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THE IMPACT OF FLIPPED LEARNING ON STUDENTS' LEVEL OF ENGAGEMENT IN COMPUTER STUDIES CLASSROOM, IN OYO STATE, NIGERIA

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Abstract

This study investigates the impact of flipped learning on students' level of engagement in computer studies classrooms in Oyo State. The study employed a quasi-experimental pre-test, post-test, and control group design and tested two null hypotheses at a 0.05 level of significance. The sample consisted of 60 junior secondary school III computer studies students selected through a purposive sampling technique. The study utilized the Students' Engagement Questionnaire (SEQ) (R=0.85) and Students' Engagement Observation Scale (SEOS)(R=0.80) as instruments for data collection. The data were analyzed using inferential statistics of ANCOVA and a chart. The study found that student's level of engagement in computer studies was significantly higher in the flipped classroom, but the level of engagement did not differ based on gender. The results of the study suggest that flipped learning can be used to increase the level of engagement of students in computer studies classrooms in Oyo State.

Key words: Flipped learning, Engagement, Gender

1. Introduction

In education, students' engagement refers to the level at which students pay attention, their level of curiosity and optimism, their level of participation, interest, and involvement in activities as regards what they are learning or being taught. Dornyei (2018) believed that student engagement concerns their involvement in school-based and academic tasks or a learner's energetic participation in an instructional task which involves their participation in class, completion of coursework, and participation in activities, interaction with other students, relationships with teachers and the school. It is believed that when students are curious, show interest, and pay attention to what they are being taught, it improves the teaching and learning process. While the process of teaching and learning tends to be ineffective when the students are disengaged. Egbert (2020) declared that successful learning happens if only students are eagerly involved in the learning process, and they are passionate about exploiting the learning opportunities in the classroom.

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According to (Fredrick et al.,2004), student engagement is a multidimensional construct that consists of three main components, namely behavioral engagement, emotional engagement, and cognitive engagement. Other researchers then developed other components such as research from Reeve and Tseng (2011) and Veiga 2016 who added agentic engagement as the fourth component in student engagement. Research from van Rooij et al. (2017) also added intellectual engagement as the fourth component in student engagement. Interactive learning, peer relationships, and social skills are one of the influential factors.

This study used three components of student engagement based on the classification of (Fredricks et al.,2004) which include behavioral, emotional, and cognitive engagement. Behavioral engagement is the degree to which students are actively involved in learning activities. The indicators of behavioral engagement include time and effort spent participating in learning activities and interaction with peers, teachers, and staff. Emotional engagement is students' affective reactions to learning. The indicators of emotional engagement include attitudes, interests, and values toward learning. And finally, cognitive engagement is the degree to which students invest in learning and expend mental effort to comprehend and master. The indicators of cognitive engagement include motivation to learn, persistence to overcome academic challenges and meet exceed requirements.

A number of studies (Wang et al., 2021; Liu and Flick, 2019; Preville, 2018; Martin et al. 2015; Trowler, 2010) have been conducted to reveal that students' level of engagement in the teaching and learning process which includes paying attention, asking questions, answering questions, interacting with other students and participation in classroom discussions, is one of the main determinants for a student's academic achievement whereas attending lessons at a low level of engagement can have negative effects on the learning process (Wang, Bergin and Bergin, 2014). However, teachers and instructors believe that developing and maintaining students' engagement in the classroom is becoming a challenging task these days (Hiver et al., 2021). Therefore, it is necessary to use an active and collaborative instructional strategy in lessons that will enhance students' active participation in activities that involve their learning process. One such instructional strategy is flipped learning.

Flipped learning is an instructional strategy that reverses the traditional learning environment by delivering instructional content, often online, outside of the classroom. It is one such learning strategy that creates learning through technology, especially online video media, which helps reduce lecture time and increase the time for in-class activities where learners can learn cooperatively through practice (DeLozier and Rhodes, 2017). Also, students can work together on a task, exchange their opinions, experiences, and views, discuss and negotiate strategies, actions, and results through a flipped classroom.

