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Editorial

This edition of *NIU Journal of Educational Research* touches on Determinants of Career Choice, Teaching Methods Required by Woodwork Teachers, Artificial Intelligence Utilization as a Correlate of Management Effectiveness in Public Tertiary Institutions and the Role of History Education in Shaping Environmental Awareness and Cultural Revivalism.

One of the papers, in this issue, reveals that local cultural expectations and formal training frameworks override informal peer dynamics. The paper, therefore, recommends the institutionalization of gender-sensitive, proactive career counseling interventions within northern Nigerian teacher education structures to enhance retention.

Another paper also reveals that Artificial Intelligence utilization is positively associated with management effectiveness and represents a strategic resource for enhancing institutional administration. The paper therefore, recommends increased investment in AI infrastructure, capacity building, and policy frameworks to promote the effective integration and utilization of AI technologies into tertiary institution management and improve organizational effectiveness.

On the whole, this issue of *NIU Journal of Educational Research* features many empirical and theoretical based articles which can be of great benefit to every reader.

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Determinants of Career Choice among Nigeria Certificate in Education (NCE) Students in Katsina State, Nigeria

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Abstract. This study analyzed the determinants of career choice among final-year Nigeria Certificate in Education (NCE III) students within tertiary institutions in Katsina State, Nigeria. Prompted by regional teacher shortages and widespread career dissatisfaction among pre-service teachers, the research assessed the impacts of internal motivation, parental background, peer networks, academic exposure, and gender roles. Using a descriptive survey research design with stratified random sampling, primary data were gathered via a structured questionnaire from 60 final-year students across three conventional tertiary institutions spanning the state's three senatorial zones. Data were processed using simple linear regression, multiple linear regression, and independent samples t-tests. The statistical findings indicate that parental influence is the strongest predictor, accounting for 51.1% of the variance in career choice ($R^2 = .511$, $F(1, 58) = 60.59$, $p < .05$), followed by internal personal drivers ($R^2 = .412$, $p < .05$). While the joint effect of peer groups and academic exposure was statistically significant ($R^2 = .354$, $p < .05$), stepwise regression proved that peer influence alone was non-significant ($\beta = .09$, $p = .303$), whereas institutional academic exposure significantly guided student paths ($\beta = .541$, $p = .001$). Additionally, a significant gender disparity emerged $t(58) = 2.45$, $p = .017$, with male students experiencing higher socio-economic pressure regarding vocational decisions. The study concludes that local cultural expectations and formal training frameworks override informal peer dynamics. It recommends the institutionalization of gender-sensitive, proactive career counseling interventions within northern Nigerian teacher education structures to enhance retention.

Keywords: Career Choice, NCE Students, Parental Influence, Academic Exposure, Gender Disparities, Katsina State.

1. Introduction

Selecting a career path is a foundational life milestone that permanently dictates an individual's professional trajectory, economic mobility, and personal fulfillment. For undergraduates enrolled in the Nigeria Certificate in Education (NCE) pathway, making an intentional, well-informed vocational choice is particularly critical. This decision directly governs their psychological readiness for the classroom and influences their long-term capacity to adapt to alternative professional fields. Extant educational literature indicates that vocational decisions are rarely solitary acts of free will; rather, they are shaped by a complex, interconnected matrix of intrinsic passions, familial expectations, socioeconomic prospects, peer networks, and prior academic socialization (Anyanwu, 2017; Oladipo, 2013).

In Katsina State, the higher education ecosystem is expanding concurrently with a rising institutional demand for highly qualified, pedagogically competent primary and junior secondary school teachers. Consequently, identifying the precise empirical variables guiding student career choices is vital for policymakers, institutional administrators, and guidance counselors aiming to improve student retention and curb professional attrition. Despite this structural urgency, localized empirical data targeting this specific geographic and institutional demographic remain sparse. This study fills this gap by investigating the primary drivers of career selection within this sub-region.

