



## Assessment of Development and Use of Technological Skills and Usage of different IT applications amongst Dental Undergraduates in Dental Institutions across Pune, India.

Dr. Renuka Nagarale<sup>1</sup>, Dr. Neetu Kadu<sup>2</sup>, Saqib Khan<sup>3</sup>, Rifa Ansari<sup>3</sup>, Zaid Chaudhary<sup>3</sup>

<sup>1</sup>Professor & HOD, <sup>2</sup>Associate Professor, Department of Public Health Dentistry; <sup>3</sup>Undergraduate, M.A. Rangoonwala College of Dental Sciences & Research Centre, Pune-01.

Corresponding Author: Faiz Sajid Khan, Undergraduate, M.A. Rangoonwala College of Dental Sciences and Research Centre, Pune-01.

Date of Submission: 15-11-2023

Date of Acceptance: 25-11-2023

**ABSTRACT:** The aim and objectives of the study is to assess the Access To Information Technology Practices, to gain knowledge about the IT skills and training among dental undergraduate students attending a Private dental school in Pune and about the Computer Activities used in pursuit of Dental Studies. In light of how flexible the internet is, students can communicate with their teacher as well as with each other through blogs, webcasting, videoconferencing, social media, and email. The Internet is likely very powerful for both communication and inflation of knowledge. In dentistry, the Internet may be used for dental education. Students' proficiency with computers varies when they enroll in dental schools. These days, dental offices are using more digital equipment and information technology (IT). Computer and internet allow people to communicate freely across an international electronic computer network. Information technology (IT) has actually had a positive impact on health care delivery systems, particularly in the areas of disease control, diagnosis, patient management, and education, thanks to the significant advancements made in computers and the internet.[4] In other words, information and communication technology (ICT) plays a pivotal role in dental and medical education and its use is rapidly increasing. In contrast to its extensively acknowledged importance, computer access and computer related skills demonstrate a wide diversity, both regional and within students and faculties of the same institution. The way dental students in India use computers and information technology has become more and more important in determining how dentistry is taught. Technology has an indisputable impact on dental students' educational experiences and professional growth as it develops.

**KEYWORDS:** IT skills, computer, tablet, laptop, dental, DCI, foundation course.

### I. INTRODUCTION

In light of how flexible the internet is, students can communicate with their teacher as well as with each other through blogs, webcasting, videoconferencing, social media, and email. The Internet is likely very powerful for both communication and inflation of knowledge. In dentistry, the Internet may be used for dental education. [1] The use of information technologies in daily life has become boundless, and equally, educational technologies have taken advantage of this fortuity. The past few years have seen rapid advances in information and communication technology (ICT), and the pervasiveness of the worldwide web in everyday life has important implications for education. [3] The rapid development in computer technology and the wide availability of personal computers together with the Internet, email, and various medical literature retrieval applications have changed in other disciplines, dental education and practice settings. Students can work independently and at their own pace with electronic learning. Additional applications of modern media and technology in dentistry include patient and dentist education, digital imaging, electronic records and databases, practitioner-colleague communication, exposure to new products and advancements, practice marketing, access to information such as lectures and course materials, and "teledentistry," which enables interactive programs and in-person consultations, allowing people in remote areas to learn without having to travel too far.

Students' proficiency with computers varies when they enroll in dental schools. These days, dental offices are using more digital equipment and



information technology (IT). [3] Computer and internet allow people to communicate freely across an international electronic computer network. Furthermore, immediate access to a large portion of medical knowledge has been made possible by the growth of the World Wide Web and the Internet as a global communication tool [4]. Use of information technologies has energetically increased in the last decennium. It is possible that mobile devices and software applications that facilitate learning and help manage and enhance a healthcare provider's life will play a major role in the future of professional education. Information technology (IT) has actually had a positive impact on health care delivery systems, particularly in the areas of disease control, diagnosis, patient management, and education, thanks to the significant advancements made in computers and the internet.[4] In other words, information and communication technology (ICT) plays a pivotal role in dental and medical education and its use is rapidly increasing. [5] This rapid development leading to enhanced medical literature retrieval applications, together with increased access to personal computers have changed both the study and practice environments in dentistry, as in other disciplines [6-8] On the other hand, the development of information technology in developing countries is slow due to limited accessibility of computers and internet, at home and on campus. [4] Previous studies have emphasized that a graduate dentist must be able to use ICT for the benefit of his personal and professional development [9,10] A critical factor for the implementation of ICT in dental education is computer competence of dental students as well as of the academic staff [11] In addition to general data management, presentation and communication applications, and search strategies and techniques, computer literacy for staff members and students should encompass these areas. In recent studies of medical practitioner's use of online evidence, it has been reported that over 80% of practitioners studied believed that the use of electronic information resources has the potential to improve patient care [12,13] In contrast to its extensively acknowledged importance, computer access and computer related skills demonstrate a wide diversity, both regional and within students and faculties of the same institution [14-16] The lack of funding for maintaining IT infrastructure in developing nations may be the cause of this, while academic staff attitudes regarding technology may account for the diversity within the field. Though India is considered the information technology hub of Asia, computer penetration accounts to no more than 20 per thousand and education comprises of a mere

