

Blended Models for Open Learning in Higher Education: An Empirical Study

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Abstract

All technology integrated language teaching courses in the institutes of higher education are delivered through blended models. Although there is a clear exposition on the philosophy and pedagogical practices of blended instruction there is a dearth of empirical evidence on a potent model of blended learning. A systematic review on blended instruction revealed that there are no comparative studies on blended models. Therefore, this study aims to fill this research gap by investigating on four popular models of blended learning namely the station rotation model, the enriched virtual model, the self-directed blend and the flipped model. The study has two primary objectives. They are i) to analyze the students' perception on the four different models of blended learning and ii) to measure the impact of these models using the test performance of the learners. A mixed methods approach was employed to study the efficacy of the blended models. The instruments of data collection are the student's perception questionnaire, focus group interviews, and performance tests. The data was analyzed using SPSS version 23. The self-perception questionnaire, focus group interviews and the t-tests showed students' preference for the enriched virtual model. The findings of this study could be useful to policy makers in recommending an effective model of instruction for open learning in higher education.

Keywords: hybrid courses, flipped model, enriched virtual model, station rotation model, self-directed blend, mixed methods approach.

Introduction

Traditional teaching practices are gradually replaced by computer assisted language teaching (CALT) in the institutes of higher education across India. In alignment with the changing pedagogies the technologies are evolving at a rapid pace. There is substantial research evidence to suggest that the students in technology oriented classrooms achieve better learning outcomes than face to face classrooms. According to Ciampa (2014), Computer Assisted Language Learning programmes has tremendous potential to foster interaction, active learning and cognition.

Some of the seminal studies that report on the positive impact of technology integration are Xu, Glick, Rodriguez, Cung, & Warschauer (2019); Vahdat & Eidipour, (2016); & Tosun, (2015). Osguthorpe & Graham, (2003), define blended learning as a combination of face-to-face and

online instruction with reduced classroom contact hours. Their study showed that BL programmes achieve better learning outcomes and reduced attrition rates.

The Institutions of higher education in India are also looking for accommodating more students in less space. Since BL programmes aim to reduce face to face time with the instructor it is a preferred in higher education to augment the teaching learning process. According to Cavanagh, Chen, Lahcen, & Paradiso, (2020) the design and delivery of learning resources is extremely important to meet the educational objectives. Despite the evident advantages of blended instruction there is a lack of empirical evidence on an effective model. Hence, the focus of this study is to investigate the value of four blended models for language learning. In alignment with the objectives of the study, we formulated the following research questions.

R1. What are the students' perceptions about the implementation of these models?

R2. Are there significant differences in the performance of the students after the intervention of these models?

With reference to these research questions a systematic literature review was carried out.

Egbert, Huff, McNeil, Preuss, & Sellen (2009) claim that research in BL has a narrow focus. It often follow a one size fits all approach. Hence, there is a need to implement a dynamic model in order to maximize the learning outcomes. Most of the previous studies on blended learning in higher education has reported on the positive impact of flipped models. Other blended models such as the station rotation model, the enriched virtual and the self-directed blend has not received the same level of attention. Previous studies that has addressed the effect of BL models are mentioned here.

Review on Blended Models

Seminal Research Studies on Flipped Model

Roehl, Reddy, & Shannon (2013) reported on the active learning opportunities that the flipped model provides. Their studies show that flipped learning provided better interaction among teachers and students, increased peer to peer collaboration and deeper engagement. They also found that flipped learning suited all learning styles, facilitated learner autonomy and interaction. Kang investigated on the impact of flipped model in comparison with the traditional model. He found that the flipped classroom resulted in better learning outcomes. Shi, MacLeod, & Yang, (2019) carried out a metaanalysis on flipped learning with respect to learning outcomes. In their metaanalysis they reported that flipped classrooms positively affected learning outcomes in higher education. They argue that flipped learning is promising when instructors adopt collaborative learning activities.