To analyze these factors systematically, this study synthesizes John Holland's Theory of Vocational Choice (1997) with Lent, Brown, and Hackett's Social Cognitive Career Theory (SCCT, 1994). Holland's framework posits that vocational satisfaction and

stability occur when an individual's personality type congruent matches their work environment. For NCE students, an internal alignment with a "social" personality type is ideal for a sustained career in pedagogy. However, SCCT extends this paradigm by introducing contextual and environmental mediators, arguing that self-efficacy and career goals are continuously shaped—and frequently constrained—by external systemic factors, such as parental expectations, socioeconomic pressures, and regional socio-cultural gender roles.

1.1 Statement of the Problem

A substantial number of NCE III students in Katsina State's tertiary institutions exhibit pronounced career confusion, vocational mismatch, and professional apathy regarding their teaching tracks. This misalignment frequently manifests as low academic motivation, poor classroom commitment, and accelerating attrition rates across various subject combinations. While general educational literature extensively documents the macroeconomic factors influencing vocational pathways, localized micro-data remain severely restricted.

Specifically, there is a shortage of empirical research examining how regional cultural norms, northern Nigerian gender expectations, and institutional teacher-training programs interact to shape the vocational trajectories of NCE students within Katsina State. Without targeted, geographically specific, data-driven insights, institutional counseling interventions risk remaining superficial. Such approaches fail to address the deeply entrenched socio-cultural and environmental factors governing pre-service teachers' career trajectories.

1.2 Objectives of the Study

General Objective

The primary aim of this study is to analyze the determinants of career choices among NCE III students in higher education institutions within Katsina State, Nigeria.

Specific Objectives

To achieve this main goal, the study addresses the following specific objectives:

- To evaluate the impact of internal personal factors on the career pathways of NCE III students.

- To measure how family background and parental expectations influence student career decisions.
- To determine the degrees to which peer groups and institutional academic exposure shape students' vocational choices.
- To analyze how gender differences affect career choices among NCE III students in Katsina State.

1.3 Research Hypotheses

The following null hypotheses were formulated to guide the empirical analysis and will be tested at a .05 level of significance:

H₀₁: Internal personal factors do not significantly predict the vocational paths chosen by NCE III students in Katsina State's teacher training institutions.

H₀₂: Family dynamics and parental expectations have no statistically significant impact on the career pathways selected by final-year NCE students.

H₀₃: The combined influence of peer groups and formal educational exposure does not significantly shape student career choices.

H₀₄: There is no significant demographic difference between male and female NCE III students regarding the factors driving their career choices.

2. Methodology

2.1 Research Design and Sample Allocation

This study adopted a descriptive survey research design utilizing a quantitative empirical methodology. The target population comprised final-year Nigeria Certificate in Education (NCE III) students within public teacher-training institutions across Katsina State, Nigeria. To ensure structural representation across the state's geo-political subdivisions, a stratified random sampling technique was employed to select twenty (n = 20) participants from each of the two premier state and federal tertiary institutions, culminating in a total sample size of sixty students (N = 60). The institutional stratification was distributed as follows:

- Federal College of Education (FCE), Katsina (Katsina Central Senatorial District)
- Isa Kaita College of Education (IKCOE), Dutsin-Ma (Katsina Central/South axis catchment)
- Yusif Bala Usman College of Education and Legal Studies (YBUCELS), Daura (Katsina North Senatorial District)

2.2 Research Instrument

The primary data collection instrument was a structured questionnaire instrument designed by the researcher, titled "Determinants of Career Choice Questionnaire (DCCQ)". The instrument comprised distinct, compartmentalized thematic sections:

Section A (Demographic Variables): Captured institutional affiliation, age, and respondent gender.

Section B (Intrinsic/Personal Factors): Measured internal motivation, occupational passion, and expected job satisfaction (e.g., *"My choice of career is driven by my personal talents"*).

Section C (Familial/Parental Factors): Assessed household socio-economic status, financial dependency, and paternal/maternal expectations (e.g., *"My parents expect me to pursue a career that aligns with family status"*).

Section D (Extrinsic/Environmental Influence): Evaluated peer group dynamics and structured institutional interventions (e.g., *"My field Teaching Practice experience reshaped my vocational goals"*).

