

Flipped Classroom Strategy and Students' Achievement in Architecture in University of Uyo, Nigeria

Ime Ikike Nnsewo

Department of Architecture, University of Uyo

Abstract

This study determined the effect of flipped classroom strategy on undergraduate students' achievement in Architecture. The quasi-experimental design, using pre-test and post-test was adopted. The sample consisted of two hundred students of Architecture from university of Uyo using random sampling. Two research questions and two hypotheses guided the study. The instrument for data collection was a 20 item multiple choice questions with options A-D. The data were analysed using mean and standard deviation for the research questions and t-test statistical tool to test the null hypotheses at 0.05 level of significance. The findings indicated that flipped classroom strategy was more effective than the conventional strategy in promoting achievement in Architecture among students. Also, male students performed better than females when taught with flipped strategy. Based on the findings, Architecture lecturers should adopt flipped classroom strategy for improved results in Architecture.

Keywords: Effect, Flipped classroom, Students' achievement, Architecture, Nigeria.

Introduction

The modern world has become technologically driven, globalized, competitive and competency based. Thus for any nations educational system to remain relevant, there must be a redefinition of fundamental educational practices. As Nigerians embrace technology, the development of a technological skills workforce becomes a major concern and the continuous development of human capital becomes a vital source of economic values (Olaajo and Oyediran, 2018). As skills and knowledge are considered important elements of success, it follows that teaching and learning are essential element of success. Education is considered to be the most powerful tool for all round development of human beings, it is considered to be powerful instrument for developing intellectual abilities shaping cultural attitudes and acquiring knowledge and skills. A teaching strategies comprises the principles and methods used by teachers to enable student learning. These strategies are determined partly on subject matter to be taught and partly by the nature of learning. It is concerned with the method teachers use to meet with objectives including the instructional organization and technique, subject matter, and the use of teaching tools and materials. Onah and Onwuburairi (2018) strategy is very vital in any teaching-learning situation and the method adopted by the teacher may promote or hinder learning. Teaching strategy is a product of the combination of method, tactics and techniques. There is need to understand that

different topics in Architecture need different approaches depending on the complexity and the structure. Teachers should be concerned with the use of different strategies and procedures.

Nigerian classroom whether primary, secondary or tertiary institution level tends to resemble a one person audience (Omokaadege, 2015). Classroom are driven usually by "teacher talk" and heavily depend on textbooks for the structure of the course. In their own opinion shymansky and Kyle (2008) instructional strategies includes the media, materials, setting and the behaviour the teacher uses to create an environment to produce an effect. Therefore, the achievement of the instructional goals and the choice of suitable strategies cannot be separated. The features of teaching strategies emphasized by Erden (2012) includes; teaching strategies should improve a student's predisposition to learn by increasing the desire for studying and understanding new situation; teaching strategies should be sequenced in the most effective manner so that students can comprehend new knowledge by applying their prior experiences; it should be structured to help learners rapidly capture the information distributed through the instruction, and develop learner's abilities in assimilating and using knowledge possessed and family, teaching strategies should be designed to allow students to genuinely engage in their learning (Onwuburairi, 2018). Various teaching strategies have been using to teach Architecture. Some of the strategies include project, inquiry, demonstration, lecture

etc. This study wish to investigate the effect of flipped classroom and conventional methods particularly lecture method on undergraduates students' achievement in Architecture since flipped classroom teaching is learner's centred method which could enhance students' achievement in Architecture. Flipped classroom method is innovative in nature.

Flipped classroom has no universal definition but the term 'flipped classroom' however academics agreed that a flipped classroom generally provides pre-recorded lectures (video or audio) followed by class activities. Students view the videos outside the classroom before or after coming to class where the free time can be devoted to interactive modules such as questions and answer sessions, discussion, exercises or other learning activities since flipped classrooms invert activities inside the classroom with activities outside the classroom they are sometimes also referred to as 'inverted' classroom' flipped classroom is an instructional strategy and a type of blended learning that reverses the conventional learning environment by delivering instructional content outside classroom, it moves activities, including those that may have conventional been considered as home work into the classroom. In a flipped classroom students carry out research the guidance of a mentor (Abeysekera, Lakmal and Davison, 2015).

