Medical Students and Their Preference for Educational Resources: A Cross-Sectional Study

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Abstract

Objectives: To identify the educational resources medical students are using for self-study.

Methodology: A self-administered questionnaire was designed after a literature search and validation. It was sent to medical students through wats app and email. Students were asked about the educational resources they use, both online and traditional, resources they used while learning new concepts and when revising concepts. Whether they used question banks, smartphone applications, and reasons for attending tutorials.

Results: While selecting their educational resources, 52% wanted their resource to be concept based,34% opted for clinical-based learning, 6.8% for a quick learning medium,4.4% for pre-prepared notes, and 2.8% went for question-based learning. For learning new topics, 54% of respondents prefer traditional resources (lectures, textbooks, and handmade notes) while 46% prefer e-learning platforms (smartphones apps, question banks, and online resources). For the revision of topics, 50.8% of respondents chose e-learning platforms while 49.2% prefer traditional resources. 50.8% reported attending lectures as fulfilling the importance of attendance. 73.6% of the respondents preferred lectures as an educational resource for both learning new topics and revision of previously learned topics. majority of respondents (74.4%) preferred smartphone apps as an educational resource for both learning new topics and revision of previously learned topics. 65.6% of students used you tube and 25.6% used google as an additional educational resource.

Conclusion: There is a shift from a teacher-centered approach to self-directed learning and more independent learning. Students prefer blackboard teaching, yet medical faculty must bring forth technology-enhanced teaching learning, and assessment resources to stay more relevant and apropos.

Keywords: Medical students, educational resources, self-study, e-learning tools, traditional tools.

Introduction

With advancements in medical technology and treatments, the sector of medical education is also seeing a shift in its fundamental structure from classic textbooks to more online educational resources [1,2]. There has been some evidence, suggesting that students in the US prefer the internet to textbooks [3]. The distribution of usage varies significantly in different regions with various factors playing a role. Studies suggest that by the time of 2030 doubling time of medical knowledge would be reduced to just 73 days, which used to be 3.5 years in 2010, 7 years in 1980 and half a century back in 1950 [4]. The developed countries being more economically sound and having better availability of resources are more equipped to use online teaching tools. Developing countries like India having vast socio-economic disparity are gradually making a transition towards e-learning platforms. With theoretical learning not being the only dimension of medical education, other aspects like clinical knowledge, communication skills, and practical experience are being realized in today's date and more so after the introduction of competency-based medical education came into force from the 2019 batch of MBBS students in India.

Studies in the UK have tried to analyze the concept of blended learning, incorporating both e-learning and traditional learning tools. There is an enhanced shift towards adult learning principles, where medical educators engage more as facilitators 5.

Medical students may have individual learning styles and such styles of learning may differ by several factors like age, year of study, and preclinical and clinical years[6] There is a need to understand the similarities and differences among such groups and what common approaches bind them together.

Currently, there is little evidence available to indicate which educational resources medical students prefer to use while completing their degrees. This analysis carries the potential to help in modifying the current teaching methods used to suit the demands of the students which could hence yield better results. [5,6]

The present study was undertaken to understand the changing needs of students in recent times from what they were when the resources were limited. The objective of the study was to identify the educational resources medical students are using for self-study.

Methods

To study how the students are using traditional and e-learning tools for effective learning. The study was conducted, between May 2020 and August 2020. The need to evaluate the importance of traditional and e-learning resources became even more relevant with the nationwide lockdown due to covid 19. The research was conducted in two states of North India, with one medical institute in Ambala, Haryana, and the second medical institute in Amritsar, Punjab.

After doing a lot of literature searches on the topic, a questionnaire was formed and validated by sharing it among faculty members. The inputs and references were incorporated and changes were made accordingly, after which pilot testing was conducted with 20 students. Ethical clearance was taken from the Institutional Ethics Committee of the primary author. A form was prepared on Google Forms and shared via WhatsApp, email, and social media sites. There were a total number of 18 questions, out of which 5 of them were open-ended with the remaining being multiple choice.