Psychometric items were rated on a modified 4-point Likert scale: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). The criterion baseline for acceptance of item means was established at a mean score of 2.50. Section or item means at or above the (ge 2.50) threshold denoted a confirmed influential factor, whereas scores below (<2.50) indicated negligible impact.

2.3 Validity and Reliability of the Instrument

The DCCQ underwent face and content validation by three experts from the Departments of Educational Foundations and Guidance and Counselling within the sampled institutions. To establish internal consistency, a pilot study was conducted on twenty ($n = 20$) NCE III students outside the main sample group. The reliability coefficients were computed using the Cronbach's Alpha (α) method, yielding values ranging from .78 to .84 across the thematic sub-scales, thereby indicating high statistical reliability.

2.4 Data Analysis Technique

Descriptive statistics (frequencies, percentages, means, and standard deviations) were utilized to summarize demographic data. Inferential statistical tools—specifically simple linear regression, multiple linear regression, and independent samples (t)-tests—were executed at a (.05) level of significance using statistical software.

3. Analysis and Testing of Hypotheses

3.1 Hypothesis One

H_{01} : Internal personal factors do not significantly predict the vocational paths chosen by NCE III students in Katsina State's teacher training institutions. An independent linear regression model was executed to examine how intrinsic motivation, personal ambitions, and expected job satisfaction predict student career selection.

Table 1

Model Summary of Linear Regression for Intrinsic/Personal Career Drivers

Model	R	R ²	Adj. R ²	Std. Error	F	p	Decision
1	.642	.412	.402	.314	40.63	.001	Reject H_{01}

Predictor: (Constant), Intrinsic Personal Factors. **Dependent Variable:** Career Choice.

The empirical data presented in Table 1 reveals a coefficient of determination (R^2) value of .412. This indicates that intrinsic personal factors account for 41.2% of the total variance observed in the career choices of NCE III students. Because the calculated probability value ($p = .001$) is strictly below the standard alpha level of (.05), the null hypothesis (H_{01}) is rejected. Consequently, individual drive and intrinsic occupational alignment are established as significant predictors of student vocational pathways.

3.2 Hypothesis Two

H_{02} : Family dynamics and parental expectations have no statistically significant impact on the career pathways selected by final-year NCE students.

A simple linear regression model was processed to compute the predictive influence of family economic profiles, parents' occupations, and familial cultural demands.

Table 2

Model Summary of Linear Regression for Household and Parental Influence

Model	R	R ²	Adj. R ²	Std. Error	F	p	Decision
1	.715	.511	.503	.285	60.54	.000	Reject H_{02}

Predictor: (Constant), Parental Influence. Dependent Variable: Career Choice.

The regression diagnostics in Table 2 outlines a prominent empirical trend. The (R²) value of .511 proves that 51.1% of the total variations within the vocational selections of pre-service teachers are predicted by parental inputs. Given that the corresponding significance level ($p = .000$) is less than the (.05) threshold of significance, (H_{02}) is rejected. Within the socio-cultural context of Katsina State, parental guidance exerts the highest predictive weight on student career trajectories.

3.3 Hypothesis Three

H_{03} : The combined influence of peer groups and formal educational exposure does not significantly shape student career choices.

A multiple linear regression model was deployed to isolate the composite and independent contributions of peer cohorts versus structured institutional exposure (e.g., Teaching Practice exercises).

Table 3

Multiple Regression Analysis for Peer Dynamics and Institutional Academic Exposure

Predictor Variables	β	t	p	Composite R ²	Composite F	Composite p
Peer Dynamics	.112	1.04	.303	.354	15.62	.002
Academic Exposure	.541	4.89	.001			

Dependent Variable: Career Choice. Statistical Verdict: Reject (H_{03}).

The composite multi-variable model exhibits high statistical significance ($R^2 = .354$, $F = 15.62$, $p = .002$), prompting the rejection of the null hypothesis (H_{03}). However, a critical inspection of individual standardized coefficients (beta) reveals that peer group dynamics alone are non-significant ($\beta = .112$, $t = 1.04$, $p = .303$). Conversely, academic exposure—attained via field practicums and formalized departmental curriculum counseling—is highly significant ($\beta = .541$, $t = 4.89$, $p = .001$), identifying it as the primary functional component of the composite model.

