National Journal of Physiology, Pharmacy and Pharmacology

RESEARCH ARTICLE

Effectiveness of digital learning versus traditional learning among undergraduate students – Prescription writing

Nalini G K, Deepak P, Neelamma P, Sahana G N, Jayashree V Nagaral

Department of Pharmacology, Hassan Institute of Medical Sciences, Hassan, Karnataka, India

Correspondence to: Deepak P, E-mail: drpdee@gmail.com

Received: August 08, 2019; **Accepted:** October 16, 2019

ABSTRACT

Background: Researchers of education constantly explore the impact of learning environment in relation to learning outcome. The social and communicative interaction between teacher and student has been an important part of classroom teaching. Now, there has been a change in electronic education due to favorable online environment due to increased Internet connectivity, speed, and accessibility. **Aims and Objective:** The aim of the study was to know the difference in outcome between traditional and online learning among medical undergraduate students. **Materials and Methods:** After the Institutional Ethical Committee clearance, this study was done on 2nd year MBBS students. A total of 102 students were participated in the study. In a pre-test, a case scenario was given to all the students and they were asked to write the prescription for that case within 15 min. Then, the students were divided into two groups of 51 each. The first group (traditional learning) was provided with textbooks and the second group (online learning) was provided Internet facility. 45 min time was given to each group to use the respective facility and then was asked to write the prescription. The prescription written was analyzed using the suitable checklist. **Results:** The study result shows that there was a significant improvement in both online learning and traditional learning methods. The improvement noted in the post-test was more in online learning when compared to traditional learning method and this was found to be statistically significant. **Conclusion:** It was observed that online learning was better than traditional textbook-based learning. The nature of teaching and learning by incorporating new technology will redefine and oppose the superficial learning. Digital learning supports deeper and self-directed learning.

KEY WORDS: Traditional Learning; Online Learning; Undergraduate Students; Prescription Writing; Self-directed Learning

INTRODUCTION

Researchers of education constantly explore the impact of learning environment in relation to learning outcome.[1] The social and communicative interaction between teacher and student has been an important part of classroom teaching.[1] Now, there has been a change in electronic education due to favorable online environment due to increased Internet connectivity, speed, and accessibility.[2]

Access this article online	
Website: www.njppp.com	Quick Response code
DOI: 10.5455/njppp.2020.10.0828816102019	

In a review, medical students have preferred web tutorials compared to traditional lecture-based such as accessibility, good quality of images, and repeat practice possibility. Web-based learning due to continuous development and updating has become an important tool in evidence-based medicine.[3] Although there are advantages in web-based learning, the important limitations to online learning are student isolation and technical problems. Students miss the regular classroom

interaction, but self-directed learners successfully use the online education.[4] To overcome these drawbacks, integrating classroom problem-solving sessions with online web-based education are necessary.[5] In the past decade, there is an increase in e-learning in higher education offering some form of distance education.[6]

Self-directed learning is more relevant among the medical students. Hence, the present study has been taken to know the influencing factors in their learning.

As there are less studies among the medical students, this study has been taken to know the difference in outcome between traditional and online learning among medical undergraduate students.

MATERIALS AND METHODS

After the Institutional Ethics Committee clearance, the study was conducted among 2nd year MBBS students (without the prior knowledge of prescription writing to a given case scenario) at Hassan Institute of Medical Sciences, Hassan.

A total of 102 students were participated in the study.

In a pre-test, a case scenario was given to all the students and they were asked to write the prescription for that case within 15 min.

Then, the students were divided into two groups of 51 each. The first group (traditional learning) was provided with textbooks and the second group (online learning) was provided Internet facility.

45 min time was given to each group to use the respective facility and then was asked to write the prescription.

The prescription written was analyzed using the suitable checklist.

The following checklist containing 15 points was used to analyze the prescription. For correct answer, 1 mark was given, whereas incorrect answer was given 0 marks.

Checklist

1. Date of prescription
2. Patients identity
3. Patients address
4. Prescribers identity
5. Professional degree and registration number
6. Prescribers address with telephone number
7. Diagnosis
8. The symbol Rx
9. Prescribers signature
10. Refill information
11. Appropriateness of drug selected
12. Strength of drug
13. Dosage form
14. Quantity to be dispensed
15. Direction for use.

Statistical Test

Student's "*t*"-test was used to analyze the results.