Students were asked what they looked for while selecting the educational source – concept-based, quick learning medium, pre-prepared notes, question-based learning, and clinical-based learning. How

often they attended lectures? What was their purpose of attending lectures – for attendance, quality of content, non-availability of lectures online, better interactive experience, or any other reason? Would they want to attend lectures to learn new concepts, revision of concepts, or both? What device did they use to access online education material? How often they used smartphone apps for educational purposes? Students were asked for what purpose they used smartphone apps – better understanding of concepts, round-the-clock availability, a wide variety of topics available, providing learning at the comfort of their place, or it doesn't solve their purpose. What other e-learning platforms do they use? How often do they use question banks for learning? What made them use question banks as learning tools? What makes them attend tutorials and for what reason do they use tutorials to learn? For learning new topics or revising concepts what educational resources will they prefer? What changes they would like to see in teaching learning in their institute?

The self-administered questionnaire was sent to 805 medical students. There were a few questions with a yes or no format along with some open-ended questions to gain better insight into the opinions of students. Two reminders were sent to students and the survey was closed after 8 weeks. The survey was anonymous in nature to avoid the pressure on students' feelings being judged for their choices, which could alter the outcome of the survey. The form was circulated among students of all professional years. Periodic reminders were given for the questionnaire to be filled. In total 250/805 (31.05%) students completed the survey.
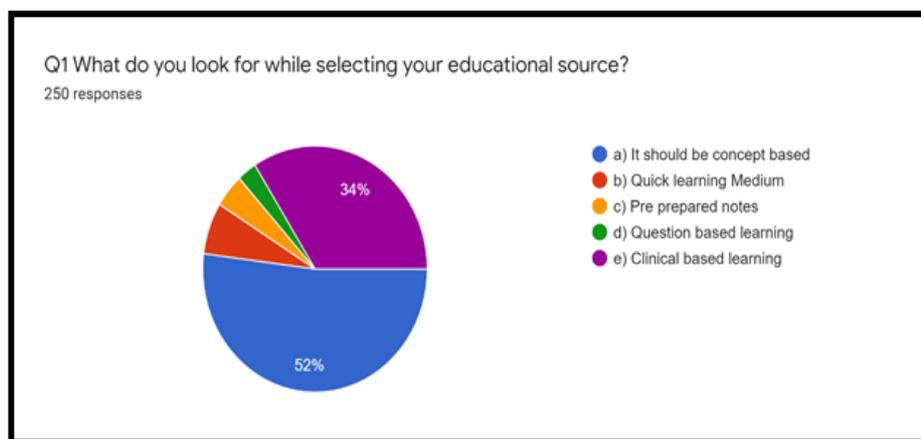
Statistical Analysis

Survey scales employed ordinal measures of self-reported use of resources (Never=1, Rarely =2, Occasionally =3, Sometimes=4, Often =5, Mostly =6, Always=7).

Results

Most of the students were in the age group 17 years to 29 years of age, most of them, 84.2% falling between 18.5 years to 23 years of age. Of the 250 students who responded, 96.8% were undergraduate students and 3.2% were postgraduate students. Among the undergraduate respondents, 30.2% were 1st-year students, 12.8% were 2nd-year students, 24% were 3rd-year students, and 18.8% were final-year students, and interns comprised 11.2% of the total respondents.
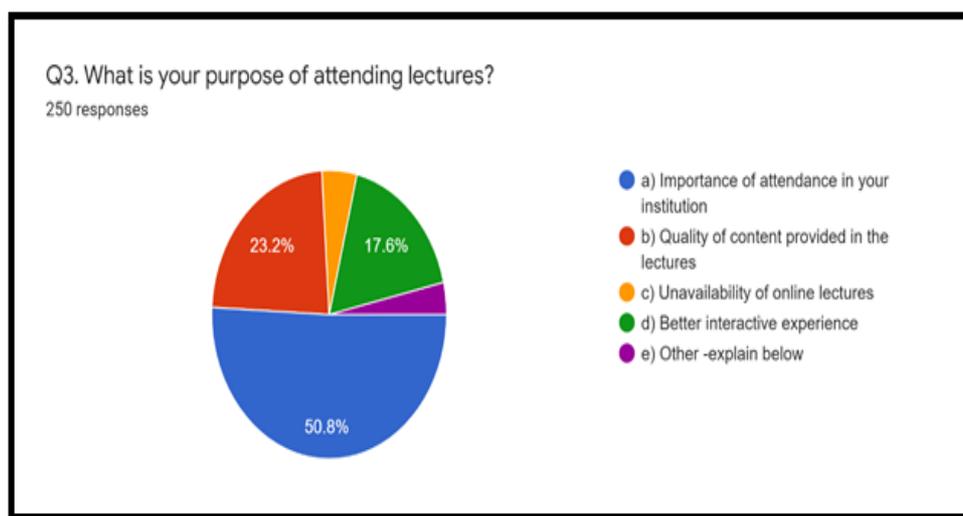
While selecting their educational resources,52% wanted their resource to be concept based,34% opted for clinical-based learning, 6.8% for a quick learning medium,4.4% for pre-prepared notes, and 2.8% went for question-based learning- Graph 1.