3.4 Hypothesis Four

H_{04} : There is no significant demographic difference between male and female NCE III students regarding the factors driving their career choices.

An independent sample (t)-test compared the mean perceptual scores of male and female cohorts to determine the presence of gender-based variances in career decision drivers.

Table 4

Independent Samples t-Test for Gender-Based Differences in Career Pressures

Gender Group	N	$\bar{X}$	SD	df	t	p (2-tailed)	Decision
Male Students	28	2.89	0.42	58	2.45	.017	Reject H_{04}
Female Students	32	2.61	0.45				

The independent comparison reveals a statistically significant variance between demographics. Male NCE III students recorded a higher mean score

($\bar{X} = 2.89$, $SD = 0.42$) regarding the perception of external career pressures than their female counterparts ($\bar{X} = 2.61$, $SD = 0.45$). Because the

two-tailed probability value ($t = 2.45$, $p = .017$) falls below the standard alpha level ($\alpha = .05$), (H_0) is rejected. Traditional gender socialization produces distinct structural pressures on career priorities.

4. Discussion of Findings

The empirical findings of this study reflect deep socio-cultural and institutional realities when evaluated against the selected theoretical frameworks. While students display clear intrinsic preferences that align with John Holland's (1997) emphasis on vocational personality congruence ($R^2 = .412$), these internal preferences are highly bounded and constrained by systemic external predictors, as conceptualized by Social Cognitive Career Theory (SCCT; Lent et al., 1994).

The finding that parental influence accounts for more than half (51.1%) of the variance in career selections mirrors deeply entrenched regional societal structures in northern Nigeria. Within Katsina State, parents maintain substantial structural, financial, and moral control over higher education funding, making their familial mandates highly persuasive. This finding demonstrates that in developing agrarian and transitioning societies, SCCT's "environmental/background affordances" frequently dominate Holland's individual trait-and-factor congruence objectives.

Crucially, the data refutes the standard sociological assumption that final-year undergraduates are highly susceptible to peer conformity. The multiple regression model isolates peer pressure as non-significant ($p = .303$). By the time students reach the NCE III threshold, they demonstrate a higher degree of vocational maturity. This development is largely catalyzed by their mandatory, credit-bearing Teaching Practice exercises. This direct academic exposure provides a realistic, unvarnished look at the pedagogical ecosystem. This structured experience enhances self-efficacy and reshapes professional objectives ($\beta = .541$, $p = .001$) far more effectively than informal peer cohorts.

Finally, the inferential (t)-test confirms that traditional gender expectations remain highly influential. Male students face pronounced socio-cultural pressure to secure high-status or financially lucrative employment paths due to their roles as prospective primary household providers. This dynamic results in a significantly higher mean perception score ($\bar{X} = 2.89$) regarding external socio-economic pressures compared to female students ($\bar{X} = 2.61$). This empirical pattern confirms that gender socialization

operates as a primary filter through which career goals are structured in Katsina State, validating SCCT's assertion that demographic background variables guide the operational formation of occupational actions.

5. Conclusion

This study establishes that career choice among NCE III students in Katsina State is a highly contextual process driven primarily by familial expectations and institutional exposure rather than peer dynamics. Parental influence serves as the primary socio-economic anchor for student paths, while structured academic training—specifically practical field Teaching Practice—serves as the most effective institutional mechanism to reinforce or correct professional trajectories. Furthermore, notable gender differences highlight that male and female teacher-trainees navigate external career pressures differently, necessitating distinct support configurations.

6. Recommendations

Based on the empirical results established in this study, the following policy and institutional recommendations are proposed:

Institutionalization of Early Career Counseling Interventions: Tertiary institutions within Katsina State should implement proactive, institutionalized career guidance frameworks during the foundational year (NCE I) rather than delaying interventions until the final year (NCE III). Early structural orientation will better align students' intrinsic passions with macroeconomic job market realities, thereby reducing academic apathy and professional attrition.

