

Access this article online
Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_1823_22

Knowledge, attitude, and perception of dental undergraduates towards mobile and digital learning methods in India: A cross-sectional study

Anshu Prakash, Kumar Anand¹, Amit Kumar, Ritesh Raj, Santosh Anand², Kriti³, Shiwangi Singh⁴

Abstract:

BACKGROUND: Internet-based education is having few advantages since it increases an emphasis on the education system based on problems by incorporation of both visual as well as interactive tools. Also, some contributions to practical skills can be made using pictorial as well as video-based knowledge. The present study aimed to assess the knowledge, attitude, and perception of dental undergraduates towards mobile and digital learning methods in India.

MATERIALS AND METHODS: This was a cross-sectional questionnaire-based study conducted after obtaining Institutional Ethical Review Board permission. Before commencing the study, the purpose of the study was explained to the study participants and written informed consent was obtained. About 200 undergraduate students of dentistry in a single institution were selected as a convenient sample. Information obtained from responses was entered into an Excel sheet (Microsoft Corporation) and was further analyzed. Data collection was done for a period of one month. Statistical analysis: Obtained data were recorded and subjected to statistical analysis by use of statistical SPSS software (version 20.0, IBM). Descriptive statistical data were recorded as frequencies or percentages. Chi-square statistical test was used for the assessment of responses obtained from dental undergraduate students. The level of significance was fixed at a probability of <0.05.

RESULTS AND OBSERVATIONS: On statistically analyzing, 99% of students were found to possess knowledge regarding the use of mobile phones for digital education. A good statistical correlation was obtained between attitude and perception regarding accessing digital learning using mobile phones.

CONCLUSION: In the present study, good knowledge, attitude, and perception regarding the use of digital learning using phones were found among Indian dental undergraduates.

Keywords:

Attitude, digital, knowledge, mobile phones, perception

Introduction

“E-learning” also known as learning based on the web, online platform learning, and learning process based upon the internet can be acquired through mobiles and digital platforms. This method of learning requires the use of electronics-based devices for the dissemination of knowledge content from any teacher to students or gaining

knowledge using internet-based resources. Education media used in e-learning includes texts, images, animations, live streaming, educational videos as well as audios. These are fabricated for making the process of understanding relatively easy. Advantages of the e-learning process involve an increase in accessibility to information, easy updating of existing content, personalized instructions as per direct live interaction between student

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Prakash A, Anand K, Kumar A, Raj R, Anand S, Kriti, *et al.* Knowledge, attitude, and perception of dental undergraduates towards mobile and digital learning methods in India: A cross-sectional study. *J Edu Health Promot* 2023;12:220.

Department of Oral and Maxillofacial Surgery, Patna Dental College and Hospital, Patna, Bihar, India, ¹Department of Oral Medicine and Radiology, Buddha Institute of Dental Sciences and Hospital, Patna, Bihar, India, ²Department of Prosthodontics and Crown and Bridge, Patna Dental College and Hospital, Bankipore, Patna, Bihar, India, ³Dental Officer, Community Health Center, Gaya, Bihar, India, ⁴Private Practitioner, Patna, Bihar, India

Address for correspondence:

Dr. Santosh Anand,
Department of Prosthodontics and Crown and Bridge, Patna Dental College and Hospital, Bankipore, Patna, India.
E-mail: santoshkumar12391@yahoo.com

Received: 23-12-2022

Accepted: 02-03-2023

Published: 30-06-2023

and teacher or course instructor, easy distribution of educational material, standardized academic content, as well as accountability. Online learners can access available content, and determine their sequence as well as the pace of learning and flexible timing of learning. This will allow individuals in attaining personally set objectives for learning.^[1,2]

Development in computer science, as well as the evolution of the internet along with formation and technology, has a positive effect on the delivery of healthcare all around the world, especially in subjects related to the control of disease, disease diagnosis, management of patients as well as methods of teaching.^[3,4]