Graph 1: What do students look for while selecting educational resources?

With respect to frequency of attending lectures,43.6% reported that they mostly attend lectures, 27.6% reported to always attend lectures,12.8% of the students responded to often attending lectures while 6.8% attend lectures sometimes. Only 5.2% and 0.4% of students responded to attending lectures rarely and never respectively.

As shown in Graph 2, 50.8% reported attending lectures for fulfilling the importance of attendance in their institutions, 23.2% attend lectures for the quality of content provided,17.6% for a better interactive experience that lectures provide, 4.8% of the students attend lectures because they are unavailable online while 3.6% had reasons other than the ones mentioned.
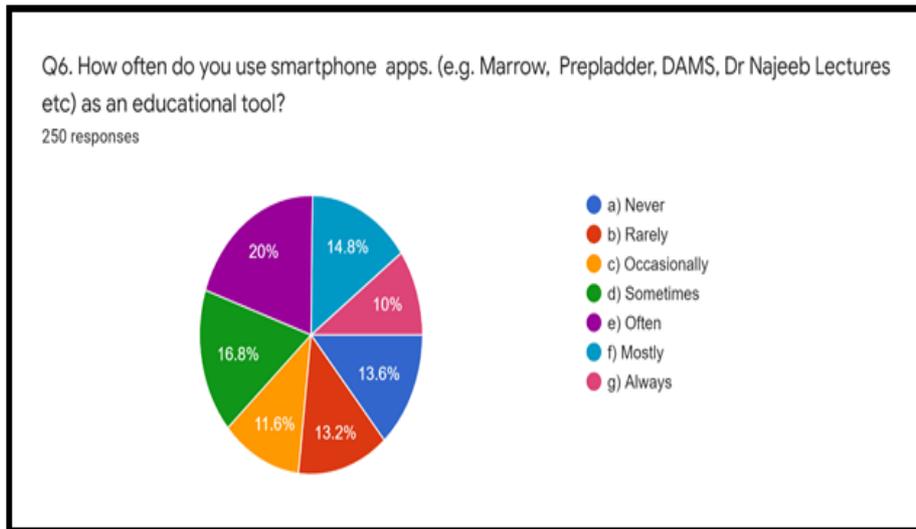

Graph 2: The purpose of attending lectures?

The other reasons mentioned by the respondents in the open-ended column were a better understanding of topics with practical knowledge, good teaching, and a better approach to the topic when reading from the book. Lectures provide a direct interactive experience with doubts being solved on the spot. The reason for not attending lectures by some students was that they were not clinically oriented.

73.6% of the respondents preferred lectures as an educational resource for learning new topics and revising previously learned topics. 19.6% of students opted for using lectures as a way of learning new topics while 6.8% preferred lectures as a tool for the revision of previously learned topics.

