



A study of effectiveness and satisfaction of conventional classroom teaching verses online teaching among undergraduate medical students in private medical colleges of South India: A cross-sectional study

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Abstract

Introduction: Due to the covid-19 pandemic there was a sudden introduction of online classes in all the medical colleges in India which had lot of implications in the knowledge and skill acquisition on the part of medical students. The aim of the present study was to evaluate the effectiveness and satisfaction of medical students towards online teaching and learning when compared to the conventional classroom teaching.

Methods: Data was obtained from 249 medical students across three medical colleges in South India. Ten parameters were measured for the effectiveness of online classes

and five parameters to measure satisfaction of online classes, both of which were measured on a five-point Likert scale.

Results: Online classes were equally, or more effective in some parameters, like offering convenience and offering better understanding through recorded classes but less effective in some other parameters that were studied. Satisfaction levels were high in parameters like class materials provided and availability of e-resources. Results showed a high positive correlation between convenience, and satisfaction with online learning.

Conclusion: Our findings have shown that online classes can assist the teaching process in medical colleges in some aspects, but not all, which is why combination of both methods called ‘blended learning’ can be adopted.

Keywords: Online classes, e-learning, effectiveness, satisfaction

Introduction

During the Covid-19 pandemic, physical classes were suspended all over India, and all schools and colleges adopted online mode of imparting education. Due to this sudden paradigm shift, there were challenges for both students as well as teachers for adapting to this new method of teaching and learning. The impact of this change undoubtedly had caused a lot of inconvenience, but at the same time paved a new way to think of innovative methodology of teaching and learning using digital technology. Thus, the pandemic triggered educational institutions to adopt to creative methods of teaching, surpassing the age-old way of classroom teaching, in a relatively very short span of time. Most of the educational institutions and universities resorted to online mode of teaching using platforms like Microsoft Teams, Google Meet, Zoom etc.

It is worthwhile to note that learning in such online classes mainly depends on the motivation of the learner, as there is less monitoring by the teacher compared to traditional classroom teaching. The interaction of teachers and students play a key role in motivating students, their efficiency, and class satisfaction during online classes ¹. This study is very relevant in the Indian context as the online mode of teaching was hardly tried anywhere in the educational institutions in India in the pre-COVID-19 era and hence was comparable to a mass social experiment when it was first introduced nation-wide. Further, the medical field comprises of many practical implications, such as clinical bedside teaching, lab experiments etc., and cannot be substituted by online teaching, however effective it may be. Still, in the present era, there has been tremendous amount of online medical literature and simulation videos which gives the learner a real bedside, as in a classroom setting ². Hence, we can take advantage of various modalities of teaching and learning which gives rise to the concept of “Blended Learning” ³. A study conducted at Matej Bel University, Slovakia, reported that blended learning was the most effective mode of learning during the COVID-19 pandemic ⁴.

A few studies done in various parts of India reported several barriers in online teaching, namely, lack of institutional strategies and support, lack of infrastructure, limited technical skills of teachers and time constraints ⁵. A meta-analysis conducted

by Cook DA *et al.* emphasized on the various beneficial outcomes of e-learning in health professionals ⁶. Data regarding the effectiveness and satisfaction of online classes is scarce in India. Hence, we conducted the present study to evaluate the effectiveness and satisfaction of online classes compared to traditional physical classes or offline classes among medical students in South India.

Materials and Methods

The present study was a cross-sectional study conducted in the month of March 2023 among medical students from first year to final year, perusing their Bachelor of Medicine and Bachelor of Surgery (MBBS) course in three medical colleges in South India. The three medical colleges comprised of a government medical college in Palakkad, Kerala (College 1), private medical college in Manipal, Karnataka (College 2), and a private medical college in Mangalore, Karnataka (College 3). All the students who were willing to take part in the study were included and the convenient sampling method was adopted. A pre-tested semi-structured questionnaire was administered to 249 subjects after obtaining their informed consent. The questionnaire included socio-demographic characteristics of the study subjects, their experience of attending online classes, both before and after the COVID-19 pandemic, the effectiveness of classes, and satisfaction of students regarding online classes was determined by a questionnaire used by Kaur N *et al.* ⁷. Effectiveness was assessed on a five-point Likert scale ranging from one (much less effective) to five (much more effective), and satisfaction was also measured on a five-point Likert scale ranging from one (strongly dissatisfied) to five (strongly satisfied).

