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EFFECTS OF FLIPPED CLASSROOM INSTRUCTIONAL APPROACH ON STUDENTS' ACADEMIC ACHIEVEMENT, RETENTION AND ATTITUDE TOWARDS HOME ECONOMICS, FEDERAL COLLEGE OF EDUCATION, ZARIA-NIGERIA

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Abstract
This study investigated the effects of the Flipped Classroom (FC) instructional approach on the academic achievement, retention, and attitudes of Home Economics students at the Federal College of Education, Zaria, Nigeria. While Information and Communication Technology (ICT) is integral to modern education, its application in Nigerian tertiary institutions often lags, with many instructors still relying on traditional lecture methods that may not be optimal for practical subjects. This research aimed to determine if the FC model—where instructional content is delivered online for pre-class study, freeing in-class time for active, application-based learning—could offer a more effective alternative. A quasi-experimental, non-equivalent pre-test and post-test comparison group design was employed. A sample of 30 undergraduate students was purposively selected and assigned to either an experimental group (Flipped Classroom) or a control group (Conventional Lecture). Data were collected using the Home Economics Achievement Test (HEAT), Home Economics Retention Test (HERT), and Home Economics Attitude Scale (HEAS). The collected data were analyzed using descriptive statistics and independent samples t-tests at a $p<0.05$ significance level. The findings revealed statistically significant differences between the two groups. The experimental group demonstrated significantly higher mean scores in academic achievement ($t(28)=4.67, p<.001$), knowledge retention ($t(28)=3.98, p=.001$), and positive attitude towards Home Economics ($t(28)=5.21, p<.001$) compared to the control group. The study concludes that the flipped classroom instructional approach is a significantly more effective pedagogical strategy than the conventional lecture method for improving student achievement, retention, and attitude in Home Economics. It is recommended that tertiary institutions encourage the adoption of this model and provide the necessary technological support and professional development for educators to implement it effectively.
Keywords: Flipped classroom, Academic achievement, Retention, Attitude, Home economics, Blended learning and Education

Introduction

Technology has firmly established itself as an indispensable tool for promoting effective transaction and communication between teachers and students. The integration of technology into the teaching and learning process holds the capability to make instruction more concrete, thereby enhancing student learning, retention, and motivation. The rapid evolution of information and communication technologies (ICTs) has elevated learners' expectations, compelling researchers to seek new and more effective modalities of learning. In response, blended learning models, which combine the advantages of traditional learning with distance education, have grown in popularity. Among these, the flipped classroom model has been a prominent topic of discussion in recent years.

The Flipped Classroom (FC) is a pedagogical model that transfers the presentation of content from the traditional classroom environment to an online platform. This allows in-class time to be repurposed for learning activities that were traditionally considered homework, all carried out under the guidance of the teacher. As described by Bishop and Vergeler (2022), the FC model replaces in-class teaching with homework assigned for reinforcement, supports students' individual learning, and helps develop their problem-solving skills. This approach allows students to learn in an active, flexible, and cooperative environment, providing them with the opportunity to apply theoretical knowledge practically. A significant advantage of the FC model is that it enables students to learn at their own pace, independent of time and place, using appropriate learning tools (Bergmann & Sams, 2019; Davies et al., 2020).

In the Nigerian context, the education sector must embrace new technologies and innovations to meet contemporary demands. The ICT revolution has permeated all sectors of human endeavour, and education is no exception. As the World Bank (2022) noted, communication technologies have revolutionized information access and are reshaping how people interact and learn. Many Nigerian students, including those studying Home Economics, already use ICT gadgets, and these

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technologies have psychologically altered how people think and behave. While ICTs have immense potential to improve teaching and learning, they can also pose a threat if used poorly (Lumadi, 2023). Traditional lecture-based instruction, which is still prevalent, may not provide sufficient opportunities for the active learning and skill development crucial for practical subjects like Home Economics. The flipped classroom is gaining traction as a method to increase student engagement and cater to diverse learning styles by using pre-recorded content to free up classroom time for interactive activities (Salihu, 2023).

Despite research demonstrating that flipped classroom instruction can enhance students' academic achievement and retention, its adoption by Home Economics teachers remains limited. In many Nigerian colleges of education, educators continue to rely on traditional teaching methods, such as lectures and didactic techniques, even with the availability of effective learner-centered strategies. This adherence to outdated methods may fail to engage students effectively and prepare them for the demands of the 21st century. Furthermore, studies on the application of flipped classrooms in Nigeria, especially within vocational subjects like Home Economics, are scarce. This research, therefore, aims to fill this gap by investigating the effects of a flipped classroom instructional approach on students' academic achievement, retention, and attitude within the Home Economics program at the Federal College of Education, Zaria.