To access online resources, 60.4% of students used smartphones,22.8% used laptops, and 15.6% tablets. Only 0.8% of students used desktops and 0.4% used some other devices to attain online education.
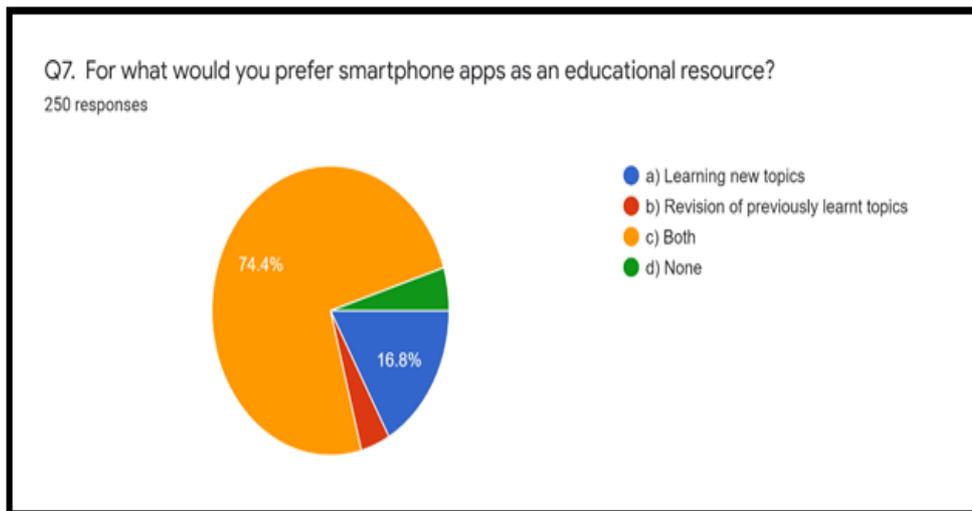
When asked about the frequency of using smartphone apps as an educational tool, on a seven-point scale ranging from never to always,20% often used smartphone apps as an educational resource,16.8% sometimes, 14.8% mostly,13.6% said that they never use any app and 13.2% use them rarely.11.6% of the students use it occasionally whereas 10% confirmed using them always – Graph 3.

Graph 3: How often students used smartphone apps as educational tools?

Graph 4 shows that the majority of respondents (74.4%) preferred smartphone apps as an educational resource for both learning new topics and revision of p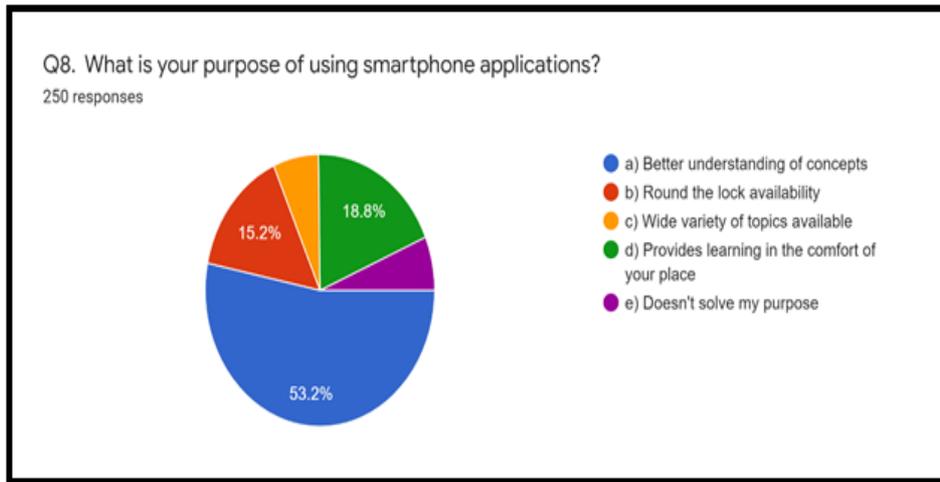reviously learned topics.16.8% of students preferred them for the purpose of learning new topics and 4% for revision of previously learned topics. About 4.8% of students did not use smartphone apps for any of the above reasons.