Bergmann and Sams (2012), the pioneers of flipped learning, indicated that this method does not just mean video lessons, the main point in this method is the significant and interactive activities conducted in lessons. The issues emphasized in the definitions of this model are as follows: student-centered, supporting active learning, increasing class study time, and providing a richer and more flexible learning environment through technological infrastructure. In addition, flipped learning has also been shown to promote not only students' sense of responsibility for their own work and self-regulation in assignment submission but also their responsibility toward group assignments and classroom activities (Yilmaz, 2017; Panich, 2013). In Flipped learning, the teacher's role is of a mentor or facilitator of the learning process. The achievements of individual members within the group are shared among the group members (Zhonggen and Guifang, 2016). These actions can provide students with the opportunity to help, discuss, review, teach, and influence each other and thereby increase their level of participation and engagement in the lesson. This study thereby examines the influence of flipped learning on students' level of engagement.

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Furthermore, research results examining gender differences related to engagement are inconsistent. (Fernández-Zabala, Goñi, Camino, and Zulaika, 2015; Teoh, Abdullah, Roslan, and Daud, 2013) for example, found that occasionally females reported more engagement than males. According to King's (2016) research result, it was found that there was no significant difference in the level of student engagement between female students and male students. Hu and McCormick (2012) suggest that while they may not differ in their average levels of engagement, males are more likely to be either highly disengaged or highly engaged. In contrast, and Kuh's (2009) reported that females are, on average, more engaged than their male counterparts. These inconsistent findings suggest more investigation in this current study.

1.1 Purpose of the Study

The purpose of this study was to examine the influence of flipped learning strategies on students' level of engagement. The study also intends to examine the possible effects of gender on students' level of engagement. The insights gained from this research will inform recommendations for enhancing and optimizing student engagement in the learning process.

1.2 Hypotheses

The null hypotheses' testing was at 0.05 alpha level;

HO1: There is no significant main effect of treatment on students' level of engagement in computer studies

HO2: There is no significant main effect of gender on students' level of engagement in computer studies

2. Methodology

The research design employed in this study was a quasi-experimental pre-test, post-test, and control group design. The design is depicted as follows:

- Experimental Group: 01 (Pre-Engagement) X1 (Flipped Learning Strategy) 02 (Post-Engagement)
- Control Group: 03 (Pre-Engagement) X2 (Conventional Method) 04 (Post-Engagement)

In this representation, "01" and "03" correspond to the pre-engagement assessment, "X1" signifies the application of the flipped learning strategy, "X2" denotes the use of the conventional method, and "02" and "04" represent the post-engagement evaluation.

2.1 Population of the Study

The study's population consisted of Junior Secondary School III Computer studies students in two private schools in Oyo State. The sample for this research included 60 Junior Secondary School III Computer studies students, chosen from two local government areas within Oyo State.

2.3 Sampling and Sampling Technique

The study used the purposive sampling technique. The selection was based on the accessibility of the students to mobile devices, iPads, computers, and laptops. Intact classes were used in both schools.

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2.4 Research Instrument

The instruments used were the Students' Engagement Questionnaire (SEQ)(r=0.85) and the Students' Engagement Observation Scale (SEOS)(r=0.80). The SEQ was administered to the students in both groups as the pre-engagement evaluation. Then the students in the control group were taught using the conventional teaching strategy while those in the experimental group were taught using the flipped learning strategy. During the period of teaching, the Students' Engagement Observation scale was used to measure students' level of engagement in the class. This teaching lasted for 4 weeks, after which both groups were administered the SEQ questionnaire as the post-engagement evaluation.

3. Results

Hypothesis One: There is no significant main effect of treatment on students' level of engagement in computer studies

In testing this hypothesis, the mean obtained from the pre-engagement and post-engagement of students exposed to flipped learning strategy and conventional strategy were subjected to ANCOVA analysis at 0.05 level of significance.