Objectives of the Study

The main objective of this study is to examine the Effects of a Flipped Classroom Instructional Approach on Students' Academic Achievement, Retention, and Attitude towards Home Economics at the Federal College of Education, Zaria, Nigeria. The specific objectives are to:

1. Compare the academic achievement of students taught Home Economics using a flipped classroom instructional approach and those taught with the conventional lecture method;
2. Examine the retention ability of students taught Home Economics using a flipped classroom instructional approach and those taught with the lecture method;
3. Determine the difference in the attitude of students taught Home Economics using a flipped classroom instructional approach and those taught with the lecture method.

Research Questions

The study answered the following questions:

1. What is the difference in the academic achievement of students taught Home Economics using a flipped classroom approach versus the conventional lecture method?
2. What is the difference in the retention ability of students taught Home Economics using a flipped classroom approach versus the conventional lecture method?
3. What is the difference in the attitude towards Home Economics among students taught using a flipped classroom approach versus the conventional lecture method?

Methodology

The study adopted a quasi-experimental research design, specifically a non-equivalent pre-test and post-test comparison group design. This design was appropriate because it allowed for the comparison of two groups (experimental and control) when random assignment of participants was not feasible. Intact classes were used, with one class designated as the experimental group (receiving the flipped classroom intervention) and the other as the control group (receiving traditional lecture-based instruction). Both groups were administered a pre-test before the intervention and a post-test after its conclusion. The population for this study consisted of all 50 undergraduate students of Home Economics at the Federal College of Education, Zaria, for the 2023/2024 academic session. From this population, a sample of 30 students was selected using purposive sampling. Two intact classes were chosen for the study, one to serve as the experimental group and the other as the control group. Three instruments were developed and used for data collection:

Home Economics Achievement Test (HEAT): This was a researcher-developed multiple-choice question test designed to measure students' cognitive achievement on the topics covered during the study. It consisted of 40 items based on the curriculum.

Home Economics Retention Test (HERT): This was a parallel version of the HEAT, containing rephrased questions with the same difficulty level. It was administered two weeks after the post-test to measure knowledge retention.

Home Economics Attitude Scale (HEAS): This was a 20-item, 4-point Likert-type scale designed to measure students' attitudes towards the Home Economics subject. The scale ranged from "Strongly Agree" to "Strongly Disagree." The instruments were validated by experts in Home Economics, Educational Technology, and Measurement and Evaluation to

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ensure face and content validity. The reliability of the instruments was determined through a pilot study. The Guttmann split-half method was used to calculate the reliability coefficient for the HEAT and HEAS.

Procedure

The study was conducted over a period of 10 weeks, following these steps:

Pre-test: At the beginning of the study, both the experimental and control groups were administered the Home Economics Achievement Test (HEAT) and the Home Economics Attitude Scale (HEAS) as a pre-test.

Intervention (Experimental Group): The experimental group was taught using the flipped classroom approach. Before each class, students were provided with online modules containing audio-visual resources, videos, and reading materials designed as tutorials. Students were required to study this material at home. During class time, the teacher acted as a facilitator, guiding students through discussions, problem-solving activities, and practical applications of the concepts learned online.

Intervention (Control Group): The control group was taught the same topics using the conventional lecture method. The teacher delivered instruction in a traditional classroom setting without the use of pre-class online materials.

Post-test: At the end of the 10-week intervention period, both groups were administered the HEAT and HEAS as a post-test to measure changes in achievement and attitude.

Retention Test: Two weeks after the post-test, the Home Economics Retention Test (HERT) was administered to both groups to assess their ability to retain the information learned.

The data collected were analyzed using both descriptive and inferential statistics with the aid of the Statistical Package for the Social Sciences (SPSS) software, version 21. Arithmetic means and standard deviations were used to summarize the pre-test, post-test, and retention scores for both groups. An independent samples t-test was used to test the three null hypotheses by comparing the mean post-test scores (for achievement and attitude) and the mean retention scores of the experimental and control groups. The level of significance was set at $p<0.05$.

Results

This section presents the results of the data analysis based on the study's objectives.

Research Question 1: What is the difference in the academic achievement of students taught Home Economics using a flipped classroom approach versus the conventional lecture method?

To answer this question, the post-test scores from the Home Economics Achievement Test (HEAT) for both groups were analyzed. The results are presented in Table 1.