3.3% of the domestic IT market of India. [4] A study exist from this country regarding computer use among dental students - Information Technology Practices Amongst Dental Undergraduate Students at a Private Dental Institution in India S. Kumar 1~, G. Balasubramanyam 2, P. Duraiswamy 3, S. Kulkarni 4. [20] But there are no studies that exist for this country related to assessment of Development, use of technological skills and of different IT applications amongst Dental UG in Dental Institutions across Pune, India. In India, duration of the Bachelor of Dental Surgery (BDS) Course is of four calendar years followed by a year of rotatory internship. The first two years comprise the preclinical years and latter the clinical. The aim of this study is to assess the development and use of technological skills and usage of different IT applications amongst Dental Undergraduates in Dental Institutions across Pune, India.

## II. MATERIAL & METHODS

A questionnaire study was conducted among dental undergraduates of various dental college in Pune, Maharashtra, India. The study population comprised dental undergraduate students from first year to Internship enrolled at Maharashtra University of Health Sciences pursuing their career at Private Dental colleges in Pune, India. Verbal consent was obtained from the respondents and ethical approval for performing the survey was availed from the ethical committee for research of M.A. Rangoonwala College of Dental Sciences and Research Centre, Pune-01. Level of information technology usage was measured using a modified questionnaire which was derived from previous surveys [17,18,19]. The input parameters for sample size calculation were as follows: 80% power of the study, alphaerror 0.05, Confidence interval was set at 95%. The calculated sample size was around 289-300. The final considered sample size was around 325. The convenient sampling techniques were used in the study. The structured, self-administered, close-ended questionnaire was designed to collect the data which consisted of 33 questions and divided into 4 parts. The first part consists of demographic data such as Email ID, Name, Gender, College Name and Academic Year. The second part consists of questions regarding Access To Information Technology Practices. The third part consists questions regarding IT skills and training among dental undergraduate students attending a Private dental school in Pune. The third part consists of questions regarding use of Computer Activities in pursuit of Dental Studies. The fourth part consists of questions regarding Different



Applications Used by Dental Students In Pursuit of Academic Activities in a Private Dental Institution in Pune. The fifth part consists of questions regarding Necessity of learning of IT skills and knowledge of different IT applications in Dental Curriculum in India. The reliability statistics were calculated and Cronbach's Alpha was 0.818. The study was conducted during the beginning of the academic year 2023- 2024. The questionnaire was designed on Google forms (Google LLC, Mountain View, California, United States) and the link was distributed among the dental undergraduates through email, whatsapp number and other social media platforms (Instagram, Telegram, etc.) All undergraduate students were requested to participate in the study. Aims of the study were explained upon distribution. All participants took part in the study voluntarily and no incentives were given to the respondents. Statistical analysis was performed using Statistical Product and Service Solution (SPSS) version 21 for Windows (SPSSInc, Chicago, IL). Descriptive quantitative data was expressed in mean and standard deviation respectively. Descriptive qualitative data was expressed in percentage/proportion. Chi square test was used to find out association of various factors with knowledge of study subjects regarding knowledge & use of IT apps.

### III. RESULT

The questionnaire in the form of Google forms was distributed among male and female undergraduates of Private dental institutions across Pune, India. The female undergraduates who responded were 74% (n=214) and males were 26% (n=75). Maximum number of respondents belonged to the First Academic Year 38.8% (n=112) followed by Second Years 27.7% (n=80), Interns 16.3% (n=47), Third Years 11.1% (n=32) and Final Years 6.1% (n=18) (**Table 1**). About 80.6% (n=233) of the respondents had access to computers/laptops/tablets with 45% (n=130) respondents having accessibility and availability of computers/laptops/tablet sometimes whereas 30.4% (n=88) having the access and availability always. The availability and access to computer/laptops/tablets was found to be maximum at home 59.9% (n=173), 15.9% (n=46) at both home and Internet cafe, 14.5% (n=42) at college and 9.7% (n=28) at other places like Internet cafe (**Table 2**). More than half of the respondents did not use computers/laptops/tablets regularly and around 54.7% (n=158) first started using a computer/laptop/tablet regularly for academic purposes before joining Dental college. The reason cited by those not using computers/laptops/tablets regularly for academic purposes was Incomplete

knowledge about availability of different IT applications for academic purposes. 73.4% (n=212) of the respondents did not receive any professional IT training and those who received 26.6% (n=77) cited the quality of IT training received as Fair.