Table 1: Analysis of Covariance of Engagement by Treatment

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	8.375[a]	11	0.761	8.056	0.000	0.700
Intercept	1.676	1	1.676	17.739	0.000	0.318
PreEngagement	0.086	1	0.086	0.906	0.347	0.023
Treatment	5.248	1	5.248	55.532	*0.000	0.594
Error	3.591	38	0.095			
Total	506.957	50				
Corrected Total	11.966	49				

Table 1 shows that there is significant main effect of treatment on students level of Engagement in ($F(1,38) = 55.53$; $p < 0.05$, partial $\eta 2 = 0.59$). The effect size is 59%. This indicates that 59.0% of the variation in students' level of engagement is as a result of the significant main effect of the treatment. Thus, hypothesis 1 was rejected. Therefore, there is significant main effect of treatment on students' level of engagement. In order to determine the magnitude of the significant main effect across treatment groups, the estimated marginal means of the treatment groups was calculated and the result was presented in Table 2.

Table 2: Estimated Marginal Means for Post-Engagement by Treatment (Control and Experimental group)

			95% Confidence Interval	
Treatment	Mean	Std. Error	Lower Bound	Upper Bound
Control (Conventional Strategy)	2.740	.072	2.593	2.886
Experimental (Flipped Learning)	3.537	.069	3.398	3.677

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Table 2 revealed that the students in Experimental group (Flipped Learning) had the highest adjusted post-Engagement mean score (3.54) while the Control group (Convention Strategy) had the least adjusted post-Engagement mean scores (2.74).

Furthermore, using the Engagement observation scale was used to determine the difference in the level of engagement between students exposed to flipped learning and students in the control group. The mean point score of both the experimental and control group for each criterion is represented in fig 1 below

