ORIGINAL ARTICLE

The Viability of Blended Model in Undergraduate Medical Education in COVID-19 Pandemic

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ABSTRACT

Introduction: With the new era of life threatening variants of Covid-19 the medical and dental education has been greatly compromised. Every school/college has to shift their educational setup to Blended model. Blended model can also be called as hybrid approach of learning or mixed mode of learning. It is an "insightful combination of Face to Face and Online opportunities for growth".

Objective: The aim of this study is to measure the viability of Blended Model through series of assessments by measuring the retention of the content after the teaching session in online and in face to face settings in Knowledge acquisition and knowledge retention test.

Material & Method

Methodology: This was a Quantitative Experimental study which was conducted in the Fatima Memorial college of Medicine and Dentistry Lahore. The participants were 66 of final year BDS students who voluntarily participated in the research project.

Results: A total of 96 students participated in the study and it was found a significant difference between the two intervention groups regarding the mean scores of Knowledge acquisition and knowledge retention test. The PowerPoint group showed lower grades in Knowledge acquisition and knowledge retention test in comparison with Prezi group. The learning performances was evaluated from immediate learning responses in Knowledge acquisition and in long term learning retention in knowledge retention test showed that both the presentation software can be used as a presentation medium and students do learn from both but Prezi presentation software students are superior in learning performances from immediate learning to long term memory retention as compared to PowerPoint presentation software in online and in face to face settings.

Conclusion: Blended model can help the medical teachers to teach the theoretical aspects of the curriculum via online and make easy schedules of student's rotations for clinical clerkships. When it comes to clinical training, there is no shortcut or better way than face to face teaching strategy. Therefore blended learning is a viable method of teaching in this period of Covid-19.

Keywords: Blended Model, Viability, Medical Education, Multimedia presentation, Covid-19

INTRODUCTION

To safeguard its quality, medical and dental teaching faces genuine challenges these days, like the vertical bend of developing clinical information, changes in wellbeing administration conveyance, and additionally changes in the learning interests of new innovative brains of students. In this specific situation, every institution need to meet the challenges and make practical strategies to overcome the challenges for their survival and success. Novel and also creative educating and learning techniques are then required to further develop students' abilities in decisive reasoning and scholastic accomplishments in medical education. With the improvement of Information and Communication in e-learning is standing out enough to be noticed it merits in the instruction of medical sciences. To improve the nature of instruction, numerous scholarly educational institutions are putting resources into the use of e-learning. In the meantime, virtual teaching isn't suggested in clinical sciences, since it is progressively underscored that the virtual can't supplant the conventional face to- face instruction and just is corresponding to it. Accordingly, at present, one of the principle approaches towards e-learning is the mixed (Blended) learning in which virtual instruction is joined with the conventional Face to face based teaching.

Blended learning can be described in three models:

Figure 1.1: Blended Learning Models

Two recent studies provide different views of whether online education will increase student learning and success. Nevertheless, over the past several years, perceptions of online learning have been shifting in its favor as more learners and educators see it as a viable alternative to some forms of face-to-face learning (Jebraeily, Pirnejad, Feizi, & Niazkhani, 2020). Drawing from best practices in both online and face-to-face methods, blended learning is on the rise at colleges and universities as the number of digital learning platforms and ways to leverage them for educational purposes continues to grow (Sharma, 2010).

Table.1: Blended learning Models

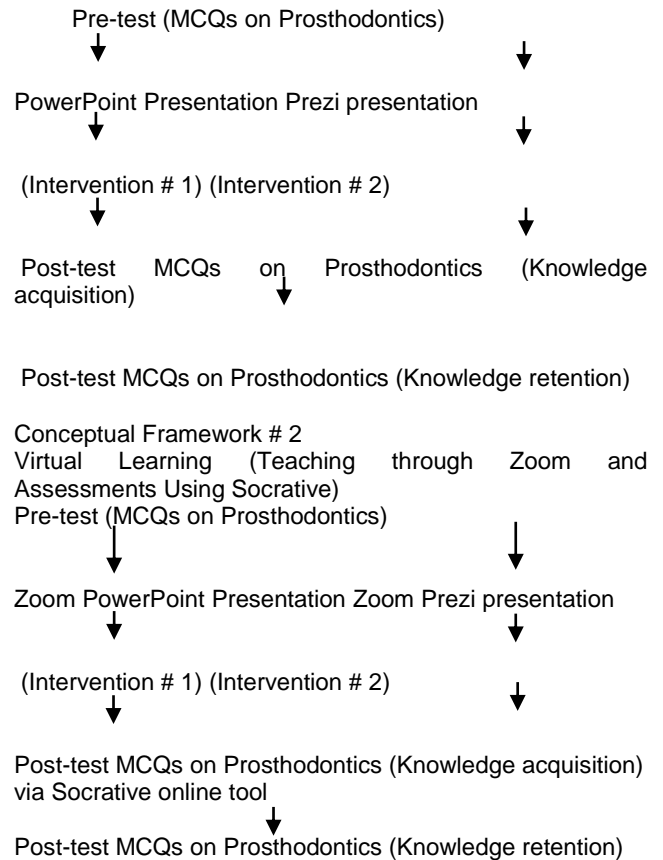| MODEL 1 Blended Presentation and Interaction	MODEL 2 Blended block	MODEL 3 Fully online
In this Model, teaching is centered face to face and availability of online resources. For example, the flipped curriculum model combines: • Short lecture podcasts, online resources with • Face-to-face tutorial/seminars for interaction and presentation of group work.	This model is the Combo of: • Intensive face-to-face sessions as one day or half days • Weekly online tutorial/seminars for activities and interaction • Online content and resources	This model is the Combo of: • Short lecture podcasts with online resources and learning activities • Online tutorials (synchronous) • Interaction via online collaboration, discussion forums and/or group work