Integration of Family Stakeholders in Career Seminars: Given that parental influence accounts for over half of the variation in student vocational choices, Colleges of Education should host structured, joint institutional-parent stakeholder seminars. These forums should be designed to sensitize guardians to contemporary educational career paths, professional teaching upgrades, and the detrimental effects of imposing rigid occupational choices on their children.

Upgrading and Capitalizing on Teaching Practice Frameworks: Because structured academic exposure successfully overrides informal peer group conformity, the National Commission for Colleges of Education (NCCE) and institutional directorates should strengthen the mentorship and financial support mechanisms attached to practical field Teaching Practice. Enhancing this field experience will reinforce pre-service teachers' professional identities and long-term classroom retention.

Implementation of Gender-Responsive Guidance

Frameworks: Institutional guidance counselors must move away from generic counseling paradigms and adopt customized, gender-sensitive strategies. These interventions should specifically address the acute socio-cultural and economic provider pressures experienced by male students in northern Nigeria, while simultaneously fostering equitable professional growth pathways for female teacher-trainees.

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Teaching Methods Required by Woodwork Teachers for improving Students Practical Skills in Technical Colleges in Lagos and Ogun States, Nigeria

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Abstract. The study investigated teaching methods required by woodwork teachers for improving students' practical skills in technical colleges in Lagos and Ogun States. Three research questions guided the study and three null hypotheses were formulated and tested at .05 level of significance. The study adopted a survey research design. The population of the study is 68 woodwork teachers of 28 females and 40 males. The instrument used was a structured questionnaire and was validated by three experts in the Department of Industrial Technical Education, University of Benin, Benin City. The internal consistency of the instrument was determined using Cronbach's Alpha statistical tool and yielded a reliability coefficient of 0.81. The data collected were analyzed using mean ($\bar{x}$) and standard deviation (SD) to answer the research questions while independent t-test was used to test the analyzed hypotheses at 0.05 level of significance. The findings of the study showed that woodwork teachers required effective teaching methods for improving students' practical skills in technical colleges in Lagos and Ogun States. The study revealed that, there is no significant difference between the mean ratings of qualified and non-qualified, male and female woodwork teachers on the required teaching methods for improving students' practical skills in technical colleges. Based on the findings of the study, the researcher recommended that both Lagos and Ogun States governments should make efforts to provide in-service training programmes for woodwork teachers in the form of workshops, seminars, conferences and any other forms of training that will assist in improving their strategies for acquisition of required hands-on skill in technical colleges in Lagos and Ogun States.

Keywords: Teaching methods, Practical skills, and Technical Colleges.

1. Introduction

Vocational skills refer to an occupation or job which an individual gets involved in leading to recognition as an expert through experience which can be acquired through formal and non-formal education. In the formal setting, skills can be acquired through schools, such as the Technical Colleges, Polytechnics and Universities, while in non-formal setting skills are acquired through means such as vocational trade centres and apprenticeship schemes (Osuyi & Owenvbiugie, 2015). The use of vocational skills as a veritable tool for job, wealth creation and a means of survival and the preservation of the human race dates back to the beginning of human society. Skill acquisition has been a major concern of parents, business leaders, and educators in Nigeria regarding the existing skill gap between students of woodwork technology and the industry. Employers of labour have continually expressed their concerns over the dearth of skills among graduates of woodwork technology programme and skills required for employment. Therefore, the woodwork technology teachers who are responsible for the training and preparation of students for skills acquisition have great challenges in the cause of delivering their duties. Today's economy is full of sophistication with a lot of competition among job seekers all over the world and teachers of technical and vocational education must strive hard to ensure that students are given adequate and necessary foundation at the basic level for the purpose of self-reliance and national development (Ferguson, 2007).