Data was entered and analyzed using Statistical Package for Social Sciences (SPSS) version 21. Categorical variables were summarized as frequencies and percentages whereas mean and standard deviation were used to summarize continuous variables. Every subject was given an average effectiveness and satisfaction score. The correlation between effectiveness and satisfaction of online classes was depicted using the Spearman correlation coefficient. Linear regression was used to find association of satisfaction of online classes with age, gender, and student's previous experience of attending online classes. The association between satisfaction of online classes and various medical colleges as well as satisfaction of online classes and different years of studying was calculated using ANOVA. P value of < 0.05 and was considered significant.

Ethical clearance for the study was obtained from the Institutional Ethics Committee of Kasturba Medical College, Manipal and Kasturba Hospital, Manipal vide letter no. IEC2:384/2022 dated 21st January 2023.

Results

The majority of the students were from a private medical college in Mangalore (46.6 per cent), while the rest belonged to a Government medical College in Kerala (28.1 per cent) and a private medical College in Manipal (25.3 per cent). In the present study 174 (69.9 per cent) respondents were females and 75 (30.1%) were males. 32

(12.9 per cent) students were studying in first year, 116 (46.6 per cent) in the second year, 88 (35.3 per cent) in the third year and 13 (5.2 per cent) in final year. Three quarter of respondents (N= 185, 74.2 per cent) did not attend any online classes before the COVID-19 pandemic.

Online learning was more convenient as depicted by the fact that 42.6 per cent of respondents felt that it is somewhat more effective or much more effective than classroom teaching in offering convenience and 27.7 per cent felt that it is equally effective. Recorded classes were proven to be beneficial to students since majority of the students (38.2 per cent) felt that it is somewhat more effective or much more effective than classroom teaching and a quarter of them (28.9 per cent) felt it is equally effective. However, results also showed somewhat negative attitude towards effectiveness of online learning with respect to few other parameters. In terms of meeting individual learning needs, nearly half (48.2 per cent) of the respondents felt online learning to be somewhat or much less effective. 55.4 per cent of respondents felt that online learning (e-learning) is somewhat or much less effective when it comes to contributing towards effective communication. The negative attitude towards online classes were also reflected in terms of some important communication parameters wherein 61.4 per cent, 55.4 per cent, and 53.8 per cent of study subjects felt that online classes were somewhat or much less effective in terms of student-teacher interactions, clarifying doubts and building skill and knowledge respectively. Majority of the students (65.0 per cent) were also of the opinion that online classes were somewhat or much less effective in grooming professional career. With regards to the effectiveness of online classes in submission of assignments, the opinion of students was equivocal.

Table 1: Effectiveness of Online learning compared to classroom learning (N=249)

Parameters	Much less effective [N(%)]	Somewhat less effective [N (%)]	Equally effective [N (%)]	Somewhat more effective [N (%)]	Much more effective [N (%)]	Mean (SD)
Convenience of e-learning	25 (10.0)	49 (19.7)	69 (27.7)	56 (22.5)	50 (20.1)	3.23 (1.25)
Effectiveness of recorded classes	43 (17.3)	39 (15.7)	72 (28.9)	59 (23.7)	36 (14.5)	3.02 (1.29)
Meeting individual learning needs	30 (16.1)	80 (32.1)	76 (30.5)	34 (13.7)	19 (7.6)	2.65 (1.13)
Student-teacher interaction	80 (32.1)	73 (29.3)	63 (25.3)	19 (7.6)	14 (5.6)	2.25 (1.15)
Conducive to the growth of professional	85 (34.1)	77 (30.9)	59 (23.7)	15 (6.0)	13 (5.2)	2.17 (1.12)

career						
Clarifying doubts	51 (20.5)	87 (34.9)	75 (30.1)	24 (9.6)	12 (4.8)	2.43 (1.06)
Contribution towards effective communication	60 (24.1)	78 (31.3)	66 (26.5)	24 (9.6)	21 (8.4)	2.47 (1.19)
Developing knowledge and skills	58 (23.3)	76 (30.5)	77 (30.9)	18 (7.2)	20 (8.0)	2.46 (1.16)
Balance between theory and practical understanding	105 (42.2)	76 (30.5)	46 (18.5)	10 (4.0)	12 (4.8)	1.99 (1.09)
Submission of assignments	36 (14.5)	32 (12.9)	95 (38.2)	49 (19.7)	37 (14.9)	3.08 (1.22)

