Original Article

Attitude towards mobile learning among resident doctors involved in undergraduate medical education at a government medical college in Delhi, India

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Abstract:

BACKGROUND: There is growing recognition of the role of mobile learning (M-learning) for undergraduate (UG) academic education and teaching purposes, but teacher attitudes toward it can be variable.

OBJECTIVE: To determine the attitudes toward the incorporation of M-learning methods for UG medical education among resident doctors at a government medical college in Delhi, India.

METHODS: A cross-sectional study was conducted for 3-months duration (2019) among 60 final year junior and senior resident doctors. The participants were selected from all the preclinical and paraclinical department, and one clinical department selected randomly based on the probability proportion to size method. The data was collected using self-administered instruments including the modified 20-item M-learning Perception Scale (MLPS).

RESULTS: Social media (36.7%) and instant messaging platforms (85%) were routinely used by the participants for exchanging academic (medical) and health-related information. The mean score for all the MLPS item responses was >3, indicating positive attitudes toward M-Learning. The participants expressed maximum agreement with the views stating M-Learning can "supplement traditional teaching," was "reliable for personal use," and "improves the quality of lessons." The responses of those participants having preexisting familiarity with health information and education portals, and those aware of massive open online courses correlated significantly with higher MLPS scores.

CONCLUSION: M-learning is visualized as an increasingly relevant teaching and learning medium by early-career resident doctors involved in UG medical education in India.

Keywords:
India, medical education, mobile learning

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Introduction

Modern information and communication technology have revolutionized teaching methods for undergraduate (UG) education. Mobile learning (M-learning) represents digital teaching and learning medium enabled with internet technology

for the transmission or reception of information and communication using text, images, audio, and videos. The data can subsequently be received on various electronic devices such as smartphones, tablets, laptops, etc., for teaching and learning purposes.[1] The application of M-learning in the domain of medical education is being increasingly witnessed

globally, especially in the developed world.[2,3] M-learning can complement learning processes by providing on-demand access to a variety of learning resources for in-depth study and revision of the vast medical curriculum from the UG level.[4-6] The increased ubiquity of inexpensive, high-speed internet access, and ownership of web-enabled electronic gadgets augments the potential of integration of M-learning for regular classroom teaching.[5,7]

Teacher's attitude toward M-learning is influenced by several factors, including the fact that current teachers usually belong to a generation who are technological immigrants while young students belong to a generation that are technological natives.[8] Consequently, the lack of familiarity with the associated technology can act as a stressor for teachers that lack technological adeptness, motivation, and training necessary for its effective implementation.[9] Furthermore, mobile phone use in classrooms may carry a negative perception for teachers as it can be a source of constant distraction for the students, often causing loss of focus and attention.[10] Moreover, it is also well-established that the use of technological tools during the class activities does not necessarily translate into enhanced pedagogical outcomes.[11] Therefore, understanding the medical teacher's perception and attitudes toward M-learning can facilitate the gradual introduction and successful implementation of M-learning in the teaching environment of medical classrooms.[12] A few studies in India have previously assessed student attitudes toward M-learning.[7,13] However, the teacher attitudes among young medical residents routinely involved in teaching and teaching assistance with the UG medical curriculum, and who represent the collective pool for the appointment of the future faculty has not been reported previously.

The present study was conducted with the objectives of determining the attitude towards the incorporation of M-learning methods for UG medical education among resident doctors at a Government Medical College in Delhi, India.

Methods

Study design
A cross-sectional study was conducted from October to December 2019 among final year junior and senior resident doctors in a government medical college in Delhi, India.

Study setting
A total of 250 UG students enroll themselves each year for the M.B.B.S course at the college. A total of 19 academic and clinical departments were involved in UG M.B.B.S curricular teaching.

Study participants
Inclusion criteria
Any junior resident doctors simultaneously undergoing training for a postgraduate medical specialization degree, or any senior resident doctor in training.

Exclusion criteria
Any senior resident doctor involved as a hospital specialist (nonacademic).

Sample size and sampling method
A sample of convenience of 60 participants was recruited for the study. All the pre- and para-Clinical Departments involved in teaching UG medical (MBBS) students were selected purposively. This was because the resident doctors in these departments were directly involved in small group UG teaching involving both theory and practical sessions. In addition, one clinical department was also selected randomly. Subsequently, three to ten resident doctors were selective consecutively from each selected department, applying the probability proportional to size sampling method based upon the total number of residents working at each department.

Study instruments
Data were collected using a pretested self-administered questionnaire that collected information on the participant's existing engagement with M-learning applications, social media usage for medical education purposes, and familiarity with online medical knowledge platforms and portals. The participant engagement with online sources of medical information and education was assessed using a self-designed questionnaire that queried the participant's familiarity of the following sources: (1) medical and health portals providing medical and health-related information, (2) major global academic journals, and (3) massive open online course (MOOC) platforms. The familiarity for each item was rated on a 10 point continuous rating scale and a score of ≥ 5 was considered as indicative of minimally acceptable familiarity present for the respective item. The reliability (Cronbach's Alpha) of this questionnaire was 0.804.