Flipped classroom addresses how students learn best. Flipped classroom involves teachers who either create or link to content related instructional materials. Students do not learn in the same paces and in the same ways. That is always been a complicating factor in teaching. The question of how to meet many unique students at their own levels is one that keeps lecturers up at night. It gives room for teachers to see it clearly when a student is lowing problem with a concepts and work with them directly to get through it. The increased interaction with students so they can tailor their instruction to the needs of each one. Student's can also work on their own pace. Flipped classroom is a way of sighting from passive learning to active learning.

By using the flipped classroom, it is expected to effectively solve the problems related to the traditional Architectural design teaching, enhance the students' participation in the teaching

process, create learning atmosphere for students, enhance the initiative of self-learning, and promote the improvement in the quality of Architectural design teaching. Architectural education has faced the challenge of instilling innovation and creativity in students and developing their professional mindsets. This teaching process transmits knowledge unilaterally. To transform education within the framework of sustainability, the concept of students as lifelong lerners must be embraced. Sustainability in Architectural education involves two main issue: teaching subject and teaching methods. Clearly, the concept of sustainability is expressed, even if rudimentarily, in many Architectural curricula in majority of higher education institutions (Jones and Powers, 2020).

In flipped learning, students are more interactive and engaged in learning through application and practices. Not only do students construct their own knowledge as a result of their interactions with their environment but they also participate in the process of constructing knowledge as a result of their interactions with their environment but they also participate in the process of constructing knowledge within their learning community.

Conventional method is the method in which the teacher is typically the central focus of a lesson and the primary disseminator of information during the class period. The teacher responds to questions while students refer directly to the teacher for guidance and feed back. In a classroom with a radically conventional style of instruction. Individual lessons may be didactic and content oriented students engagement in the conventional model may be limited to activities in which students work independently or in small groups on an application task designed by the teacher. Class discussions are typically centred on the teacher, who controls the flow of the conversation. Typically, this pattern of teaching also involves giving students the task of reading from a textbook or practicing a concept by working on a problem set, for example, outside school.

Lecturer method is an oral method of teaching (Oludipe, 2010). It is essentially a one way process of transmission of knowledge with the lecture and teacher being active while the students are passive. It is talk and chalk approach in

teaching and teachers are seen as the custodian of knowledge and thus dominate the lesson. Lecture method therefore, the whole lot of scientific exercise ends on the mere presentation of the lesson through vocal sounds and sketch work done on the chalkboard (Onah and Onwubuairi, 2018).

Gender is associated with being a male or female, including the construction of identities, expectations, behaviours and power relationship that derive from social interactions (Ambe-Uva; Iwuchukwu, and Jibrin, 2008). Educators have expanded tremendous efforts in the study of personal factors on students' academic achievement. Sex related problems have contributed greatly to the creation of gender crisis by providing equal opportunities for males and females. In recent years a clear gender gap has been found by many researchers in their previous studies.

Statement of the Problem

Teaching strategies has the potential to enhance knowledge, attitude and skills through its application. Verbalization alone as a medium of instruction cannot help to explain concept for effective teaching and learning for undergraduates in higher institutions. Instruction can be effective only when students are participatory in all the activities of learning. However, it seems lecturers and students are not use to student centred pedagogy, and this has made learning. Boring and more teacher centred. Most of heir students themselves do not possess flipped classroom skills and so could not integrate its use in their instruction. It is with this motion that the researcher seek to research on effect of flipped classroom strategy on undergraduate students' achievement in Architectural in university of Uyo.

Purpose of the Study

The main purpose of the study is to investigate the efficacy of flipped classroom strategy on undergraduate students' achievement in Architectural, specifically the study determined;

1. The efficacy of flipped classroom strategy on undergraduate students' achievement in Architectural
2. The influence of gender on students' achievement in Architectural using flipped classroom and lecture teaching strategy.