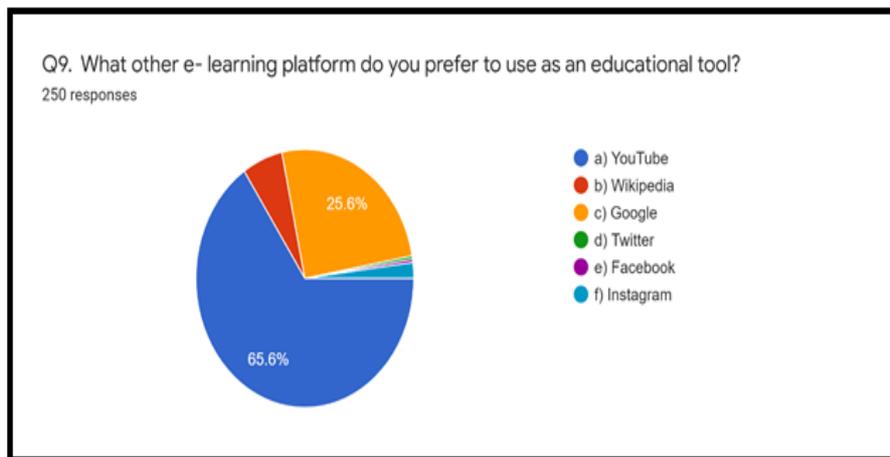**Graph 4: Reason for using smartphone apps as an educational resource.**

On being asked about the purpose of using smartphone apps, more than half of the respondents (53.2%) use it for better understanding of concepts,18.8% use it because they can learn from the comfort of their place,15.2% as it is available round the clock and 6.4% as they have a wide variety of topics available. For 6.4% of the respondents, it did not solve their purpose as an educational tool – Graph 5.

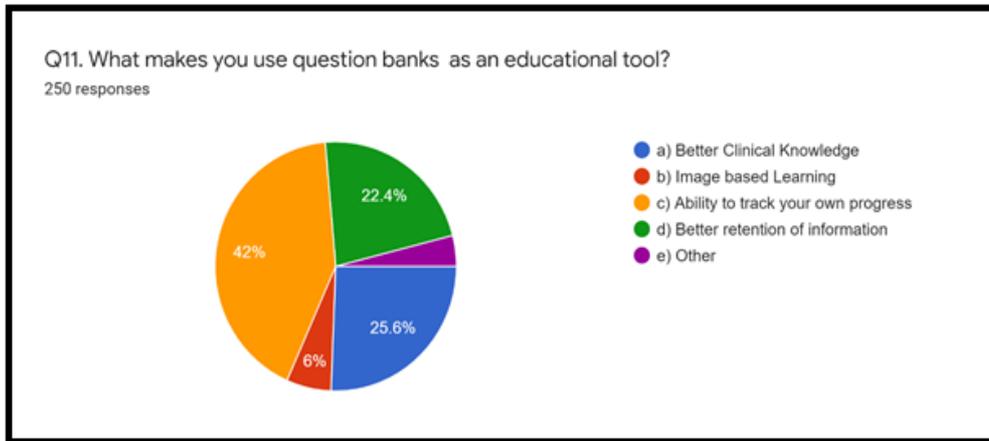**Graph 5: The purpose of using smartphone applications.**

The other e-learning platform preferred by 65.6% of the students was Youtube,25.6% students used Google ,15% Wikipedia and 2% used Instagram. Facebook and Twitter were used each by 0.4% of students – Graph-6.

Graph 6: The other e-learning platforms used as educational tools.

