

# Challenges faced by faculty in the implementation of e-learning among undergraduate medical students: A Multicentric Cross-Sectional Study

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## Abstract

**Background:** Many medical educators are experimenting with innovative ways of E-learning, which provides an opportunity to students for self-directed learning apart from other advantages. Diverse challenges in infrastructure and adoption are encountered when implementing E-learning within medical education. This study aims to assess the limitations of e-learning and difficulties faced by medical faculty in implementing it.

**Methods:** A cross-sectional study was conducted by distributing a 21-item closed-ended, pre-tested & pre-validated questionnaire among medical faculty as Google Form. The responses received were analysed using Microsoft Excel (2019) and SPSS (ver.26). Statistical significance was set at  $P < 0.05$ .

**Results:** About 89.3% of faculty agreed that additional training is required for e-learning. About 72.4% of clinical faculty felt that there would be resistance from teachers in adopting e-learning, whereas 48% pre/paraclinical faculty felt the same. More than 80% and Associate & Assistant professors suggested developing e-modules for CBME. Compared to clinical faculty, pre/para clinical faculty have favoured e-learning, and statistical significance was observed ( $p=0.02$ ).

**Conclusion:** There is a growing positive perception of E-learning, but the level of acceptance remains low. Further research is required on how to enhance and maximize the confident & effective utilization of ever-increasing opportunities in E-learning. Establishing well-developed E-learning facilities in teaching hospitals will tremendously enhance educational opportunities for its faculty & medical students.

**Keywords:** e-Learning, Faculty, CBME, Medical education.

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## I. Introduction

E-Learning refers to the use of information technology or internet for learning activities.<sup>1</sup> Technology delivers a broad array of solutions that enhance knowledge, performance and responsiveness of the learners. Several governments enforce the development of community health care aiming to health support and sustainability as well as the prevention of diseases. All these factors require the modernisation of education, especially education in the field of medicine. The educational system supported by e-learning offers modern form of study which is highly flexible from the point of view of time requirements and material resources. It represents very good accessibility and easy and direct communication with the tutor.<sup>2</sup>

The present generation of learners are "digital natives" due to their familiarity and reliance on information and communication technology.<sup>3</sup> Students easily adapt the new generation of smart phones (mobile phones) and tablet personal computers. Competency-based curricula emphasise the learning outcome, not the process of education.<sup>1</sup> It shifts medical education from teachercentric to more student-centred, enhances student's retention, application of knowledge and promote self-directed learning environments compared to conventional learning, it engages the students in to active learning with ease of access and choice of own learning goal, content, sequence, time, place and pace.<sup>4</sup> The active learning engages the student in higher-order thinking, practical application of knowledge and improves exam scores.<sup>5</sup> It also provides an extra tool for students to use the lecture material for revision and clarification.<sup>6</sup>

E-learning helps the academics or educators to meet the growing needs and expectations to improve the quality of education.<sup>7</sup> They help the educators in improving the distribution, standardization and updating of course materials.<sup>8</sup> Educators can check the individual learning activity and progress of the students with e-learning assessment tools.<sup>7-8</sup> The demand for e-learning has increased due to its flexibility, access to reach a

wider audience and the potential for cost reduction in the long-term.<sup>9</sup> In a recent vision document, Medical Council of India (MCI) emphasized the use of e-learning as an advanced teaching method.<sup>10</sup>

The use of e-learning is limited in medical education in India.<sup>11</sup> It is generally perceived that infrastructural resources and human readiness is not always present in low and middle-income countries.<sup>12</sup> The present study is aimed to assess the facilitating & deterring factors faced by medical faculty and the objective was to find correlation between clinical & Pre/Paraclinical Faculty.

## II. Materials And Methods

**Study Location:** This is a cross-sectional study was conducted online across 45 institutes in India.

**Study Period:** Data collection started in September 2020 and was completed in November 2020.

**Selection Criteria:** The inclusion criteria consisted of healthcare professionals involved in delivering medical education who were willing to participate and fill out the questionnaire.

