

RESEARCH ARTICLE

Study of the effectiveness of e-learning to conventional teaching in medical undergraduates amid COVID-19 pandemic

Nimarpreet Kaur, Deepti Dwivedi, Jyoti Arora, Asha Gandhi

Department of Physiology, SGT Medical College, Gurugram, Haryana, India

Correspondence to: Deepti Dwivedi, E-mail: deeptidwd86@gmail.com

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ABSTRACT

Background: Sudden outbreak of COVID-19 pandemic created panic, anxiety among the population worldwide. The education sector was among many which had taken a strong blow due to pandemic. In the wake of institute shut down, this was a challenging time for professional education which was combated through introduction of e-learning through online classes so as to ensure continuation of teaching-learning process for the medical students. **Aims and Objectives:** The aim of the study was to rank the effectiveness and satisfaction of online classes compared to classroom conventional teaching among medical students. **Materials and Methods:** After the Institutional Ethical Clearance, this online cross-sectional survey study was done on medical students. A total of 983 students participated in this study. This online survey was carried out from April 10, 2020, to April 18, 2020, after completion of 3 weeks of online classes. A set of self-designed questionnaire based on 5-point Likert scale was given to the students, to rank the effectiveness of learning through e-classes and their understanding with the satisfaction level on various parameters. This was pre-tested on 20 students for standardization. All the students voluntarily participated in the survey. **Results:** The study result shows that online classes were equally effective in five parameters and less effective in the other but were not at all superior than the conventional classroom teachings. We could come to an interpretation that students were not much satisfied with this way of teaching but definitely it was the need of the hour. **Conclusion:** We could conclude from our study that e-education can supplement the process of present education, but it cannot be a substitute for the established system of education.


KEY WORDS: COVID-19; e-Learning; Pandemic

INTRODUCTION

The World Health Organization (WHO) declared the outbreak of new coronavirus disease in January 2020, COVID-19, a public health emergency of international concern. In March 2020, the WHO declared COVID-19 as pandemic.^[1] This time of crisis generated stress among general population

from youngsters to old age people. Anticipating worsening of the situation, Government of India recommended suspension of classroom teaching in all the educational institutions. This was a challenging time for the educational industry to cope with the present scenario, more challenging was the professional education, especially medical education. Hence, online classes for the medical undergraduates were started throughout India with a lot of trial and error.

The letter “e” in e-learning stands for the word “electronic.” E-learning pioneer BERNARD LUSKIN (2001) explains “e” as exciting, energetic, enthusiastic, emotional, extended, and educational. E-learning is internet-enabled learning. It is a store house of education, information, communication, training, knowledge, and performance.^[2] E-learning encompasses a

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pedagogical approach that typically aspires to be flexible, engaging and learner centered. It does not only differ from traditional learning (i.e., face-to-face learning that takes place in a classroom environment) in the medium by which learning is delivered^[3] but also affects the teaching and learning approaches used. The United Nations (UN) and the WHO regard e-learning as a useful tool in addressing education needs in health care, especially in developing countries.^[4,5]

However, due to resource limitations in a developing country like India, this approach created a major challenge. To combat the crisis, the medical colleges adopted various innovative techniques, used different software/applications such as Zoom, Microsoft, Google Classroom, and Google Docs to take the online classes. These online classes/e-learning were started with an intention not only to complete the course but also to remain in continuous touch with the students, to increase the confidence and faith of the students in their faculty during COVID-19 pandemic.

There is no second thought that the conventional classes provide an efficient way to transfer knowledge. Therefore, the institutes tried to take the help of digital media in making teaching more easier and convenient for the students during pandemic. With this type of model in mind, online classes were started in the medical school teachings.^[6]

We conducted a survey study among the medical graduates to evaluate the effectiveness of online classes and the level of satisfaction of various students in terms of gaining knowledge, balance between the practical and theoretical experiences, and availability of e-resources.

MATERIALS AND METHODS

After the Institutional Ethical Clearance, this online cross-sectional survey study was done on medical students. The information was anonymized and randomly coded so as to ensure delinking with any identity of the participant.

A total of 983 students participated in the study after 3 weeks of initiation of online classes. This online survey was carried out from April 10, 2020, to April 18, 2020.

It was a cross-sectional survey study based on questionnaire. Before giving the questionnaire, the students were asked about the severity of pandemic and their state of mind during the lockdown as shown in Figures 1 and 2.