About 50.5% (n=146) of the participants familiarised themselves with computer/laptop/tablet through personal interest and experience, 31.8% (n=92) through a subject in a school (n=92), 7.6% through a course in senior college (n=22) and only 10% (n=29) through a friend. In the terms of level of general IT skills, 28.4% (n=82) were beginners compared to 5.2% (n=15) were competent in most advanced skills like Designing, Animations and Web designing (**Table 3**). Internet, 74.7% (n=216) was the main feature used more in the pursuit of their studies and 47.8% (n=138) used MS Powerpoint (**Graph 1**). Some of the respondents suggested E-books in replacement of expensive reference books used in their pursuit of studies. According to the responses, a comparative analysis of use of computers/laptops/tablets for personal use and for academic purposes revealed that 32.2% (n=93) used computers/laptops/tablets 2-3 days a week for academic activities and 37.4% (n=108) used it often for personal use. 22.1% (n=64) used computers/laptops/tablets everyday for academic activities. An equal number of respondents; 36.7% (n=106), rated Fair and Good as their ability to use various features of computer/laptop/tablet for academic activities, 10.7% and 4.8% rated their ability as Poor and Very Poor (**Table 4**). 62% (n=179) of the respondents were aware of various IT applications that can be used for academic activities and 62% (n=179) use different IT applications for academic activities. Maximum number; 34.6% (n=100), of respondents that used IT applications for academic purposes were from First year, followed by 19.7% (n=57) from second year, 14.5% (n=42) from final year, 12.11% (n=35) from Internship and 8.7% (n=25) from third year. 82.4% (n=238) use YouTube for academic activities followed by Google with 60.2% (n=174) using it (**Graph 2**). The IT applications used by maximum undergraduate students; 61.6% (n=178) were of Free unlimited subscription based and 18.7% (n=54) used it as Subscription based. 34.9% (n=101) used these IT applications as and when the need arises and 18.3% (n=53) used it every day and every alternate days for the pursuit of their academic activities. (**Table 5**) The purpose of use of IT applications was cited as for clearing concepts and basics by 72.3% (n=209) of the respondents and about 45% (n=130) stated the use of IT applications for yearly academic activities and university examinations as the reason (**Graph**



3). Respondents were of the view that they agree that IT applications can change the scope & face of Dentistry in India; 59.2% (n=171), whereas 28.7% (n=83) strongly agreed, 5.2% (n=15) disagreed and 6.9% (n=20) strongly disagreed with the same. 64.7% (n=187) of the participants agreed that prior knowledge of IT applications would have served a better purpose for them in their UG or during their UG whereas 21.8% (n=63) strongly agreed, 5.9% (n=17) disagreed and 7.6% (n=22) strongly agreed with the same. 90% (n=260) of the participants want that the Dental Curriculum in India should include foundation courses on IT learning skills and about 93.8% (n=271) were of the opinion that IT skills are helpful in Dental Curriculum (**Table 6**).

#### IV. DISCUSSION

There have been several studies that have reported on usage of computer and the use of internet in dental education and their potential use as an educational tool. This study is an effort to include the knowledge gained from the dental students across private institutions in India regarding the prevalence of use of Information technology practices and the awareness amongst them with respect to the various IT applications available for them for academic purposes. More than two-thirds of the students reported that they had access to computer/laptop/tablet at home which was consistent with the study conducted in the University of Jordon (3).

