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DIFFERENTIAL EFFECTS OF FLIPPED CLASSROOM AND GENDER ON NIGERIAN FEDERAL UNIVERSITIES CEP STUDENTS' ACADEMIC ACHIEVEMENTIN BASIC METHODOLOGY

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ABSTRACT

The objective of teaching and learning of Basic methodology course in the university is to make students have an in-depth knowledge about what goes on in a typical classroom setting. The achievement of students especially the Continuing Education Programme (CEP) students in the course has been a source of worry to the researchers. In search of answers to this growing problems, the present study investigated the differential effects of flipped classroom and gender on academic achievement of CEP students in Basic methodology in Nigerian federal universities. The design of this study was guided by two research questions while three hypotheses were tested at 0.05 level of significance. The design of the study was quasi experimental design involving 2x2 factorial design while two-stage sampling procedure of purposive and simple random sampling techniques were used to select two departments out of fifteen departments in the Faculties of Education of the two selected universities from South-East and South-South. The sample was 74 third year

CEP students drawn from two intact classes. The instrument, Basic methodology Achievement Test (BMAT) was used for data collection. Data collected was analyzed using mean while Analysis of Covariance (ANCOVA) was used to test the hypotheses. The result revealed that CEP students in experimental group who were taught Basic methodology using flipped classroom had a higher mean scores than those in control group who were taught using conventional lecture method. The result further revealed that both male and female students in the experimental group improved in their achievement in Basic methodology, however, male students achieved slightly better than the female students after the treatment. This shows that gender is not a significant factor in students' achievement in using flipped classroom. Based on this, flipped classroom stands as an effective alternative teaching method to enhance students' academic achievement in Basic methodology. Thus, recommendation was made for its adoption by the university administrators.

Keywords: Academic achievement, Basic methodology, Flipped classroom, Gender, Conventional lecture method.

Introduction

The formation of young minds and hearts for the development of the society and the world at large is done by teachers. The quality and quantity of teachers in any nation directly affect the growth and development of that society. In Nigeria, Education as a course of study in the university is where students are trained to become professional teachers. To achieve this, all education students in the university are exposed to core education courses that are capable of providing them with the essential skills, methods, and materials that will help them on graduation to effectively implement curriculum. Basic methodology is one of the core education coursesoffered by all education students in different undergraduate programmes of Regular, Sandwich and Continuing Education Programmes in Nigerian universities.The Department of Educational Foundations' Handbook (2015) emphasized that the courseexposes students to rudimentary

issues in curriculum implementation.It is a fundamental course thatgivesstudents a solid introductory background to the courses that will enable them to demonstrate some degrees of proficiency during classroom exposure. The objective of teaching the course in the university is to give students an in-depth knowledge about what goes on in a typical classroom setting (National Open University of Nigeria Handbook (NOUN), 2014). In spite of the immense benefits of Basic methodology, the researchers observed that the academic achievement of Continuing Education Programme (CEP) students in the course for two consecutive years (2017 and 2018 sessions)is not encouraging.

The Continuing Education Programme (CEP) students are undergraduate students whose programme is designed for government workers, business men and women, nursing mothers, artisans and their likes who instead of the normal class period attend lectures on weekends. Notwithstanding the nature of their lecture schedule, some of them still do not regularly and punctually attend lectures as a result of their engagements. Moreover, the usual conventional lecture method according to Ikwuka (2019) and Mang (2013) which is not student-centered and non-participatory is not suitable to address the situation on ground. Studies byEfiuvwere and Fomsi(2019), Achuonye(2015) and Mang (2013) further posited that the predominant teaching method in use in Nigerian schools is still the Conventional Lecture Method (CLM) which is more of teacher-centred and classroom-based and does not take care of distance and location. Therefore, to address the issue of low academic achievement caused by the present situation, there is need for lecturers to adopt an innovative technique that is more of student-centered and technology-based that will actively involve the CEP students in the instructional process irrespective of their being regular or punctual and/or absent to lectures without minding the distance and location. To achieve this, flipped classroom technique which is student-centered and technology-based that will cater for individual needs, abilities and learning styles could be employed for effective teaching and

learning to enhance academic achievement of university CEP students in Nigeria.

