

# Transition of preferences, perception and barriers towards E learning during COVID-19 pandemic among medical students in India -A Mixed method study

**Dr Deodatt M Suryawanshi**

Trichy SRM Medical College Hospital and Research Centre

**Suguna A** (✉ [sugucorred87@gmail.com](mailto:sugucorred87@gmail.com))

Trichy SRM Medical College Hospital and Research Centre

**Surekha A**

Shri Sathya Sai Medical College and Research Institute, Sri Balaji Vidyapeeth Deemed to be University, Ammapettai, Tamil Nadu, India

**Raghuram V**

Trichy SRM Medical College Hospital and Research Centre

**Divya R**

Trichy SRM Medical College Hospital and Research Centre

**Kalaipriya Gunasekaran**

Trichy SRM Medical College Hospital and Research Centre

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## Research Article

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# Abstract

**Introduction:** Though E learning among medical students has been well received in other parts of the globe, challenges to implementation can only be documented through a longer duration study which can truly fathom the learning experiences of medical students and how their perceptions, preferences and barriers change over a period of time.

**Objectives:** To assess the transition of preferences, perceptions and barriers among medical students towards E-learning during the six months and to explore the perception towards E learning using qualitative method

**Methodology:** The present study used Mixed Method approach to find out the transition of e learning experiences through their perception, preferences and barriers among medical students over the period of 6 months from April to Nov 2020. A total of 296 students belonging to the second year MBBS and Prefinal year were recruited using complete enumeration method. 286 students returned the questionnaire in phase 1 and 277 students in Phase 2. The investigators conducted Focused group discussion (FGD) in two batches of 10 students.

**Results:** There was a significant increase of 20.4% ( $p = 0.007$ ) in students' preference to classroom teaching in Phase 2 as compared to phase 1. Lack of personal interaction was perceived as a barrier in phase 1 by 180 (62.9%) students, only 71 (25.6%) students perceived it as a barrier in phase 2. There was significant increase in participants 96 (34.6%) in Phase 2 as compared to phase 1 (19.9%) who replied negatively about its inclusion in the curriculum ( $p = 0.0003$ ). In phase two there was a significant increase in number of students as compared to Phase 1 who perceived that lack of access to internet and data availability as a barrier to E learning ( $p = 0.002$ ). Continuity of education during pandemic time and distractive environment with lack of motivation was quoted by many students when asked about merits and demerits of e learning in FGD.

**Conclusion:** The present study raises certain important questions regarding the utility of E learning during extended periods of lockdown which needs to be addressed if we have to adopt this new method of learning. Any new method of learning has to consider students preferences and perceptions if it has to yield satisfactory outcomes with respect to knowledge and skill acquisition.

## Introduction

On 30th January 2020, the World Health organisation (WHO) for the sixth time in the last decade declared COVID-19, caused by SARS COV-2, a Public Health Emergency of International Concern (PHEIC) as it constituted grave Public health threat to other countries through international spread and required a coordinated international response under the International Health Regulations (2005).<sup>1,2</sup>

As cases continued to increase worldwide and more so ever in India, the Indian Government ordered a nationwide lockdown to ensure social distancing as a fundamental strategy to mitigate the impact of SARS COV-2 on 24th March 2020.<sup>3</sup> Following this to ensure social distancing many state governments ordered suspension of all its educational institutions.<sup>4-6</sup> All the undergraduate medical students were sent to the safe confinement of their homes until the completion of lockdown. While the lockdown continued for many months continuing medical education remained a priority of various stakeholders (Students, administrators and policy makers and a parents) which led to adoption of E learning as a viable alternative to the traditional face to face learning.

Means et al defined E-learning or online learning as “the learning that occurs entirely (purely online learning) or partially (blended learning) through the internet”.<sup>7</sup> As of 2018, India produces 58756 MBBS graduates from 529 medical colleges, the highest in the world.<sup>8,9</sup> These medical graduates hail from diverse geographical, social, economic and linguistic backgrounds. This heterogeneity inhibits “once size fits all” approach and prerequisites graduate learning to be more diverse and inclusive in India. Diversity forms one of the most important principle of Competency Based Medical Education 2019 introduced by the regulator National Medical Commission (NMC) of India.