<b>Table 1: General information about study participants</b>			
		Number (n)	Percentage (%)
Gender	Male	75	26%
	Female	214	74%
Academic Year	First Year	112	38.8%
	Second Year	80	27.7%
	Third Year	32	11.1%
	Final Year	18	6.1%
	Internship	47	16.3%

<b>Table 2: Knowledge about Access and Availability To Information Technology Practices.</b>			
		Number (n)	Percentage (%)
Do you have access to a computer/laptop/tablet?	Yes	233	80.6%
	No	56	19.4%
How will you describe the access and availability of computer/laptop/tablet?	Always	88	30.4%
	Sometimes	130	45%
	Often	53	18.3%
	Never	18	6.2%
	Always	88	30.4%
Where do you have access to a	At college	42	14.5%
	At home	173	59.9%



computer/laptop/tablet?	Other Places (Internet Cafe)	28	9.7%
	At both home and internet cafe	46	15.9%

In terms of respondents, female responded more than males owing to the fact that there is a larger proportion of females in dental school across Private institutions in Pune. A significantly higher percentage of students had access to computer/laptop/tablet at their homes. Around 45% had access and availability to computer/laptop/tablet sometimes whereas 30.4% had the access and availability to computer/laptop/tablet always. The reason for the lower percentage of access and availability to computer/laptop/tablet always could be due to the absence of computer/laptop/tablet at home and inconvenience encountered by students to use it at Internet cafe's or college when the need arises. The availability and access to computer/laptop/tablet was found to be only 14.5% at college probably due to the absence of proper awareness among the dental students about the usage of these Information technology devices in the college. 54.7% of the participants first started using computer/laptop/tablet for academic purposes before joining the dental college and 35.3% did not

use the facilities regularly for academic purposes. The most common reason for lack of regular usage of information technology practices for academic purposes cited by the participants incomplete knowledge about availability of different IT applications for academic purposes. Around half of the students familiarised themselves computer/laptop/tablet through personal interest and experience, which is significantly different from the data collected by University of Jordan which signifies that about two-third of their students learn IT skills through personal experience and self learning. In this study, a significantly high percentage of 31.8% students learnt IT practices through a subject in school, indicating a good emphasis on this aspect of the curriculum. The quality of training received by the students was rated as Fair. Almost equal percentage of students graded themselves as beginners and being competent in some advanced skills indicating a fair level of intellectual knowledge, training and experienced gained by them in the use of IT practices.

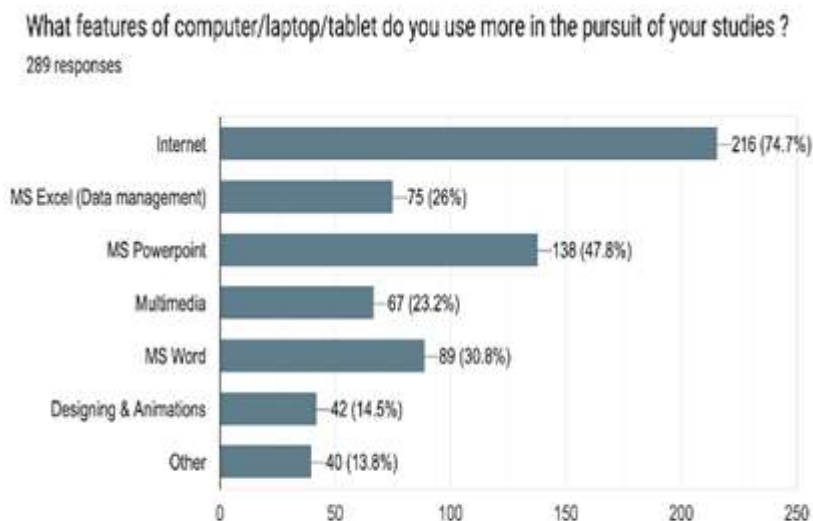
<b>Table 3:</b> Responses regarding questions on IT skills and training among dental undergraduate students attending a Private dental school in Pune.			
		Number (n)	Percentage (%)
Do you use computer/laptop/tablet regularly ?	Yes	119	41.2%
	No	170	58.8%
How long ago did you first start using a computer/laptop/tablet regularly for academic purposes ?	Not using regularly	102	35.3%
	Before joining Dental College	158	54.7%
	During Dental College	29	10%
How did you familiarize yourself with computer/laptop/tablet ?	Through a course in senior college	22	7.6%
	Through personal interest and experience	146	50.5%
	Through a friend	29	10%



	Through a subject in school	92	31.8%
How would you grade your General IT skills ?	Beginner	82	28.4%
	Competent in some basic skills	48	16.6%
	Competent in most basic skills	65	22.5%
	Competent in some advanced skills	79	27.3%
	Competent in most advanced skills	15	5.2%