M-learning perception
The previously validated M-learning Perception Scale (for teachers) (MLPS) designed by Uzunboylu and Ozdamli[12] was used to ascertain the perception of the participants toward M-learning. It was modified by removing redundant items and updated to account for the current advances in information and smartphone technology. The reliability (Cronbach's-Alpha) of the MLPS in this study was 0.832.

The dimensions assessed by the MLPS include:
i.   Aim-mobile technologies fit: To assess the perceived appropriateness of M-learning goals for achieving the goals of learning activities

ii. Appropriateness of branch to assess the perceived appropriateness of M-learning and teaching goals, and

iii. Forms of M-learning application and tools sufficient adequacy of communication: To assess the relevance of M-learning in education and the adequacy of its merits in achieving high-quality communication for educational purposes.

All the item responses for the MLPS were coded on a 5-item Likert scale – 1 (Strongly disagree), 2 (Disagree), 3 (Neutral), 4 (Agree), and 5 (Strongly Agree).

Statistical analysis

The data were analyzed with SPSS Version 25 (IBM Inc. Armonk. NY). The categorical variables were summarized as frequencies and proportions and the continuous variables as mean (standard deviation [SD]) or median (interquartile range) based on the distribution of data. The statistical significance of the difference between the categorical variables was assessed using the Chi-square test and between the skewed continuous variables using the Mann–Whitney test. $P < 0.05$ was considered statistically significant.

Ethics

The study was approved with exemption from full review by the Institutional Ethics Committee of the medical college. All participants provided written and informed consent for participation in the study.

Results

The study was conducted among 20 (33.3%) male and 40 (66.7%) female resident doctors of the institute having a mean (SD) age of 30.1 (2.8) years.

In the previous 15 days from the time of enrolment, a total of 18 (30%) participants reported completion of an online course assignment. There were also 34 (54.7%) participants who reported listening to a web-based podcast (digital audio broadcast). However, only 11 (18.3%) participants had previously participated in the development of any academic webinar i.e., an internet-based seminar which is attended by an online audience.

Table 1 describes the utilization of social media and instant messaging platforms for medical education purposes by the participants. WhatsApp and Facebook were reported by the participants as their most preferred social media/instant messaging platforms for the exchange of information for medical education purposes.

In Table 2, the participant familiarity with medical information portals are depicted. Most participants

Table 1: Use of social media for medical education and information purposes in the participants (*n*=60)

Social media platform	Use platform for medical education-related activities		Total (*n*=60), *n* (%)	*P*
	Male (*n*=20; 33.3)	Female (*n*=40; 66.7)		
Facebook	9 (45.0)	13 (32.5)	22 (36.7)	1.00
Twitter	1 (5.0)	2 (5.0)	3 (5.0)	1.00
Instagram	2 (10.0)	5 (12.5)	7 (11.7)	1.00
WhatsApp	16 (80.0)	35 (87.5)	51 (85.0)	0.44

Table 2: Familiarity of participants with online medical knowledge platforms (*n*=60)

Knowledge platform	Familiar with the platform		Total (*n*=60), *n* (%)	*P*
	Male (*n*=20; 33.3)	Female, (*n*=40; 66.7)		
UptoDate	7 (35)	19 (47.5)	26 (43.3)	0.416
DynaMed	5 (25)	10 (25)	15 (25)	1.00
MedScape	15 (75)	37 (92.5)	52 (86.6)	0.103
WebMD	14 (70)	32 (80)	46 (76.6)	0.519
Mayo's clinic	15 (75)	32 (80)	47 (78.3)	0.744
BMJ	14 (70)	34 (85)	48 (80)	0.189
Lancet	11 (55)	33 (82.5)	44 (73.3)	0.032
Epocrates	3 (15)	11 (27.5)	14 (23.3)	0.347
EdX	3 (15)	8 (20)	11 (18.3)	0.736
Coursera	5 (25)	13 (32.5)	18 (30)	0.766

were also familiar with freely accessible medical information portals such as Medscape (86.6%) and WebMD (76.6%). However, a majority were unaware of paid and licensed medical information platforms that were otherwise not licensed for use by the institution. No significant differences in the familiarity and utilization of M-learning resources were observed among the male and female participants.

The median MLPS score was 74. The mean score for all the MLPS item responses was >3, showing participant agreement with the statements. The participants expressed maximum agreement regarding M-learning for the following items; "can supplement traditional teaching," "reliable for personal use," and "improves the quality of lessons." Female compared to male participants were significantly more likely to perceive M-learning as being useful in enhancing student motivation ($P = 0.04$) [Table 3].

On bivariate analysis, the participants having preexisting familiarity with health information and education portals, and those aware of MOOCs were observed to show significantly higher MLPS scores [Table 4].

