



Effect of Flipped Teaching Strategy on Students Academic Achievement in Electronics Based on Gender in Nigeria Certificate in Education (Technical) Awarding Institutions in Plateau State

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| Abstract | Original Research Article |
|---|---------------------------|
| <p>This study examines the effectiveness of the flipped teaching strategy in improving students' academic achievement in electronics at the NCE level, with a particular focus on gender differences. The research employed a quasi-experimental design with pretest and post-test non-equivalent control groups. The study was conducted in Plateau State, Nigeria, involving 72 students from Federal College of Education, Pankshin, and Plateau State Polytechnic, Barkin Ladi. The experimental group was taught using the flipped teaching strategy, while the control group received conventional lecture-based instruction. Results indicated that male students had a slightly higher mean achievement score (20.13) than their female counterparts (18.80). However, statistical analysis ($p > 0.05$) showed no significant difference in achievement scores based on gender. These findings suggest that the flipped teaching strategy is gender-neutral and effective for teaching electronics. The study recommends its adoption in technical education and further research on its applicability in other subjects and educational levels.</p> <p>Keywords: Flipped Teaching Strategy, Student Achievement, Gender Differences, Electronics Education, Pedagogical Approach, Academic Performance, Quasi-Experimental Design, Higher Education,</p> | |

BACKGROUND

Flipped teaching strategy refers to a teaching strategy in which students gain first exposure to new material outside of class, usually via reading or watching lecture videos, virtual laboratories, simulations and then use class time to do the harder work of assimilating that knowledge, perhaps through problem solving, discussion and collaboration has become the latest applauded in pedagogical approach to learning in higher education (Fitzpatrick, 2012, Berrett, 2012 and Mazur, 2009). It is seen as an inverted teaching strategy where students get their first hand information about the subject matter outside the classroom thereby encouraging student- centered approach to learning. Flipped teaching strategy is seen as a tacit admission

that students no longer have the attention span to learn in old way (lecture method), which requires that they listen carefully to someone spinning a factual narrative, pay close attention, take detailed notes and take much of this information to memory. The use of flipped instructional model (such as video-recorded lectures) to compliment the traditional (face to face) teacher centered method of learning has given the learner (student) responsibility for his own learning.

Findings on effects of gender on students' academic achievement are inconclusive. For instance, Etim., Etim, Heilman., Mathiyalakan, and Ntukidem, (2016) reported the performance of female students was higher than that of male counterparts in English Language, Mathematics and Biology. Similarly, Alexander and Maeda (2015)

reported that females outperformed their male counterparts in sciences, but no gender difference in mathematics was observed. Also, Hossain and Tarmizi (2012) reported that the academic achievement of male and female were highly improved in mathematics achievement, however, the performance of female students higher than that of male students after the treatment. However, Gambari, Shittu, Daramola, and James, (2016) reported that gender did not influence students' academic achievement in individualized and cooperative learning but the males academic achievement is better than female in competitive instructional strategy. In addition, Salah (2016) found no significant difference in terms of academic achievement between female and male students. Similarly, Yaki and Babagana, (2016) reported that Technology Instructional Package employed for teaching Biology was gender friendly. Also, Onwuebguna (2009) reported the academic achievement of male and female students exposed to computer-assisted instruction and found no significant difference between the groups. Gender is a contemporary issue in education and has attracted the attention of many researchers as quoted above but none of the above researchers has drawn a conclusion line on the issues of gender.

Research Design

The study adopted quasi-experimental design which employed the pretest and post-test non-equivalent control group. Considering the nature of the class and also because the researcher did not intend to disrupt the normal school set-up, only classes of NCE 2 electronics student were involved in the study.

To determine the effectiveness of using flipped teaching strategy as an alternative method of teaching in NCE awarding institution, this was being equated with the conventional lecture method for substitution. Therefore, those taught using flipped teaching strategy served as the experimental group, while those taught using conventional lecture serve as the control group.

Quasi-experimental design has a great of currency in researching teaching (Nwankowo, & Emunemu, 2015). Because they had already been selected for admission and the researcher cannot go

to select people from outside to come and add to them. The idea of selecting them by random sampling is not relative (Dakun, Ogbonna, Lere, and Bulus, 2002). This is because it is natural to use exiting classroom in a school for a study and a lot simpler than to start creating classroom groups through random selection and random assignment.

Area of the Study

Plateau is the twelfth largest state of Nigeria, and is located approximately in the center of the country. It is geographically unique in Nigeria because its boundaries surround the Jos Plateau, having the entire plateau in its central and northern part. The capital is Jos. Plateau State gets its name from the Jos Plateau. It has a population of around 3.5 million people (Blench, R. M., Daniel, P. & Hassan, Umaru 2003). The research was conducted in two Local Government Area of the State. Federal College of Education is located in Pankshin about one hundred and twenty five kilometers North-East of Jos, and Plateau State Polytechnic is located in Barkin Ladi Local Government Area North-East of Jos, it has boundary with Jos and it is about 30 minutes' drive from the capital city of Plateau State, Jos.

Population of the Study

A population is a group of individuals who have the same characteristic (Creswell, 2012). The target population of this study comprised of all NCE Technical education students in Plateau State. One hundred and seventy two (172) from Federal College of Education Pankshin and one hundred and fifty four (154) students from Plateau State Poly technique B/Ladi. The total sum of the population is three hundred and twenty six (326).