The study conducted by University of Jordan (3) was done in the academic year 2002-2003, the development of information technology during those times was significantly lower as compared to present modern times and hence this study stands out unique in its own way in collecting data from students about their knowledge, attitude and awareness regarding the use of IT applications for the pursuit of their studies. Internet was the most common feature cited by the participants followed by MS Powerpoint and MS Word. Some respondent suggested that they use E-books in replacement of expensive reference books as feature in pursuit of their studies. This study reveals a higher percentage of about 37.4% participants using IT practices for personal use as compared to 32.3% of them using for academic purposes. Only 22.1% of the participants used IT practices everyday for academic activities. 62% of the students were aware of various IT applications

available for academic activities and an equal percentage of the students used these IT applications. Youtube was among the highest used IT application for academic activities followed by Google. Other IT applications like CEDEES, Canva, Meriters, Bone Box- Dental Lite, tooth view, etc, were not as popular among dental undergraduates. The purpose of use of IT applications was cited as to clear concepts and basics by 72.3% of the participants and around 45% used it for yearly academic activities and university examinations. This indicates that students prefer animated, pre-recorded, interactive and visual ways of learning available on Youtube and Google rather than an array of other applications present on the internet today either due to lack of knowledge of such applications available or due to their personal choice.

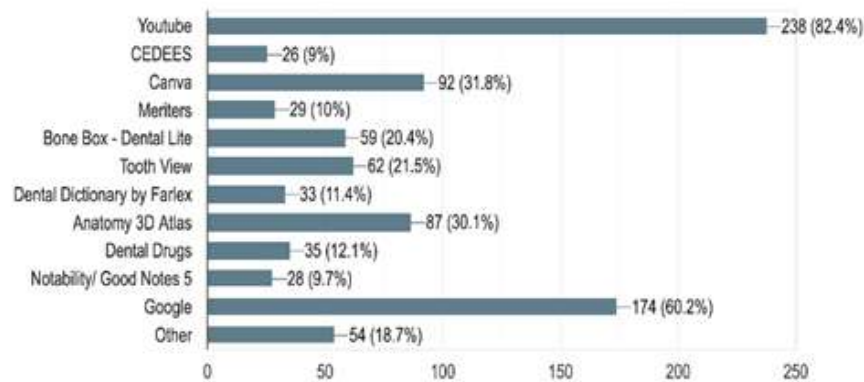


Graph 1



Which IT applications do you use for academic activities ?

289 responses



Graph 2

Among the IT applications used by the students, 61.6% used fee unlimited plans and only 18.7% used it as subscription based. The necessity of addition of foundational courses as a part of the dental curriculum by DCI is proved by the agreement of 90% of the respondents. 59.2% of the students are of the view that IT applications can change the scope and face of dentistry in India. A significantly higher percentage of individuals (93.8%) think that IT skills are helpful in dental curriculum. 64.7% of the respondents agree that IT applications would have served a better purpose for them in their Undergraduate or during their undergraduate. Students of class 10th are being taught basic computers. Lots of private training institutes throughout the country provide both basic as well as advanced training in computer. However most of the students taking dentistry as a profession are exposed to only basic computer training before joining the dental college as compared to students taking engineering or other branches. The students concentrate more on the studying life sciences. The pre medical and pre dental examinations conducted over various colleges of India include questions on Physics, Chemistry and Biology. Certain dental colleges include English and Current affairs questions but none of the dental colleges check the knowledge of computers as a criterion for admission to medical and dental courses. The post graduate admission is based on questions on topics of dentistry. Incorporation of few questions on computer sciences in such examination may create a positive change. (20) The dental council of India has not recognized the importance of inclusion of computers in dental curriculum. Few dental

colleges have organized courses on computers for the benefit of their students and faculty. American association of dental schools has approved incorporation on computer training as a fundamental part of syllabus (21). General medical council, UK has recommended optional modules to increase computer literacy among medical professionals (22). Japan offers a total of 788 hours for general educational courses which includes training in computer science (23). In Jordan all schools provide mandatory basic computer training to the students and all teaching staff is required to obtain a Jordan University Computer Driving License (3). Even short term training programs have shown to increase the knowledge of computers among students (24). With the introduction of graphic user interface, computers have become a house hold necessity now. It is being used but not studied. This may manifest as day to day problem in handling. Few hours of computer training during dental education may save a lot of trouble caused due to inadequate handling of computer during life time of dental practice. (20) We live in the age of internet. Finding dental education information is easy on the internet (25) and is also the most preferred place to search for information, updates and recent advances with respect to dentistry (26). However still there is a digital divide among the students (27). Certain students are comfortable to use internet and computers whereas there a lot many who are not. India is lagging behind from the western world in computer use (25). The availability of various applications like Bone Box-Dental Lite, Tooth View can be used by



