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Original Article

Effectiveness of Flipped Classroom On 3rd Year Students of Oral Medicine Subject to Achieve the Learning Outcome

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ABSTRACT

In the flipped learning technique, the lesson content is supplied to students prior to the actual class, often in an online form, as background knowledge to prepare for the face-to-face time. In this approach, it puts students in an active learning situation, including them in the learning process prior to class. **Objective:** To determine the efficacy of flipped classroom in achieving learning objectives in third-year BDS students studying Oral Medicine. **Methods:** This study was conducted in Department of Oral Medicine, Institute of Dentistry, LUMHS, Jamshoro. Study was conducted from November 20th 2021 to February 21st 2022. The third-year BDS students of Oral Medicine (100 students) were categorized into two groups (Group-A traditional teaching method n=50 and Group-B flipped classroom teaching method n=50). The pre-test and post-test were conducted. **Results:** Around 60% of the students were satisfied that the instructions for the pre-class preparation were clear but 20% remain neutral. Around 40% agreed that the teaching schedule allow enough time to prepare for the class and 20% were strongly agreed but 40% remained neutral. In terms of post-test scores in both teaching methods, flipped method technique showed a significantly higher 8.45±0.30 versus the traditional method technique of 5.83±0.17 (p-<0.001). **Conclusion:** Third Year BDS students of oral medicine identified flipped learning as a dynamic student-centered technique for teaching

INTRODUCTION

One of the most important concerns for dental educators today is how to enhance the learning environment and raise student satisfaction with the curriculum. Current dentistry students represent a wide variety of cultures, experiences, personalities, and learning preferences and methods [1]. Because of this diversity, it is challenging for dental educators to address the educational requirements of all students [2]. The "traditional lecture," which goes back to the mid-nineteenth century, has been the primary style of instruction since universities were created, and it continues to be the dominating type of teaching in health care professions education [3]. The greatest advantage of lectures is the ability to share information with a large number of students; they are the primary teaching strategy of choice for delivering the curriculum to as many students as can fit in a lecture theatre; and they are cost-effective for institutions, staff, and facilities [4]. The term "flipped classroom" refers to a new educational approach that was created in 2012 and is rapidly gaining popularity throughout the globe [5]. In Flipped learning that was defined by Flipped Learning Network as "an approach in which undeviating instruction is changed from the group learning space to the idiosyncratic learning space, and the resulting group space is transformed into a dynamical, interactive learning situation where the facilitator guides learners as they utilize concepts and engage creatively in the topic

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matter" [6]. In the flipped learning technique, the lesson content is supplied to students prior to the actual class, often in an online form, as background knowledge to prepare for the face-to-face time. In this approach, it puts students in an active learning situation, including them in the learning process prior to class [7]. Furthermore, the classroom atmosphere is utilized to investigate issues and engage in group discussions and problem-based learning [8]. The benefits of a flipped classroom include more one-on-one time between instructor and student, more collaboration time for students, students learning at their own speed, students arriving to class prepared, better engagement with deeper topic mastery, and maybe improved exam performance [9]. Medical education is a lifelong process, and today's students are more involved with new technologies than previous generations. The goal is that with the advancement of technology in medical education, it may be used as a powerful source to aid in the teaching-learning process. One advantage of this technological improvement is the increased simplicity with which pre-reading information may be shared with students by email, WhatsApp, or other means. As a result, the healthcare educator may simply deliver the content ahead of time and conduct a flipped classroom. Now that it is increasingly likely that a flipped classroom will be used, it is important to investigate the usefulness of this learning style. The objective of this research was to determine the efficacy of flipped classroom in achieving learning objectives in third-year BDS students studying Oral Medicine.