RESULTS

After the study, the results were compared using Student's "*t*"-test. The study result shows that there was a significant improvement in both online learning and traditional learning methods. The improvement noted in the post-test was more in online learning when compared to traditional learning method and this was found to be statistically significant. The pre-test score in the online method was 5.49 ± 2.686, whereas in the traditional method, it was 4.57 ± 2.707 [Table 1]. The post-test score in the online method was 7.61 ± 4.281 and in the traditional method was 6.10 ± 3.607 [Table 2]. There is increase in mean score in post-test group compared to pre-test group by 2.160 ± 2.675 (95% CI= 1.4–2.9) and it is found statistically significant with $P < 0.05$ ($P = 0.001$) [Figure 1]. Table 3 and Figure 2 show that there is a significant change in pre-test (5.49 ± 2.686) and post-test (7.61 ± 4.281) in online learning method. Table 4 and Figure 3 show that pre-test score (4.57 ± 2.707) is more than post-test score (6.10 ± 3.607) in traditional learning. The mean score of online learning method (7.61 ± 4.281) is higher than the traditional textbook-based learning (6.10 ± 3.607) [Figure 4].

The mean score of online learning method (7.61 ± 4.281) is higher than the traditional textbook-based learning (6.10 ± 3.607) and it is found statistically significant with $P < 0.05$ ($P = 0.006$).

Table 1: The difference in pre-test scores among online and traditional group

Variables	Mean	Number	Standard deviation	Standard error mean
Online pre-test	5.49	51	2.686	0.376
Traditional pre-test	4.57	51	2.707	0.379

Table 2: The difference in post-test among online and traditional group

Variables	Mean	Number	Standard deviation	Standard error mean
Online post-test	7.61	51	4.281	0.599
Traditional post-test	6.10	51	3.607	0.505

Table 3: The difference in pre-test and post-test in the online group (paired samples test)

Variables	Paired differences					*t*	df	Sig. (two tailed)
	Mean	Standard deviation	Standard error mean	95% confidence interval of the difference				
				Lower	Upper			
Online pre-test and post-test	2.118	3.374	0.472	−3.067	−1.169	−4.482	50	0.000

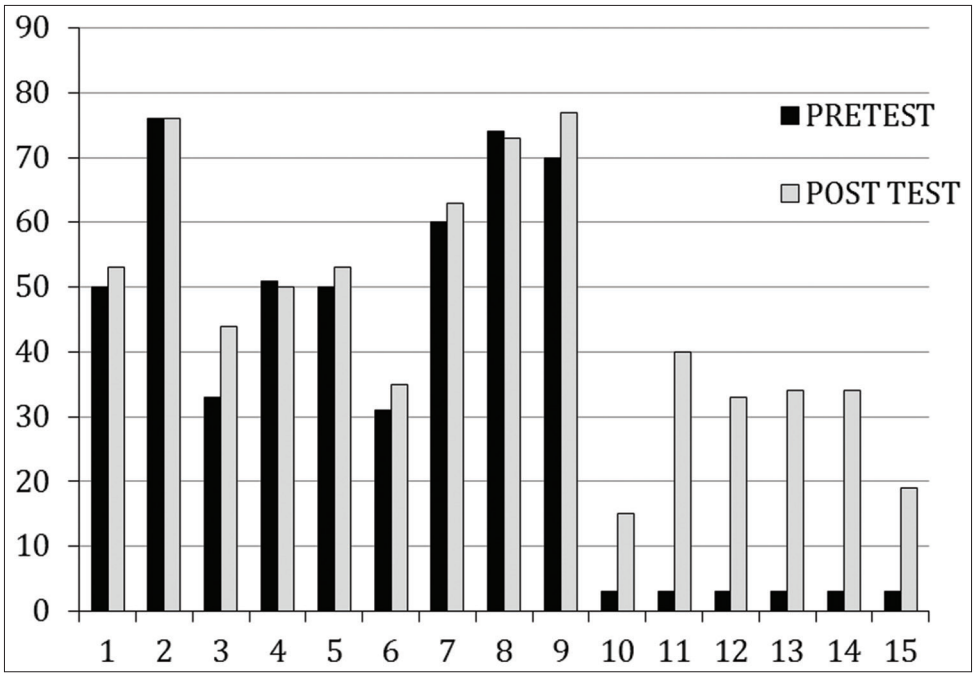

Figure 1: The difference in pre-test and post-test in both groups based on the checklist