undergraduates, postgraduates and clinicians alike as it provides a three dimensional view of individual tooth and well as its in depth anatomy. Students must be given demonstration for the usage of such applications. Many digital companies have come up with MDS Exam preparation applications that provide not only a reservoir of questions but also clear basic concepts, enhance clinical skills and knowledge by providing animated videos, pre-recorded sessions by eminent faculties and key concepts in a well structured flowchart or concept maps that could make studying and attempting theoretical questions easy. The world of digital dentistry has begun, and is advancing quickly. It is the need of the hour that the budding dentists and even the present clinicians have good amount of knowledge on how to use compute technologies and the availability of different applications and their benefits in their studies and practice. After the National Medical Council emphasising the role of IT in medicine and by addition of foundation courses on IT by NMC, the Dental Council of India has also proposed the addition of foundation courses in Information technology in order to bring the evolving dentists at par with the western world, but it still has to be implemented.

## V. CONCLUSION

The way dental students in India use computers and information technology has become more and more important in determining how dentistry is taught. Technology has an indisputable impact on dental students' educational experiences and professional growth as it develops. Students now have access to a wide range of educational resources, digital textbooks, and interactive simulations thanks to the use of computers and information technology. This could improve their comprehension of dental principles and practices in both depth and breadth. Dental students' clinical skills have been greatly improved by technology-driven instruments and simulators. Digital imaging, diagnostic software, and virtual patient simulations all help to create a more practical and realistic learning environment that better prepares students

for clinical practice in the real world. Dental professionals, instructors, and students can communicate and work together more easily thanks to information technology. A sense of community is fostered within the dental education ecosystem through the use of online platforms, forums, and collaborative tools that facilitate knowledge-sharing and networking. The need to equip dental undergraduates with basic to advanced information technology skills is urgent, even though Indian dental students use computers, laptops, and tablets for both personal and academic purposes. This will enable dental students to stand out from the competition and provide developed-nation dentists and other medical disciplines a competitive edge. Making them aware of the various IT tools that are accessible online is essential if they want to ace their exams, understand concepts more thoroughly, increase their clinical knowledge, and pick up new clinical skills. It is imperative that the Dental Council of India, which is now known as the National Dental Council, conduct needs assessments and include IT training programs for dental students pursuing undergraduate and graduate degrees. The educational experience of dental students in India has been greatly enhanced by the integration of computers and information technology practices. Even with all of the advantages, there are still issues that need to be resolved, like the digital divide, cybersecurity threats, and ongoing training requirements for technology. It is imperative that educational establishments put policies in place that guarantee fair access to technology and give students continuous assistance in navigating the rapidly changing digital environment. Dental schools must keep up with the rapid advancements in technology in order to create an environment where students are ready to adjust to the fast-paced, technologically-driven world of modern dentistry. This study has been conducted on a small scale. More studies in this field involving more number of dental colleges from different parts of India is required.

<b>Table 4:</b> Responses regarding questions on Computer Activities in pursuit of Dental Studies.			
		Number (n)	Percentage (%)
How often do you use the computer/laptop/tablet for academic activities ?	Every day	64	22.1%
	2-3 days a week	93	32.2%
	Once a week	49	17%





