



# E-Learning Versus Traditional Teaching in Medical Education: A Comparative Study

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## Abstract

**Background:** Traditional method of learning via face to face lecture has been in curriculum since times immemorial. E-learning via multimedia has been a recent introduction in education system. **Purpose:** To compare e-learning with the traditional method of teaching in medical education. **Material and Methods:** The two different methods of teaching were applied on the same group of students. A total of six lectures were conducted. Three of them were taught by traditional method of teaching and three by e-learning. Formative assessment in the form of written examination was carried out, followed by qualitative assessment at the end of session. **Results:** The mean marks obtained after Exam-1 (i.e. following traditional teaching method) was  $6.46 \pm 1.48$  and mean marks obtained after Exam-2 (i.e. following e-learning) was  $8.37 \pm 1.27$ . The mean difference score was  $1.91 \pm 1.55$ . The paired *t*-test was applied, and the value of *t* was 11.96 with *p*-value  $<0.001$ . The results between two teaching methods were statistically significant. For qualitative analysis Likert scale was used. 66% of students strongly agreed that e-learning is a superior method than traditional method of learning. **Conclusion:** The e-learning proved to be more efficient and uniform method of student learning with revision facilities.

## Key words

Assessment, e-learning, lectures, medical education, traditional teaching

## Introduction

Medical education is a process of acquiring knowledge, psychological skills, positive values and attitude (1). The ultimate aim of medical education is to provide highly educated and well qualified doctors to combat the current health care issues (2). Medical education and training are not good unless student acquire the nucleus of minimum knowledge (cognitive aspect), minimum required skills (psychological/motoric aspect) and minimum obligatory conduct values (affective aspect) (1). Medical education faces a lot of internal and external

challenges as we change our traditional education system to e-learning methods. Conventional system of education is tedious for students due to lack of interaction and makes them lose interest, thereby, not developing their problem solving, critical thinking and decision- making skills.

E-learning has become a standard teaching approach in medical education as certain characteristics of e-learning impart better potential over traditional teaching methods (3). E-learning seems to be more student friendly

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as it provides easier adaptability and enhances flexibility (4). E-learning also provides self-regulated learning that helps individual to structure their learning process and enhance their ability to acquire deep knowledge like critical thinking (5). The present study was undertaken with the aim to compare e-learning with the traditional method of teaching and to see which method of teaching is better.

### Material and Methods

This prospective study was conducted on 158 students of third professional part-I MBBS (Batch 2019-20) to compare the traditional learning system with e-learning system of medical education. Students were explained about the details of the study and an informed written consent was taken before including them into the study. The two different methods of teaching were applied on the same group of students. A total of six lectures were conducted. Three of them were taught by traditional methods of teaching i.e. face to face lectures and power point presentations and assessment was made after the completion of all the three lectures in the form of written examination that included a total of five short questions with the maximum marks of ten. The other three lectures were taught by e-learning methods and included animations, illustrations and videos. Content of these lectures was shared among the students electronically. Again, at the end of session a written examination was conducted after the completion of all the three lectures which also included five short questions with the maximum marks of ten.

In the end, qualitative assessment was done in which students were asked to grade their experience on the basis of following questionnaire: I think e-learning is superior method than traditional learning; I think that communication, discussion or debates with my classmates and teachers are important; I think this type of education encourages me to develop solutions for myself; I think e-learning will be useful for the development of positive attitude. Likert (6) scale was used to grade the answers in which 1 refers to strongly agree and 5 refers to strongly disagree.

Both the methods of teaching were analysed and compared based on the performance of the students during the two assessments. The data was entered in MS Excel spreadsheet and analysis was done using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp. Released 2017. Armonk, NY, USA). Categorical variables were shown in number and percentage (%) and continuous variables as mean  $\pm$  SD. Paired sample t-test was applied for the comparison of mean score between the two teaching methods.  $P < .05$  was considered to be statistically significant.

### Results

The total number of students in the class were 158. Students who gave examination after traditional method of teaching were 98 and students who gave examination after e-learning method were 110. The study included only those students who attended both the examinations and their number was 94. Rest were excluded from the study. Of the 94 students, 43 (45.74%) were males and

**Table 1: Marks Obtained by the Students with Two Teaching Methods**

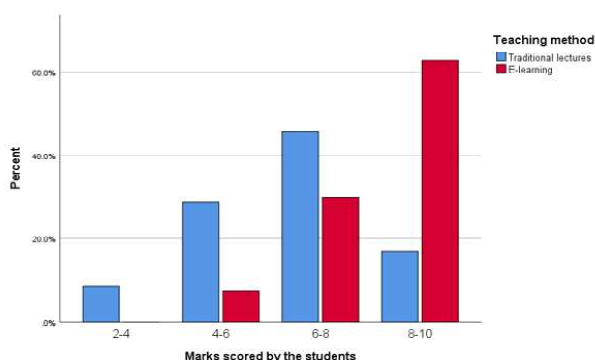
Marks Obtained	After Traditional Lectures	After e-Learning Methods
	No. of Students (%)	No. of Students (%)
0-2	0 (0.00)	0 (0.00)
2-4	08 (08.51)	0 (0.00)
4-6	27 (28.73)	07 (07.44)
6-8	43 (45.75)	28 (29.79)
8-10	16 (17.01)	59 (62.77)
Total	94 (100)	94 (100)