Sampling and Sampling Technique

A sample is a subgroup of the target population that the researcher plans to study for generalizing about the target population (Creswell, 2012). The sample size is 72 students (37 students for the experimental and 35 students for the control group), for the purpose of this work; the researcher adopted purposive sampling technique, which is a

non-probability sampling technique. Because the researcher deliberately chose NCE 2 of the two institutions because at these level electronics is taught as a compulsory course and it is a determining factor for them to go for electrical/electronic options in NCE 3 which is the final year.

Research question

What is the mean achievement score of

electronics students taught using flipped teaching strategy based on gender?

The table 1 presents the mean achievement score of electronic students in the experimental group of the study based on gender. The male students had a mean score of 20.13 while the female counterpart had a mean achievement score of 18.80. Therefore, it was observed that the male students achieved slightly higher than the female counterpart in the study.

Table 1: Mean Achievement Score of Electronics Students Based on Gender

| Variables | N | π | S D |
|-----------|----|-------|-------|
| Male | 32 | 20.13 | 3.338 |
| Female | 5 | 18.80 | 3.962 |

N – Number of NCE 2 student
 π - Mean
 SD – standard deviation

Hypothesis (H0₁): there is no significant difference between the mean achievements score of electronics students taught using flipped teaching strategy based on gender.

The table 2 below presents the t-test result on the significant difference in the mean achievement score between male and female students in the

experimental group of the study. The hypothesis was accepted since the p-value of 0.425 > 0.05 significance level. Therefore, it was concluded that there is no significant difference between male and female achievement score when taught using flipped teaching strategy.

Table 2: T-test Result on the Mean Achievement Score Based on Gender

| Variables | N | π | S D | t | df | Sig (p value) |
|-------------------------|----|-------|-------|------|----|---------------|
| Male experimental group | 32 | 20.13 | 3.338 | .807 | 35 | .425 |
| Female control group | 5 | 18.80 | 3.962 | | | |

N – Number of NCE 2 student
 π - Mean
 SD – Standard Deviation

Hypothesis four shows that the null hypothesis was accepted. Therefore, it was

concluded that there is no significant difference between male and female achievement score when

taught using flipped teaching strategy. This is in accordance to Salah (2016) view in chapter two. He affirmed that there was no significant difference in terms of academic achievement between female and male students. Onwuebguna (2009) also reported the academic achievement of male and female students exposed to computer-assisted instruction and found no significant difference between the groups.

Major Finding of the Study

There is no significant difference between the mean achievements score of electronics students taught using flipped teaching strategy based on gender.

Discussion on the Major Findings

Hypothesis four shows that the null hypothesis was accepted. Therefore, it was concluded that there is no significant difference between male and female achievement score when taught using flipped teaching strategy. This is in accordance to Salah (2016) view in chapter two. He affirmed that there was no significant difference in terms of academic achievement between female and

male students. Onwuebguna (2009) also reported the academic achievement of male and female students exposed to computer-assisted instruction and found no significant difference between the groups.

Conclusion

The result of the findings also shows that the strategy is neutral to gender thereby corroborating its relevance as an instructional strategy in study of electronics.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. Educators should consider using the flipped teaching strategy to improve student learning outcomes in electronics.
2. Educators should take into account the gender differences when implementing the flipped teaching strategy in their classrooms.
3. Further research should be conducted to investigate the effect of the flipped teaching strategy on student learning outcomes in other subjects and at different levels of education.

REFERENCES

- Alexander, V. and Maeda, Y. (2015). Understanding student achievement in mathematics and science: The case of Trinidad and Tobago. *Prospects: Quarterly Review of comparative education*, 45(4): 577 - 591.
- Berrett, A. 2012. Flipping the classroom, center for teaching Vanderbilt, the Chronicle of Higher Education, Retrieved on 18 August 2017 from cft.vanderbilt.edu
- Creswell, J. W. (2012). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (4rd ed.). Upper Saddle River, NJ: Pearson Education.
- Dakun, S.W; Ogbonna, B.B.; Lere, M.M & Bulus, H. (2002). *A Practical Approach to Research Methods and Statistics*. Jos. Ehindero Nigeria Limited.
- Etim, J. S., Etim, A. S., Heilman, G., Mathiyalakan, S. and Ntukidem, E. (2016). Gender influence on students' achievement in English language. *European journal of science Mathematics Education*, 4(2): 186 - 195.
- Fitzpatrick (2012). Flipping the Classroom, Center for Teaching Vanderbilt. ; The Chronicle of Higher Education, Retrieved on 18 August 2017 from cft.vanderbilt.edu
- Gambari, A. I., Shittu, A. T., Daramola, F. O. and James, M. (2016). Effects of video-based cooperative, competitive and individualized instructional strategies on the performance of senior secondary schools' students in geometry. *Malaysian online journal of Educational Sciences*, 4(4): 31 - 47.
- Hossain, M. A. and Tarnizi, R. A. (2012). Gender-related effects of group learning on mathematics achievement among the rural secondary students. *Eurasian Journal of Educational Research*, 47: 1 - 22.
- Mazur, E.(2009). Flipping the Classroom/; Center for

Teaching. Retrieved on 12 September 2018 from

cft.vanderbilt.edu/guides-sub-pages/flipping-the-classroom

Ogunleye, B. O. (2009). Integration of contemporary ICT tools in the teaching of chemistry awareness and attitude of chemistry teachers in South West, Nigeria. *Journal of E-Learning* 8.2

Onwegbuna, J. O. (2009). Comparison of psychomotor achievement of metalwork

students taught using CAI and demonstration method. *Journal of Research in Curriculum and teaching* , 4(1): 331 – 341.

Salah, R. O. (2016). Effectiveness of using computerized educational packages in teaching math curriculum on the learning of student in eighth grade at Ma'an City. *Journal of Education and Practice* , 7(12): 60 - 66.