Original article

Comparative Study of Flipped and Supplemental Learning Classroom Process among Economics Students in Osun State

Esther Opeyemi Olasupo, Adebayo Joseph Obadiora, Adeyinka Oluwaseun Kareem

Department of Arts and Social Science Education, Obafemi Awolowo University, Ile-Ife, Osun State Nigeria

Correspondence: Esther Opeyemi Olasupo

Received: February 24, 2021; Accepted: March 09, 2021; Published: 3 April 2021

Abstract

This quasi experimental study compared the effectiveness of flipped and supplemental classrooms in enhancing students' academic performance in a traditional African setting. It also examined the difference in the effectiveness of flipped and supplemental classrooms in improving Economics students' retention ability. The sample size was made up of three intact classes of secondary students in Senior School Two (SS 2) in Osun State, Nigeria. Two research hypotheses were formulated for the study. The collected data were analyzed using ANCOVA. The result revealed that there is no significant difference in the effectiveness of flipped and supplemental classrooms in enhancing students' academic performance in the study area. The study also revealed that there was a significant difference in the use of flipped and supplemental classrooms in improving students' retention ability. The study concluded that flipped and supplemental classrooms had no significant difference in their effectiveness. The study further concluded that for a better delayed achievement, the Supplemental classroom is more effective

Keywords: Flipped Classroom, Supplemental Classroom, Delayed Achievement

Introduction

Performance of students in any teaching and learning process is no doubt one of the learning outcome indicators. Until the year 2017, the performance of Economics students' in Osun State have not been encouraging as the number of students' with Distinction and Credit passes in Economics have been below average. However, the year 2017 gracefully ushered in an improvement in Economics Students' performance above 50% of the total number of students who sat for the exam in Osun State, and a subsequent significant increase in the year 2018 as documented in the statistics of Economics students' performance in Senior Secondary School Certificate Examination in the state.

Table 1.1: Statistics of Students Performance in Senior Secondary School Certificate Examination in Economics in Osun State (WAEC, May/June 2010 – 2018)

Year	No of Candidates	Distinction & Credit Passes (A1 – C6)	%	D7 – E8	%	F9	%
2010	18,938	5,668	29.93	7,852	41.46	4,985	26.32
2011	25,197	9,200	36.51	8,746	34.71	5,566	22.09
2012	23,342	6,545	28.04	9367	40.13	7201	30.85
2013	22,166	9,020	40.69	7940	35.82	4905	22.13
2014	13,174	1,935	14.69	3336	25.32	6970	52.91
2015	15, 712	1,838	11.70	3021	19.23	9721	61.87
2016	4,431	1,535	34.64	1560	35.21	1247	28.14
2017	10,514	5,759	54.78	2233	21.24	1587	15.09
2018	27080	18,547	68.48	4487	16.56	4042	14.92

Source: Department of Planning, Ministry of Education, Osun State. [3]

[1] Noted that regular poor performance by students is linked to the application of ineffective teaching methods by teachers to influence students with right knowledge. Students' participation in teaching and learning process is also very crucial to achieving high participation in examinations. Beyond the teacher assuming the role of sole knowledge sharing, the students also need to be encouraged to make their contributions in the classroom. [8] Submitted that no teaching technique can influence or enhance students' classroom participation except by voluntary interest. These interests come when the students are introduced to facilities or atmosphere they could easily relate with without any form of cohesion. Technology is one stronghold that can arouse the interest

of students. The eagerness to know how this technology will work when integrated into the teaching learning process can arouse students' voluntary interest to participate in the classroom.

Blended learning as one way of improving students' active participation in class, is now an increased and well known systematic philosophy on teaching that adds in technology component to support daily instruction in the classroom. It is an environment where the conventional or traditional teaching method is supported by electronic facility to boost students' active interaction, participation and performance in the classroom. The flipped classroom is a form of blended learning where the students are first exposed to course contents or topics from home with the use of smart phones, DVD and DVD player, Television, and so on and then come to the classroom for face to face activities. The supplemental classroom on the other hand is another form of blended learning where the students are first exposed to the face-to-face traditional method of teaching, after which the lesson is being supported by the use of technology and any other supporting materials or activities ranging from charts, question and answer, role-play, quiz, etc, outside the classroom environment to finish up the lesson that had already started in the classroom.

The social constructivist theory propounded by [10] also advocated for creating a learning environment where students are able to freely get themselves engaged in activities that facilitates learning. Educational media are also included in the facilitating components of classroom interaction as they help to either introduce or supplement knowledge. Teachers are expected to guide the students as they face difficulty working through tasks.