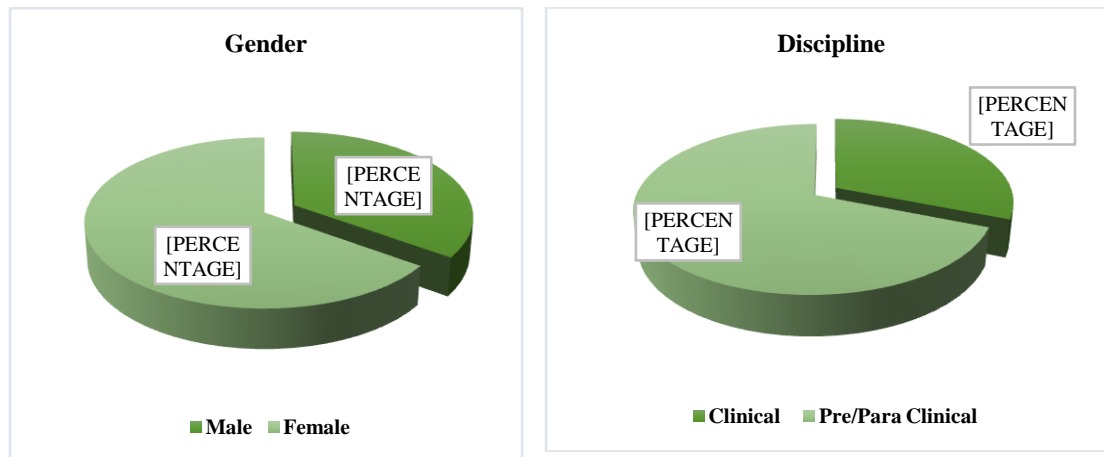
**Sample Size:** A total of 200 questionnaires were distributed, and a total of 187 were submitted successfully (93.5% response rate).

**Study Tool:** The instrument used in this study was 21-item pre-tested&pre-validated, closed-ended questionnaire and 5 open ended feedback questions. To ensure the confidentiality of information, all questionnaires were completed and submitted anonymously.

**Ethical Consideration:** Institutional ethics committee approval was taken.

**Data Analysis:** Statistical Package for the Social Sciences (SPSS), Version 23 (IBM Corporation, Armonk, NY, USA) was used to analyse the collected data. To summarize quantitative variables, descriptive statistics such as mean, median, and standard deviation were used. Frequencies and percentages were used to summarize qualitative variables. The inferential statistical chi-square test was used for the comparison of two or more variables. The level of significance ( $p$ -value) was determined at  $p < 0.05$ .

## III. Results



**Fig 1:**Gender distribution among participants**Fig 2:**Discipline of participants

Figures 1 & 2 show distribution of gender and discipline among the respondents. About 65% respondents were females and 35% were males. About 69% respondents were from pre/paraclinical domain and 31% respondents were from clinical domain.

**Table 1:** Distribution of designation and gender

Cadre	Male	Female	Total
Senior Resident	4(6.2%)	30(24.6%)	34
Tutor	4(7.7%)	8(6.6%)	12
Assistant Professor	28(43.1%)	38(31.1%)	66
Associate Professor	10(15.4%)	18(14.8%)	28
Professor	18(27.7%)	28(23%)	46
Total	65	122	187

Table 1 shows distribution of gender and designation among the respondents. Among the 66 assistant professors, 43.1% were males and 31.1% were females. A statistically significant association between gender and designation was observed with chi-square  $\chi^2 = 10.11$  and  $p=0.0039$ .

**Table 2:** Response of participants to questions regarding e-learning

Question	Clinical Faculty	Pre/Paraclinical Faculty
E-Learning can aid the process of learning in healthcare.	62%	79%
There would be resistance from teachers to adopt E-learning as a teaching modality.	72.4%	48.8%
There would be resistance from students to adopt E-learning as a teaching strategy in medical education.	65.5%	38%
E-Learning can be used as a flexible mode of teaching.	72.4%	84.4%
E-learning can have a role in competency-based medical training.	51.7%	71.3%
It's easier to explain different case scenarios using a simulated/virtual patient.	44.8%	58.9%
E-Learning can facilitate skill acquisition and allow practicing of skills before real-life experience or encounter with patients.	34.5%	43.4%
Down the Future, E-learning can replace traditional learning (Disagreed)	65.5%	58.1%

Table 2 shows the response to questions from respondents regarding e-learning. About 38% pre/paraclinical faculty felt that there would be resistance from students to adopt e-learning. Most of the pre/paraclinical faculty (84.4%) felt that e-learning can be used as a flexible mode of teaching. About 65.5% clinical faculty and 58.1% pre/paraclinical faculty have disagreed that e-learning can replace the traditional learning.

