Chapter Three: Research Methodology

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

This study adopted a quasi-experimental research design involving pre-test and post-test non-equivalent groups. This design was chosen because it allowed for the comparison of the academic performance of students taught using different instructional methods-lecture, cooperative, and competitive learning-without random assignment of participants. It enabled the researcher to examine the causal effects of classroom goal structures on students' academic achievement in computer education.

3.2 Area of the Study

The study was conducted in selected junior secondary schools in Gombi Local Government Area, Adamawa State, Nigeria. Gombi is a semi-urban area with a mix of public and private secondary schools. The location was selected due to its accessibility and the emphasis placed on computer education in the schools' curriculum.

3.3 Population of the Study

The population of the study comprised all Junior Secondary School Two (JSS 2) students offering Computer Education in selected schools within Gombi LGA. This group was chosen because they had foundational exposure to computer studies, making them suitable for the teaching methods being evaluated.

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3.4 Sample and Sampling Technique

A sample of 90 students was selected from three co-educational junior secondary schools using a purposive sampling technique. Each school provided a group of 30 students assigned to one of the three instructional methods:

- Group A: Lecture Method (Control group)
- Group B: Cooperative Learning Method
- Group C: Competitive Learning Method

Selection criteria included the presence of functional computer laboratories and qualified computer science teachers.

3.5 Instrument for Data Collection

The instrument used for data collection was a Computer Education Achievement Test (CEAT) developed by the researcher. The CEAT consisted of 40 multiple-choice questions designed to assess students' knowledge and understanding of topics covered during the intervention.

3.6 Procedure for Data Collection

The study lasted for four weeks. In the first week, a pre-test was administered to all groups to assess their baseline academic performance in Computer Education. For the next three weeks, each group was taught the same computer education topics using different instructional methods:

- Lecture Group received teacher-centered lessons.
- Cooperative Group worked in small, mixed-ability groups with shared tasks and roles.
- Competitive Group worked individually, with performance-based rewards and ranking.

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At the end of the intervention, a post-test (the CEAT) was administered to measure the impact of each method on academic achievement.

3.7 Method of Data Analysis

Data collected from the pre-test and post-test were analyzed using descriptive and inferential statistics. Mean and standard deviation were used to summarize students' performance. Analysis of Covariance (ANCOVA) was used to test the null hypotheses, with the pre-test scores serving as covariates to control for initial differences. All hypotheses were tested at 0.05 level of significance.

3.8 Ethical Considerations

Permission was obtained from the school authorities before the study commenced. Informed consent was also sought from the students and their guardians. Confidentiality and anonymity of the participants were maintained throughout the study.

3.9 Validity and Reliability of the Instrument

Content validity of the Computer Education Achievement Test (CEAT) was established by subjecting the instrument to review by two experts in Computer Education and one expert in Educational Measurement and Evaluation. The experts evaluated the test items to ensure coverage of relevant topics and learning objectives. Necessary adjustments were made based on their feedback.

Face validity was also ensured by confirming that the language was clear, the items were appropriate, and the test structure was suitable for junior secondary school students.

Reliability of the Instrument

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To ascertain the reliability of the instrument, a pilot study was conducted with 20 JSS 2 students from a school outside the study area. The reliability coefficient of the CEAT was determined using the Kuder-Richardson Formula 20 (KR-20), yielding a coefficient of 0.81. This high reliability index confirmed that the instrument consistently measured what it was intended to measure.