Since teaching methods has in a way contributed to the unsatisfactory performance of students in their exams and with reference to the economics curriculum which states that interactive teaching strategies should be used by teachers, incorporating technology into teaching is expected bring about the needed interest in students, thus enhancing improved students voluntary participation in education. Considering that there has been an upward trend in technology and many western countries have adopted technology into their education system but there has been little or no adoption of it in a localized African setting. Hence, it is therefore imperative to comparatively examine the flipped and supplemental learning classroom process among economics students in Osun state, Nigeria.

Research Objective

The objective of this study is to

(i) compare the effectiveness of flipped and supplemental classrooms in enhancing students academic performance;

(ii) There is no significant difference in the effectiveness of flipped and supplemental classrooms in improving students retention

Research Hypotheses

(i) There is no significant difference in the effectiveness of flipped and supplemental classrooms in enhancing students academic performance

(ii) There is no significant difference in the effectiveness of flipped and supplemental classrooms in improving students delayed achievement

Methodology

The study adopted a pretest - posttest, control quasi-experimental design to examine the effectiveness of flipped and supplemental classrooms in enhancing economics students' learning outcomes in senior secondary schools in Osun State. The study used three groups which were experimental groups A and B, and a control group C. Students in the experimental group A were taught using the Flipped form of blended learning. Students in the Experimental group B were taught using the Supplemental form of blended learning while Students in the control group were taught using the conventional teaching method.

The design is represented schematically as follows:

O1	X1	O2	Experimental Group A
O3	X2	O4	Experimental Group B
O5	C	O6	Control Group

O1, O3 and O5 represent the pre-test for experimental groups A, B and the control group respectively.
O2, O4 and O6 represent the post-test for experimental Groups A, B and the control group C respectively.
X1 represents the treatment for experimental group A (FC)
X2 represents the treatment for experimental group B (SC)
C represents conventional Method (CM).

Results

Hypothesis 1: There is no significant difference in the effectiveness of flipped and supplemental classrooms in enhancing students' academic performance

Table 2.1.1: ANCOVA of the Effectiveness of Flipped and Supplemental Classrooms in Enhancing Economics Students' Academic Performance

Tests of Between-Subjects Effects						
Dependent Variable: Posttest						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	51.684[a]	3	17.228	2.523	.066	.106
Intercept	125.003	1	125.003	18.304	.000	.222
Pretest	24.617	1	24.617	3.605	.062	.053
Group	20.519	2	10.260	1.502	.230	.045
Error	437.066	64	6.829			
Total	4573.000	68				
Corrected Total	488.750	67				
a. R Squared = .106 (Adjusted R Squared = .064)						

Table 2.1.1 showed that (F=1.502, p > 0.05) there was no significant difference in the effectiveness of flipped and supplemental classrooms in enhancing the performance of students in the study area. The null hypothesis is hereby not rejected because the p-value is greater than 0.05. A partial eta squared value of 0.045 showed that the strategies used accounted for 4.5% variation in the performance of students in the study area. It could therefore be concluded that the use of flipped and supplemental classrooms does not have significant difference in its effectiveness to enhance students' academic performance.

Table 2.1.1.2: Mean Estimate of the Effectiveness of Flipped and Supplemental Classrooms in Enhancing Economics Students' Academic Performance

Estimates				
Dependent Variable: Posttest				
Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Flipped	8.076[a]	.568	6.942	9.210
Supplemental	9.513[a]	1.363	6.790	12.236
Conventional	7.378[a]	.420	6.538	8.218
a. Covariates appearing in the model are evaluated at the following values: Pretest = 7.9706.				

The mean values of the Flipped, Supplemental and Conventional teaching strategy which are 8.076, 9.513, and 7.378 with a pretest mean of 7.971 also buttresses the point that the study carried out showed that there is no significant difference in their level of enhancing the students' performance.

Hypothesis 2: There is no significant difference in the effectiveness of flipped and supplemental classrooms in improving students delayed achievement

Table 2.1.3: ANCOVA of the Effectiveness of Flipped and Supplemental Classrooms in Improving Economics Students' Delayed Achievement

Tests of Between-Subjects Effects						
Dependent Variable: Delayed Achievement						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	151.129[a]	3	50.376	11.763	.000	.355
Intercept	441.541	1	441.541	103.099	.000	.617
Posttest	21.892	1	21.892	5.112	.027	.074
Group	123.952	2	61.976	14.471	.000	.311
Error	274.092	64	4.283			
Total	8155.000	68				
Corrected Total	425.221	67				
a. R Squared = .355 (Adjusted R Squared = .325)						

Table 2.1.3 showed that (F=14.471, p < 0.05; p = 0.00) there was a significant difference in the effectiveness of flipped and supplemental classrooms in improving students delayed achievement the study area. The null hypothesis is hereby rejected because the P-value is greater than 0.05. A partial eta squared value of 0.311 showed that the strategies used accounted for 31.1 % variation in the delayed achievement of students in the study area. It could therefore be concluded that the use of flipped and supplemental classrooms have significant difference in its effectiveness to improve students' delayed achievement.