**Table 2: Comparison of Mean Score Between Two Teaching Methods**

Paired Samples Statistics				Paired Sample t-test				
Teaching Method	N	Mean Score	Std. Deviation	Paired Differences		t	df	Sig. (2-tailed)
				Mean	Std. Deviation			
E-learning	94	8.37	1.27	1.91	1.55	11.96	93	P < 0.001
Traditional Lectures	94	6.46	1.48					

**Table 3: Qualitative Assessment of Students**

Questions	Strongly Agree	Agree	Nor Agree Nor Disagree	Disagree	Strongly Disagree
	1	2	3	4	5
I think e-learning is superior method than traditional learning	62(65.97%)	24(25.53%)	06(06.38%)	01(01.06%)	01(01.06%)
I think that communication, discussion or debates with my classmates and teachers are important	46(48.94%)	19(20.21%)	17(18.09%)	11(11.70%)	01(01.06%)
I think this type of education encourages me to develop solutions for myself	31(32.98%)	50(53.19%)	09(09.58%)	03(03.19%)	01(01.06%)
I think e-learning will be useful for the development of positive attitude	47(50%)	35(37.23%)	09(09.58%)	01(1.06%)	02(02.13%)



**Figure 1: Showing Marks Scored by the Students with Two Teaching Methods**

51 (54.26%) were females. The marks obtained by the students with both the methods of teaching are given in Table 1 [Fig. 1].

The mean marks obtained after Exam-1 (i.e. traditional teaching method) were  $6.46 \pm 1.48$  and mean marks obtained after Exam-2 (i.e. e-learning method) were  $8.37 \pm 1.27$ . The mean difference score was  $1.91 \pm 1.55$ . The paired t-test was applied and the value of t was 11.96 with  $p$ -value  $<0.001$  [Table 2]. Thus, the results between two teaching methods were statistically significant. The qualitative assessment of the students is given in Table 3. The results of qualitative analysis showed that 66% students believed that e-learning was superior to traditional method of learning. Moreover, in addition to better performance in the examination, student's motivation, engagement, attendance, acceptance and enthusiasm to e-learning was more.

### Discussion

With this study we tried to analyse two teaching methods about their effects on learning, thinking and general development of the students. The mean marks obtained after traditional teaching method were  $6.46 \pm 1.48$  and mean marks obtained after e-learning were  $8.37 \pm 1.27$ . The mean difference score was  $1.91 \pm 1.55$  and was statistically significant ( $p < 0.001$ ). After qualitative analysis, 66% of students strongly agreed that e-learning is superior than traditional method of learning.

Through the feedback obtained via general discussion with the students, the results of written examination and the qualitative analysis of their responses, it was observed that e-learning is very useful, effective, uniform and easy way of understanding the subject along with provision of revision facility for the students. Students enthusiasm and participation was encouraging during this study as it makes the subject more interesting. Also, learning and thinking comes passively with this new method than traditional method of learning.

The traditional method of teaching does not develop students critical thinking, problem solving and decision-making skills as it focuses on learning through memorization and recitation (7). Many studies have shown that effective use of e-learning could help increase student motivation, engagement and attendance. It also increases student's class participation and improves their behaviour (8). Bandhu and Raje (9) concluded that all the students agreed on the usefulness of e-learning in medical education and it is well accepted as a medium of instruction by medical students. Gaupp *et al.* (10) believed that e-learning can foster reflection and critical reflection



through a combination of different learning tasks. Medical educators should set standards towards system usability when designing novel e-learning environment, significantly enhancing students learning experience.

Mezirow's transformative learning theory observed that the level of reflection deepens toward critical reflection when students adopt significant change of perspective and thus engage in deeper knowledge processing strategies (11). In Boekaerts' three layered model for defining individual goals and self-regulated learning, critical reflection is essential. The impact of self-regulated learning in the model was less impressive than expected. However, it was still detectable and statistically significant, suggesting that self-regulation skills are important for success in e-learning environment (12). Ruiz *et al.* (13) concluded that by assimilating medical education with e-learning will bring about the shift towards applying adult learning theory, here the educators will be acting as coordinator of learning and analyser of competency and not just as distributors of content.

In the present study we observed that e-learning has more impact on student's overall development and attitude as compared to traditional learning method. Establishment of the fact that e-learning techniques are more effective than conventional teaching techniques can lead to the development of e-learning modules and their inclusion into future curriculum at undergraduate level. Development of e-learning modules will make medical education uniform across different medical colleges throughout the country. E-learning using videos may act as a bridge for learning surgical skills as large number of student's entry into operation theatre to watch the actual surgical procedures may not be possible. We could not find any similar study in literature. Additional studies are required to confirm the findings of our study.

Time was the biggest limitation in this study as we could not conduct more sessions. Secondly, only one method of assessment could be used. In addition, IT team of the college could have made things even more effective and better.

### Conclusion

From our study we concluded that e-learning is superior than traditional method of teaching and the findings of our study would be relevant to teachers, students and the society at large and would be helpful in framing a curriculum for medical students.

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### Conflicts of Interest

There are no conflicts of interest.

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