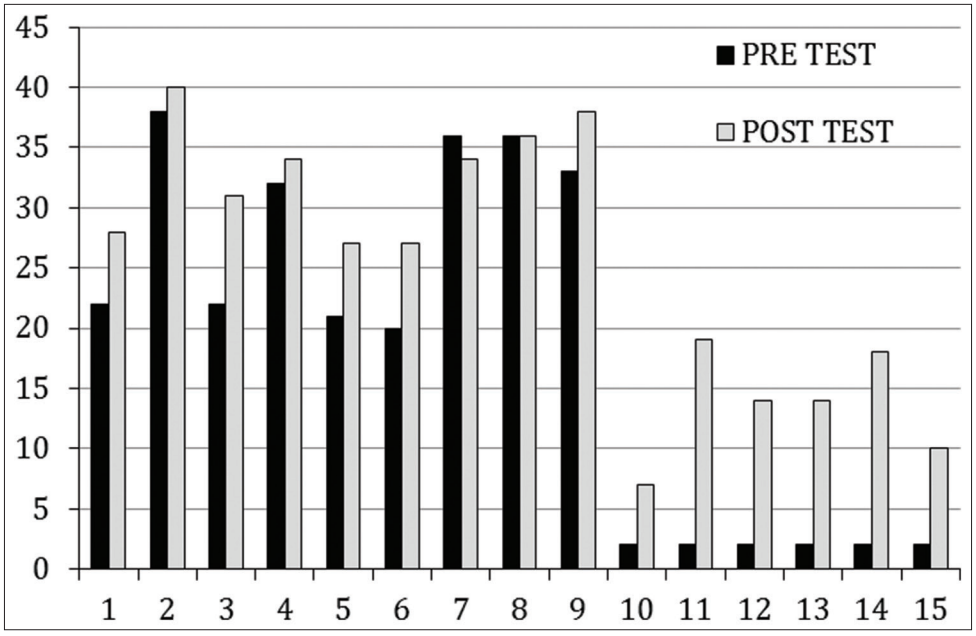

Figure 2: Comparison of pre-test and post-test in online learning

Table 3: The difference in pre-test and post-test in the online group (paired samples test)

Variables	Paired differences					*t*	df	Sig. (two tailed)
	Mean	Standard deviation	Standard error mean	95% confidence interval of the difference				
				Lower	Upper			
Online pre-test and post-test	2.118	3.374	0.472	−3.067	−1.169	−4.482	50	0.000

Table 4: The difference in pre-test and post-test in the traditional group

Variables	Paired differences					*t*	df	Sig. (two tailed)
	Mean	Standard deviation	Standard error mean	95% confidence interval of the difference				
				Lower	Upper			
Traditional pre-test and post-test	−1.529	2.723	0.381	−2.295	−0.764	−4.011	50	0.000

Barriers to Learning

There were few barriers noted by the students for learning in both the methods which are as follows:

- Barriers to online learning
  1. Multiple drug information was available so it was difficult to choose the best one
  2. Complete explanation of why treatment regimen is given is not available
  3. Choosing the appropriate dosage forms was difficult.
- Barriers to traditional learning
  1. Recent drug information are not mentioned in the textbook
  2. There were no pictures in the textbook
  3. Difficult to choose specific treatment from the textbook as it gives information regarding all the drugs
  4. Time consuming.

DISCUSSION

Results of the present study show that there was a statistically significant improvement in the post-test in both the traditional and online group. The mean score of online learning method is higher than the traditional textbook-based learning in the post-test which is found to be statistically significant with $P < 0.05$.

From these results, we can say that highly personalized content for learning can be provided by web-based learning. The students' online expertise is possible increased by the diversity of skills and knowledge among them.