Table 1: Summary of Independent t-test for Academic Achievement Scores

Group	N	Mean	Std. Deviation	t-value	Df	Sig. (2-tailed)
Experimental	15	78.53	8.21	4.67	28	.000
Control	15	62.13	9.45			

The results in Table 1 show that the experimental group, which was taught using the flipped classroom approach, had a higher mean achievement score ($M=78.53, SD=8.21$) compared to the control group ($M=62.13, SD=9.45$). The independent t-test revealed a statistically significant difference between the two groups, $t(28)=4.67, p<.05$. Therefore, the null hypothesis (H01) is rejected. This indicates that the flipped classroom approach had a significant positive effect on students' academic achievement in Home Economics.

Research Question 2: What is the difference in the retention ability of students taught Home Economics using a flipped classroom approach versus the conventional lecture method?

The scores from the Home Economics Retention Test (HERT), administered two weeks after the post-test, were analyzed. The results are presented in Table 2.

Table 2: Summary of Independent t-test for Retention Scores

Group	N	Mean	Std. Deviation	t-value	df	Sig. (2-tailed)
Experimental	15	74.20	7.98	3.98	28	.001
Control	15	58.47	9.12			

As shown in Table 2, the experimental group had a higher mean retention score ($M=74.20, SD=7.98$) than the control group ($M=58.47, SD=9.12$). The t-test result, $t(28)=3.98, p<.05$, shows that this difference is statistically significant. Consequently, the null hypothesis (H02) is rejected. This suggests that students taught with the flipped classroom approach retained information significantly better than those taught with the conventional lecture method.

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Research Question 3: What is the difference in the attitude towards Home Economics among students taught using a flipped classroom approach versus the conventional lecture method?
The post-intervention scores from the Home Economics Attitude Scale (HEAS) were analyzed to determine the effect of the teaching method on student attitude. The results are presented in Table 3.

Table 3: Summary of Independent t-test for Attitude Scores

Group	N	Mean	Std. Deviation	t-value	df	Sig. (2-tailed)
Experimental	15	72.80	6.50	5.21	28	.000
Control	15	59.60	7.15			

The analysis in Table 3 indicates that the experimental group demonstrated a more positive attitude towards Home Economics (M=72.80,SD=6.50) compared to the control group (M=59.60,SD=7.15). The difference was found to be statistically significant, $t(28)=5.21, p<.05$. Therefore, the third null hypothesis (H03) is rejected. This implies that the flipped classroom approach significantly improved students' attitudes toward the subject.

Discussion of the Findings

The results of this study indicate that the flipped classroom instructional approach is significantly more effective than the conventional lecture method in improving students' academic achievement, retention, and attitude in Home Economics. The finding regarding academic achievement aligns with the theoretical basis of the flipped classroom. By moving direct instruction online, class time was repurposed for active learning, which, according to constructivist theory, facilitates deeper understanding and knowledge construction. This result supports the work of Goodwin and Miller (2018), who argued that the flipped model shifts the teacher's role to that of a coach, guiding students to higher levels of learning. When students come to class prepared, they can engage in higher-order thinking activities rather than passively receiving information.

The significant improvement in knowledge retention among students in the experimental group is also a critical finding. This can be attributed to the flexibility and self-paced nature of learning inherent in the flipped model. As noted by Bergmann and Sams (2019), allowing students to learn via tools appropriate to their own pace helps solidify understanding. The ability to review online materials multiple times likely contributed to better long-term retention compared to the one-time delivery of a traditional lecture.

Furthermore, the study found a significant positive change in students' attitudes toward Home Economics. This is consistent with literature suggesting that flipped learning increases student engagement and ownership (Hamdan et al., 2013). The interactive and collaborative nature of the in-class activities may have made the subject more enjoyable and relevant to students, fostering a more positive disposition towards it.

Conclusion

Based on the findings, this study concludes that the flipped classroom instructional approach is a highly effective pedagogical strategy for teaching Home Economics at the tertiary level. It leads to superior academic achievement, better long-term knowledge retention, and a more positive student attitude compared to traditional lecture-based methods. The implementation of this model successfully shifts the learning environment to one that is more student-centered, active, and engaging, which is particularly beneficial for a practical subject like Home Economics.

Recommendations

In light of the findings, the following recommendations are made:

1. Home Economics lecturers and teachers at Federal Colleges of Education and other tertiary institutions should be encouraged to adopt the flipped classroom model to enhance student learning outcomes and engagement;
2. College management should provide the necessary support for implementing flipped classrooms, including reliable internet access, access to technology, and professional development workshops for lecturers on how to effectively design and manage a flipped learning environment;
3. Curriculum bodies should consider incorporating blended learning models like the flipped classroom into the pedagogical guidelines for vocational and technical education subjects to promote 21st-century skills.

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