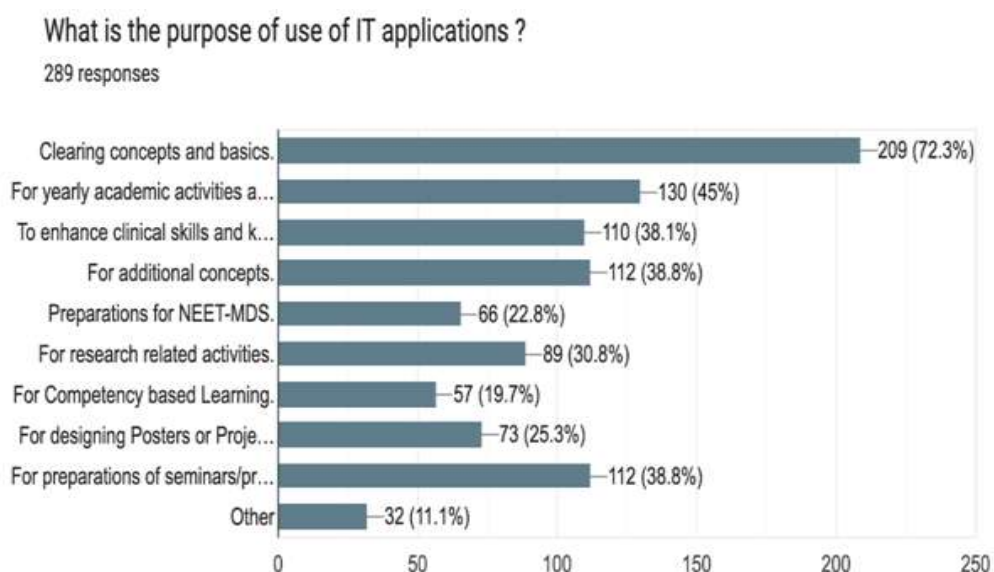
How often do you utilize the computer/laptop/tablet for personal use ?	Once a month	52	18%
	Never	31	10.7%
	Least often	42	14.5%
	Less often	76	26.3%
	Often	108	37.4%
	More often	43	14.9%
How would you rate your ability to use various features of computer/laptop/tablet for academic activities ?	Most often	20	6.9%
	Very Poor	14	4.8%
	Poor	31	10.7%
	Fair	106	36.7%
	Good	106	36.7%
	Very Good	32	11.1%

<b>Table 5:</b> Responses regarding questions on Different Applications Used by Dental Students In Pursuit of Academic Activities in a Private Dental Institution in Pune.			
		Number (n)	Percentage (%)
Do you use different IT applications for academic activities ?	Yes	179	62%
	No	110	38%
Are you aware of various IT applications that can be used for academic activities ?	Yes	179	62%
	No	110	38%
In which year did you use IT applications the most ?	First Year	100	34.6%
	Second Year	57	19.7%
	Third Year	25	8.7%
	Final Year	42	14.5%
	Internship	35	12.11%
What is the nature of use of the IT applications utilised by you for academic activities ?	Subsciprtion based	54	18.7%
	Free unlimited usage	178	61.6%
	Free limited usage	95	32.9%
	Trial subscription	39	13.5%
How frequent do you use such IT applications for your	Everyday	53	18.3%
	Every alternate days	53	18.3%



academic activities ?	Once a week	64	22.1%
	Once a month	18	6.4%
	As and when required	101	34.9%

<b>Table 6:</b> Responses regarding Necessity of learning of IT skills and knowledge of different IT applications in Dental Curriculum in India.			
		Number (n)	Percentage (%)
Do you think IT applications can change the scope & face of Dentistry in India ?	Strongly Disagree	20	6.9%
	Disagree	15	5.2%
	Agree	171	59.2%
	Strongly Agree	83	28.7%
Do you agree that prior knowledge of IT applications would have served a better purpose for you in your UG or during your UG ?	Strongly Disagree	22	7.6%
	Disagree	17	5.9%
	Agree	187	64.7%
	Strongly Agree	63	21.8%
Do you think Dental Curriculum in India should include foundation courses on IT learning skills ?	Yes	260	90%
	No	29	10%
Do you think IT skills are helpful in Dental Curriculum ?	Yes	271	93.8%
	No	18	6.2%