Electronic learning or e-learning may be utilized by medical educators for improving efficiency as well as effectiveness relating to imparting knowledge in their respective fields keeping in view various challenges associated with social issues, scientific along with pedagogical issues.^[5]

The future of the e-learning process appears to be bright with the increased use of mobile phones and the stress on digital learning. Blended learning includes a mixture of internet-based learning along with practical and classroom-based educational skills. Also, the rapid advances in knowledge of dentistry and medicine have made medical teaching much more complicated, information-driven, and technology-oriented.^[6-9]

Smartphones (newer versions of mobile phones with internet access) have found their use in education-related activities for accessing syllabi, acquiring knowledge and information, evaluating students' performances, and also, for sharing content between teachers as well as students.^[10] Thus, smartphones can have a significant contribution to modern dental education. Thus, these devices play a vital role in teaching as well as learning processes.^[11,12] There are a limited number of studies related to the perception of mobile (smart) phones as educational material in India. Hence, the present study was designed for evaluating knowledge, attitude, and perception regarding the digital mode of learning by use of mobile phones among dental undergraduate students in India.

Materials and Methods

Study design and settings

This was an observational and cross-sectional questionnaire-based survey analysis. Ethical approval was obtained from Institutional Ethical Review Board (IEC/PDM/2021E). Convenience sampling of undergraduate students was done. A questionnaire was designed in the form of sub-parts, i.e., a) Knowledge, b)

Attitude, and c) Perception regarding the use of mobile phones and digital learning for studying dental subjects. The questionnaire was distributed to the participants and the purpose and method of answering the questions were explained. Participants' personal information was coded so that any bias could be avoided.

Study participants

A total of 200 undergraduate students who were pursuing dentistry in a single institution, i.e., place of study were the targeted population.

Information derived from recorded responses was entered into an Excel spreadsheet (Microsoft Corporation) and analyzed.

The internal consistency of the prepared questionnaire was analyzed using Cronbach's " α " (alpha) test. The calculated test value observed was 0.80, which showed a high correlation level. Data was collected for a duration of one month.

Inclusion criteria for the study were as follows: 1) Study participants ≥ 18 years of age, 2) Dental undergraduate students regardless of the batch of admission, 3) Students who were capable of understanding the purpose of the study, and 4) Those students who were willing to participate in the study.

Exclusion criteria for the study were as follows: 1) Students not willing to participate in the survey, 2) Students who did not attend online classes, and 3) Students who did not access educational content on the internet.

Statistical analysis

Obtained data were collected and then subjected to statistical assessment using the SPSS software (version 20.0, IBM). Descriptive statistical data were obtained in form of frequencies or percentages. Chi-square statistical test was used for assessing the dental students' responses regarding their knowledge, attitudes, and perception related to digital learning using mobile phones. The level of significance was set at a probability of less than 0.05.

Results and Observations

a) Knowledge: In the present study, it was observed that 99% of study participants used mobile phones for viewing educational videos and for searching and reading scientific literature. 96% were of the opinion that the use of the information accessed through digital means improved knowledge as well as clinical skills. Most commonly accessed sites for seeking knowledge by undergraduate students were Google Scholar (59%),

PubMed (39%), and Wikipedia (02%). On analyzing statistically, a significant association between dental undergraduate students and search engines or sites searched was found to have high significance ($P < 0.001$).

89% of undergraduates had an awareness concerning the use of various dental apps for training and teaching purposes. Only 5% of the study participants had not downloaded any apps on their smartphones, which was found to be statistically significant.