A study was conducted to assess the learning modality among dental and dental hygiene student who was enrolled in a health informatics course. The study indicated that it would be best if both classroom instruction and e-learning are combined together. In this study, the major area of concern expressed by students was lack of online support and lack of advanced information.[2]

Sitzman *et al*. conducted a meta-analysis, in 2006, which suggested that if the contents and learners are similar, classroom instruction and online learning are equally effective. They reviewed 96 studies comparing classroom teaching and e-learning, whereas in our study, online learning was found better when compared to traditional learning.[7]

Bernard *et al*. did a meta-analysis, in 2004, which reviewed literature comprising 232 studies of all types. The results found that distance education and classroom learning were comparable to each other. The findings suggested that when synchronous medium was used, classroom instruction was favored over distance education.[8]

Zogas *et al*. conducted a pilot research among university students. The students were divided into two groups – the traditional learners and e-learners. To find the difference on students' performance, the examination marks obtained by them were compared. Results showed that irrespective of the learning method, the students scored almost the same marks while our study showed that there was a significant improvement in the online learning method when compared to traditional learning method.[9]

Petrarca *et al*. did a study, in which the students were more satisfied with e-learning with 87% rating compared to lectures with 65% rating. About 87% of students rated "excellent" or "good" for e-learning. The mean examination score was 55% for traditional learning versus 58% for online learning. These results are found to be consistent with our study.[10]

In a study by Adams *et al*., one instructor taught two sections of an Introductory Microbiology course. The assigning of students into two sections was done randomly. One section of students was taught using hybrid format and the other through a traditional format. Both were provided with similar lecture materials. The main difference was the delivery of lecture material – in person for traditional section and online for hybrid section. The traditional section students did significantly better compared to hybrid section when the analysis of final grades