**Table 3:** Association between questions regarding e-learning with gender & discipline

Question	Gender	Discipline
E-Learning can aid the process of learning in healthcare.	$p = 0.021^*$	$p = 0.009^*$
There would be resistance from teachers to adopt E-learning as a teaching modality.	$p = 0.031^*$	$p = 0.011^*$
There would be resistance from students to adopt E-learning as a teaching strategy in medical education.	$p = 0.00002^*$	$p = 0.002^*$
E-Learning can be used as a flexible mode of teaching.	$p = 0.196$	$p = 0.04^*$
E-learning can have a role in competency-based medical training.	$p = 0.536$	$p = 0.029^*$
E-Learning can facilitate skill acquisition and allow practicing of skills before real-life experience or encounter with patients.	$p = 0.218$	$p = 0.022^*$

Table 3 shows the association between questions regarding e-learning with gender & discipline.

**Table 4:** Association between designation & e-learning

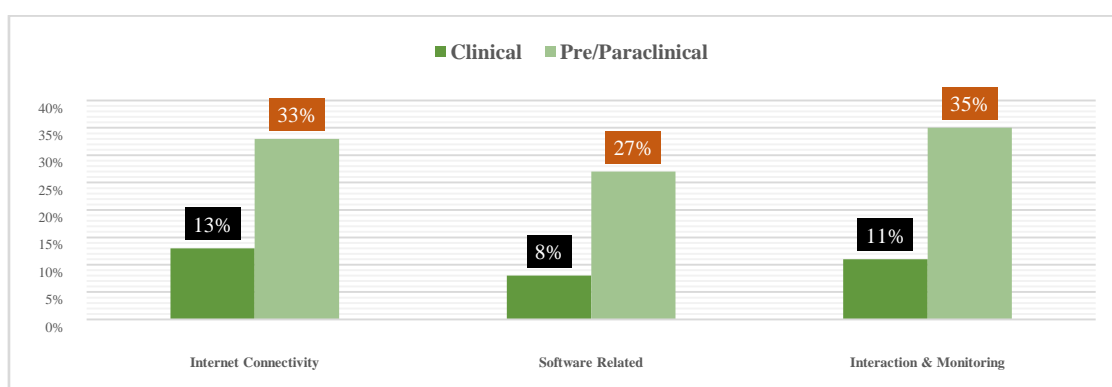
Opinion	Senior Resident	Tutor	Asst. professor	Asso. Professor	Professor
Unfavorable	5.8% (2)	16.6% (2)	3% (2)	7.14% (2)	8.5% (4)
Neither Unfavorable/Nor Favorable	70.5% (24)	50% (6)	36.36% (24)	21.4% (6)	42.5% (20)
Favorable	23.5% (8)	33.3% (4)	60.6% (40)	71.4% (20)	48.9% (23)
Total	34	12	66	28	47

Table 4 shows association between designation and e-learning. About 66% Assistant and Associate Professors have preferred E-learning. A statistically significant association between designation and e-learning was observed ( $p=0.0037$ ) with chi-square  $\chi^2 = 22.73$

**Table 5:** Association between Clinical & Paraclinical faculty regarding opinion on e-learning

Opinion	Clinical	Pre/Paraclinical	Total
Unfavorable	10.3% (6)	4.6% (6)	12
Neither Unfavorable/Nor Favorable	53.4% (31)	37.9% (49)	80
Favorable	<b>36.2%</b> (21)	<b>57.3%</b> (74)	95
Total	58	129	187

Table 5 shows association between clinical & pre/paraclinical faculty regarding opinion on e-learning. Compared to clinical faculty, pre/paraclinical faculty have favoured e-learning and statistically significant association ( $p=0.02$ ) is seen with  $\chi^2 = 7.783$ .



**Fig 3:**Feedback – Barriers for e-learning

Fig 3 shows the barriers for e-learning faced by the faculty. About 33% clinical and 13% pre/paraclinical teachers experienced problems during online classes due to internet connectivity. Most of the faculty felt that lack of physical interaction with students and monitoring them is the main barrier for e-learning.

