30 items) towards M-learning was done and it was found that 80% students (scored more than 90 out of 150) had positive attitude towards M-learning. Item wise analysis showed that the percentages of 24 items were above 60% and the percentages of 6 items were below 60% which indicate that attitudes of students were positive towards M-learning [Table/Fig-3].

Instrument sections	Number of items	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
R-SPQ-2F Deep learning approach	10	0.703	0.708
R-SPQ-2F Surface learning approach	10	0.711	0.704
Attitude questionnaire	30	0.730	0.740
Perception questionnaire	08	0.760	0.830

[Table/Fig-1]: Reliability statistics of the instrument used.

Learning approach score	N	Mean	SD	t	df	p-value
Deep learning approach	90	30.39	5.528	7.38	89	<0.001*
Surface learning approach	90	22.99	6.284			

[Table/Fig-2]: Analysis of students' learning approach.
*significant

Item number	Order of Item	Statement	Total score- out of 150 (%)
1	1	I would get benefits in my learning if M-learning is used	122 (81.3)
13	2	I believe that M-learning provides me with rich resources	116 (77.3)
14	3	I think M-learning provides massive education for learners	115 (76.7)
12	4	I believe that M-learning may saves my effort	113 (75.3)
17	5	I think M-learning is easy to monitor the teaching and learning process	112 (74.7)
8	6	I believe M-learning works well with my study plan/program	108 (72.0)
15	7	I think M-learning provides efficiency in learning	108 (72.0)
6	8	I think M-learning should be supplementary to traditional teaching-learning	107 (71.3)
22	9	M-learning needs well prepared mobile materials	105 (70.0)
18	10	M-learning is effective in terms of creating a personally meaningful learning experience for me	105 (70.0)
16	11	I think M-learning minimizes the cost of teaching and learning	104 (69.3)
25	12	M-learning needs variant teaching strategies	101 (67.3)
30	13	M-learning requires crucial technological infrastructure	100 (66.7)
5	14	I would feel comfortable taking courses through mobile devices	97 (64.7)
7	15	I think M-learning will save my time	97 (64.7)
3	16	I prefer M-learning to traditional learning	96 (64.0)
24	17	M-learning needs sufficient ground work	96 (64.0)
9	18	I think M-learning enables me to attend classes more frequently than traditional learning	96 (64.0)
2	19	I believe that I learn better through M-learning material than through lectures	96 (64.0)
10	20	I think M-learning enables me to understand the subject more than the traditional style of learning	95 (63.3)
11	21	I would like to have teaching-learning using the M-learning methodology	95 (63.3)
23	22	M-learning needs sufficient training courses for implementation	94 (62.7)
20	23	M-learning requires significant changes by the student	93 (62.0)
26	24	M-learning poses difficulty in monitoring the evaluation process	93 (62.0)
21	25	M-learning hinder contribution to classroom discussions	90 (60.0)
4	26	I think M-learning is uncomfortable for me	86 (57.3)
29	27	M-learning reduces teamwork and collaboration between students	85 (56.7)
28	28	M-learning causes fragmentation of work and loss of consistency in learning	82 (54.7)
27	29	M-learning causes decline in learners' academic performance	78 (52.0)
19	30	M-learning will not offer any advantages to me	54 (36.0)

[Table/Fig-3]: Item analysis of the students' attitude towards M-learning.

The analysis of students' perceptions (8 items) towards M-learning was also done and it was found that 76.7% students (scored more than 32 out of 40) had perceived the importance of M-learning. Item wise analysis showed that the percentages of 5 items were above 75% and the percentages of 3 items were below 75% which indicate that the students perceive the importance of M-learning [Table/Fig-4].

There was no statistically significant gender difference among the students for mean attitude score as well as mean perception score [Table/Fig-5].

Utilisation of M-learning by MBBS students was studied [Table/Fig-6] with the help of application database backup of group activity records. It was found that all the students had chat or SMS activity for social purpose and 73.3% students were actively involved more than twice a week for the same. It was also found that only 10 (11.1%) students were not active on the group chat or SMS for learning purpose and 52.2% students were actively (twice or more than twice a week) involved in group learning purpose. However, 57.8% students have not downloaded (at least twice weekly) the shared reference material, 38.9% students never read and replied to the questions asked, only 30.0% students have accessed the web link of references/guidelines given and 60.0% students never asked any doubts/questions related to the discussion.

DISCUSSION

The purpose of the present research was to investigate the medical undergraduates orientation towards mobile learning. Aim of this study was to reveal their attitudes, perceptions and involvement in M-learning, regardless of its efficiency. Results of

Number of Item (Perception Questionnaire)	Mean	SD	Percentage	Order of Item
M-learning will bring new opportunities of learning	4.30	0.589	86.0	1
M-learning will be more flexible method of learning as it can be done anytime, anywhere	4.27	0.731	85.3	2
M-learning can be an effective method of learning as it can give immediate support	4.20	0.796	84.0	3
M-learning is a quicker method of getting feedback in learning	4.20	0.796	84.0	4
M-learning will improve communication between student and teacher	4.13	0.962	82.7	5
M-learning cannot be used for learning due to:				
Expenses involved in Mobile learning	3.60	1.261	72.0	6
Poor internet network (for mobile) in the city	3.60	1.314	72.0	7
Unavailability of mobile phones with a larger number of students	3.47	1.439	69.3	8

[Table/Fig-4]: Mean and the Standard Deviation (SD) of perception of students towards M-learning.