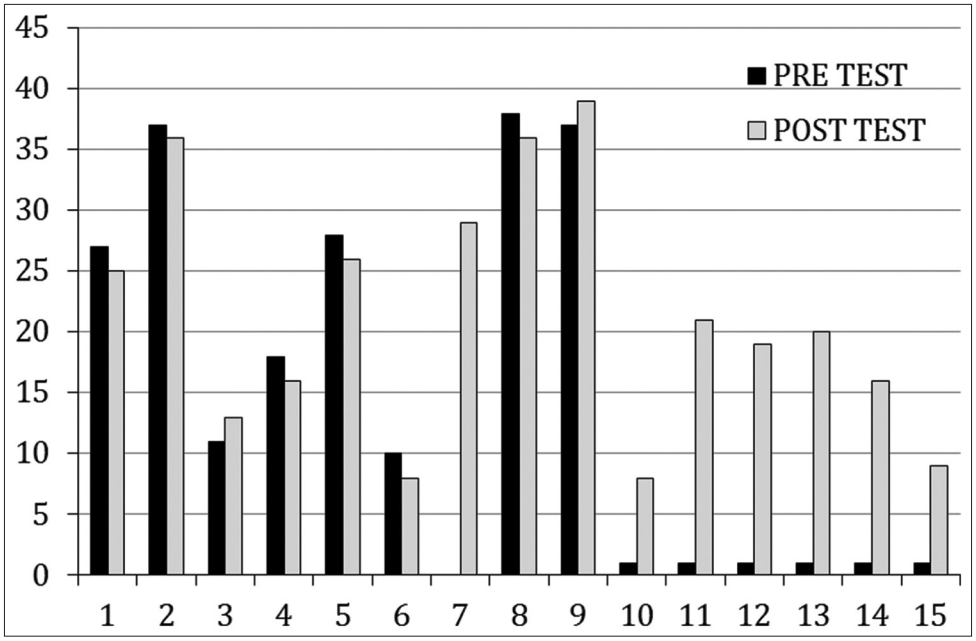

Figure 3: Comparison of pre-test and post-test in traditional learning

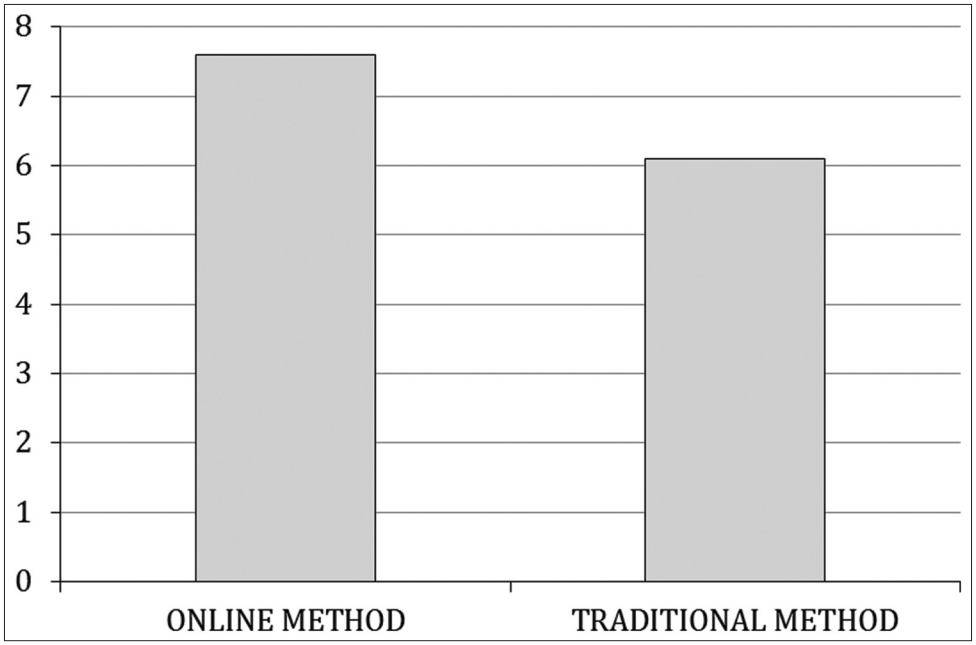

Figure 4: The mean score of post-test with online learning and traditional textbook-based learning

was done. However, our study results showed that online learning method was better compared to traditional method.[11]

The limitations of the study were small sample size and only one textbook was provided to the students in the traditional group to find the answer for the case scenario. Providing multiple books to the traditional learning method group might have changed the results.

CONCLUSION

It was observed that online learning was better than traditional textbook-based learning. The nature of teaching and learning by incorporating new technology will redefine and oppose the superficial teaming, where facts are memorized and regulated to pass the test. Digital learning supports deeper and self-directed learning.

REFERENCES

1. Ni AY. Comparing the effectiveness of classroom and online learning: Teaching research methods. J Public Aff Educ 2013;19:199-215.
2. Pahinis K, Stokes CW, Walsh TF, Cannavina G. Evaluating a blended-learning course taught to different groups of learners in a dental school. J Dent Educ 2007;71:269-78.

3. Potomkova J, Mihal V, Cihalik C. Web-based instruction and its impact on the learning activity of medical students: A review. Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub 2006;150:357-61.
4. Grimes EB. Student perceptions of an online dental terminology course. J Dent Educ 2002;66:100-7.
5. Karamizadeh Z, Zarifsanayei N, Faghihi AA, Mohammadi H, Habibi M. The study of effectiveness of blended learning approach for medical training courses. Iran Red Crescent Med J 2012;14:41-4.
6. Parsad B, Lewis L. Distance Education at Degree Granting Post Secondary Institutions: 2006-2007. Washington DC: National Center for Educational Statistics, Institute of Education Sciences, U.S Department of Education; 2008.
7. Sitzman T, Kraiger K, Stewart D, Wisher R. The comparative effectiveness of web based and class room instruction – a meta analyis. Pers Psychol 2006;59:623-64.
8. Bernard RM, Abrami PC, Lou Y, Borokhovski E, Wade A, Wozney L, *et al*. How does distance education compare with class room instruction? A meta analysis of the empirical literature. Rev Educ Res 2004;74:379-439.
9. Zogas S, Kolokathi A, Birbas K, Chondrocoukis G, Mantas J. The e-learning effectiveness versus traditional learning on a health informatics laboratory course. Stud Health Technol Inform 2016;226:109-12.
10. Petrarca CA, Warner J, Simpson A, Petrarca R, Douiri A, Byrne D, *et al.* Evaluation of eLearning for the teaching of undergraduate ophthalmology at medical school: A randomised controlled crossover study. Eye (Lond) 2018;32:1498-503.
11. Adams AE, Randall S, Traustadóttir T. A tale of two sections: An experiment to compare the effectiveness of a hybrid versus a traditional lecture format in introductory microbiology. CBE Life Sci Educ 2015;14:ar6.

How to cite this article: Nalini GK, Deepak P, Neelamma P, Sahana GN, Nagaral JV. Effectiveness of digital learning versus traditional learning among undergraduate students – Prescription writing. Natl J Physiol Pharm Pharmacol 2020;10(01):9-14.

Source of Support: Nil, **Conflicts of Interest:** None declared.