The attitude of majority of students was neutral with respect to satisfaction of online learning regarding the usefulness of the materials provided for online learning, balance between theoretical and practical knowledge, and the contribution of online classes towards professional development strategy. However, students were very much satisfied by the availability of E-resources and the assistance of teachers during online learning. [Table 2]

Table 2: Satisfaction of online classes compared to classroom learning (N=249)

Parameters	Strongly dissatisfied [N (%)]	Dissatisfied [N (%)]	Neutral [N (%)]	Satisfied [N (%)]	Strongly satisfied [N (%)]	Mean (SD)
Usefulness of materials provided for learning	12 (4.8)	17 (6.8)	111 (44.6)	95 (38.2)	14 (5.6)	3.33 (0.87)
Satisfaction regarding balance between theoretical and practical knowledge	29 (11.6)	65 (26.1)	98 (39.4)	48 (19.3)	9 (3.6)	2.77 (1.00)
Contribution of online classes towards professional development strategy	23 (9.2)	71 (28.5)	107 (43.0)	36 (14.5)	12 (4.8)	2.77 (0.97)
Availability of	5 (2.0)	20 (8.0)	80 (32.1)	112 (45.0)	32 (12.9)	3.59 (0.88)

E-resources						
Availability of assistance	12 (4.8)	39 (15.7)	110 (44.2)	73 (29.3)	15 (6.0)	3.16 (0.92)

Results showed a high positive correlation between convenience and satisfaction with online learning (Spearman correlation coefficient $r= 0.735$, $P< 0.001$) which indicates that students who perceived online learning as convenient, were more likely to be satisfied. Spearman correlation coefficient $r= 0.735$, $P< 0.001$) [Fig 1]