Chen, Monrouxe, Jenq, Chang, & Chai, (2018) compared the effectiveness of flipped model over traditional lecture based model in their meta-analysis. They choose quantitative studies that dealt

with higher education. Their analysis was based on 46 experimental studies with a sample size of over 9000 participants. Their analysis showed better learning outcomes in the flipped model. Despite the success of flipped learning there are some studies which contradict the positive impact of flipped classrooms. A Meta-analytic study by Cheng, Ritzhaupt & Antonenko (2018) showed a lack of conclusive evidence on the students learning outcomes in the flipped mode of instruction.

Studies on Station Rotation Model

According to Maxwell & White (2017) station rotation model is a model in which the students rotate between face to face classrooms and online learning modalities. The station rotation includes a specified place for online learning and a specified place for face to face learning. Brodersen & Melluso, (2017) made a comprehensive analysis of different models of blended learning. They note that the station rotation model provides opportunities for personalized instruction in a heterogeneous classroom. Flores (2018), remark that the special feature of the station rotation model is the nonlinearity of instruction. According to this model the content is broken in to smaller chunks and delivered at different stations in smaller groups.

Research on Self Directed blend

In self-directed blend the students are provided online reading materials and instructional videos. In this model they learn at their own pace. Research on self-directed blend is at a nascent stage. Previous research on self-directed blend has reported on its positive impact. (Akgunduz & Akinoglu, 2016) investigated the student's performance in self-directed blend using a pre-test posttest design. The results of t-test and one-way Annova indicated that the group which received instruction using the self-directed blend performed better than traditional instruction. Greener, (2008) studied the student's perception of the self-directed blend. They used a qualitative approach in their study. Their analysis of interview transcripts showed that the success of blended learning depends on the awareness and need for self-directed learning in blended environments. Other seminal studies which reported on the efficacy of self-directed blend are Denis (2003); Kim & Lee (2015).

Woltering, Herrler, Spitzer, and Spreckelsen (2009) found that self-directed blend helps the learners to stay motivated and take full responsibility for their own learning. According to him, in self-directed blend, the learners do not compete with others but with themselves. They move to the next module after they have achieved a certain level of mastery. Hence, this model provides more autonomy to the learners.

Studies on Enriched Virtual Model

According to Staker, & Horn, (2012) the students do not attend the brick and mortar campus every day in the enriched virtual model of instruction. Rather, the teacher meets the students initially and the students complete the rest of the course remotely. There are no proctored exams.

According to Christensen (2012) the enriched virtual model is predominantly online based. Face to face instruction is very minimal. Most of the content for online learning is video based. A study by Kang & Van's (2018) has confirmed that videos are extremely useful tools to achieve the desired learning outcomes. In recent years, the enriched virtual model is implemented in many institutions of higher education as there is a considerable rise in the use of videos to augment the teaching learning process.

The studies dealt with in this section have reported on the positive impact of each of these models. Despite the benefits of each approach we do not have conclusive evidence on which among these models is practically useful. There is no one size fits all approach to blended learning. The effectiveness of the models may vary depending on the course, the level of the learners, and the learning outcomes. Hence, this study makes an effort to investigate a competent learning model in the context of language learning in higher education.

Methods

Using a mixed methods approach the efficacy of the blended models were assessed. Ivankova, Creswell & Stick, (2006) state that a mixed methods design is a robust approach to validate the research findings. The students pretest and posttest was analysed quantitatively whereas the self-perception questionnaire and focus group interviews were analysed both qualitatively and quantitatively. The various stages of the study are mentioned in figure-1.