With respect to the frequency of using question banks as an education tool, 26.8% of the respondents said they use them rarely, 19.2% use them occasionally, 14.8% sometimes and 12.8% use them often. The frequency of using it mostly and always was 10.8% and 10.4% respectively. About 5.2% of the respondents reported to always using question banks as an educational resource. For 42% of the students, the reason for using question banks was the ability to track their own progress, 25.6% because of better clinical knowledge provided,22.4% due to better retention of information, and 6% for the image-based learning it delivers – Graph 7.
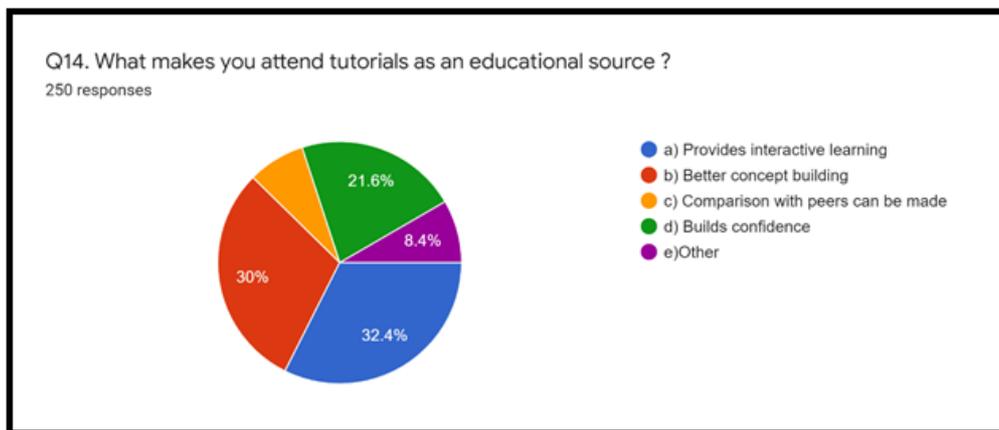
Graph 7: What makes students use a question bank as an educational tool?

4% of respondents cited reasons other than the ones mentioned above. These included better retention and image-based learning; active learning and recall; covering of missing content of videos enhancement of notes; better clinical knowledge; exam-based studies; aids in making differential diagnoses. The inability to build new concepts being boring were reasons mentioned for not using question banks as an educational resource.

54.4% of the respondents said that they use question banks for both learning new topics and revision of old topics, 35.6% of students use it only for the revision of previously learned topics and 5.6% of students use it for learning new topics while 4.4% of the respondents use it for none of the reasons mentioned above.

The reason for attending tutorials for 32.4% of students was that it provided interactive learning. 30% of the respondents said that tutorials provide better concept building. 21.6% of respondents believe that tutorials build confidence and 7.6% of students said that comparison with peers can be made through tutorials- Graph 8.

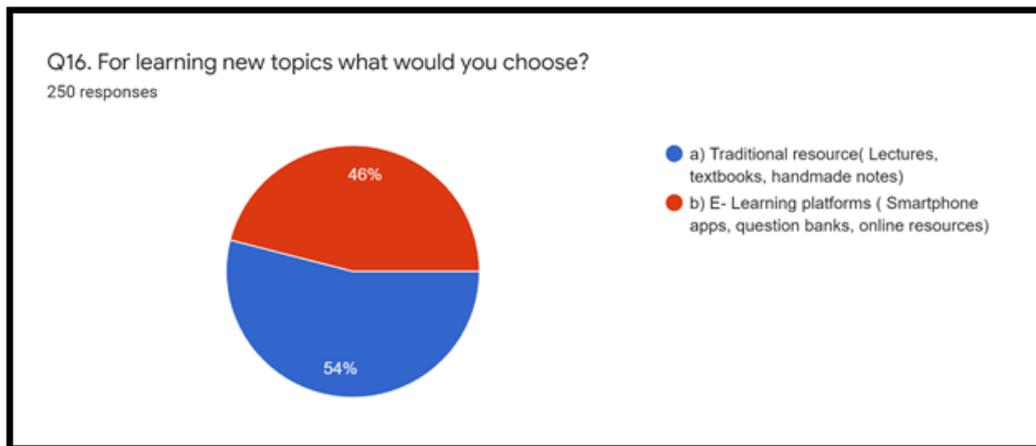**Graph 8: Reason for attending tutorials as an educational source?**