While E-learning was born out of necessity and demand, medical institutions world-wide affirmed their faith and moved over from the traditional face to face (f2f) learning to non-face to face learning. Institutions employed a variety of e-learning typologies like asynchronous (different time different place), Synchronous (same time different place) or Blended (face to face and online) to reach out to students far and wide through either.<sup>10,11</sup>

In India, E learning though not an explicit part of the CBME curriculum was reinforced through specific directives of the NMC through the modules of pandemic management and online learning assessment.<sup>12,13</sup>

The Challenges to E learning in India are many folds and involves multiple stakeholders like the teaching faculties, the students, the institutions and the curriculum regulators. While faculty challenges include preparedness to innovate and adapt to E-Learning technology, training in E learning infrastructure, mental resistance to change and apathy.<sup>14</sup>

Challenges described by other studies include absence of clinical teaching with a ‘live’ patient, reduced interactions and discussions, uninterrupted internet access, provision of infrastructure, and familiarity with the technology are the major barriers in e-learning implied in medical education.<sup>15,16</sup>

The other major challenge of E -Learning is disparity in access from electricity, internet and devices like computer or smartphones.<sup>17</sup>

While equality of opportunity is enshrined in article 15 of the Indian constitution, the use of e-learning as a primary modality in the present pandemic in a socioeconomically diverse country like India with only 47% of households having accessible to electricity more for more than 12 hours, only 24% Indians owning a smartphone, 11% of households owning any type of computer and broadband accessibility to only 51% population in Urban areas and 29% in rural ,implementing E learning will be a challenge to only end up in perpetrating educational inequality.<sup>17,18,19</sup>

Though E learning among medical students has been well received in other parts of the globe, challenges to implementation can only be documented through a longer duration study which can truly fathom the learning experiences of medical students and how their perceptions, preferences and barriers change over a period of time.

So, the present study was conducted assess how medical students perceive e learning, what methods do they prefer in e learning and what barriers they faced during this long ordeal.

Objectives:

1. To assess the transition of preferences, perceptions and barriers among medical students towards E-learning during the six months.

2. To explore the perception towards E learning (Overall idea, advantages, disadvantages, barriers, future needs and inclusion into curriculum) using qualitative method.

## Methodology

The present study, made an attempt to study the transition of perceptions, preferences and barriers towards e-learning among medical students over a period of 6 months.

The study was conducted in two parts where in the initial part the perceptions preferences and barriers towards E learning were assessed. The findings from initial part can be accessed at <http://dx.doi.org/10.18203/2394-6040.ijcmph20204383>.

The present study used Mixed Method approach to find out the transition of elearning experiences through their perception, preferences and barriers among medical students over the period of 6 months

The quantitative part was a longitudinal online study conducted over a period of 6 months from April to Nov 2020. Where in April (phase 1) was conducted and in November (phase 2) was created. The investigators recruited participants through online questionnaire using Google forms. A total of 296 students belonging to the second year MBBS and prefinal year were recruited using complete enumeration method. 286 students returned the questionnaire in phase 1 and 277 students in Phase 2.

There was no scheduled teaching by the department for 1st year MBBS student during this period so they were not recruited in the study. The investigators used a semi-structured online questionnaire after obtaining informed consent which included the questions on demographics details, their perception, preferences, merits and barriers to e-learning. Some questions were kept open ended where multiplicity of responses was expected from the participants.

### Qualitative methodology:

Post December when the lockdown was lifted and medical students revisited their schools the investigators choose to interact with students regarding their e learning experiences at home. Here they employed qualitative approach to know about their learning experiences.

The investigators conducted Focused group discussion (FGD) in two batches of 10 students.

Following steps were done:

- A topic guide was prepared (Table 1)

Table 1  
Interview Guide

Themes	Subthemes
Overall idea of E learning	Source/How enriched students are/Current updates
Advantages	Pre-Covid time/Post-Covid/Theoretical/Clinical
Disadvantages	Network issues/Understanding/Timing
Barriers	Connectivity/Cop up/Resilience
What students need in future	Demands/expectations
Including as part of Curriculum	Feasibility/Others
Assessment	Formative/Summative/Part of already existing

All methods were carried out in accordance with relevant guidelines and regulations.

Research protocol was approved by institutional ethics committee (TSRMMCHRC/ME-1/2020-IEC 56)

Informed consent was obtained from all subjects.

### **Statistical Tests to be used for Data Analysis**

The data for quantitative part was entered in MS excel version 2016 and analysed using SPSS v 21. Quantitative variables were summarised using mean and standard deviation. Percentage change in responses to variables in Phases 2 was described as compared to the Phase1 Paired student T test was used as the test of significance to find out the differences in in two phases and a p value of less than 0.05 level was considered as significant.