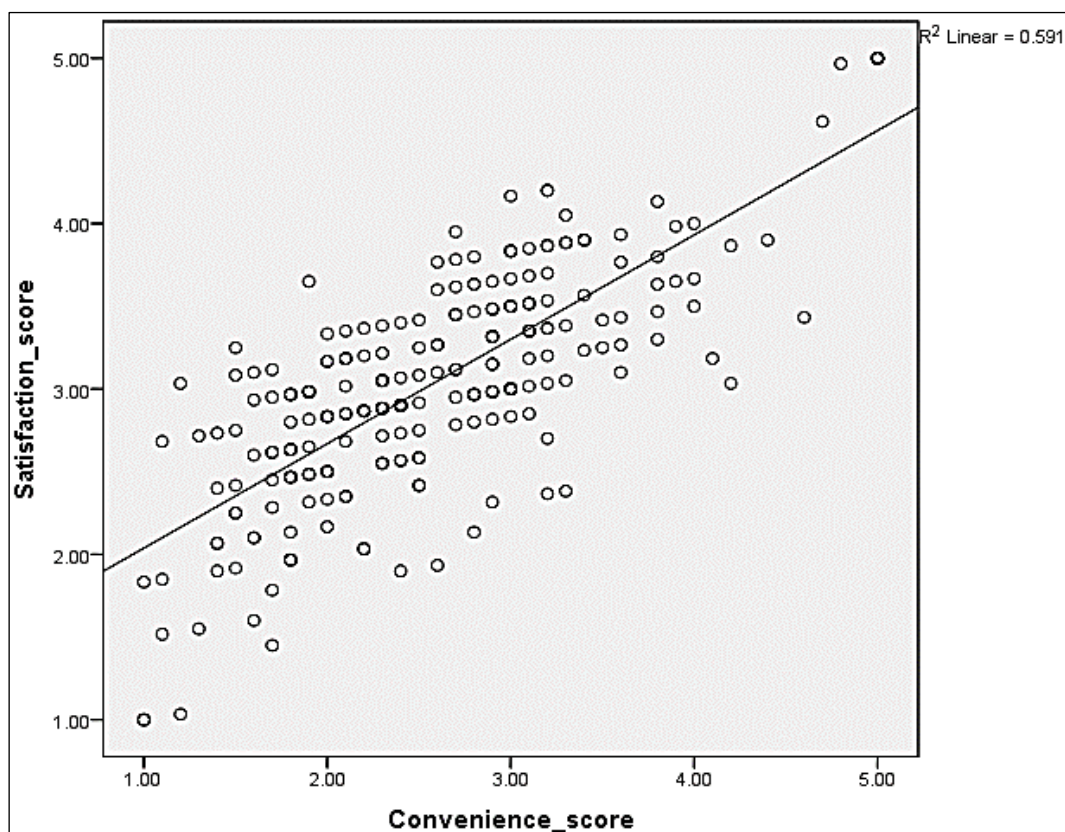


Fig 1: Correlation between effectiveness and satisfaction of online classes

Linear regression analysis showed that the satisfaction among females was lesser compared to males ($B = -0.058$). Satisfaction score was lower with increasing age ($B = -0.059$). Attending online classes before the pandemic did not have a bearing on satisfaction levels ($B= 0.114$). But none of these results were statistically significant. [Table 3].

Table 3: Factors associated with satisfaction score

Predictors	B value	95% CI	P Value
Gender	-0.058	-0.271 - 0.099	0.360
Age	-0.059	-0.131 - 0.014	0.111
Whether attended online classes before pandemic	0.114	-0.081 - 0.308	0.250

Results from ANOVA showed that there was a statistically significant association between medical college and satisfaction of online learning. The mean satisfaction score was higher for college 2 compared to college 1 and 3. [Fig 2] It was found that there was statistically significant difference between satisfaction of online learning between college 2 and college 1 ($P < 0.001$). Satisfaction scores between college 1 and college 3 were also found to be statistically significant ($P = 0.007$). However, no significant association was found between the satisfaction scores of college 2 and college 3.

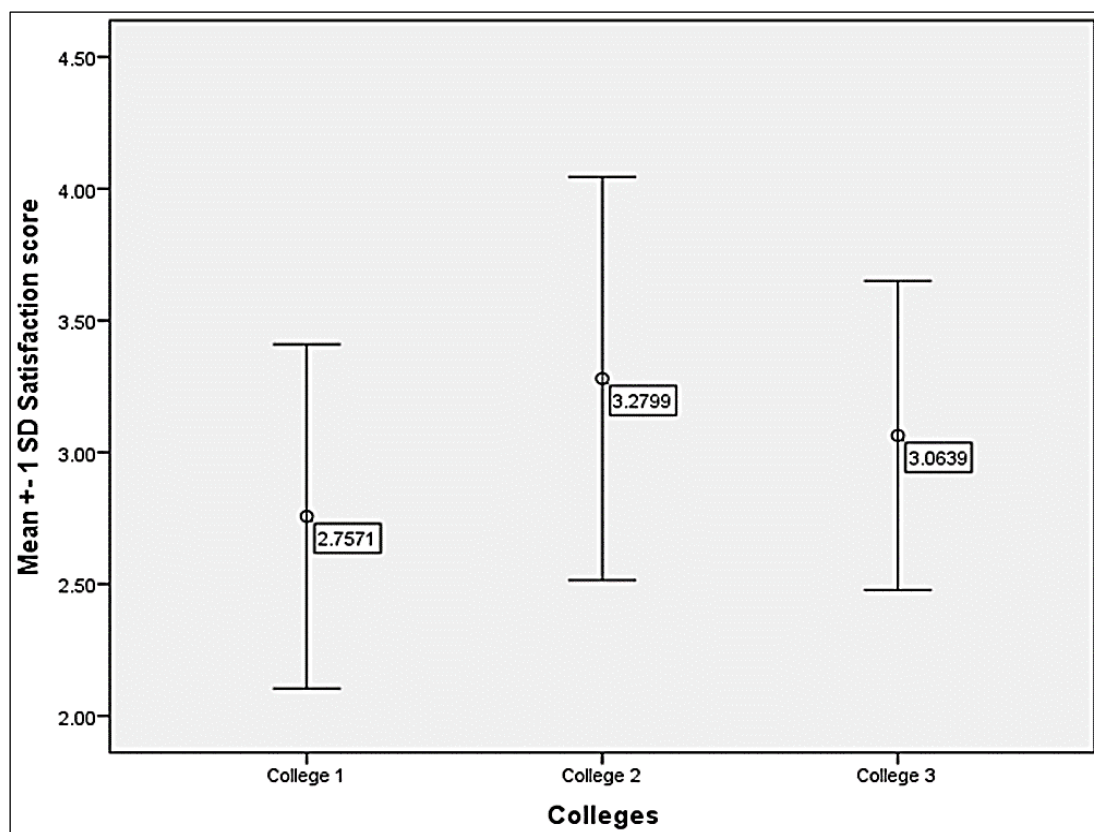


Fig 2: Association between medical college and satisfaction of online classes

When we compared satisfaction levels of online classes between students studying in various years of medical college, there was no significant association found between the mean satisfaction scores. [Fig 3]