Research Question

The following research questions guided this study:

- i. Which of flipped classroom and lecture strategy recorded higher mean gain of academic achievement in Architecture?
- ii. What is the influence of gender on students' academics in Architecture?

Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance in the course of the study

Ho₁: There is no significant difference in the achievement of male and female students taught Architectural concepts using flipped classroom and those taught the same concepts using lecture strategy.

Ho₂: There is no significant difference in the achievement of male and female students taught Architectural concepts using flipped classroom and lecture teaching strategy.

Methodology

The quasi-experimental design, using pre-test and post-test was adopted for this study. The population of the study comprised of all students offering Architectural in University of Uyo which are almost 600 in number. The sample for the study comprised of two hundred students offering Architectural. Simple random sampling technique was adopted and they were divided into two groups experimental and control group. The instrument used for data collection was Architectural achievement test (AAT). It was a 20 items multiple choice objective questions with option A to D developed by the researcher. The same instrument was used for the pre-test and post-test. The instrument was validated and the reliability established. The internal consistency for AAT was determined using Kuder Richardson 21-formula. An internal consistency reliability of 0.87 was obtained. The data obtained from the pre-test and post-test were analysed using mean and standard deviation to answer the research questions while z-test statistical tool was used to test the null hypotheses at P<0.05 level of significance.

Results

Research Question 1: Which of flipped classroom and lecture teaching strategy recorded higher mean gain of academic achievement in Architectural?

Table 1: Relative students' mean Architectural scores and Standard Deviation of Students with flipped classroom and lecture teaching strategies.

Teaching Strategies	Pre- test			Post – Test		Main gain difference
	N	X	SD	X	SD	
Experimental Group						
Flipped classroom	100	64.72	7.86	104.60	7.88	39.88
Control Group						
Lecture Strategy	100	62.28	8.00	90.44	8.46	28.16

N= Number of students, X = Mean SD = Standard Deviation

Table 1 shows that the mean score for the experimental group (64.72) as against (62.28) for the control group which showed that the range scores between the experimental and control groups for the pre-test AAT were very narrow. This suggests that the groups were equivalent before treatment. The post-test mean scores for the experimental students improved appreciably from 64.72 to 104.60. for the control group, it was an improvement from mean score of 62.28 to 94.44 and a marginal increase in standard deviation. When compared with the experimental group, it

was low. The table also shows that the mean gain difference was 39.88 for flipped classroom strategy and 28.16 for lecture strategy. This implies that the subjects taught with flipped classroom strategy recorded higher mean score than those taught with lecture method.

Research Question 2: What is the difference of gender on students' academic achievement in Architecture using flipped classroom and lecture-teaching strategy?

Table 2: Gender Difference in Achievement in Architecture

Teaching Strategies	Pre- test			Post – Test			Main gain difference
	Gender	N	X	SD	X	SD	
Flipped Classroom	Male	54	66.32	7.34	104.20	7.72	41.68
	Female	46	62.60	7.94	101.64	7.00	39.04
Lecture Control Group	Male	54	62.80	6.60	94.22	9.24	31.42
	Female	46	61.92	8.82	86.00	6.76	24.08

Research question 2 sought the influence of students' gender on the achievement of students taught Architecture concepts using flipped classroom and lecture strategies. The mean gain differences boy male are 41.68 for the flipped classroom strategy and 31.42 for the lecture strategy, for female the mean scores are 39.04 for the flipped classroom strategy and 24.08 for the lecture strategy respectively.

Hypotheses Testing

H₀_i: There is no significant difference in achievement of students taught Architecture concepts using flipped classroom teaching strategy and those taught the same concepts using lecturer strategy.