93% of student participants had shown preference regarding the use of their mobile or smartphones over the use of the library. This was mainly because of quick usability [Table 1].

b) Attitude: On analyzing the attitude of undergraduate students towards the use of mobile phones and digital learning, it was observed that a statistically significant ($P < 0.01$) difference was seen regarding the use of digital learning in acquiring knowledge, i.e., high numbers of students believed that digital platform may be used for learning. There was statistically significant ($P < 0.05$) agreement in reviewing educational material available on digital platforms before learning from them. Significant numbers of undergraduate students believed that digital learning can help in improving scores ($P < 0.05$) while significant numbers of subjects believed that digital tools can be of significant use in achieving standardization in teaching [Table 2].

c) Perception: On studying perception regarding the use of mobile phones with digital learning by dental undergraduate students, it was seen that a statistically significant ($P < 0.05$) number of students had possession of a smart or mobile phone and/or laptops while there was accessibility to a Wi-Fi or mobile data for a statistically significant number of students ($P < 0.05$). Statistically significant ($P < 0.05$) numbers of dental undergraduate students found the available applications

user-friendly. Most of the students reported that good learning was achieved from online classes ($P < 0.05$). Digital learning was found to be more helpful in the process of acquiring knowledge by the majority of students ($P < 0.05$). Similarly, most students found digital learning more helpful than traditional lectures. Most students had the knowledge of capturing screenshots during digital presentations. However, a statistically significant ($P < 0.01$) number of students got distracted more during online classes when compared to offline classes. Most students preferred a combination of both digital as well as traditional means of classes for gaining knowledge and learning ($P < 0.05$) [Table 3].

Discussion

Medical and dental education as well as healthcare facilities across the globe faced new challenges due to the spread of the coronavirus (COVID-19) pandemic. As per the government guidelines, the closure of academic institutions with immediate effect had a tremendous impact on the quality of the learning process. This was attained by imparting education using digital platforms. However, the biggest hindrance was the accessibility of internet facilities as it is still not a widely available resource in India.

Also, the introduction of a curriculum based on the competency of students enrolled in the year 2019 was of major concern due to the outbreak of the pandemic in most countries. Most institutes had framed daily schedules for the phase I program. Also, training of teachers for the phase II program had to be initiated. Both dental as well as medical education requires clinical exposure and patient handling thus these healthcare systems remained affected.

Demographic characteristics: On analyzing the demographic data of the studied population, it was observed that most students belonged to urban areas and

Table 1: Table demonstrating knowledge regarding the use of mobile phones and digital tools among dental undergraduate students

Questions	Responses	Percentages	P
Do you use your mobile phones for accessing scientific content and educational material available on online platforms?	Yes	96%	$P < 0.01$
	No	04%	
Do you think the use of knowledge available through digital platforms provides knowledge and can improve clinical skills?	Yes	96%	$P < 0.01$
	No	04%	
What are the search platforms you utilize for accessing educational content?	Google Scholar	59%	$P < 0.05$
	PubMed	39%	
	Wikipedia	02%	
Are you aware of dental apps that contain educational content?	Yes	89%	$P < 0.05$
	No	11%	
Do you have educational apps downloaded in your mobile phones?	Yes	96%	$P < 0.05$
	No	04%	
Do you prefer using your mobile or smartphones over using library for searching educational material?	Yes	93%	$P < 0.01$
	No	07%	

Table 2: Table showing attitude towards digital learning among undergraduate students of dentistry

Attitude related questions	Response	Total	P
Digital learning can be useful in the learning process	Agree	116	<0.05
	Do not agree	84	
A careful review of the educational material should be done	Agree	156	<0.05
	Not agree	44	
The use of digital learning can help in upgrading scores	Agree	167	<0.05
	No agreement	33	
The use of digital tools can help in achieving standardization in teaching	Strongly agree	112	<0.05
	Agree	57	
	Do not agree	31	

Table 3: Table demonstrating perception of the dental undergraduate students towards mobile-based digital learning

Questions	Responses	Percentages	P
Subjects have mobile phones (smartphones) or laptop	Yes	78%	$P < 0.05$
	No	22%	
There is the accessibility of a Wi-Fi network or mobile internet	Yes	79%	$P < 0.05$
	No	21%	
Application tools available for accessing online teaching is user-friendly	Yes	86%	$P < 0.05$
	No	14%	
I have learned well during online classes	Yes	91%	$P < 0.05$
	No	09%	
Digital learning is more helpful than traditional classes	Yes	54%	$P < 0.05$
	No	45%	
There is knowledge regarding capturing of screenshots during lectures	Yes	89.1%	$P < 0.05$
	No	10.9%	
Do you get distracted more often during online classes when compared with offline regular teaching classes	Yes	67%	$P < 0.01$
	No	33%	
Do you prefer that both digital and offline teaching should be combined?	Yes	95%	$P < .05$
	No	05%	

had accessibility to the use of smartphones and digital learning, though a very small percentage of students did not have any access to the use of mobile phones. On analyzing the gender ratio, 55% of studied undergraduate students were females while 45% were male gender.