Gender	N	Mean	SD	t	df	p-value
Attitude score						
Male	49	96.22	11.157	1.83	88	0.07 Not significant
Female	41	100.05	8.015			
Perception score						
Male	49	31.37	4.902	0.82	88	0.42 Not significant
Female	41	32.24	5.262			

[Table/Fig-5]: Gender wise comparison for mean attitude and perception scores.

Activity on M-learning group	Never		Once per week		≥ Twice per week	
	N	%	N	%	N	%
Send/receive chat SMSs for social purpose	0	0.0	10	11.1	80	88.9
Send/receive chat SMSs for learning purpose	10	11.1	33	36.7	47	52.2
Download the shared learning material (word, pdf, text file/image/audio/video)	22	24.5	30	33.3	38	42.2
Read and reply to the questions asked	32	38.9	28	31.1	30	33.3
Access the shared web links given as a reference/guideline	35	38.9	25	27.8	27	30.0
Ask doubts/questions to others chat/call	54	60.0	32	35.6	4	4.4

[Table/Fig-6]: Utilisation of M-learning by students.

this research reveal the fact that undergraduate students were interested in M-learning if it is available and implemented in the institute. This positive attitude towards M-learning is because of the fact that now-a-days almost all students use such devices and on a regular basis.

Mobile learning, or "M-learning," is broadly defined as the delivery of learning content using mobile technology that is accessed at a student's convenience from any location [19]. Many studies have indicated that mobile, wireless device technology supports teaching and learning [20-22].

This result is in line with the findings of other researchers [7,11,23-32] that students are willing to use technology in the educational setting. Whereas, few studies showed a not so positive attitude/perception of students towards M-learning (no or little change in their perceptions either negatively or positively [33,34]).

The present study found that the mobile phone enabled students to communicate easily with faculty and each other, regardless of time and place. It also helped students to exchange information and data related to their reference materials. These findings were found to be similar to studies conducted by Al-Fahad and Pachler [7,35]. Additionally, students reported that using mobile devices was convenient and it saved their time and efforts. This perceived convenience associated with mobile learning was also in line with previous studies [7,8,23,36].

However, students felt that M-learning requires additional expenses which were needed to perform the tasks (i.e., if they had to purchase a mobile data plan or new handset if their mobile phone did not support a software) and these factors would act as a discouragement for M-learning. Similar finding was reported by Venkatesh et al., [10].

Regarding availability of mobile phones, students agreed that mobile phones are available to a large number of students. Students did, however, report concern regarding the quality of internet network presently available to them. The low (4.4 to 52.2) percentage towards the mobile phone usage (≥ twice per week) in learning might be attributed to the lack of upgraded mobile phone or its associated features (less mobile memory, slow internet connection), lack of interest, unsuitability and ignorance regarding provided or installed application for learning purpose. This result is consistent with the results of the studies of Al-Fahad, Waycott and Kuklsca-hulme, Tenant and Cook [7,12,37,38]. In the present research, the M-learning utilization by students was low especially regarding downloading educational files, reading and responding to the questions asked based on the reference material provided and this could be due to the fact that M-learning was not formally accounted for their assessment and no other departments were using M-learning in their teaching-learning at the time of the study.

The results showed that there was no significant statistical differences among the students' attitudes as well as perceptions (mean scores) towards the mobile phone usage in education ascribed to gender. This may be due to the equality of the attitudes and perceptions of both gender students towards the mobile phone, belonging to same age group, class and may be they also have the same need to use the mobile phone in education. Besides, the general characteristics of males and females were similar despite the different cultural, social and economical contexts, reflecting congruent views of both genders towards the mobile phone usage in learning. This result is consistent with the results of other [7,35,37-39].

LIMITATION

The study has relied on a self-reporting survey and there may be other variables affecting the low usage of the provided application for M-learning which was not assessed by the researchers. The research focuses on the attitudes and perceptions of the undergraduate students in the medical education, regardless of efficiency of M-learning.

CONCLUSION

This paper tries to understand the attitudes and perceptions of medical students towards mobile learning. Based on the results of the study, the researchers found that undergraduate students viewed M-learning positively and they showed interest in it but when they were provided with the opportunity, they did not show appreciable compliance. These findings were compatible with other research results presented in the present literature about the topic. Though the students were keen to use M-learning; their actual M-learning utilization was low in present study since it was not implemented by all departments, also it was not the part of student's assessment and probably because the study duration was less. In developing countries like India mobile technology is found to be popular and holds tremendous potential which can be strategically used to support and improve student teaching-learning.

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