The other reasons mentioned by 8.4% of students for attending or not attending tutorials are revision and learning new things taught by the teacher, the topic is prepared and attendance while reasons for not attending tutorials are that tutorials are boring, and teachers can be demotivating if wrong answers are given. 55.2% of the respondents mentioned that they use tutorials both for learning new topics and revision of previously learned topics, 28.4% use it only for revision of previously

learned topics, and 8% for learning new topics. 8.4% of students use it for none of the reasons mentioned above.
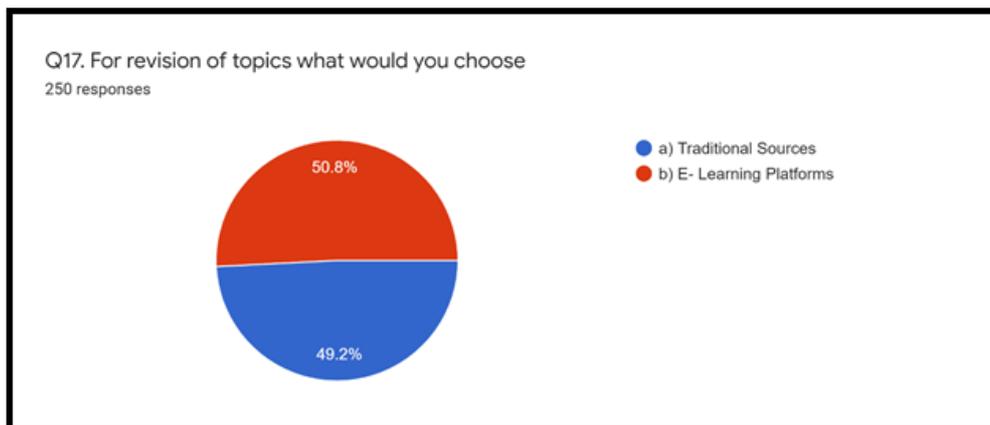
For learning new topics, 54% of respondents prefer traditional resources (lectures, textbooks, and handmade notes) while 46% prefer e–learning platforms (smartphones apps, question banks, and online resources) – Graph 9.

Graph 9: For learning new topics what would students choose?

For the revision of new topics, 50.8% of respondents chose e-learning platforms while 49.2% prefer traditional resources- Graph 10.

Graph 10: For revision of topics what will students choose?

On being asked if they wanted any reforms into the teaching methods used in their college, 82.4% of the students, responded by saying yes while 17.6% said that they don't want any reforms. Multiple suggestions were given by the students regarding the kind of reforms that they wanted in the teaching methods used in college. The majority of students preferred classical blackboard teaching to replace the current dependence on PowerPoint presentations. The use of PowerPoint presentations should be more for the purpose of pictorial representation, and revision of topics and to be shared after the lecture for future reference.

Importance should be laid on building concepts, clinical aspects, and practical knowledge with more hands-on skill-based teaching workshops. Attention must be given to the weaker students with more interaction during lectures, which should be made more interesting. Flexible scheduling

of lectures according to the needs of the students with less mandatory attendance.

The other suggestions included, more seminar conduction, journals and case presentations, smaller batches of study, better conduction of tutorials, more revision classes, and more visits to the hospital.

Switching to e-learning was recommended by some students as it makes lectures easier to grasp and 3-Dimensional animation videos for anatomy and physiology for better concept building.

Discussion

This study showed that for learning new topics students preferred traditional educational resources like lectures, textbooks, and handmade notes. While revising the concepts students preferred e-resources more than traditional ones. The e-resources preferred were smartphone apps, question banks, and other online resources. A study in the UK reported medical students to use textbooks as the primary educational resource in primary healthcare rotations [3]. Another study showed that students preferred handouts from lectures followed by internet use as the main educational resource [7].

The students in this study were mainly undergraduate medical students and perhaps according to the competency-based medical curriculum are evolving their self-directed learning style. In fact, the blended method enhances students learning. E-learning tools and access to the internet are widely available, so they can be used to supplement traditional modes of learning and an education alternative [8].

Students attended tutorials as they helped increase interactivity, clear concepts and build confidence. Tutorials help students to test their ideas, clarify concepts, and acquire problem-solving skills. They also help in developing interpersonal skills and self-directed learning skills [9]. In fact, the participatory tutorial format is an interactive teaching-learning method

advantageous to learn concepts and making the subject more engrossing [10].