Knowledge: On analyzing the knowledge regarding the use of mobile phones and digital learning among dental students in the present study, it was seen that 99% of individuals had knowledge regarding the use of mobile phones and digital platforms in the process of learning. Also, students accessed sites such as PubMed and Google Scholar for accessing scientific literature. Saxena *et al.*^[10] (2022) reported good knowledge regarding the use of digital platforms for learning purposes by students which is in support of our findings.

Attitude: On analyzing attitudes towards using digital platforms from mobile phones, the current study

demonstrated a statistically significant number of students favoring this. Valdamani *et al.*^[11] (2019) in their study reported that 46.7% of undergraduate medical students made use of both laptops as well as smartphones for digital-based learning. Of these, 53% confidently used software-based applications. 44.8% of study participants had shown a preference for smartphones for purpose of e-learning when compared with laptops and computers which was reported to be 8.5%. This study represented an increase in the role of mobile phones in the learning process on the internet. On analyzing attitudes towards digital learning, most of the study participants, i.e., 81.33% were in agreement that the use of digital learning will help in achieving standardization in methods of teaching while 70.7% were of the view that the use of digital platforms can cause improvement in academic performances.

Similarly, Chowdary *et al.* (2013) reported good skills in computers in 87% of Bangladeshi medical undergraduate students.^[13]

Also, Varghese *et al.*^[14] (2012) in their study found that 88% of students reported positively that digital learning must be used as a supplementary means in addition to traditional methods of teaching.

Perception: On analyzing the perception regarding the use of mobile phones and digital learning among dental undergraduate students, it was observed that in the present study, a significantly high number of students had a positive perception regarding the digital learning method although they also reported a higher distraction while accessing online content when compared to regular teaching classes. Our findings are supported by Patil *et al.*^[15] (2021) who in their study found a high use of computer usage for accessing online lectures of which 77.8% reported good understanding via online means. However, in contrast to our study, only 18% of students reported a lesser impact with online mode when compared to regular classes. Also, similar to our study, very high statistically significant numbers of students reported higher distraction while accessing online content.

In contrast to our findings, Asiry *et al.*^[16] (2017) found that 61.2% of subjects were not satisfied with teaching or the use of online content for learning.

Major challenges that were faced during the online mode of teaching, as well as learning, were inadequate skills, management of time, insufficient infrastructure and/or resources, poor quality of communication at different levels, negative or lack of an attitude towards new technologies, and difficulty in engaging students.^[17-19]

HM Thippeswamy *et al.*^[20] (2022) in their study observed that although dental students had computer and internet facilities, they had negative perceptions and attitudes toward online learning. Almost all students favored the traditional method of learning.

Rana Noor *et al.*^[21] (2002) observed that most of the students preferred face-to-face learning. The majority of the students found it difficult to cope with technology-aided learning and encountered glitches with internet connectivity while using various online platforms.

Limitations

The major limitation of the study included a smaller sample size and only dental students were included in the study sample. A few more questionnaires on the related subject must be included to access the knowledge, attitude, and perception of dental students towards digital learning.