METHODS

It was a quasi-experimental (Mixed Method) research that lasted three months from November 20th, 2021 to February 21st, 2022 at the Department of Oral Medicine, Institute of Dentistry, Liaquat University of Medical & Health Sciences, Jamshoro. The study's sample size was 100, and participants were chosen using a non-probability convenience sampling technique. An ethical approval (NO.LUMHS.REC/-209 Dated: 17th November 2021) was obtained from Research Ethics Committee of LUMHS prior conducting the research. The inclusion criteria were all third-year BDS students who were engaged in oral medicine subject and students who were unwilling to participate in the research were excluded. Before enrolling in the research, each subject provided informed written permission. The third-year BDS students of Oral Medicine (about 100 students) were categorized into two groups (Group-A traditional teaching method n=50 and Group-B flipped classroom teaching method n=50). Group-A had a pre-test consisting of 10 Multiple Choice Questions (MCQs) before to the commencement of the lecture and secured their MCQs papers, and then the lecture was presented after the post-test (same) MCQs exam. Group-B received information one week before the subject, and on the day of the lecture, a pre-test consisting of 10 MCQs was administered, followed by a lecture presented after the post-test (same) MCQs. SPSS (SPSS Inc., Chicago, IL) version 22 was used to analyze the data. For quantitative variables, the mean and standard deviation were calculated. For qualitative variables, frequency and percentage were determined (i.e., Likert scale). As needed, pie and bar charts were employed for graphical depiction. Independent T test was applied to compare scores between groups (group A- traditional teaching method 3rd year BDS class) versus group B (flipped classroom teaching method 3rd year BDS class). The paired T test was applied to compare pre and post scores in term of ranks for group A (traditional teaching method 3rd year BDS class) and group B (flipped classroom teaching method 3rd year BDS class) separately. $p \leq 0.05$ was considered as significant.

RESULTS

A total of 100 students from third year BDS engaged in Oral Medicine subjects were included in this study. The population was divided into two groups of flipped teaching method (n=50) and traditional teaching method (n=50). Twelve questions were asked from group of flipped teaching method to analyze the outcome which included response before and after class. Around 60% of the students were satisfied that the instructions for the pre-class preparation were clear but 20% remain neutral. Majority (80%) were agreed that the instructions for the pre-class preparation were provided in good time. However, only 20% completed the pre-class preparation while 60% remained neutral and 20% did not. Around 40% agreed that the teaching schedule allow enough time to prepare for the class and 20% were strongly agreed but 40% remained neutral. The majority of the participants were agreed or strongly agreed when asked about following questions, preparation essential for the class (59% agreed; 41% strongly agreed), the practice was helpful for the course (395 agreed; 41% strongly agreed), You expected to collaborate in the class (79%), the preparation allows you to collaborate effectively in class/session (80%), used social media/ electronic communication (Google, email, WhatsApp or YouTube) to discuss the preparation (80% strongly agreed; 20% agreed), the session itself add to your understanding of the topic (59% strongly agreed; 41% agreed), this method of class teaching effective to understand today's topic/class (80% strongly agreed; 20% agreed) and felt that you achieved the learning outcome of today's topic 61% strongly agreed; 39% agreed) as shown in Table 1.

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Flipped Method Technique Questions	Results % (n=50)				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The instructions for the pre-class preparation were clear.	0	61	20	19	0
Were the instructions for the pre-class preparation provided in good time?	0	80	20	0	0
Did you complete the pre-class preparation?	0	20	60	20	0
Did your teaching schedule allow enough time to prepare for the class?	20	40	40	0	0
Was the preparation essential for the class?	41	59	0	0	0
Was the preparation useful for the class?	41	39	20	0	0
Were you expected to collaborate in the class?	21	79	0	0	0
If collaboration in the class was expected, did the preparation allow you to collaborate effectively in class/session?	20	80	0	0	0
Did you use social media/ electronic communication (Google, email, WhatsApp or YouTube) to discuss the preparation?	80	20	0	0	0
Did the session itself add to your understanding of the topic?	59	41	0	0	0
Was this method of class teaching effective to understand today's topic/class?	80	20	0	0	0
Did you feel that you achieved the learning outcome of today's topic?	61	39	0	0	0

Table 1: The responses of the participants regarding Flipped Method Technique(n=50)

Paired sample t-test indicated that the post-test scores in both teaching methods showed a significant difference (p-<0.001) flipped method technique 8.45±0.30 versus traditional method technique 5.83±0.17 when compared to the pre-test results as indicated in Table 2 and Table 3.