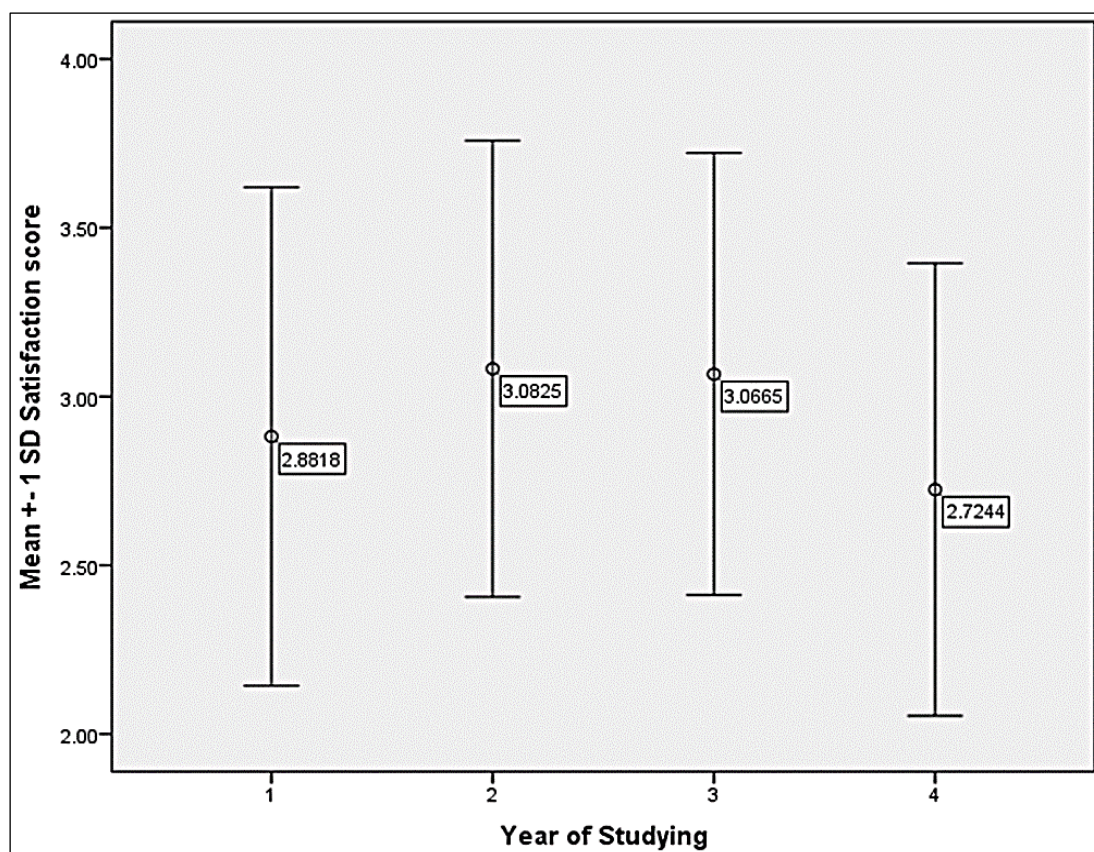


Fig 3: Association between year of learning in medical college and satisfaction of online classes

Discussion

Cognitive skills like concept acquisition, systemic decision making, brain storming, etc., requires the age-old methods of teaching like one to one contact, mentoring, supervision, and also group discussion among students⁸. However, it is assumed that e-learning will be an important method of teaching and learning in the future years⁹. Nowadays, there is an increasing accessibility of e-learning materials for students of medicine which has grown exponentially over the years and can be accessed both in computers and mobile phones¹⁰.