Source: Hannon & Macken (2014)

MATERIAL AND METHODS

This Quantitative Experimental study involving two groups of participants of Bachelors of Dental surgery (BDS) final year students who voluntarily participated with written consents, and was conducted at Fatima Memorial College of Medicine and Dentistry (FMH) Lahore and Islam Medical and Dental College, Sialkot Pakistan. FMH College of Medicine and Dentistry and Islam Dental College, both a private institution, accredited by the Pakistan Medical Council (PMC) and Higher Education Commission (HEC) of Pakistan. The college has the traditional curriculum of Dentistry as directed by the PMC and University of Health Sciences (UHS) Lahore.

In this study, the total of 125 students were given the consent form. Out of total 96 gave the written consent to participate in the study. Participants of the study was divided into two equal groups of 48 students each. The selection of participants for both the groups were made on the basis of previous professional UHS result so that both the groups will have same caliber of students from excellent to poor. This division of students was done in collaboration with the department of Student affairs to provide data of student's previous academic results of UHS. Participants of the study was divided into two equal groups of 33 students each at FMH College of Medicine and Dentistry and 15 each in two groups at Islam Dental College. Total Strength at FMH College was 75 and 50 at Islam Medical and Dental College.

Census Sampling was used in this study where the entire population was included for conduction of a study. This happens when the entire population is small in number or it is reasonable to include the entire population, so in this study researcher invited all the participants of final year BDS and those who gave the written consents were included in the study. Data were analyzed using SPSS Version.22. For Descriptive Statistics: Mean, Standard deviation, Paired t-test were applied. For analytical statistics: Repeated Measures of ANOVA was applied.

Conceptual Framework # 1
Face to Face Teaching and Assessment

Pre-test (MCQs on Prosthodontics)

PowerPoint Presentation Prezi presentation

(Intervention # 1) (Intervention # 2)

Post-test MCQs on Prosthodontics (Knowledge acquisition)

Post-test MCQs on Prosthodontics (Knowledge retention)

Conceptual Framework # 2
Virtual Learning (Teaching through Zoom and Assessments Using Socrative)
Pre-test (MCQs on Prosthodontics)

Zoom PowerPoint Presentation Zoom Prezi presentation

(Intervention # 1) (Intervention # 2)

Post-test MCQs on Prosthodontics (Knowledge acquisition) via Socrative online tool

Post-test MCQs on Prosthodontics (Knowledge retention)

RESULTS

Table 2: Demographic details

Academic year	Class Strength FMH+IDC Combined			Students participated in the Study		
	Male	Female	Total	Male	Female	Total
Final year BDS	27	98	125	34	62	96

Data analysis was done on SPSS 22 version and following maximum number of comparisons was done with the currently available data of the study.

For both Online and in Face to Face settings
1. Pre-test PowerPoint vs. Pre-test Prezi
2. Pre-test PowerPoint vs. Post-test PowerPoint
3. Pre-test Prezi vs. Post-test Prezi
4. Post-test PowerPoint vs. Post-test Prezi
5. Post-test PowerPoint vs. Delayed Summative Post-test PowerPoint
6. Post-test Prezi vs. Delayed Summative Post-test Prezi
7. Delayed Summative Post-test PowerPoint vs. Delayed Summative Post-test Prezi
Abbreviations: PowerPoint = PP, Prezi = PR, Pre-test = Pre

Table 3 shows the 96 students who participated with written consents in face to face and in Online settings and 48 each were divided in 2 groups. The Pre-test results shows the mean score of PowerPoint group was 4.58 and Prezi group was 4.70 with difference between these two

were only 0.12 in face to face settings. In Online settings the values comes 4.20 and 4.12 with the difference of 0.8. These results shows that both the groups were of equal caliber regarding the knowledge of topic and it will give strength to the study that knowledge acquisition test will be more accurate to evaluate the learning performance of the students. P-value was calculated and found insignificant 0.45, which it further demonstrate that there is insignificant difference between PowerPoint and Prezi group.