Discussion

M-learning has become a significant adjunct for the provision of medical education in recent years.[14] The present study found considerable access and utilization of M-learning resources by young resident doctors that

Table 3: Distribution of responses to the mobile learning perception scale for undergraduate medical teaching among resident doctors (*n*=60)

Item serial number	Statement regarding mobile learning	Mean score		P
		Male	Female	
1	Remove limitations of time and space	3.9 (0.7)	4.1 (0.8)	0.20
2	Do not generate effective teaching-learning environments	3.1 (1.1)	2.6 (0.9)	0.07
3	Should be used to perform teaching-learning	3.4 (0.7)	3.6 (0.9)	0.46
4	Good discussion tool for use with student learning activities	3.7 (0.7)	4.0 (0.7)	0.08
5	Video conferencing tools are useful teaching tools	3.9 (0.8)	3.9 (0.7)	0.91
6	Supplements the traditional teaching	4.1 (0.9)	3.9 (0.9)	0.69
7	Learning activities can be realized	3.7 (0.6)	3.7 (0.7)	0.78
8	Promotes learning environment by the distribution of teaching notes through social media	3.5 (1.1)	3.6 (0.9)	0.78
9	Good learning method for my specialized subject	3.5 (0.9)	3.6 (0.8)	0.68
10	Good method for exact transmission of knowledge	3.5 (0.7)	3.9 (0.8)	0.21
11	Facilitates teacher-student communication	3.3 (1.0)	3.6 (0.9)	0.29
12	Increases student motivation	3.3 (0.9)	3.8 (0.7)	0.04
13	Provides prompt access to teaching materials	3.8 (0.8)	4.1 (0.8)	0.13
14	Reliable for personal use	4.0 (0.6)	3.9 (0.7)	1.00
15	Good for interaction in a class	3.6 (0.8)	3.7 (0.9)	0.54
16	Useful for research and knowledge sharing with colleagues	3.8 (0.6)	3.9 (0.6)	0.19
17	Improves the quality of lessons	4.2 (0.6)	4.1 (0.6)	0.76
18	Would like to supplement my lessons with mobile learning	3.6 (0.9)	3.9 (0.7)	0.27
19	Facilitates student-student communication	3.5 (1.1)	3.8 (0.7)	0.17
20	More effective student-student communication compared to traditional methods	3.4 (1.1)	3.7 (0.9)	0.23

Table 4: Factors influence positive perception toward Mobile Learning for undergraduate medical teaching among resident doctors (*n*=60)

Variable	Total, *n* (%)	MLPS score, mean (SD)	P
Sex			
Male	20 (33.3)	72.3 (8.5)	0.158
Female	40 (66.6)	75.7 (7.9)	
Completed an online assignment			
Yes	18 (30)	76.1 (10.1)	0.433
No	42 (70)	73.8 (7.1)	
Facebook for medical education			
Yes	22 (36.7)	74.7 (7.7)	0.351
No	38 (63.3)	74.4 (8.6)	
Familiarity with health portals*			
Yes	52 (86.6)	76.1 (7.36)	<0.001
No	8 (13.3)	64.7 (6.1)	
Familiarity with academic journals+			
Yes	52 (86.6)	74.5 (6.81)	0.883
No	8 (13.3)	74.6 (14.81)	
Familiarity MOOCs#			
Yes	20 (33.3)	79.3 (7.9)	0.004
No	40 (66.6)	72.2 (7.3)	

*Either Medscape or WebMD; +Both Lancet and BMJ; #Either Coursera or EdX. MOOCs: Massive open online courses, MLPS: Mobile Learning Perception Scale, SD: Standard deviation

more in agreement with the use of M-learning compared to teachers with lesser experience.[15] Unlike a previous study by Hung in Taiwan (2015), in this study, teacher readiness for M-learning was not associated with greater male proclivity.[16] A significant finding of the present study was that only one in three participants were utilizing MOOCs for updating their medical education or for teaching purposes, which could be improved through further awareness.

Our study results imply the need for incorporating M-learning techniques in UG medical education in Indian medical colleges and institutions, through the greater involvement of resident doctors due to their preexisting utilization and higher self-efficacy towards teaching via this method. Future studies should assess the effectiveness of M-learning technologies in medical education during the COVID-19 pandemic globally, as most countries had to initiate lockdowns and suspend university classes.

There are certain limitations of the study. Our sample size was small due to the exclusion of most clinical departments in this study. The pedagogical outcomes among the UG students during classes that already involved the utilization of any M-learning methods was also not assessed in this study.

Conclusion

M-learning is visualized as an increasingly relevant teaching and learning medium by early-career resident

were involved in assisting the faculty and independent teaching of UG medical students. The participants also reported positive attitudes toward the utilization of M-Learning for supplementing traditional classroom teaching. Furthermore, M-learning applications were considered as a reliable tool for personal use by most participants.

Previous studies have reported mixed attitudes of teachers toward M-learning initiatives.[15,16] However, we included young participants who are more likely to be familiar and at ease at handling resources related to information technology compared to relatively older teachers. Nevertheless, a study in Korea (2018) among school teachers observed that experienced teachers were

doctors involved in UG medical education in India. Most participants used mobile teaching and learning methods for keeping abreast with newer knowledge and favored the medium's unprecedented value in knowledge transmission and accessibility without restrictions of time and space. Future studies need to ascertain the effect of innovative M-learning interventions on teacher and student satisfaction with the teaching process and their long-term impact on learning outcomes.

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Conflicts of interest

There are no conflicts of interest.

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