Flipped classroom is an instructional technique that reverses the traditional content, often online, outside of the classroom. It moves activities including those that may have traditionally been considered homework, into the classroom. Here, the students are introduced to the learning materials before class, with the classroom time then being used to deepen understanding through discussion with peers and problem-solving activities facilitated. It uses technological tools and devices such as internet, video, computer, mobile phone, IPad, tablet and YouTube to engage students in the learning process. According to Bergmann and Sams (2012), flipped classroom involves the process of using internet technology to leverage the learning in a classroom so that a teacher can spend more time interacting with students instead of lecturing. In support of this, Clark (2013) stated that flipped classroom is the use of technology to provide lectures outside the classroom, while assignments with concepts are provided inside the classroom through different learning activities. DeLozier and Rhodes (2017) also posited that flipped classroom is a process through which teachers design lectures for students via Internet outside the classroom and later use class time for variety of learning activities. On the other hand, Talan and Gulsecen (2019) opined that flipped classroom is an instructional process where students learn the lesson content/learning materials at home or wherever that is convenient for them at their own time and pace through technology using computer or mobile phone before coming to class.

In the light of the above, flipped classroom can be viewed as an instructional process whereby technology and face-to-face learning environments are used to engage students in the learning process. Technology-based learning environment is the online platform where students can be anywhere at any time of their choice to assess learning materials through teacher's pre-recorded video using any technological tools and devices of their choice while

face-to-face learning environment is the conventional classroom setting where students after studying the uploaded learning materials via the internet engage in various learning activities such as discussion, review and interaction with their classmates and teacher for internalization and assimilation. Flipped classroom is more than a method rather a process. It involves a two-way instructional process that focuses on the students and makes them the center of the learning process while the teacher who used to be the initiator of knowledge in the instructional process now serves asa mentor or facilitator who renders assistance to students during learning instead of lecturing. The benefits of flipped classroom cannot be over emphasized. Students learning with flipped classroom do not need to be physically present in the classroom. They can be anywhere either at home, in the library or wherever the instructional materials can be assessed at any time to acquire knowledge and improve their academic achievement. This therefore, seems to be suitable and could enhance Nigerian university CEP students' academic achievement in Basic methodology course.

Academic achievement is the outcome of performance of students in a course of study which is shown by the scores obtained by the students. It is the standard for measuring students' learning and knowledge in a given course of study or task. In a school, students' academic achievement in a course may be assessed or measured in form of quizzes, tests and examinations. These quizzes, tests and examinations may be teacher-made or standardized. Therefore, the only way of ascertaining students' academic achievement is through their performance in examination or test at the end of each teaching and learning period. In this regard, university CEP students' academic achievement could be ascertained through their performance in Basic methodology achievement test after their exposure to flipped classroom. Several researchers have conducted a number of researches to ascertain the effects of flipped classroom on students' achievement in a particular course of study both within and outside Nigeria.

