


**Article History**

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***PhD Thesis Abstract***


**Effects of a Developed Flipped Classroom Package on Senior Secondary School Students' Performance in Mathematics in Lagos, Nigeria**

Semiu Olawale Makinde\* 

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Flipped Classroom (FC) is an “inverted” classroom where school work is done at home, and homework is done at school. The application of this learning approach is not well-known in Nigeria. External examination results in Nigeria revealed that students' performance in mathematics is poor. Out of curiosity to find a solution to this poor performance, the effectiveness of FC was explored. Guided by the constructivist theory, this study specifically (i) examined the effect of a developed and validated Flipped Classroom Package (FCP) on post-test performance (PP) and retention performance (RP) of students in Mathematics; (ii) determined the influence of gender on PP, RP and attitude of students towards learning mathematics in FC; (iii) investigated the influence of students' ability levels on PP, RP and students' attitude towards FC; and (iv) examined interaction effects of gender, ability levels and treatment on PP and RP of students in mathematics.

The study adopted a 2 x 2 x 3 quasi-experimental design. The sample was drawn from two secondary schools in Lagos, Nigeria. A total of 268 students participated in the study. Among them, 145 students (78 males and 67 females) were in the experimental group, taught with offline videos. The remaining 123 students (66 males and 57 females) were in the control group, taught with lesson notes. Four instruments were used: developed FCP; lesson note; performance test; and questionnaire. The

\* Author Email: [somakinde@alhikmah.edu.ng](mailto:somakinde@alhikmah.edu.ng)  
 <http://orcid.org/0000-0001-5456-3464>



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instruments were validated by experts and tested for reliability, which yielded 0.78, 0.85, 0.95, and 0.88, respectively. Standard deviation and mean were used to answer all the research questions. Hypotheses formulated were tested using the t-test and One-way Analysis of Covariance (ANCOVA). Bonferroni pairwise comparison test was conducted to locate the direction of the difference established by ANCOVA.

The findings of the study were:

- i. developed FCP was effective; there was a significant difference in the PP  $F(1, 265) = 142.002, p = .00$  and RP  $F(1, 265) = 130.24, p = .00$ ; this favoured the FC group;
- ii. no significant difference existed in the PP of both male and female students in the FC group;
- iii. using a benchmark of 2.00, male and female students had positive attitudes towards learning mathematics with a mean score of 2.92 in FC; this favoured female students;
- iv. there was a significant difference in the PP  $(F(2, 141) = 10.562, p = .00)$  and RP  $(F(2, 141) = 11.411, p = .00)$  based on the ability level of students in favour of FC;
- v. there was a significant difference between the students' attitude and ability levels  $F(2, 276) = 4.944, p = .006$  in favour of FC; and,
- vi. no significant difference existed in the interaction effect of treatment, gender and ability level of students on PP and RP.

The study concluded that flipped classrooms improved students' performance in mathematics. The implication is that FC promoted student-centred instruction. Thus, there will be a greater improvement in students' learning of Mathematics at the secondary school level. It was, therefore, recommended that secondary school administrators implement flipped classrooms for outstanding performance in Mathematics.

*Keywords:* flipped classroom, performance, retention, attitude, mathematics