Table 2.1.3.1: Mean Estimate of the Effectiveness of Flipped and Supplemental Classrooms in Improving Economics Students' Delayed Achievement

GROUP				
Dependent Variable: Delayed Achievement				
Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Flipped	8.842[a]	.422	7.998	9.686
Supplemental	12.206[a]	1.062	10.083	14.328
Conventional	11.599[a]	.328	10.944	12.254
a. Covariates appearing in the model are evaluated at the following values: Posttest = 7.7500.				

The mean values of the Flipped, Supplemental and Conventional teaching strategy which are 8.842, 12.206, and 11.599 with a post-test mean of 7.750 also showed that there is significant difference in their level of improving students delayed achievement in favour of the supplemental classroom.

Table 2.1.3.2: Scheffe Post-hoc test for Multiple Comparison Output on the Effectiveness of Flipped and Supplemental Classrooms in Improving Economics Students' Delayed Achievement

Multiple Comparisons						
Dependent Variable: Delayed Achievement Scheffe						
(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Flipped	Supplemental	-3.9167*	1.1525	.005	-6.8038	-1.0295
	Conventional	-2.7167*	.55097	.000	-4.0970	-1.3363
Supplemental	Flipped	3.9167*	1.1525	.005	1.0295	6.8038
	Conventional	1.2000	1.1193	.566	-1.6035	4.0035
Conventional	Flipped	2.7167*	.55097	.000	1.3363	4.0970
	Supplemental	-1.2000	1.1193	.566	-4.0035	1.6035
Based on observed means. The error term is Mean Square (Error) = 4.554.						
*. The mean difference is significant at the .05 level.						

This output shows the Scheffe post hoc test combining test combining the Least Significant Difference (LSD) and Student-Newman-Keus (S-N-K) post hoc test. The result shows the group by group comparisons and are interpreted the same as the LSD tables. Comparing the teaching strategies which is in (I) group to each of the remaining teaching strategies in (J) group from the table above, it can be seen that there is a statistically significant difference in the Flipped and Supplemental classrooms effectiveness in improving students delayed achievement because the significant level is 0.005 which is less than the 0.05 level. Comparing the Flipped classroom and Conventional method, the result indicates that there is a statistically significant difference in their effectiveness to improve the delayed achievement of economics students with a significant level of 0.000 which is less than 0.05. Comparing the Supplemental classroom and Conventional method, the result above however indicates that there is no statistically significant difference in their effectiveness to improve the delayed achievement of Economics students following their significant level which is 0.566 which is greater than the 0.05 level that is required for statistical significance.

Table 2.1.3.3: Sheffe Homogeneous Subset of the Effectiveness of Flipped and Supplemental Classrooms in Improving Economics Students' Delayed Achievement

Delayed Achievement			
Scheffe			
Group	N	Subset	
		1	2
Flipped	24	8.8333	
Conventional	40		11.550
Supplemental	4		12.750
Sig.		1.000	.477

Means for groups in homogeneous subsets are displayed.

Based on observed means

The error term is Mean Squre (Error) = 4.554

a. Uses Harmonic Mean Sample Size = 9.474
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type 1 error levels are not guaranteed
c. Alpha = .05

The output here presents the tests from the lowest to the highest mean. The flipped classroom had the lowest mean, followed by the conventional method and then lastly is the supplemental classroom, which are 8.83, 11.55, and 12.75 respectively. The result therefore shows that the Supplemental classroom and the Conventional method are not significantly different. However, the Flipped classroom is significantly different from the Supplemental classroom and the Conventional method

Discussion

Research Hypothesis One revealed that there is no significant difference in the effectiveness of flipped and supplemental classrooms in enhancing the performance of students in the study area. This means that the relative effectiveness of either of these strategies used in the teaching of Economics in senior secondary schools in enhancing students' academic performance is not different from each other. However, it is seen that the mean score of 8.079, 9.513 and 7.378 for each group is low relative to the total score of 25. This finding is not in congruence with what [2] Noted that the students in the flipped classroom performed better than students in the control group. The result also is contrary to what [5] Noted that the supplemental classroom is an effective programme that increases academic performance as a result of the total points earned by students in the experimental and control groups. Performance of students in Economics is very vital as it would serve as a way of ascertaining that the objective of the Economics Curriculum which is to equip the students with basic knowledge and skills to appreciate the nature of economic problems in any society and adequately prepare them for the challenges in the Economy is being achieved. This and many more is the reason why there is a search for better strategies that can be used by Economics teachers in senior secondary schools to teach Economics. However, from the findings of this study on the effectiveness of the flipped and supplemental classrooms in enhancing students' performance in Economics, it was discovered that there is no relative difference in the effectiveness of the strategies. The reason for the difference in this study in relation to the findings of [2] and [6] could perhaps be due to the students inability to link what they have watched to the questions been asked. It could also be due to the fact that the students have not been exposed to such type of teaching and thus making it difficult for them to relax and adjust to this new method of teaching. Furthermore, it could be that the students were carried away by the pictures or motions in the video that hindered them

from putting their mind to the content of the lesson. This point buttresses [9] findings that Students in the flipped classroom were less happy with how the structure of the classroom situated them to the learning tasks in the course they however with time became progressively open to helpful learning and inventive teaching techniques.