After that, a set of questionnaire was given to the students, which was based on the effectiveness of learning through e-classes and their understanding with the satisfaction level. This set of questionnaire was self-designed based on 5-point Likert scale. This was pre-tested on 20 students

for standardization. All the medical students voluntarily participated in the survey.

RESULTS

In this survey, a total of 983 medical students took part predominantly MBBS, BDS, and other allied courses. The survey was carried out after 3 weeks of online classes. Students were enquired whether they had taken online medical classes before this pandemic. Out of 983 students, 826 had not taken online classes earlier and 123 students had already experienced and 34 students did not reply. The mean age group of students was between 20.02 ± 1.45 years. About 66.6% of the students were female and 32.6% were male. Before going to the proper questionnaire, they were asked about the severity of the pandemic, 37.6% of students rated it to be very severe, and 37.1% rated it to be severe [Figure 1].

A state of the mind of students was asked, 39.6% were anxious, 26% no change, 20.8% were relaxed, 12.5% were depressed, and 1.1% were euphoric depicted in Figure 2.

Table 1 shows the effectiveness of e-classes as compared to regular classroom settings based on 10 parameters.

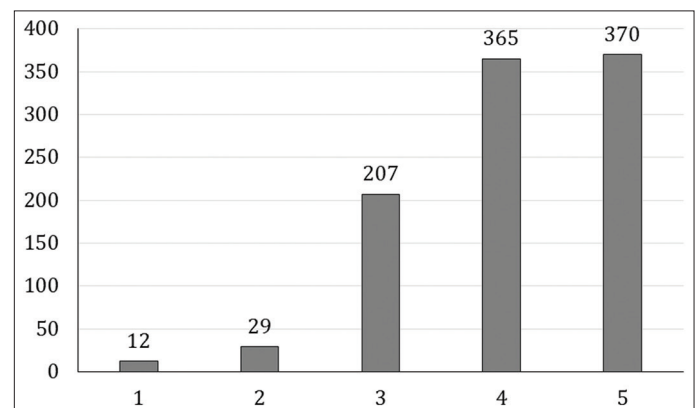


Figure 1: Severity of pandemic according to participants

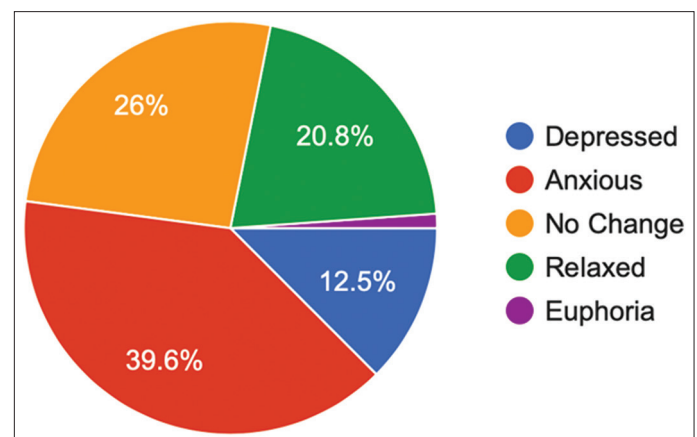


Figure 2: State of mind of participants

Table 1: Rank the effectiveness of online learning compared to meeting regular classroom settings

Parameters	Much less effective (%)	Somewhat less effective (%)	Equally effective (%)	Somewhat more effective (%)	Much more effective (%)
Offering convenience	15.6	37.8	31.1	11.1	4.4
Meeting individual learning needs	12.2	36.7	34.6	11.2	5.3
Contributing to effective communication	13.8	37.4	36.9	7.9	3.9
Building skills and knowledge	13.9	32.8	37.6	11.5	4.2
Offering better understanding through recorded class	13.1	26.4	35.9	18.7	5.8
Interaction level	24.5	38.3	28.6	6.3	2.3
Doubt sessions	20	32.6	38.1	7.2	2.1
Balancing of practical and theoretical experience	35.4	36.9	21.7	4	2
Grooming of Professional career	21.5	31	39.1	6	2.4
Assignment submission	13.8	18	47	13.2	7.9

Table 2: The satisfaction level of students with regard to online classes on five parameters

Parameters	1 Strongly dissatisfied (%)	2 Dissatisfied (%)	3 Neutral (%)	4 Satisfied (%)	5 Strongly Satisfied (%)
How helpful was the class material provided to you?	4.1	9.3	30	33.8	22.9
How satisfied are you with the balance of practical and theoretical knowledge provided by these classes?	13.8	18.3	36	22.3	9.6
There is a professional development strategy towards online training?	8.7	13.2	36.1	27	12
Availability of e-resources	6.2	10	29.6	34.1	20.1
Availability of assistance	7.6	12.5	35.6	25.9	18.3