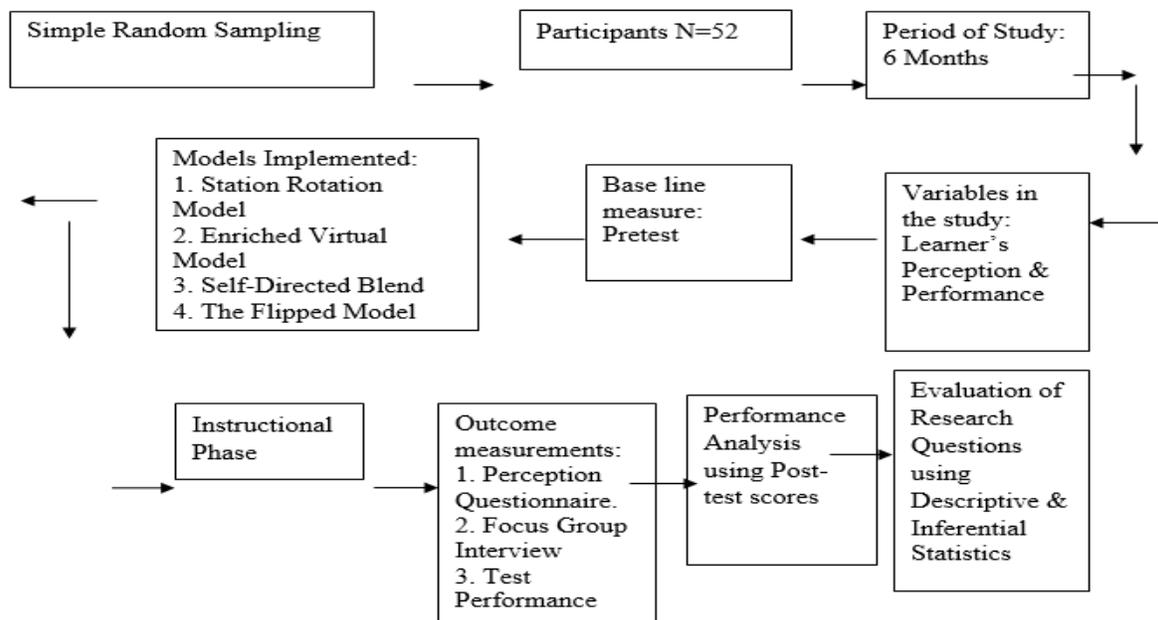


Figure-1 Various Stages in the Research Study

Context of the Study

The research was conducted at crescent Institute of Science and Technology in the Multimedia Language Lab. The language learning courses were delivered using blended approaches at crescent Institute of science and Technology. Some blended practices implemented in the language lab is presented in figure -2.



Figure-2 Blended learning practices in the Multimedia language Lab

Participants

The participants were 52 English as a Second Language (ESL) students majoring in Electrical and Electronics Engineering enrolled in a course on Business English. They were selected using simple random sampling. They were in III semester. The age mean was 18.5 (S.D=0.92). There were 19 female students and 33 male students. They were at the B1 level according to the Common European Framework of Reference. (CEFR). Informed consent was obtained from all the students who participated in the study. The Students were enrolled in a course on Business English delivered through blended mode. The test performance of II semester communication skills course was used for diagnostic purposes. The study spanned for a period of six months. (July-December-2019). None of the students dropped out of the study as it was a one credit course.

Instructional Phase

Four models of blended learning were implemented to teach Business English Certificate (BEC) offered by the Cambridge University in collaboration with the Crescent Institute of Science and Technology. The Course focussed on four macro skills of language learning such as listening, speaking, reading and writing. The weightage for each module is 25%. Each macro skill was taught using a particular blended model. Listening skills were taught using the station rotation model, speaking skills using the enriched virtual model, reading skills using the self-directed blend and writing skills using the flipped model. The teaching learning activities and the technologies used in each module is presented in table-1.

Table-1
Summary of Teaching Learning Activities

Skill Focus	Model	Teaching Learning Activities	Infrastructure Facilities & Technologies Used
Listening	The Station Rotation Model	Podcasts	1. Multimedia language lab equipped with individual desktops 2. An electronic whiteboard 3. Hi-speed broadband connectivity 4. Learning management system 5. Teachers' console and students console, Headphones.
		Video lectures	
		Reading materials on listening skills	
		Classroom discussions	
		The final listening test	
Speaking	The Enriched Virtual Model	Teacher directed lab sessions	
		Lecture videos with worksheets	
		Online quiz	
		Viewing assessment rubrics with video explanation for every parameter.	
		Mock evaluation	
		The final speaking test	
Reading	The Self Directed Blend	Links appropriate reading materials from the Cambridge English website.	
		A slideshow of SQ4R technique of reading	
		Practice sessions with a flexible deadline.	
		Model test provided by the instructor	
		Self-evaluation using the answer key shared by the instructor.	
		The final reading test	

Writing	The Flipped Model	Pre Class Activity:	
		A short video clip on how to write an email	
		A video clip on how to write a memo.	
		In Class Activity:	
		Practice tasks on email and memo	
		Peer evaluation and personalized feedback.	
		The final writing test.	
		After Class Activity	
		Mini project.	