Research Hypothesis Two also revealed that there was a significant difference in the use of these strategies in improving students' delayed achievement. Students in the supplemental classroom and Conventional classroom exhibited a more improvement in their ability to recall lessons than students in the Flipped classroom. This is not to say that the students in each of the groups did not demonstrate an improvement in their ability to be able to recall what has been learnt in the classroom considering the fact that the posttest means score was 7.750, as there was also a slight improvement in the delayed achievement of students in the flipped classroom. The findings from this study negates the assertion made by [7] who discovered that there was a significant difference in the Retention Performance of students which is in favour of the flipped classroom against the conventional classroom. This may be due to absent mindedness of the students while they were watching the video. However, the finding supports [4] having discovered that expanding students' accomplishment in classes and exposure to online material contributes essentially to improvement in the delayed achievement of students. The reason for this could be that the students were able to relate with the question, making reference to their contact with similar questions from the posttest and also picturing the images and recalling discussions and interactions made in the classroom.

Conclusion

The study concluded that the Flipped and Supplemental classrooms are effective to enhance economics students learning outcomes. In other words, either of the strategies could be used by economics teachers. However, either of these strategies should be carefully selected by the teachers as it best suits the topic of interest and consideration of the classroom environment. The strategies will also help the students to relate more to concepts and ideas than just abstract thinking. This will help them to be able to develop concept definition on their own and being expressive when questions arise from what they have learnt. This strategy would be more beneficial as teaching and learning in recent times tends towards minimal face-to-face interaction.

Furthermore, the study concluded that students' in the supplemental classroom had an improved delayed achievement. This shows that for a better delayed achievement, the Supplemental classroom could be more effective and should be used by teachers. Students' interaction is being deepened when major ideas and objectives are being demonstrated after being taught in the classroom. They are able to have a pictorial view of what they have learnt in the classroom and can relate easily with them.

Data Availability

The data can be found by contacting the researchers via Olasupoesther123@gmail.com

Funding Statement

No funding was received from any organization for this research.

Acknowledgments

A sincere appreciation to the school, management and teachers for the cooperation and assistance received for the study.

Statement of Competing Interests

The authors have no competing interests'.

References

[1] Adunola, O. (2011),"The Impact of Teachers' Teaching Methods on the Academic Performance of Primary School Pupils in Ijebu-Ode Local Government Area of Ogun State," Ego Booster Books, Ogun State, Nigeria.

[2] AlJaser, A. M. (2017). Effectiveness of Using Flipped Classroom Strategy in Academic Achievement and Self-Efficacy among Education Students of Princess Nourah Bint Abdulrahman University. English Language Teaching; Vol. 10, No. 4; (pp. 67-77). Published by Canadian Center of Science and Education.

[3] Department of Planning, Ministry of Education, Osogbo, Osun State. (2019)

[4] Hennings, A. L. (2016). The Use of Online Supplemental Materials in College Courses to Improve Retention. Walden University ScholarWorks, 1-107.

[5] Jones, J. P. (March/April 2013). The Impact Of The Supplemental Instruction Leader On Student Performance in Introductory Accounting. American Journal Of Business Education , 247-254.

[6] Kolar, H., Carberry, A., & Amresh, A. (2013) "Assessing Student Computing Self-efficacy: A Pilot Study." To be Presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA, April 27-May 1

[7] Makinde, S. O., & Yusuf, M. O. (2017). The Flipped Classroom: Its Effects on Students' Performance and Retention in Secondary School Mathematics Classroom. International Journal for Innovative Technology Integration in Education, 117-126.

[8] Oranu, P. C., & Onwioduokit, F. A. (2012). Relative Effectiveness of Classroom Interaction Techniques on Students' Participation in Rivers State, Nigeria. Journal of Educational and Social Research Vol. 2 (10) , 81-88.

[9] Strayer, J. (2012). How Learning in an Inverted Classroom Influences Cooperation, Innovation and Task Orientation. Learning Environments Research, 15, 171–193

[10] Vygotsky, L. S. (1978). Mind in society. Cambridge, MA: Harvard University.