Table 3: Mean and standard deviation of the parameters of effectiveness scale

Parameters	Number	Mean	Standard deviation
Offering convenience	983	2.50	1.02
Individual learning needs	983	2.60	1.01
Effective communication	983	2.49	0.95
Skills and knowledge	983	2.59	1.00
Understanding through recorded classes	983	2.77	1.07
Interaction level	983	2.23	0.96
Doubt sessions	983	2.38	0.95
Balance between practical and theoretical experience	983	2.00	0.95
Grooming of professional career	983	2.36	0.96
Assignment submission	983	2.83	1.07

Out of 10 parameters, in six parameters, students rated the e-classes to be equally effective, the parameters which are contributing to communication, building skills and knowledge, offering better understanding through recorded classes, in doubt sessions, in grooming of professional career, and in assignment submission. In four parameters, i.e., offering convenience, interaction level, individual learning needs, and balancing of practical and theoretical knowledge, the students found it to be less effective.

With regard to class material and availability of e-resources, students were satisfied and as regards the balance of practical and theoretical knowledge, professional development, and availability of assistance, they had equal level of satisfaction with the normal classroom teaching [Table 2].

DISCUSSION

Medicine being a challenging profession, needs a lot of commitment, dedication, acquisition of clinical skills, and self-directed learning attitude by the students. COVID-19 outbreak created a panic, distress among student community, and uncertainty about the normalization of the situation. Online classes were started throughout the medical colleges keeping in mind, the students perception. The mean score and percentage of all the parameters assessed are in favor that online learning worked similar to the conventional classroom teaching in few parameters, but was less effective than classroom teaching in other parameters as shown in Table 3. It implies that online learning is not as effective or superior teaching method for every student in the learning context especially medical students. Our study goes in accordance with the study of author Subramanian *et al.*^[7]

A study by Ni^[8] came to a conclusion that the social and communicative interaction between teacher and student has been an important part of classroom teaching. The main

Table 4: Mean and standard deviation of satisfaction parameters

Parameters	Mean	Standard deviation
How helpful was the class material provided to you?	3.82	1.11
How satisfied are you with the balance of practical and theoretical knowledge provided by these classes?	3.05	1.11
There is a professional development strategy towards online training?	3.17	1.11
Availability of e-resources	3.51	1.10
Availability of assistance	3.34	1.14

difference between types of classes is the mode of interaction between instructor and students as well as among the students. The results of this study indicate that although student performance is independent of mode of instruction, certain courses are more challenging to students who persist in virtual environment than in classroom. According to another study, the effectiveness could also be influenced by characteristics of the students such as gender,^[9] attitude,^[10] satisfaction,^[11] and level of engagement^[12] which is in accordance with our study, in which there is also gender variation and that can be contributing factor.

A study by Bettinger *et al.*^[13] also shows that to some extent, online learning might not compete with aspects of other learning, such as interactive knowledge building between teacher and students. Such limitations could create opportunities for students to obtain self-learning methods through information technology. The results of this study were also similar to our survey which showed that the level of interaction of students with the faculty is less as compared to classroom teaching. According to Nalini *et al.*,^[14] highly personalized content for learning can be improved by web-based learning. The students online expertise is possibly increased by diversity of skills and knowledge.

The effectiveness of online learning, though less effective as compared to a normal classroom teaching and it varied for various categories of students. Our study shows that online classes are effective to some extent in some parameters but inadequate in others [Table 4]. To avoid the potential limitation of online learning in undergraduate medical education, it should be worthwhile to combine the advantages of online teachings and classroom teachings called blended learning^[15] which is also being supported by Dodiya *et al.*^[16] We could conclude from our study that e-education can supplement the process of education, but it cannot be a substitute for the established system of education.

Strength of the study is the students who participated in the study for the survey of new method of teaching and giving us a good sample size.

Limitation of our study was short duration, only 3 weeks of online learning.

CONCLUSION

Advancement in biotechnology and internet technology has brought about a revolution in the field of medical sciences with the innovation of trinity of e-learning, e-teaching, and e-research constituting the superstructure of e-education. This will facilitate adaptive and collaborative learning by the learners and the teachers. It will lend support to the old system by extending the frontiers of knowledge and research. It will become effective means of communication provided it is supported by the state of art infrastructure and blended learning technology. Hence, blended learning should be started as soon as situation becomes normalized as it would lead to more development of professional skills and grooming of professional career.

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