Conclusion

Though internet-based education has continuously enriched medical and dental sciences as well as learning, it remains highly recommendable for formulating structured education patterns. This interwoven hybrid mode of learning has been recommended by many and must be analyzed after carefully examining various aspects of the digital learning process. Mobile/smartphones are regularly being used by many students, hence, digitizing the learning process may be a suitable solution for revolutionizing the education system in dentistry.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Moberg TF, Whitcomb ME. Educational technology to facilitate medical students' learning: Background paper 2 of the medical school objectives project. *Acad Med* 1999;74:1146-50.
2. Ward JP, Gordon J, Field MJ, Lehmann HP. Communication and information technology in medical education. *Lancet* 2001;357:792-6.
3. Myers MR. Telemedicine: An emerging health care technology. *Health Care Manag (Frederick)* 2003;22:219-23.
4. Edworthy SM. Telemedicine in developing countries. *BMJ* 2001;323:524-5.
5. Dalsgaard C. Social software: E-learning beyond learning management systems. *Eur J Open Dist E-Learn* 2006;21;1-9.
6. Link TM, Marz R. Computer literacy and attitudes towards e-learning among first year medical students. *BMC Med Educ* 2006;6:34. doi: 10.1186/1472-6920-6-34.
7. Koschmann T. Medical education and computer literacy: Learning about, through and with computers. *Acad Med* 1995;70:818-21.
8. Seago BL, Schlesinger JB, Hampton CL. Using a decade of data on medical student computer literacy for strategic planning. *J Med Lib Assoc* 2002;90:202-9.
9. Ajuwon GA. Computer and internet use by first year clinical and nursing students in a Nigerian teaching hospital. *BMC Med Inform Decis Mak* 2003;3:10. doi: 10.1186/1472-6947-3-10.
10. Saxena N, Hugar SM, Soneta SP, Dialani PK, Kohli N, Patil VH. Knowledge, attitude, and practices about online education during COVID-19 outbreak among dental professionals in India – A cross-sectional study. *Indian J Health Sci Biomed Res* 2022;15:147-51.
11. Valdamani S, Kandipudi LP, Bhimarisetty DM. Assessment of knowledge, attitude and practice towards e-learning among undergraduate medical students, Andhra Medical College, Visakhapatnam. *Int J Community Med Public Health* 2019;6:5235-40.
12. Gilavand A, Shooriabi M. Investigating the impact of the use of mobile educational software in increase of learning of dentistry students. *Int J Med Res Health Sci* 2016;5:191-7.
13. Nasrin Sultana Chowdhurya, Nurun Nahar Chowdhury, Ferdous Rabbic, Rehnuma Tabassum, Sonia Ishrat. Computer Literacy and Attitudes Towards e-learning among Bangladeshi Medical Students. *Updat Dent. Coll.j* 2013; 3:3-6.
14. Varghese J, Faith M, Jacob M. Impact of e-resources on learning in biochemistry: First-year medical students perceptions. *BMC Med Educ* 2012;12:1-9. doi: 10.1186/1472-6920-12-21.
15. Patil D, Singh S, Katge F, Jain R, Bhanushali N, Bhanushali P. Perception of undergraduate dental students toward online lectures during COVID-19 lockdown period. *World J Dent* 2021;12:64-9.
16. Asiry MA. Dental students' perceptions of an online learning. *Saudi Dent J* 2017;29:167-70.
17. Hiwarkar M, Taywade O. Assessment of knowledge, attitude and skills towards e-learning in first year medical students. *Int J Res Med Sci* 2019;7:4119-26.
18. Regmi K, Jones L. A systematic review of the factors – Enablers and barriers – Affecting e-learning in health sciences education. *BMC Med Educ* 2020;20:91.
19. Ghani F. COVID19 outbreak – Immediate and long-term impacts on the dental profession. *Pak J Med Sci* 2020;36:S126-9.
20. Thippeswamy HM, Anushree SM, Kumar MN, Pradeep S. Dental undergraduate students knowledge, attitude, and perception of online learning during COVID-19 pandemic. *J Datta Meghe Inst Med Sci Univ* 2022;17(Suppl S1):5-8.
21. Noor R, Singh D, Agarwal A, Mansoori S, Ansari MI. Perception of dental students towards the online method of dental education during the COVID-19 pandemic. *J Oral Biol Craniofac Res* 2022;12:223-7.