Table 3: Z-test statistics for comparison of the flipped classroom and lecture teaching strategies

Z-cal	z-crit	Decision
17.22	3.92	Rejected

This result showed that the difference in post-test scores was statistically significant for the two groups, z-cal (17.22) is greater than z-crit (3.92), $P < 0.05$. With this result, the hypothesis which states that there is no significant difference in achievement of students taught Architecture using flipped classroom teaching strategy and those

taught the same concept using lecture strategy was rejected. There is statistically significance difference in the achievement of students taught Architecture concepts using flipped classroom teaching strategy and those taught the same concept using lecture teaching strategy.

H0₂: There is no significant difference in the achievement of male and female students taught Architecture concepts using flipped classroom and lecture teaching strategies.

Table 4: z – test statistics comparison of the post-test mean scores of male and female students in flipped classroom and lecture teaching strategies.

Teaching Strategy	z-cal	z-crit	Decision
Flipped Classroom	6.30	2.92	Rejected
Lecture	6.90	2.92	Rejected

z-cal (6.30) is greater than z-crit (2.92). Therefore, there is no significant difference in academic achievement of male and female students expose to lecture strategy and those taught using flipped classroom strategy.

Discussions

The result displayed on Table 1, discovered different teaching strategies used in teaching Architecture in University of Uyo, the mean scores of students taught using flipped classroom strategy was compared with the mean scores of students using lecture strategy. Therefore, the flipped classroom strategy is more effective than lecture strategy. This is in agreement with Treety (2019) who reported a great significance of flipped classroom strategy above the conventional lecture method. Creswel (2020) claim that flipped classroom played a great role as part of active education especially in helping students and young people learn about assessing and managing risk, in offering them new techniques and exciting challenges, and in helping them gain skills in teaching and learning that would be of huge value in their progression to adulthood – Jones and Powers (2020) observed that flipped class strategy performed better in Architecture concepts, as the strategy enhanced students' content – driven scholarship of focusing upon the application of knowledge to solve educational problems and complex tasks them lecture strategy. This can also be explained further

from the opportunity the strategy afforded the students. They were able to pursue the problem and find solutions by clarifying the problem, posing necessary questions, researching the questions and coming out with a product that displayed their thinking. Also, Davis (2019) implemented the flipped classroom pedagogy in an introductory Information Technology course with an emphasis on learning excel and found that the instructional strategy captured students' interests, challenged the students and contributed with the traditional classroom, students' feedback suggests that the flipped classroom strategy was more effective than lecture strategy.

Again, the result revealed that the male students achieved higher than their female counterpart in Architecture which is in agreement with Erden (2012) view on the use of flipped classroom strategy where male students performed better than the female students. The finding is in line with Treety (2019) who found that gender has significant main effect on students' knowledge of environmental education. He further stressed that there was a significant gender difference in environmental knowledge of male and female students in favour of male counterparts. Creswel

(2020) confirmed that there was a significant interaction effect of treatment and gender on the dependent variables of his study. He reported that male subjects would be better in school subjects given the use of the flipped classroom strategy, while the problem-solving strategy would improve female students' achievement tremendously. The male students benefited more in the two strategies than the female students.

Conclusion

In conclusion, based on the findings of the study, the researcher concluded that the strategy employed by lecturers in teaching Architecture affects the academic achievement of students. The finding also indicate that flipped classroom strategy is more effective than lecture strategy in promoting cognitive achievement in Architecture among students. Also, male students performed significantly better than the their female counterparts when taught with flipped classroom strategy. It is no more disputable that flipped classroom strategy is important in the development of quality teaching and learning in our educational system, especially at the tertiary institution. This is evident in the findings made.

Recommendations

Based on the findings, the study recommends the following:

1. Architecture lecturers should adopt flipped classroom strategy for improved performance of students in Architecture.
2. Workshops/seminars be organize at intervals for Architecture lecturers on acquiring more skills in the use of flipped classroom strategy.
3. There should be an internet immersed curriculum which should be provided by the authority through the help of the curriculum specialists.
4. University lecturers should be encouraged to prepare and present their lessons using student centred methods.

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