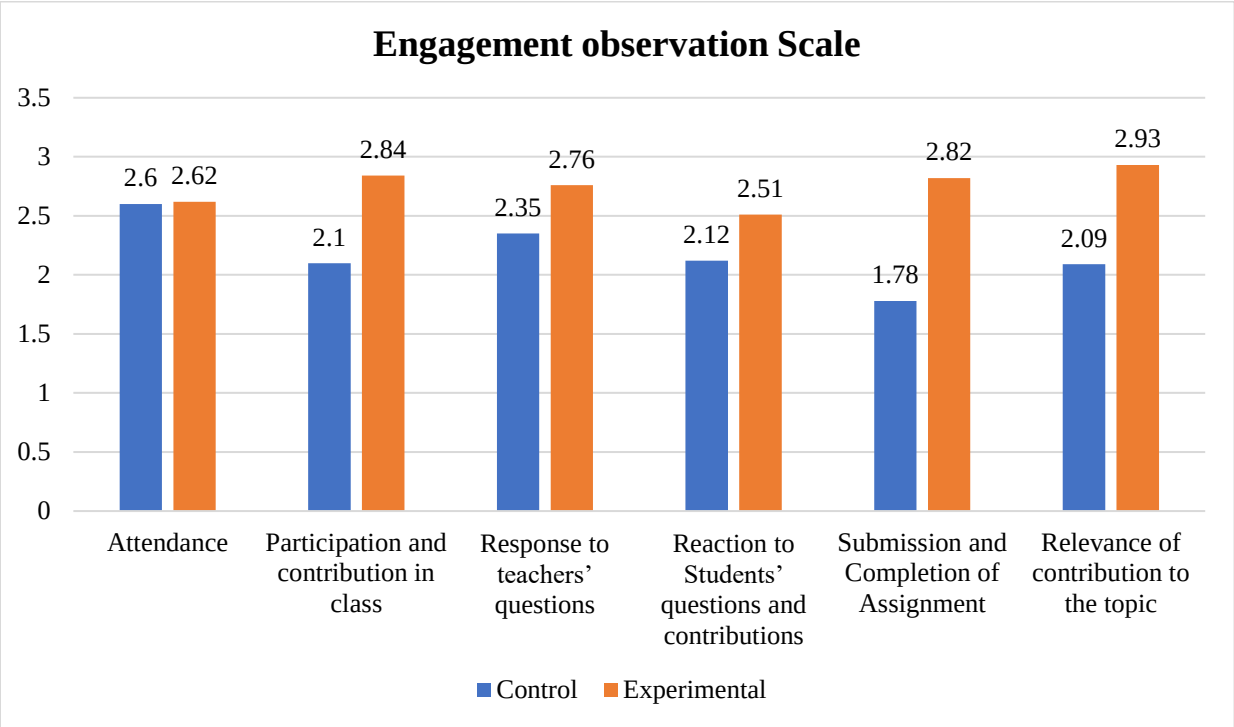

Fig 1 above shows the difference in the mean point of students in both the flipped learning group and conventional strategy group for each criterion used to measure the engagement level. For student's attendance, no difference was seen in their mean point. For the other criteria, the students taught using the flipped learning strategy had the highest mean point while the control group had the least mean point.

H02: There is no significant difference between male and female levels of engagement in computer studies

In testing this hypothesis, the scores obtained from the pre-engagement and post-engagement of male students exposed to flipped learning strategy and conventional strategy were subjected to ANCOVA analysis at 0.05 level of significance.

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Table 3: Analysis of Engagement mean scores by Gender

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	8.375a	11	0.761	8.056	0.000	0.700
Intercept	1.676	1	1.676	17.739	0.000	0.318
PreEngagement	0.086	1	0.086	0.906	0.347	0.023
Gender	0.012	1	0.012	0.126	0.725	0.003
Error	3.591	38	0.095			
Total	506.957	50				
Corrected Total	11.966	49				

Table 3 shows that there is no significant main effect of gender on students' Level of Engagement ($F(1;38) = 0.13$, $p>.05$, partial $\eta 2 = 0.00$). This means that gender has no influence on the level of engagement of students. Thus, hypothesis 2 was not rejected.

4. Discussion

Significant differences in the level of engagement between students in the experimental and control groups were revealed in the findings of the study. Students in the experimental (flipped learning) group particularly had the highest adjusted post-engagement mean score while students in the control group had the least adjusted post-engagement mean score. The Engagement observation scale also showed that students in the flipped class were actively engaged and participated in their learning. This result is in line with the findings of (Preville, 2018; Riordan, Hine and Smith, 2017; Talley and Scherer 2013). In their study, they flipped an undergraduate psychology course, comparing it to previous semesters of the traditional format, and discovered an increase in retention and engagement with the flipped model of instruction. The increase in retention and engagement resulted in improved performance on the midterm and final exams. The result also proves that flipped learning is an active and collaborative instructional strategy that can be used in lessons as it ensures and enhances students' active engagement participation especially in computer studies since it deals with skills acquisition. The result also supports Dornyei (2018), who believed that student engagement in learning concerns involvement in academic tasks.

A major point of note is that, flipped learning create ample time for teachers and students to interact and discuss major concepts or areas where there seems to be difficulty. This is so because students were already exposed to the content outside the classroom and this saves the teacher's time and allows for students' engagement in the lesson. Whereas in the conventional class, the teacher has to manage the allocated time to expose the students to the content and also make time for discussion and this might not permit students' full participation and engagement in the lesson. Also, the contact class was not teacher-dominated as it was in the conventional method, questions generated in the flipped lesson were tackled collaboratively in the contact class, this gave a whole lot of peer interaction and participation, and the teacher was able to guide by the side paying attention to students with weak contribution with the aim of guiding and correcting them. Thus, using flipped learning is necessary because, with its characteristics, it ensures

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students' active engagement thereby improving their academic achievements and promoting permanent learning.

Furthermore, it was observed that gender did not exert a statistically significant impact on students' engagement in computer studies. This aligns with King's (2016) research, which similarly concluded that there was no significant disparity in the level of student engagement between female and male students.

5. Conclusion

The results of the study have shown that using flipped learning as an instructional delivery strategy is more effective in influencing students' level of engagement. Based on the result of the study, flipped learning allows students to be involved in their learning as it makes them active participants rather than passive learners. The level of students' engagement in their learning influences the overall success of the student.

6. Recommendations

Based on the findings of the study, the following recommendations were made:

1. Seminars and workshops should be organized by the school management to train teachers on how to implement flipped learning in teaching computer studies.
2. In the teaching and learning process, teachers should ensure they include activities that would require student's engagement and participation.

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