Station Rotation Model in Practice

The listening module was delivered using the station rotation model. The students were equally divided into two groups. The instruction of the first group was through teacher directed lab sessions. They were given text books and practice tasks. The second group viewed videos on sub skills of listening strategies to enhance their scores in the listening component. They also took an online test on listening. Eventually, both the groups had a classroom session where they received feedback from the instructor. The students discussed the learning activities that were carried out in the two stations. The instruction was a combination of podcasts, reading materials, video lectures, and classroom discussions.



Figure-2 Station Rotation Model in Practice at Crescent

The Enriched Virtual Model in Practice

The speaking module was delivered through enriched virtual model. It is a combination of online instruction and face-to face supplementation. In this learning model 90% of the content was delivered online and 10% of the content was delivered using face to face mode. The objective of this model was to enable the learners to spend less classroom time thereby increasing online learning time. The speaking module of the Cambridge Business English had three learning stations. The teacher directed lab sessions were facilitated in the first station. The format of the speaking test was explained to the students. They viewed video clips on general guidelines, dos and don'ts of the exam and the language aspects of the speaking test. There was an online quiz to check the learners' understanding.

The mode of learning in the second station was online instruction. In the online mode the students viewed the video recordings of the candidates who had taken up the speaking test earlier. The objective was to familiarize the learners with the format of the speaking test. They were given the assessment rubrics for speaking and were asked to rate the performance of the candidates in the video clips using the speaking rubrics.

The third learning station was a face to face classroom session with the instructor. There was a mock test and teacher's feedback. The layout of the enriched virtual model is shown in figure-3.

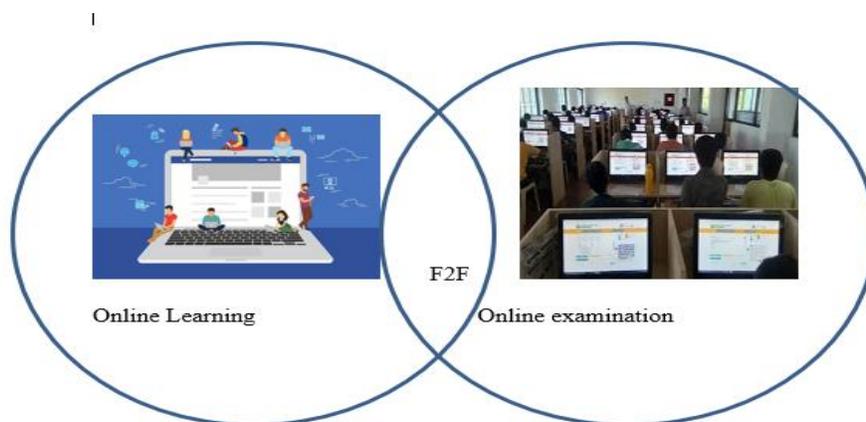


Figure-3 Enriched Virtual model used for teaching speaking

Self-Directed Blended Learning Model in Practice

The reading module was delivered using the self-directed blend. The target learners were asked to identify the reading materials from the Cambridge English website. After identifying the materials they were asked to manage the resources and practice the reading exercises. A video clip on the reading technique SQ4R was shared using the classroom learning management system (LMS). SQ4R is an acronym for survey, question, read, respond, record and review. The reading module had seven parts. All the seven parts of reading were practiced on the same day.

Each part was divided into smaller segments to avoid cognitive overload of the learners. After classroom practice and self-reflection they practiced model test papers. Eventually, they reviewed the answers using the answer key provided by the instructor and take another test to improve their performance. A flexible timeline was given to the students to learn at their own pace. The principles employed for the self-directed blend is shown in figure 4.