For instance, Love, Hodge, Grandgenette and Swift (2013) investigated the achievement of students taught by two different methods (flipped classroom and ordinary classroom) in Finland and found out that performance of students in the flipped classroom was higher than those in the ordinary classroom. Albalawi (2018) discovered that students taught using flipped classroom instruction performed higher than those taught with traditional instruction. Similarly, the study of Ramaglia (2015) on the effect of flipped classroom in a High school Math 2 on students' performance and critical thinking in Kansas State University found no significance difference between the achievement of those in flipped classroom group and those in ordinary classroom group. Another study by Abdel and Diab (2016) in their investigation on the effect of flipped classroom instruction on students' achievement in the new SAT 2016 mathematics skills (heart of Algebra, problem-solving and data analysis and passport to advanced Math) reported that flipped classroom method enhances students' achievement more than traditional method. Talan and Glusecen (2019) on their investigation on the effect of flipped classroom on students' achievement, academic engagement and satisfaction levels using three different methods, flipped classroom, blended learning and traditional classroom instructions found out that flipped classroom method was more effective in the teaching and learning process because out of the three methods of teaching employed, students in the flipped classroom section performed better than those in the other two groups. More so, a statistically significant difference in their achievement was also observed. Overmyer (2014) investigated the effects of flipped classroom model for college Algebra on students' achievement in Colorado State University Fort Collins, Colorado and found out that students taught with flipped classroom performed slightly higher than their counterparts taught with traditional method. However, there was no statistically significant difference in their achievement. On the contrary, the study of Saunders (2014), found out that flipped classroom is not a significant factor in enhancing

students' achievement. However, the inconclusive nature on the effect of flipped classroom on academic achievements prompted the researchers to carry out this study using university CEP students in Nigeria. On the other hand, the researchers further sort to find out the effect of gender on university CEP students' academic achievement using flipped classroom.

Gender is a common term that refers to male and female. It is one of the factors that has significant effects on students' academic achievements. According to Singh (2010), gender is a socio-cultural construct that connotes the differentiated roles and responsibilities of men and women in a particular society. This means that gender determines the role which one plays in the society even in educational context. Generally, it is assumed that some courses and knowledge of gadgets use are regarded as either male's or as female's. Therefore, gender should be examined in academic achievement because of the notion of differences between boys and girls. In this study, gender should be regarded as a factor because it might be that male and female may have differences in academic achievement when flipped classroom method is used for instructional process.

For instance, Ellan and Hamaidi (2018) in their study on the effect of flipped classroom on the academic achievement of fourth grade students in science in Jordan determined the level of students' achievement based on gender and found out that female students out performed male students when exposed to flipped classroom but no statistically significant difference was found in their performance. Odewumi and Yusuf (2018) in a similar study found out that male students performed better than female students on their exposure to flipped classroom, yet no significant difference was also found in their achievement. Memler (2017) in her study on the efficacy of flipped classroom on students' academic achievement and gender gap in High school Physics observed that students' achievement did not differ by gender because there was no significant difference in the achievement of males and females when exposed to flipped classroom. Likewise, Gambari, Bello, Agboola and Adeoye (2016) in their

study found out that both male and female exposed to flipped classroom method performed equally better. On the contrary, Chiquito, Castedo and Santos (2019) in their study found out that female students performed higher than their male counterparts on their exposure to flipped classroom and there was a significant difference in their achievement. They concluded therefore that flipped classroom is gender discriminatory. The inconclusiveness of the effect of gender on academic achievement of students also called for investigation. Based on this backdrop, the researchers sort to determine the differential effects of flipped classroom and gender on academic achievement of university CEP students in Basic methodology in Nigeria.

Research Questions

The following research questions guided the study;

1. What are the mean achievement scores of CEP students taught Basic Methodology using flipped classroom and those taught using conventional lecture method?
2. What are the mean achievement scores of male and female CEP students taught Basic Methodology using flipped classroom?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

1. There is no significant difference in the mean achievement scores of CEP students taught Basic Methodology using flipped classroom and those taught using conventional lecture method.

2. There is no significant difference in the mean achievement scores of male and female CEP students taught Basic Methodology using flipped classroom.

Method

A pretest, posttest quasi-experimental design involving 2x2 factorial design was adopted in this study using intact classes. The intact classes for the study were randomly assigned to experimental and control groups. The experimental group was taught using Flipped Classroom (FC)

while the control group was taught using Conventional Lecture Method (CLM). At the beginning of the experiment, pretest was administered to both groups; thereafter at the end of the experiment, posttest was then administered. The study was carried out in two federal universities, one from the South-East and the other from South-South. The population of the study consisted of 622 CEP students from the Faculties of Education in the two universities. The choice of these universities is that they are among the few public universities in Nigeria that have Education as a course of study in their Continuing Education Programme (CEP).