#### IV. Discussion

The present study was conducted across 45 Institutes in India with 187 respondents. Among the 187 respondents, 35% were females and 65% were males. About 69% participants were from clinical discipline and 31% were from pre/paraclinical discipline. Among them, 18% were senior residents, 6.4% were tutors, 35.2% were assistant professors, 14.9% associate professors and 24.5% were professors. A statistically significant association between gender and designation was observed with chi-square  $\chi^2 = 10.11$  and  $p=0.0039$ .

In this study, about 72.4% of clinical faculty have felt there would be resistance from teachers in adopting e-learning while 48% of paraclinical faculty felt the same. About 64.9% faculty have agreed that e-learning can have a role in Competency Based Medical Education (CBME) and statistically significant association was seen.

About 80% of assistant and associate professors have suggested developing e-modules for vertical integration in CBME, which was statistically significant ( $p<0.05$ ) across different designations. About 59% of pre/paraclinical faculty and 44.8% clinical faculty have opined that it's easier to explain different case scenarios using simulated patient. Only 34.5% clinical faculty have agreed that e-learning can facilitate skill acquisition while 55% disagreed. About 89.3% of faculty opined additional training is required for smooth implementation of e-learning.

The main findings in our study suggest that pre/paraclinical faculty (57.3%) preferred e-learning than clinical faculty (36.2%). Most of the assistant and associate professors were favourable to e-learning.

A study done by Mohammed Amin Almaiah (May 2020) on “Exploring the critical challenges and factors influencing the E-learning system usage during COVID-19 pandemic” shows that technological factors were one of the critical factors that affect the usage of e-learning system according to respondents which were similar to this study that about half of the teachers (46.6%) got disturbed for their online classes because of internet problem.<sup>13</sup>

A study done by Owusu-Fordjour, C. (2020) on “The impact of COVID-19 on learning – The perspective of the Ghanaian Student” highlights that only 18.7% of the respondents agreed of being able to learn effectively in the house, similarly in this study only 42.3 % of teachers agreed that its comfortable to take the class from home. More than half (64.5%) of the respondents agreed that getting an understanding of concepts during individual studies is challenging, similarly in the present study, 49.19% of teachers faced it challenging.

A number of systematic reviews have been conducted to examine the effectiveness of e-learning across the continuum of medical training covering medical students, residents, and practicing physicians.<sup>14</sup> As e-learning continues to be widely integrated in the training of future physicians, it is critical that our efforts in conducting evaluative studies should target specific e-learning features that can best mediate intended learning goals and objectives. Without an evolving knowledge base on how best to design e-learning applications, the gap between what we know about technology use and how we deploy e-learning in training settings will continue to widen.

## V. Limitations

Sample size could have been more. Detailed assessment in faculty regarding skill to prepare e-modules could have been done. The impact of e-learning was not compared with the traditional teaching methods in the study. The long-term gains and behavioural change among the students were not assessed. In the study, e-based interactivity in the form of self-evaluation exercises and formative feedback interactivity between students and faculty were not explored. Subjective experiences may have contributed to faculty perceptions relative to e-learning.

## VI. Conclusion

E-learning is fast becoming a part of undergraduate courses, as an adjunct to traditional learning activities for pharmacology content in healthcare professional training. This blended approach might be more attractive to adult learners because of their assumed higher levels of motivation and capability for self-directed learning. Our study suggests that, in developing country like India, where many students do not have access to quality education, e-learning can be viewed as a promising tool to improve the accessibility and availability of learning resources by employing cost effective and user-friendly programs. Keeping in mind, the increased complexity of e-learning, it is also proposed that having a team of educationists, technical experts and administrators in each university may prove more beneficial. The increasing positive perception of students about E-learning is a good omen. There is a need to increase the level of acceptance of E-learning, both among students and teachers. This can be achieved by establishing well-developed E-learning facilities in medical institutions. The move will bring India’s medical educational system in parallel with the educational systems of developed countries around the world.

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**CONFLICT OF INTEREST:** None declared

**ETHICAL APPROVAL:** The study was approved by the Institution Ethics Committee

**APPENDIX:** Link to the questionnaire: <https://forms.gle/LiyCX45vJpgXvr7m7>

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