Activity Name	Flipped Pre-test score Mean ± SD	Post-test score Mean ± SD	p-value
10 Multiple choice questions	5.96 ± 0.45	8.45±0.30	<0.001

Paired sample t- test

Table 2: Pre-test and post-test assessment of the flipped method technique

Activity Name	Flipped Pre-test score Mean ± SD	Post-test score Mean ± SD	p-value
10 Multiple choice questions	2.69 ± 0.28	5.83 ± 0.17	<0.001

Paired sample t- test

Table 3: Pre-test and post-test assessment of the traditional method technique

However, flipped method technique showed a significantly higher 8.45±0.30 versus the traditional method technique of 5.83±0.17(p-<0.001)as given in Table 4.

Activity Name	Group A Flipped method technique Mean ± SD	Group B Traditional method technique Mean ± SD	p-value
10 Multiple choice questions	8.45 ± 0.30	5.83 ± 0.17	<0.001

Independent sampled t-test

Table 4: Flipped method technique versus traditional method technique

DISCUSSION

Despite the fact that the use of flipped-classroom pattern more than around 15 years, it still lacks a coherent theoretical structure or methodology, and it continues to manifest itself as disparate executions across educational contexts and academic fields [10]. However, it is widely acknowledged that the majority of flipped settings include video lectures seen not in the classroom, in-class activities, and little supporting during class time [11]. There have been few studies of the flipped-classroom concept in speedup the courses [12]. Francl detailed the application of the flipped-classroom technique in two master's level accelerated finance/ accounting courses, but did not provide objective evaluations. In a five-week basic spread sheet course, the flipped-classroom technique was proven to be successful and scalable [13]. To our best of knowledge, no flipped-classroom studies for intensify oral medicine courses have been published. Furthermore, we were curious how a primarily non-traditional learner's population would react to the shift in course design. The flipped and control groups had similar mean ages of 21, emphasizing the unconventional character of the student population. Several restrictions should be noted while assessing the findings. It is common activity to administer a pre-test to analyze students' prior cognition in the flipped and traditional groups to ensure comparability [14]. Because of the rapid pace of the subjects, having a pre-test and the first post test(ten multiple choice questions on oral medicine subjects) with only seven days of apart may have influenced learners' answers, so no pre-test was given. While there were momentous differences in student pre-test and post-test levels between the flipped and traditional groups, we cannot rule out the possibility that differences in prior knowledge influenced the results. Another limitation was that the instructors for the flipped and traditional sections were different. Furthermore, the oral medicine course from which the MCQs were drawn was the same across both groups; previous to the assessment, all students had received this oral medicine course, and they all used the same textbook and adhered to the same MCQ format. The question of what factor or factors caused the students' increased performance in the flipped parts remains unanswered since our data did not demonstrate that in-class activities were a significant contributor to it. There have been conflicting results regarding the factors that contribute to improved student performance in the flipped classroom. Some authors have suggested that a more structured curriculum, greater pre-class preparation, active learning, or even a more collaborative classroom environment is to blame. Most students utilized social media to prepare for the flipped instruction style, often more than once, as shown by a variety of indicators,

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including student self-reporting and analytic features of both the media site and the course learning management system. Our pupils did not get points for utilizing social networking sites, in contrast to a previous study. Numerous studies have hypothesized that the various teaching methods used in a blended learning atmosphere may change depending on the study discipline, instructional goals, student characteristics, the types of resources available, and the instructors' backgrounds [15-17]. The FC model appears to have high reaction requirements on the Kirkpatrick's four level model of training assessment criteria, which are often used as particular markers of educational efficacy [15, 16]. According to Kim *et al.*, on student learning styles and personality, homogenous instructions do not promote active learning [17]. Students claim that the availability of online resources is the most significant advantage of the FC model, however there is very little evidence to support the superiority of one resource over another in terms of student preferences or influence on academic achievement[18-20].

CONCLUSIONS

Third-year BDS students who were taught oral medicine identified flipped learning as a dynamic student-centered technique for teaching diverse pupils that may use technology to increase student learning, interaction, and assessment.

Conflicts of Interest

The authors declare no conflict of interest

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