The sample size for the study was 74 third year CEP students. Two stage sampling procedures of purposive and simple random sampling techniques were used in the study. Purposive technique was used to select two departments out of the fifteen departments in the Faculties of Education of both universities. Simple random sampling technique was used to assign those departments into experimental group comprised of 32 students (15 males and 17 female) that was taught Basic methodology using flipped classroom and control group of 42 students (10 males and 32 females) that was taught the same course using conventional lecture method. Data were collected using Basic Methodology Achievement Test (BMAT). The researchers also prepared lesson plan for both experimental and control groups and marking guide for BMAT. The instrument was validated by three experts from the Faculty of Education, Nnamdi Azikiwe University, Awka, Anambra State. The reliability of the instrument was ascertained using Kudder Richardson 20 (KR-20) reliability measure which yielded the coefficient of 0.78. Moreover, certain variables were controlled to enable the researchers investigate the differential effects of flipped classroom such as: class interaction, experimental mortality, resentful demoralization of the control group, effect of pre-test and posttest, Hawthorne effect and teacher variable. Data were analyzed using mean while Analysis of Covariance (ANCOVA) was used to test the hypotheses.

Presentation of Results

Research Question 1

What are the mean achievement scores of CEP students taught Basic methodology using Flipped classroom and those taught using Conventional lecture method?

Table 1: Mean achievement scores of CEP students taught Basic methodology using flipped classroom and those taught using conventional lecture method

Groups	N	Pretest		Posttest		Mean Gain
		Mean	SD	Mean	SD	
FCM	32	15.71	3.35	35.87	5.90	20.16
CLM	42	13.26	2.98	26.16	5.72	12.9

Results in Table 1 showed the mean achievement scores of CEP students taught Basic methodology with flipped classroom and those taught with conventional lecture method. The mean scores indicated that the experimental group (FCM) had a higher mean gain than those in control group (CLM). This showed that students in experimental group achieved higher than those in the control group.

Research Question 2: What are the mean achievement scores of male and female CEP students taught Basic methodology using Flipped classroom?

Table 2: Mean Achievement Scores of Male and Female CEP Student taught Basic Methodology using Flipped Classroom

Gender	N	Pretest		Posttest		Mean Gain
		Mean	SD	Mean	SD	
Male	15	16.93	3.41	38.53	5.1	21.6
Female	17	14.64	2.99	33.52	5.65	18.88

Results in Table 2 showed the mean achievement scores of male and female CEP students taught Basic methodology using flipped classroom. The mean scores indicated that male students had slightly higher mean score than female students. Though, there is a slight difference in both male and female CEP students' achievements, flipped classroom proved to be gender-friendly.

Test of Hypotheses

Hypothesis 1: There is no significant difference in the mean achievement scores of CEP students taught Basic methodology using flipped classroom and those taught with conventional lecture method.

Table 3: ANCOVA for Differences on Mean Achievement Scores of Students taught Basic Methodology using Flipped Classroom and Those taught with Conventional Lecture Method

Source	Type III Sum of Squares	Df	Mean Square	F	Sig
Corrected model	2945.812[a]	2	1472.906	87.781	.000
Intercept	466.511	1	466.511	27.803	.000
Pretest	1233.997	1	1233.997	73.542	.000
Method	661.155	1	661.155	39.403	.000
Error	1191.336	71	16.779		
Total	72367.000	74			
Corrected total	4137.149	73			

R Squared =.712 (Adjusted R Squared =.704)

Results in Table 3 showed that there is a significant main effect of treatment in the posttest achievement of students in the experimental and control groups, $F(1,71) = 39.403$, $P=0.000< 0.05$. This means that there was significant difference in the mean achievement scores of students who were taught Basic methodology using flipped

classroom and conventional lecture method in experimental and control groups. Therefore, the hypothesis that there is no significant mean difference in the achievement scores of students taught with FCM and those taught with CLM is therefore rejected.