Table 3: Pre-test PowerPoint vs. Pre-test Prezi

Pre-Test Face to Face	Number of Students	Mean	Standard Deviation	p-value
PP Intervention #1	48	4.58	1.32	0.45
Face to Face PR Intervention #2	48	4.70	0.95	
Online PP Intervention #1	48	4.20	1.01	0.5
Online PR Intervention #2	48	4.12	1.17	

Table 4: Pre-test PowerPoint vs. Post-test PowerPoint

	Number of Students	Mean	Standard Deviation	p-value
Pre-Test	48	4.58	1.32	0.00
Knowledge Acquisition Face to face	48	7.64	0.99	
Knowledge Acquisition Online	48	6.88	0.99	

Table 4 shows that 48 students who gave the Pre-test with results of mean score found 4.58 and after the content delivery the depth of knowledge regarding the topic to be covered has increased to 7.64 and 6.88 in face to face in online respectively, which indicated that students have learned from the PowerPoint presentation. The p-value was calculated for knowledge acquisition test and it was found significant 0.00.

Table 5: Paired samples t-test

Paired Sample t-Test		Paired Differences			
		Mean	Std. Deviation	t	p-value
Intervention #1	PP_pre and Knowledge acquisition	-3.15	1.58	-11.43	0.00
Intervention #2	PR_pre and Knowledge retention	-4.12	1.53	-15.41	

Table 5 shows that there is a significant relationship exist between intervention 1 and intervention 2. The training by using Prezi software is more effective than PowerPoint.

This test shows that all the factors contributing in this research are working which has been showed by the value of Greenhouse-Geisser which is 0.48 and it has been explained in the Methodology chapter that the value of

Mauchly's test statistic is insignificant (i.e. p > .05) then it is reasonable to conclude that the variances of differences are not significantly different (i.e. they are roughly equal).

If Mauchly's test is significant then we cannot trust the F-ratios produced by SPSS.

Table 6: Repeated Measures of ANOVA: Mauchly's Test of Sphericity

	Mauchly's W	df	Sig.	Epsilon Greenhouse-Geisser
Factor1	.000	14	.	0.48

Table 7:

Intervention #1 PowerPoint		Number of Students	Mean	Standard Deviation	p-value
Face to Face Teaching	Knowledge Acquisition	48	7.64	0.99	1.00
	Knowledge Retention	48	7.17	0.93	
Virtual/ Online Teaching	Knowledge Acquisition	48	7.34	0.99	1.00
	Knowledge Retention	48	6.88	0.93	

Table 7 shows the complete picture of blended learning model with series of assessments in both face to face and in online lecturing delivery. The values of mean in knowledge retention exam in face to face and in online settings showed a remarkable retention of knowledge in a hybrid approach of teaching. Thus in undergraduate medical education the viability of blended model is fully promising in regards to teaching the content and managing the daily activities of students in Covid-19 pandemic.

DISCUSSION

This study explored the viability of blended model in undergraduate medical and dental education by measuring the learning performance of students through series of assessments. The current research used the presentation software which are the backbone of our daily educational activities either face to face or on online through zoom. Microsoft PowerPoint is the most frequently used multimedia presentation software (Thompson, Mcnutt, & Ky, 2009) in our daily life and facilitators use it for their own feasibility (Daka, 2019). In this study the PowerPoint and Prezi presentations were made by same class facilitator and the topic to be covered in it was not completely a conceptual topic that have relations from start till the end but it was also presented in a bulleted format too. In some areas on the other hand the PowerPoint was also designed in such a way that it should engage students, for instance the presentation was not a typical one that many have been used for many years but it was designed in such a way that there should have minimum extraneous cognitive load in each slide so that it should actually be competing with Prezi .Well Prezi is a generally new interactive media presentation software, propelled in 2009, so there has been a restricted measure of research compiled relating to its utilization and viability as a training based instructional software. The idea of a non-direct presentation, Prezi parallels the well-known elements of education and

learning models, for example, constructivism, that are being used in dynamic instructive projects today. Prezi like these presentation software should be "just right fit" in regards to the revolutions of 21st century medical education (Bender & Bull, 2012) However, with the advances in technology there is a learning curve with every revolution, as initially Prezi was difficult to understand as it need some time to know about the software and to make a presentation on it but now a days Prezi is dominating the presentation market. These outcomes should be translated with alert that as other medical instructors have remarked, "While technology brings revolution in education, it frequently needs cautious application" (Duffy, Guerandel, Casey, Malone, & Kelly, 2015). Overall, Prezi can possibly give students and associates an engaging and fortifying instructive experience. For educators, it gives a natural apparatus that can rapidly create amazing instructing material.

CONCLUSION

The results of current study shows that blended learning model can help the medical teachers to teach the theoretical aspects of the curriculum via online and make easy schedules of student's rotations for clinical clerkships. When it comes to clinical training, there is no shortcut or better way than face to face teaching strategy. But a lot of content that can be covered using online tools of teaching. Recently, Online Problem Based learning strategies has been introduced by many universities and there has been great innovation in the field of medical which is now the basic need of any institution for its survival and success.

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