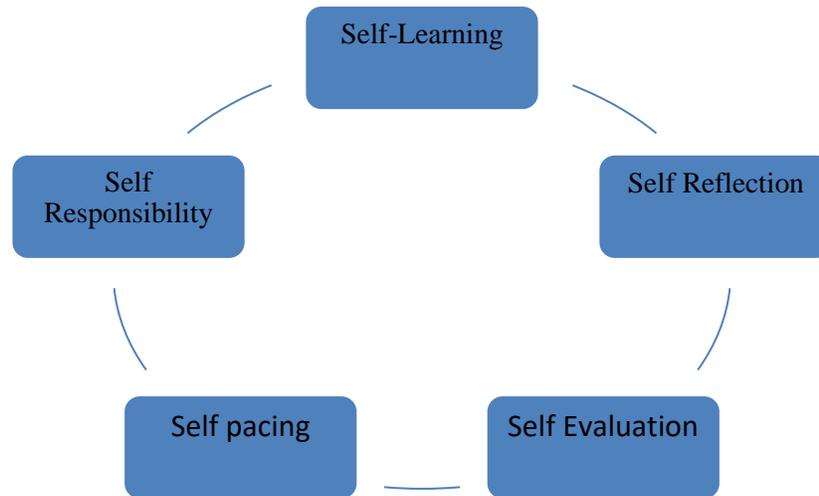


Figure -4 Self Directed Blend for enhancing Reading Skill.

The Flipped Model in Practice

The flipped model was used for fostering the writing skills. A tripartite approach of pre class activities, in class activities and after class activities were employed in the flipped model. E-mail and memo was shared using the teachers' blog. <http://becwizard.blogspot.com/2013/03/bec-memo.html>. In the pre class activity, video lectures on writing Email and memo was shared using the learning management system. The video lectures were shared well in advance to classroom instruction. In the in class session the instructor gave them practice tasks on Email and a memo. The tasks on Email and memo were relevant to the workplace communication. The instructor monitored the writing activities and gave them personalized feedback. The assessment rubrics on email and memo was provided to the learners and they were encourage to do peer evaluation. The students completed a real time writing test. After the test, the instructor allotted a session for self-reflection. Finally, the students were instructed to do a mini project on E-mail writing and memos. The tripartite approach to writing using the flipped model is represented in figure 5.

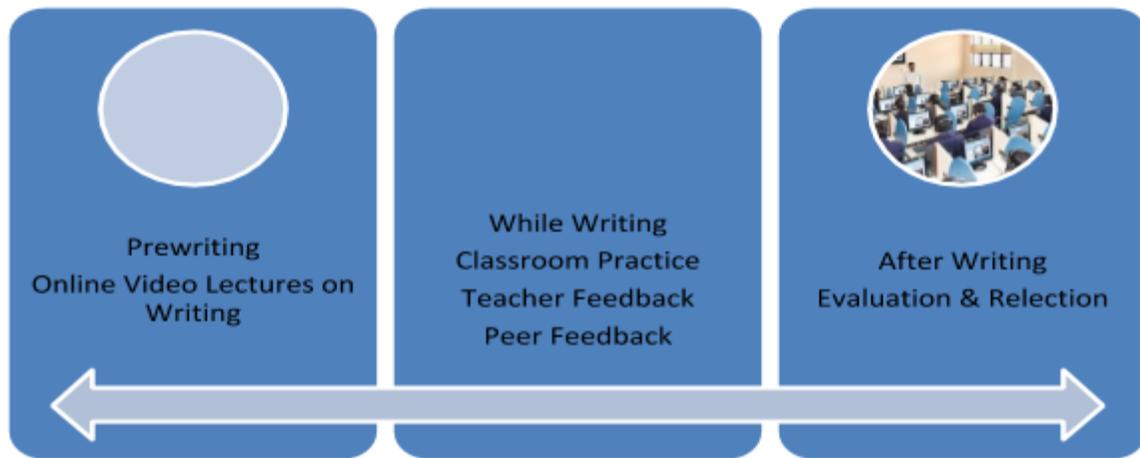


Figure-5. The flipped model in practice.