## REFERENCES

1. Usage of mobile technologies by undergraduate dental students Prabhu Subramani, Suganthi Rajaram, G Suganya Kumari, K Sureshkumar, Department of Public Health Dentistry, Asan Memorial Dental College and Hospital, Chengalpattu, Tamil Nadu, India.
2. Adoption and Use of Digital Technologies among General Dental Practitioners in the Netherlands, [https://www.researchgate.net/publication/274332349\\_Adoption\\_and\\_Use\\_of\\_Digital\\_Technologies\\_among\\_General\\_Dental\\_Practitioners\\_in\\_the\\_Netherlands](https://www.researchgate.net/publication/274332349_Adoption_and_Use_of_Digital_Technologies_among_General_Dental_Practitioners_in_the_Netherlands).
3. Rajab LD, Baqain ZH. Use of information and communication technology among dental students at the University of Jordan. *J Dent Educ*. 2005 Mar;69(3):387-398.
4. <https://www.proquest.com/openview/538f08c9cdce788a4481868e0a01eb1c/1?pq-origsite=gscholar&cbl=105756>
5. Nattestad A, Attström R. Information technology in oral health education. *Eur J Dent Educ* 1997 Aug;1(3):101-7.
6. Greenwood SR, Grigg PA, Vowles RV, Stephens CD. Clinical informatics and the dental curriculum. A review of the impact of informatics in dental care, its implications for dental education. *Eur J Dent Educ* 1997 Nov;1(4):153-61.
7. Grigg P, Stephens CD. Computer-assisted learning in dentistry. A view from the UK. *J Dent* 1998 Jul-Aug;26(5-6):387-95.
8. Nattestad A. The Internet in dental education. *Eur J Dent Educ* 1999;3 Suppl 1:57-60.
9. Schitteck M, Mattheos N, Lyon HC, Attström R. Computer assisted learning. A review. *Eur J Dent Educ* 2001 Aug;5(3):93-100.
10. Nattestad A, Attstrom R, Mattheos N, Ramseier C, Canegallo L, Eaton K, et al. 4.1 Web-based interactive learning programmes. *Eur J Dent Educ* 2002;6 Suppl 3:127-37.
11. Mattheos N, Nattestad A, Attstrom R, Eaton K, Feeny L. Dissemination and the Net. In: Shanley D, editors. *Dental education in Europe: towards convergence*. Budapest: Dental Press Kft; 2001. pp. 132-9.
12. Magrabi F, Coiera EW, Westbrook JI, Gosling AS, Vickland V. General practitioners' use of online evidence during consultations. *Int J Med Inform* 2005 Jan;74(1):1-12.
13. Westbrook JI, Gosling AS, Coiera E. Do clinicians use online evidence to support patient care? A study of 55,000 clinicians. *J Am Med Assoc* 2004 Mar-Apr;291(2):113-20.
14. Virtanen JI, Nieminen P. Information and communication technology among undergraduate dental students in Finland. *Eur J Dent Educ* 2002 Nov;6(4):147-52.
15. Mattheos N, Nattestad A, Schitteck M, Attström R. Computer literacy and attitudes among students in 16 European dental schools: current aspects, regional differences and future trends. *Eur J Dent Educ* 2002 Feb;6(1):30-5
16. Walmsley AD, White DA, Eynon R, Somerfield L. The use of the Internet within a dental school. *Eur J Dent Educ* 2003 Feb;7(1):27-33.
17. Mattheos N, Nattestad A, Schitteck M, Attström R. Computer literacy and attitudes among students in 16 European dental schools: current aspects, regional differences and future trends. *Eur J Dent Educ* 2002 Feb;6(1):30-5
18. Walmsley AD, White DA, Eynon R, Somerfield L. The use of the Internet within a dental school. *Eur J Dent Educ* 2003 Feb;7(1):27-33.
19. Rajab LD, Baqain ZH. Use of information and communication technology among dental students at the University of Jordan. *J Dent Educ* 2005; 69(3):387-98.
20. Information Technology Practices Amongst Dental Undergraduate Students at a Private Dental Institution in India Kumar, S; Balasubramanyam, G; Duraiswamy, P; Kulkarni, S. *Journal of Dentistry*; Tehran Vol. 6, Iss. 3, (2009): 130-138.
21. Castelló-Castañeda C, Ríos-Santos JV, Bullón P. Analysis of the knowledge and opinions of students and qualified dentists regarding the use of computers. *Med Oral Patol Oral Cir Bucal*. 2008 Jan;13(1):E71-76.
22. Inamdar SC, Rotti SB. Computer use among medical students in an institution in southern India. *Natl Med J India*. 2004 Jan-Feb;17(1):8-10.
23. Komabayashi T, Raghuraman K, Raghuraman R, Toda S, Kawamura M, Levine SM, Bird WF. Dental education in India and Japan: implications for U.S. dental programs for foreign-trained dentists. *J Dent Educ*. 2005 Apr;69(4):461-469.
24. Neuhaus KW, Schegg R, Krastl G, Amato M, Weiger R, Walter C. Integrated learning in dentistry: baseline data and first



- evaluation at the Dental School of Basel. Eur J Dent Educ. 2008 Aug;12(3):163- 169.
25. Marya CM, Marya KM, Dahiya V, Juneja V, Gupta P. Internet usage among dental students in north India. J Pak Med Assoc. 2013 May;63(5):628-629.
  26. Jali PK, Singh S, Babaji P, Chaurasia VR, Somasundaram P, Lau H. Knowledge and attitude about computer and internet usage among dental students in Western Rajasthan, India. J Int Soc Prev Community Dent. 2014 Jan;4(1):29-34.
  27. Mariño R, Habibi E, Morgan M, Au-Yeung W. Information and communication technology use among Victorian and South Australian oral health professions students. J Dent Educ. 2012 Dec;76(12):1667-1674.