In the present study it was found that 51.8 per cent of the respondents found that online classes are equally or somewhat more efficient in meeting individual learning needs compared to traditional classes which is in sync with the results of the study conducted by Kaur N *et al.* among medical undergraduate students in Haryana which showed that 51.2 per cent of the students opined that online classes are equally or somewhat more efficient than traditional classes in meeting individual learning needs⁷. Results of the study conducted by Subramanian A *et al.* among medical students in Texas, USA during the pre COVID-19 era is also in agreement with our study results¹¹. A study conducted by Al-Qhtani A *et al.* among medical students in Saudi Arabia showed that 65.5 per cent of the respondents felt that the efficiency of online classes in meeting individual learning needs to equal to or somewhat more efficient than traditional classes¹². With regards to assignment submission, 72.8 per cent of subjects

felt that online classes are equally or somewhat more convenient than traditional classes which is better than the results of the study conducted by Kaur *et al.* and AlQhtani *et al.* where 68.1 per cent and 51.9 per cent of the respondents respectively had the same opinion as ours^{7, 12}. This can be taken as a positive input from the present study where assignment submission can be considered to be done as an online activity which saves time both for teacher as well as student. Majority of the respondents (57.9 per cent) in our study were satisfied with the availability of E-resources for online learning which is seconded by the opinion of the respondents in the study conducted by Kaur N *et al.* and Al-Qhtani *et al.*^{7, 12}. This implies that though the physical classes had commenced post diminution of the pandemic, still some aspects of online studies can be still continued especially learning from E-resources which may be helpful as a part of self-directed learning (SDL) among students. With regards to the balance between theoretical and practical knowledge gained through online classes, three fourth of the respondents in the present study felt that it is somewhat less effective or much less effective which is also supported by the study results of Kaur N *et al.* and Al-Qhtani *et al.* where three fourth and more than half of the respondents respectively had the same opinion as the present study which can be considered as a negative factor of online classes^{7, 12}. Factually, it may be considered that as the students in medical field go to higher semesters, exposure to patients, bedside teaching increases which may not be conducted effectively with online classes, which may lead to dissatisfaction of students with regards to practical learning through online classes.

More than half of the respondents in the present study opined that online classes are somewhat less effective or much less effective in developing knowledge and skills and also in developing student teacher interaction which is supported by studies conducted by Bettinger *et al.* among university students in Stanford, California and Nalini *et al.* among medical students of a government medical college in Hassan, Karnataka^{13, 14}. A study conducted by Laura M *et al.* among medical students in New York showed that well-structured, well-designed, well-organized e-learning courses will lead to increased satisfaction among students with greater impact on their cognitive and psychomotor skills compared to traditional classroom teaching¹⁵.

Weighing the pros and cons of both methods of teaching, it is worthwhile to note that combining both online and traditional classroom teaching with an optimum mix, gives advantages of both methods to the learners, which is a concept known as “Blended Learning”¹⁶. This idea is supported by some of the studies conducted in India like the one conducted by Dodiya D *et al.* among medical students in Gandhinagar, Gujrat¹⁷. A systematic review conducted by Vallee A *et al.* showed that blended learning was the most effective method in enhancing student’s knowledge when compared to traditional method of teaching¹⁸. Another systematic review conducted by Wilcha R J *et al.* found that during the covid-19 pandemic all the educational institutions have strived hard to improve their online training resources and have found that online teaching is a very effective way of enhancing knowledge of students¹⁹. Dost S *et al.* in their study were hopeful that online teaching methods within the framework of

traditional teaching will increase over the years²⁰. Regarding the limitations of the present study, we would like to mention that since we have used a questionnaire used by authors of a previous study with their permission, there may be additional factors which may influence effectiveness and satisfaction of online classes. Moreover, each of the factors studied at present can be studied independently in detail, which is the scope for future research in this area.

Conclusion

The present study has emphasized the advantages of online learning or e-learning with regards to factors like submission of assignments and self-directed learning using the vastly available e-resources in medical education. At the same time, when it comes to gaining practical experience through patient interaction and bedside teaching, online learning has got its own limitations. Hence, an optimum mix of both methods which is known as “blended learning” can be adopted in medical colleges to capture the advantages of both ways of learning. This will also create opportunities for students to direct their own learning which may be beneficial for the next generation of medical students.

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