Efficacy Study on the Four Models.

After the intervention stage the impact of the four models was analyzed. The instruments used for data collection were a self-perception questionnaire, a focus group interview and the pretest posttest performance. The pretest scores of all four components such as listening, speaking, reading and writing were taken from the previous semesters' course on communication skills. The self-perception questionnaire and the focus group interview was analysed in the first part of the results and the test performance is presented in the second part. SPSS version 26, the professional edition was used for analysis.

Results

This study investigated the pedagogical implications of four blended models namely the station rotation model, the enriched virtual model, the self-directed blend and the flipped model in a course on Business English. The objective of the first research question was to explore the students' perception on the efficacy of the four models. In order to answer the first research question a self-perception questionnaire was administered and a focus group interview was conducted. The second research question was analyzed using the data of the test performance.

Student Self-Perception Questionnaire

The students were asked if their learning experiences were interesting and engaging than the traditional models of learning. They were asked to respond either in the affirmative or in the negative. Most of the students responded positively to the intervention of these four models. But, an overwhelming majority of the learners (75%) have preferred the enriched virtual model. 63% of the learners have positively responded to the flipped model. 54% of them have positively responded for the self-directed blend and 46% of them have preferred the station rotation model. The results of the students' perception is shown in table-2.

Table-2

Student's perception on the efficacy of blended models

Models	Positive response	Negative response	Cannot say
The station Rotation Model	24 (46%)	25 (48%)	3 (5.7)
The enriched virtual model	39 (75%)	12 (23%)	1 (2%)
The self-directed blend	28 (54%)	22 (42)	2 (4%)
The flipped model	33 (63%)	17 (32%)	2 (4%)

Focus Group Interview

A focus group interview was conducted to further validate the student's perception on the effectiveness of the four blended models implemented in the study. Students were asked about the positive impact of the four models. Five students were randomly selected for focus group interviews after the end of the study. The extracts of their comments are reported in this section.

Respondent-1

I think that the enriched virtual model was practically relevant than the other models of learning. It is because we preferred to learn at our convenient time and not inside the four walls of a classroom. We were very happy with minimal interference from the instructor.

Respondent-2

I felt that the learning experience was better in all the models when compared to the traditional classroom. But I personally prefer the enriched virtual model as it gave us the more freedom and personal space to learn.

Respondent-3

It is very difficult to choose which among these models is impactful. I would fancy both the enriched virtual and the flipped model. The enriched virtual model suited my learning style because I wish to revisit my learning materials again and again. The flipped model also suited my learning style because I already had a feel of what I wanted to learn in my class.

Respondent-4

I felt that the self-directed blend is better because I would like to browse a lot on online resources whenever I learn anything new. I choose the material that best fit my understanding.

Respondent-5

I think that the enriched virtual is more convenient since we had minimal face to face sessions with the instructor. All these models were engaging except the station model as I did not like the ideas of switching places for learning.

The respondents' view of the focus interviews showed that the students had a high level of engagement. They also achieved their learning outcomes in the enriched virtual model and the flipped model.

Paired t-test

The second research question was related to the performance of the learners. In order to assess their performance the pretest post test scores were assessed. The diagnostic scores before the beginning of the course was used as a pretest data. Both descriptive and inferential statistics for the four kinds of intervention were studied. The significance level of the test was set at an alpha level of $p < 0.5$. Table 3 shows the results of the paired sample statistics. There was a significant difference in mean scores of the pretest and posttest in all four models. The mean difference was very high in the enriched virtual model followed by the flipped model and the self-directed blend. Compared to the other models the mean difference was less in the station rotation model. The test performance indicated that the students have performed well in the enriched virtual model when compared with the other models.