The analysis of FGDs and IDI was done through a conventional content analysis approach. Data were analysed and managed simultaneously by sketching ideas, taking field notes, summarizing field notes, identifying codes, reducing codes into themes in Microsoft Excel, and finally developing categories

## **Results**

In the present study Majority of the study participants 221 (77.2%) in Phase 1 and 219 (79.0%) in Phase 2 were in the age group of 18–20 yrs.

In both the phases Majority of study participants 179 (62.5%) were females.

The present study made an attempt to assess the Transition of E learning experiences of medical students during COVID-19 pandemic in South India.

All the 286 students participated in the pre-test whereas only 277 participated in the post test.

### **Quantitative**

#### **Preferences**

Students were enquired for their preferences of teaching mode and out of 286 students in Phase 1 and 277 in Phase 2. (Table 2) Majority 138 (48.3%, 49.8%) of them preferred both classroom and online teaching mode in both the Phases.

Table 2  
Comparison of perceptions and preferences regarding E learning between Phase 1 and Phase 2

Variables		Pre-test N (%)	Post 6 months N (%)	Per cent Change (%)	P value
Age	18.0–20.0	221(77.2)	219((79.0)	-0.9	0.8
	21.0–23.0	62(21.6)	55(19.8)	-11.3	
	23.0+	3(1.04)	3(1.0)	0.0	
	Total	286(100.0)	277(100.0)	-3.1	
Preferred teaching mode	both	138(48.2)	138(49.8)	0.0	0.007
	Classroom teaching	98(34.2)	118(42.5)	20.4	
	Online teaching	50(17.4)	20(7.2)	-60.0	
Which Teaching method is easy to comprehend?	Classroom teaching	174(60.8)	210(75.8)	20.7	0.000076
	Online teaching	112(39.1)	65(23.4)	-42.0	
Rate of Computer and Internet skills	Proficient	153(53.4)	155(55.9)	1.3	0.73.
	Learner	115(40.2)	107(38.6)	-7.0	
	Advanced	18(6.2)	14(5.0)	-22.2	
Preferences for e-learning methods	Non interactive (Whats app web, slideshare ,YouTube videos)	203(70.9)	107(38.6)	-47.3	< .00001
	Interactive (Zoom, Face book live, YouTube live)	83(29.0)	170(61.3)	104.8	
Preferences in interactive Platform	YouTube live	135(47.2)	16(5.7)	-88.1	< 0.00001
	Zoom/Google Meet	63(22.0)	251(90.6)	298.4	
	Any other	59(20.6)	6(2.1)	-89.8	
	Instagram live	27(9.4)	0(0)	-100.0	
	Face book live	2(0.6)	0(0)	-100.0	
Preferences in Non-interactive platform	YouTube videos	105(36.7)	140(50.5)	33.3	.001892.
	Slide share	100(34.9)	84(30.3)	-16.0	
	Whats app web	81(28.3)	52(18.7)	-35.8	
Should E learning be made a part of MBBS Curriculum	Indeterminate	157(54.8)	125(45.1)	-20.4	.000347.
	Yes	72(25.1)	54(19.4)	-25.0	
	No	57(19.9)	96(34.6)	68.4	

There was a significant increase of 20.4% ( $p = 0.007$ ) in students' preference to classroom teaching in Phase 2 as compared to phase 1. In phase 2, 210 (75.8%) students said that classroom teaching method was easy to comprehend than online teaching method which was a significant increase of 20.7% over Phase 1.

There was no significant increase observed in Computer literacy skills of study participants in phase 2 as compared to first phase.

In phase two as compared to Phase 1, there was high significant increase (104%) ( $p = 0.00001$ ) observed in students preference to Interactive E-learning platforms like Google Meet, Zoom or WebEx. 170 students (61.3%) preferred interactive learning over non-interactive learning as compared to 83 (29.0%) students.

There was significant increase of 298% ( $p = 0.00001$ ) in preference for Google meet as an interactive platform in Phase 2 as compared phase 1. 251 (90.6%) participants in phase 2 preferred Google meet as an Interactive platform of choice over other platforms like YouTube live (5.7%) or Facebook live which were preferred in the first phase.

Though students preferred interactive platforms in Phase 2 of the study, they also replied that in non-interactive platforms Pre uploaded YouTube videos can also be a part of E learning experience.