Hypothesis 2: There is no significant difference in the mean achievement scores of male and female CEP students taught Basic methodology using flipped classroom.

Table 4: ANCOVA for Difference in Academic Achievement of Male and Female CEP Students taught Basic Methodology using Flipped Classroom

Source	Type III Sum of Squares	Df	Mean Square	F	Sig
Corrected model	564.671[a]	2	282.336	15.842	.000
Intercept	419.012	1	419.012	23.511	.000
Pretest	365.140	1	365.140	20.489	.000
Gender	44.196	1	44.196	2.480	.126
Error	516.829	29	17.822		
Total	42266.000	32			
Corrected total	1081.500	31			

R Squared =.522 (Adjusted R Squared =.489)

Results in Table 4 showed that there is no significant main effect of treatment in the posttest mean scores of male and female students in the experimental group, $F(1,29) = 2.480$, p-0.126>0.05. This is an indication that there was no significant difference in the mean achievement scores of male and female CEP students in Basic methodology. Hence, the hypothesis that there is no significant difference in the mean achievement scores of male and female students taught Basic methodology using FCM is not rejected.

Discussion of Findings

The finding of the study revealed that the CEP students in experimental group who were taught Basic methodology using flipped classroom has higher mean scores than those in control group who were taught the same course using conventional lecture method. Similarly, the result showed that there is a statistically significant difference between the achievement of students taught with flipped classroom and those taught with conventional lecture method. This recorded improvement showed that students in the experimental group achieved better than those in the control group. This, therefore is an indication that flipped classroom is effective and as well has the possibility of improving students' achievement in Basic methodology. This finding agrees with the results of Love, Hodge, Grandgenette and Swift (2013), Overmyer (2014), Ramagalia (2015), Diab and Abdel(2016), Albalawi (2018) and Talan and Glusecen (2019) who found out that students exposed to learning using flipped classroom instruction achieved significant results than their counterparts taught using ordinary classroom instruction. On the contrary, Saunders(2014) in a similar study found out that flipped classroom is not a significant factor in enhancing students' academic achievement.

The findings of the present study further revealed that male and female students taught with flipped classroom improved in their achievement in Basic methodology, however, male students achieved slightly better than the female students after the treatment. Despite the slight difference in the mean achievement scores of male and female students in the present study, the finding showed that there is no significant difference on the achievement scores of male and female students in Basic methodology on their exposure to flipped classroom. Therefore, gender is not a significant factor as regards to male and female achievement in the use of flipped classroom. This study is in line with the findings of Odewumi and Yusuf (2018) that male students performed better than their female counterpart on their exposure to flipped classroom but no significant difference was observed in their achievement. Gambari et al (2016) and Memler (2017)

also supported that gender is not a significant factor in male and female achievement when exposed to flipped classroom, therefore, flipped classroom is gender friendly. However, Ellan and Hamaidi (2018) did the same study but found out that female outperformed their male counterpart. These therefore, showed that effect of gender on academic achievement of students is inconclusive.

Conclusion

Based on the findings of this study, it was concluded that the use of flipped classroom had a significant effect on the university CEP students' achievement in Basic methodology. Also, that gender was not a significant factor on the students' achievement in Basic methodology using flipped classroom in Nigeria.

Recommendations

Based on the findings and conclusions of this study, it was recommended among others that:

1. Basic methodology lecturers should be encouraged to adopt the use of flipped classroom in the teaching and learning of Basic methodology since it was found to be an efficacious means of instructional delivery.

2. University administrators and Education Faculties should organize seminars, workshops and conferences to train Basic methodology lecturers and other course lecturers in the university to acquire the basic knowledge and skills in the use of flipped classroom for effective teaching and learning process.

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