Table-3

Paired Samples Statistics

The Blended Models	Before and After Intervention	Mean	Number of Students	Std.Dev	Std.Error Mean
Enriched Virtual	Pretest	12.9980	52 52	3.79608	.53156
	Posttest	16.8039		3.78428	.52991
Flipped Model	Pretest	12.1983		3.77603	.53014
	Posttest	15.4902		3.80448	.54042
Self-Directed Blend	Pretest	11.9020		3.63458	.50894
	Posttest	14.9020		3.737670	.52338
Station Rotation Model	Pretest	11.9804		3.73358	.52281
	Posttest	13.6275		4.10834	.57528

Although the mean difference of the posttest is relatively high it does not provide conclusive evidence on the statistical difference. Therefore, a one sample t-test was carried out to compare the impact of different conditions. The SPSS output of the one sample t-test is shown in table-4.

Table-4

One Sample t-test

Models	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Enriched Virtual Model	4.70588	3.46580	48531	5.68065	3.73111	9.697	52	.000
Flipped model	4.39216	3.47032	48594	5.36820	3.41611	9.038	52	.000
Self-Directed Blend	3.98000	3.57211	50020	5.00467	2.99533	7.997	52	.001
The Station Rotation	3.64706	3.52604	49374	4.63877	2.65534	7.387	52	.002

Lakens (2003) state that a t-test is valid test to measure the random effects of a group. Table-4 shows the pretest posttest difference of the same group across four different conditions. Since the alpha value is set at less than 0.5 there was a statistical difference between the pre and posttest in all four models. However, the test results were more significant in the enriched virtual model as the paired mean difference was 4.70. This was relatively higher than the other models. The mean difference of 4.39 found in the flipped intervention was also distinct. The paired mean was 3.98 in the self-directed blend and 3.64 in the station rotation. The confidence intervals reflect the true mean of the sample size. The lower and upper values of confidence intervals was more significant in the enriched virtual model followed by flipped, self-directed blend and the station model. These results were in consonance with the self-perception questionnaire and focus group interviews.

Discussion

The aim of the study was to find which model of blended learning was effective for English Language Teaching in higher education. Our findings confirmed that the enriched virtual was handy than the other blended models investigated in the study. The students' performance was higher in the enriched virtual model compared to other blended models. The student's self-

perception questionnaire, focus group interviews and the performance test confirmed this hypothesis'. There are two possible explanations that we could infer. The first one is that the enriched virtual model will be a suitable blend for language teaching in higher education. The second one is that the flipped model will be a suitable alternative for the enriched virtual model. However, the students have preferred the enriched virtual model as they have demonstrated better learning capability in this model. Previous studies have also focussed on the efficacy of the flipped model. Surprisingly there was no research studies on the enriched virtual model till date.

Implications

It is widely believed that flipped model will help the instructor in achieving the learning outcomes. Some of the recent studies that report on the positive flipped learning and Zheng, Ward, & Stanulis (2020); Kurnianto, Wiyanto & Haryani, (2020). Our findings offer a different perspective. The enriched virtual model is more effective than the flipped model. The findings open the door for new research on the enriched virtual model.

The implications of this study will be useful to the teaching practitioners and policy makers in deciding an appropriate model of blended learning. However, further studies with larger samples are required to authenticate this finding.

Limitations

The study was conducted with 52 students from Electrical and Electronics Engineering. The researchers could have involved participants from other branches of Engineering. This would have not only increased the sample size but also made the group heterogeneous. But this was not possible because only two independent researchers carried out the study. The researchers could have opted for a true experimental design instead of a quasi-experimental study. Since the researchers had a limited sample size and a limited time frame to complete the study this was not possible. The reason for zero attrition could be because it was mandatory for the students to complete the course in order to get a degree.

Conclusion

According to **Strake (2019)** there is lack of holistic framework to open education where in learners can be facilitated to learn by themselves. The enriched virtual model provides great scope for learners to learn by themselves.

The results suggested that the students had a special liking for the enriched virtual and the flipped model. The study also indicated that the students do not prefer the station rotation model as they did not enjoy moving from one station to another station. On the whole this study offers a novel perspective on the impact of blended models.

It is hoped that comparative studies on blended models will help the instructors to adopt a appropriate blended model for ESL and EFL instruction. Although the findings of this study are

generalizable to all blended environments, it will be particularly useful in higher education. A learning model which is competent in one environment need not be effective in another environment. More studies on blended models should be conducted to understand its impact.

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