In our study, 57% of students either did not use or occasionally used online question banks. Those who used them wanted to enhance their clinical knowledge, ability to track their own progress and better retention of information. Question banks were used both to learn new concepts as well to revise the concepts. The reason for students using fewer question banks was probably because the assessment pattern was more subjective and question banks had more objective questions. Moreover, question banks are preferably used by Students and Interns who start preparing for their PG entrance or licensing exam [11]. There are a number of online question banks available, some free of cost some paid.

Most of the students – 65.6% used YouTube and the second-best e-learning platform used by students was Google. A previous study shows that students assimilate and recall difficult concepts better when they use visual explanation videos. Youtube has the edge of being a free web-based service. The contents are short and plenty. Anybody can find the content and or share the link to important information [12]. There is a practicality and cost-effectiveness of e-learning use in resource constraint settings [13].

Many smartphone apps are being used by students like Marrow, prep ladder, DAMS, and Dr. Najeeb's lectures. They use them both to understand a new concept as well as to revise them. Also, they are a good source for preparing for the Postgraduate entrance exam. The apps are being increasingly used by medical students as an educational resource. 44.8% of students use them mostly and often.

Smartphones are becoming increasingly used in medical education and healthcare. Many applications and access to medical information and healthcare need the use of smartphones. According to a cross-

sectional study, 79.4% of medical students felt that smartphones should be introduced in MBBS course [14]. In another study, Medical students use mobile applications for online textbooks (70%), medical podcasts (60%), medical calculators (75%), online lectures (50%), and notes taking (45%) [15].

Most of the students accepted (52.8%) that they attended lectures for attendance. 23.2% attended for quality of content, while 17.6% for better interactivity in the class. A study in the UK confirmed that some students value the importance of lectures, as a supplement to other resources, but others find that other methods help them learn better [16]. In a study in Pakistan influencing factors on attendance in lectures were interest in the subject, personality traits of the teacher, good communication, command of the subject, good interactivity, use of humor, friendly attitude, punctuality, control over the class, and human nature. The most significant was, the subject being part of exams rated by 83.7% of students, and the strictness of the teacher for marking attendance 73.9%. Attendance is therefore a primary reason for attending lectures [17]. Attendance may vary between institutes depending on institutional policies, curriculum, quality of lectures, and attendance strictness. Medical educators need to shift their focus on other technologies to falling out of touch with medical students' educational needs.

While selecting educational sources 52% of students in our study looked for concept-based information, while 34% focused on clinical-based educational resources. A study in Australia in 2019 indicates that students use both online and offline. Students used online resources for both revisions and learning new concepts. New technologies are being developed and used by students to enhance their concepts and clinical skills [18]. New mobile technologies have changed the way medical students chose to learn and integrate information. Smartphone technologies are at the fore now, occupying social, emotional, and professional spaces [19]. Multiple platforms are available to access online learning in any setting, facilitating opportunistic learning.

Conclusion

The study sought to explore the educational resources used by medical students to enhance learning. Most of the students reported the use of medical apps, question banks, online resources as well as traditional lectures and textbooks. It is a period of blended learning where students use both traditional methods specially to learn new concepts and new technologies to revise concepts and clinical material. Smartphone technologies are learner-centered, available round the clock, convenient, and easier to access in all situations. There is a shift from a teacher-centered approach to self-directed learning and more independent learning. The teaching-learning needs a paradigm shift to cater to the felt needs of medical students. More technology has to evolve and medical faculty needs to bring forth technology-enhanced teaching learning and assessment resources to stay more relevant and apropos.

Limitations

The response rate in our study was 31.055% (250/805). Probably this study was a student lead study and sending questionnaires through online format does not appear personal. Another limitation is that participation was from two different medical schools, which may weaken the generality of the study as the student cluster, lecture programs, online resources, and resources with students to buy technology may differ. This may influence the learning resource preference of students. But because of ethical concerns, a direct comparison between the two was not possible.

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