### **Perceptions**

Though majority (54.9%) of study participants were indeterminate regarding inclusion of E learning to be a part of the undergraduate MBBS curriculum there was significant increase in participants 96 (34.6%) in Phase 2 as compared to phase 1 (19.9%) who replied negatively about its inclusion in the curriculum ( $p = 0.0003$ ).

Post the Phase 2 more students (42) as compared to Phase 1 (13) replied that only perceived advantage of E learning is absence of Monotony in the classroom.

In phase two there was a significant increase in number of students as compared to Phase 1 who perceived that lack of access to internet and data availability as a barrier to E learning ( $p = 0.002$ ).

Though lack of personal interaction was perceived as a barrier in phase 1 by 180 (62.9%) students, only 71 (25.6%) students perceived it as a barrier in phase 2 (Table 3)

Table 3  
Comparison of Perceived merits and Barriers to E learning between Phase 1 and phase 2

		Pre-test N (%)	Post 6 months N (%)	Per cent change (%)	P value
Perceived Merits of E Learning	Flexible timings, Breaks the monotony of classroom teaching, Helps in Better understanding	134(46.8)	115(41.5)	-14.2	0.00218
	Flexible timings	127(44.4)	112(40.4)	-11.8	
	Breaks the monotony of classroom teaching	13(4.5)	42(15.1)	223.1	
	Helps in Better Comprehension	12(4.1)	6(2.1)	-50	
Perceived Barriers to E learning	Lack of Personal interaction with the teacher	180(62.9)	71(25.6)	-60.6	0.00001
	Access to internet & availability of Data	67(23.4)	142(51.2)	111.9	
	Requirement of laptops, mobile or Pcs for accessing the lecture.	53(18.5)	24(8.6)	-54.7	
	Others	7(2.4)	36(12.9)	414.3	

As the question on Perceived barriers was left open ended the quantitative analysis of other perceived barriers was difficult. To ameliorate this investigator used qualitative approach.

**Qualitative results:**

Result of focus group discussions has been projected in (Table 4)

Table 4  
Qualitative results on perception about e learning among medical undergraduates

<b>E learning</b>	<b>Domains</b>	<b>Response</b>
<b>Overall idea</b>	Source	Google
	Exposed to	Google meet, Zoom
	Current updates	No idea
	How to enrich	Conduct separate Orientation sessions
<b>Advantages</b>	Pre-Covid	Not much exposed to sessions like flip classes
	Post Covid	Got quickly adapted without any break in academic sessions
	Theory	Fruitful
	Clinical	Prerecorded videos help to only certain extent Without real patients, difficult
<b>Disadvantages</b>	Network	Poor connectivity
	Understanding subject	Good to some extent but with much distractions
	Timing	Not convenient
<b>Barriers</b>	Cop up	Very difficult in the beginning
	Resilience	Over repeated use
<b>Future needs</b>	Demands	Training sessions/workshops
	Expectations	Trained faculties Flexible timing Accompanied by notes
<b>Part of Curriculum</b>	Feasibility	Possible with proper planning of sessions
	Overburden	Should ease learning rather than overburdening
<b>Assessment</b>	Time consuming	Without wasting much time
	Shortcomings	Stimulate copying as there is no supervision
	Others	Alternate timings should be fixed in case not able to attend

**Verbatim:**

**Knowledge about E learning:**

When asked about what is students' overall idea on E learning and source of their knowledge, one of the students responded as follows:

*".....it's a tool which will enable us to learn wherever we are and helps mainly in distant learning" (Student 1)*

Regarding current updates response was as follows:

*"Other than Google meet and zoom, I don't have much knowledge about other e learning platforms....." (Student 3)*

#### **Advantages and disadvantages of E learning:**

Continuity of education during pandemic time and distractive environment with lack of motivation were quoted by many students when asked about merits and demerits of e learning.

*"We could be in touch with our academic activities especially during this Covid 19 pandemic mainly because of e learning and thanks for that....." (Student 6)*

*".....there was not much face to face interaction, rather not much motivation to continue listening to lectures.....very boring" (student 2)*

*"I was totally distracted at home (laughs).....environment is not at all conducive for learning.....developed headache frequently" (Student 5)*

*Absence of monotony was perceived as important advantage of E learning which is similar to the response of phase 2 students.(42 in number)*

#### **Barriers and Challenges in future:**

Network issue was perceived as most important barrier, whereas inclusiveness in future curriculum were looked upon as challenge by many students

*"I spent lot of money trying to get good laptop and network for this e learning..... (Sighs)" (This is again in conjunction with the quantitative results)*

*(Student 4)*

*"If at all this will be included in future curriculum.....we need proper training and division as small groups will be really useful..." (Student 2)*

Lack of personal interaction was perceived as a barrier in phase 1 by 180(62.9%) students which were reflected as part of FGD by many students.

