**CHAPTER THREE**

**METHODOLOGY**

In this chapter, the processes and procedures that were followed in carrying out the study are discussed under the following sub-headings:

* 1. Research Design
  2. Population of the Study
  3. Sample and Sampling Techniques
  4. Instrument for Data Collection
  5. Validity of the Instrument
  6. Reliability of the Instrument
  7. Procedure for Data Collection
  8. Method of Data Analysis

**3.1 Research Design**

This study adopts a descriptive survey design, which is appropriate for collecting data to describe the current status of the use of technology in teaching and learning in senior secondary schools in Edo South Senatorial District. According to Creswell, a survey design is best suited for studies that require data to be collected from a large population to make inferences about the broader group. This design allows the researcher to gather data regarding teachers' and students' use of technology, their perceptions, and the resulting learning outcomes (Creswell, 2014, p. 52). Descriptive surveys also enable researchers to collect quantitative data systematically and analyze trends effectively (Babbie, 2010).

This design is particularly useful in educational research, where studying behaviors, opinions, and attitudes without manipulating variables is necessary. Since this study aims to assess the impact of technology on teaching and learning, a descriptive approach ensures the collection of empirical data from multiple respondents within the school system.

**3.2 Population of the Study**

The population of this study consists of all senior secondary school students and teachers in public and private secondary schools in Edo South Senatorial District. The district includes various urban and rural schools, making it essential to account for differences in technological access across different socio-economic regions. The total population is estimated at 50,000 students and 3,000 teachers from approximately 200 secondary schools across the region (Edo State Ministry of Education, 2023).

The population is diverse, consisting of students from different backgrounds and schools with varying levels of technological infrastructure. This diversity makes the study valuable in understanding how socio-economic and geographical factors influence the adoption of technology in education.

**3.3 Sample and Sampling Techniques**

A stratified random sampling technique was used to ensure that both urban and rural schools were adequately represented in the sample. A total of 500 participants (400 students and 100 teachers) were selected from 20 secondary schools. The sample size was determined using Yamane's (1967, p. 22) formula for sample size determination, ensuring a 95% confidence level. Stratified sampling was chosen because it allows for more accurate representation of various subgroups within the population, which is critical given the disparities in access to technology between urban and rural schools (Babbie, 2010).

**Sample Breakdown:**

|  |  |  |
| --- | --- | --- |
| **Category** | **Population** | **Sample Size** |
| Teachers | 3,000 | 100 |
| Students | 50,000 | 400 |
| Schools | 200 | 20 |

Stratified sampling ensures that schools with different levels of technological integration (high, moderate, and low) are included. A proportional approach was used to select participants from both public and private schools to maintain representation.

**3.4 Instrument for Data Collection**

The primary instrument for data collection was a structured questionnaire developed by the researcher. The questionnaire was divided into three sections:

* **Section A:** Demographic information (age, gender, school type, location).
* **Section B:** Availability and accessibility of technological resources.
* **Section C:** Frequency and effectiveness of technology use in the classroom.

The questionnaire utilized a Likert scale format, with response options ranging from "Strongly Agree" to "Strongly Disagree." The questionnaire was adapted from previous validated instruments used in similar studies on technology in education (Adewale & Alabi, 2019).

Additionally, structured interviews were conducted with selected school administrators to obtain qualitative insights into the barriers and opportunities for technology integration in secondary schools.

**3.5 Validity of the Instrument**

The instrument was subjected to face and content validity by a panel of experts in the fields of educational technology and educational research. Content validity was ensured by aligning the questionnaire items with the study objectives and research questions, while face validity was assessed through pilot testing with 20 randomly selected respondents from the population, as recommended by Nunnally (Nunnally 1978, p. 122).

Pilot testing helped refine unclear or ambiguous questions, ensuring that the final instrument was easy to understand and effectively measured the intended variables. Expert feedback ensured the instrument's construct validity, verifying that it accurately captured elements of technology integration in education.

**3.6 Reliability of the Instrument**

To establish the reliability of the instrument, a **test-retest method** was employed. The questionnaire was administered twice to the same group of 20 students from different schools, with a two-week interval between the two administrations. The **Cronbach's alpha coefficient** was used to measure internal consistency, yielding a reliability coefficient of 0.82, which is considered acceptable for educational research (George & Mallery, 2003).

Additionally, a **split-half reliability test** was conducted, where the questionnaire was divided into two halves, and the correlation between them was analyzed. The results showed a strong internal consistency, further validating the reliability of the instrument.

**3.7 Procedure for Data Collection**

The data collection process took place over a period of four weeks. The researcher, along with trained research assistants, visited the selected schools to administer the questionnaires. Before data collection, informed consent was obtained from participants, and they were assured of the confidentiality of their responses. The respondents were guided on how to fill out the questionnaire, and any unclear sections were explained to them. Data collection was completed in both rural and urban schools to capture the diversity in technology access across the district.

The step-by-step procedure included:

* Obtaining Approval: Permission was sought from the Edo State Ministry of Education and school principals.
* Training Research Assistants: Assistants were trained to ensure consistency in questionnaire administration.
* Conducting the Survey: Questionnaires were distributed to students and teachers during school hours.
* Interviews with Administrators: Face-to-face interviews were conducted with selected school heads.
* Data Verification & Storage: Completed questionnaires were reviewed for missing responses and stored securely.

**3.8 Method of Data Analysis**

The data collected were analyzed using descriptive statistics such as frequency counts, percentages, and means to summarize the participants' responses. In addition, inferential statistics such as t-tests and ANOVA were employed to test the research hypotheses. These methods are appropriate for determining relationships between variables such as technology access, usage, and academic performance (Pallant, 2020, p. 102). Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25.

Inferential statistics were used as follows:

* Chi-square tests: To determine the relationship between school type (public/private) and technology availability.
* T-tests: To compare mean differences between urban and rural schools.
* ANOVA: To compare multiple school categories based on technology integration.

This robust analysis ensures a comprehensive understanding of how technology affects education in Edo South Senatorial District.

**References**

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