#### **Assessment:**

Not a preferable method by many students

*".....we developed a tendency to copy as not much supervision and also not much time for preparation for most of the assessments through Google forms...." (Student 3)*

#### **Inclusion in curriculum:**

Not very keen in including E learning as part of curriculum which is similar to the quantitative results whereas 96 students(34.6%) told negatively about its inclusion in curriculum

## Discussion

The present study is an attempt to understand the pattern of transition of preferences and barriers to E learning of medical students in south India during extended periods of lockdown leading to disruption of traditional classroom teaching. Lack of comparable studies examining this aspect in India and other countries has to be kept in mind while drawing any inferences from the findings of the present study.

There was a significant increase of in students' preference to classroom teaching by the end of the study as compared to beginning. By the end of the study majority of the students said that classroom teaching method was easy to comprehend than online teaching method which was a significant increase of 20.7% over the number of students at the beginning of the study. This finding is an important one as it highlights the importance of teacher-student interaction which is lacking in online learning.

One of the most important factors in online learning is social presence. Social presence also can be interpreted as the degree to which a person is perceived as "real" in mediated communication, which contribute to the social climate in the classroom experience<sup>20</sup>

Nowadays modelling user's preferences is one of the most challenging tasks in e-learning systems that deal with large volumes of information. Traditionally, most of student modelling systems have been limited to maintain assumptions related with student's knowledge not paying too much attention to student's preferences. However, over the last years the growth of on-line educational data has made it necessary to "filter" or "sort" the information shown to the student, so he/she can make a better use of it. Use of learning styles for determining the student's preferences has been getting more and more attention in recent times.<sup>21</sup>

There was highly significant increase in the number of students at the end of the study as compared to the beginning observed in terms of preference to Interactive E-learning platforms like Google Meet, Zoom or WebEx. As many as 170 students (61.3%) preferred interactive learning over non-interactive learning.

These findings reiterate the observations made by Moore who demonstrated that interaction is one of the most important components of teaching and learning experiences<sup>22</sup>. Interaction is the most important thing when it comes to face-to-face learning or even in online learning<sup>23</sup>. Inevitably, interaction that uses the social aspect must be apply in learning in order to improve student learning by enhancing student knowledge.<sup>24</sup>

The findings of the present study seem to resonate with a national cross-sectional survey in UK involving 2721 medical students by Samiullah Dost et al who found that overall, students did not find online teaching to be engaging or enjoyable, with limited opportunities to ask questions and not as effective as face-to-face teaching.<sup>25</sup>

During the course of the study it was noted that according to students the only perceived advantage of E learning is absence of monotony of the classroom learning. There was a significant increase in number of students by the end of the study as compared to the beginning, who perceived that lack of access to internet and data availability as a barrier to E learning. .Though lack of personal interaction was perceived as a barrier in the beginning of the study by majority of the students, only a small proportion continued to have the same perception even at the end of the study, reflecting their effort in adapt to this new way of learning.

Some of the important themes that emerged during the focussed group discussion sessions to identify perceived barriers to E learning were ,continuity of education during pandemic time and distractive environment with lack of

motivation., network issue, doubts regarding its inclusiveness in future curriculum and not being a preferable method by many students.

Similar findings have been noted in a national cross sectional survey by Dost et al where family distractions, Internet connection and the timing of tutorials were identified as main barriers to E learning.<sup>25</sup>

## Conclusions

The present study raises certain important questions regarding the utility of E learning during extended periods of lockdown which needs to be addressed if we have to adopt this new method of learning. Any new method of learning has to consider students preferences and perceptions if it has to yield satisfactory outcomes with respect to knowledge and skill acquisition.

## Declarations

**Ethics approval and consent to participate:** Obtained ethical approval from Institutional ethics committee with reference number: TSRMMCHRC/ME-1/2020-IEC 56. Informed written consent has been obtained from the participants

**Consent for publication:** obtained from concerned authorities

**Availability of data and materials:** Raw data has been shared

**Competing interests:** Nil

**Funding:** Nil

**Authors' contributions:** All authors have contributed equally in preparation of manuscript

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## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Phase1data.xlsx](#)
- [Post6monthsPhase2.xlsx](#)