According to Federal Republic of Nigeria (FRN, 2013) states that one of the goals of education in Nigeria is the development of appropriate skills, mental, physical and social abilities and competencies to empower the individual to live in and contribute

positively to the society. Such knowledge, skills and attitudes are acquired through the training provided in basic, post-basic and career education. Okorie (2011) held that Technical Colleges in Nigeria are established to prepare individuals to acquire practical skills and basic scientific knowledge. However, Technical Colleges are specialized institutions of learning where trade and modular courses are offered in addition to general education and science subjects. It is a post-basic institution established by the Federal and State Governments to complement vocational education programmes at that level. Hence, the graduates of Technical Colleges are expected to be equipped with knowledge, understanding and skills that would make them to be either be employable in the industry or be self-employed (FRN, 2014). Technical Colleges were established with the mandate to improve on the skill acquisition as well as to encourage occupational development (Pugates, 2014). The relevance of practical skills development in contemporary Nigeria society cannot be underemphasized as it creates a workforce empowered with matching skills, knowledge and internationally recognized to gain access to employment and ensure competitiveness in the dynamic global market.

According to Dauda, Bello, Usman and Adewole (2020) teaching of technical competencies inherent in brick/blocklaying and concreting works can only be effective if the teacher in the trade area is knowledgeable in both theoretical and practical aspects of the trade. However, Orebango (2010) also reported good human resources particularly well trained, qualified and devoted teachers help students in various aspect of development in practical projects and skills acquisition in woodwork related services. Similarly, there are various methods of teaching technical trade programmes in Technical Colleges; woodwork trade is one of the trade modular programmes in Technical Colleges in Nigeria. Woodwork is the art of producing objects or projects from wood such as doors, windows, roofs, beds, cupboards, chairs and tables. Woodwork includes timber technology, safety rules in the workshops, tools and classification of materials such as nails, adhesives, fittings and their uses, preparation of timber, classification and construction of joints, forestry and products of trees, woodturning, repairs and maintenance of tools and equipment are the practical aspect of woodwork (Aliyu, 2014). The process of working with wood is called woodwork practice. Woodwork has areas of specialization such as; carpentry, joinery, cabinet making, furniture making, upholstery, coffin making among others.

The training of woodwork teachers is aimed, at imparting them with adequate knowledge and skills to guide and direct the learning activities in a woodwork trade area or subject. The woodwork teacher is equipped with technical skills, pedagogical knowledge and methodology of teaching technical subjects. However, due to the high expectations in the training of technical and vocational education students towards employment after graduation, there is also the need for competent and highly equipped technical teachers who possess practical skills and methodology for transferring such skills to the student at various stages (Maclean & Kerre, 2009). The main goal of teaching technical and vocational education and training (TVET) in Nigeria technical colleges are to prepare students for the world of work through the acquisition of theoretical and practical skills (FRN, 2014). However, the current teaching approaches adopted by most teachers are focused on rote learning and “memorization/regurgitation of facts” which have dominated the system of technical and vocational education in Nigeria (Oduolowu, 2017).

Teaching methods could be regarded as the process and procedures adopted by teachers to guide and prepare students through organized and planned learning activities for the purpose of accomplishing educational goals. In the same vein, Alseldiqi and Mishra (2010) postulated that, the teaching and learning processes in technical and vocational institutions is conducted using traditional way without injecting new approaches by the teacher which is actually depriving students of learning the right skills needed for self-employment. Therefore, for proper practical performance in woodwork trades, appropriate teaching strategies must be applied by teachers for teaching both the theory and practical aspects of woodwork trades. Teachers also need relevant woodwork tools and equipment for imparting practical skills to the students under their control. In the context of this paper, a woodwork teacher is one who gives instructions, communicate knowledge, skills and attitude in woodwork trades to students.

Qualified teachers of woodwork trades are individuals who have requisite teaching qualifications. A qualified teacher can be defined as one who holds a teaching certificate and/or licensed by Teachers Registration Council of Nigeria (TRCN) to teach. Such qualifications as, Nigerian Certificate of Education NCE (Technical), Bachelor of Science Education B.Sc (Ed), M.Ed, PGDE (Technical) and Ph.D in Education, while unqualified and non-professionals teachers of woodwork trades are persons who have no teaching qualifications such as National Diploma (ND), Higher National Diploma (HND) or Bachelor of

Science B.Sc and PhDs in other fields outside Education.

Experienced teachers or teaching experience is the time spent by a teacher in the teaching profession. A person with considerable experience can gain a reputation as an expert. Therefore, woodwork teachers that have served for ten years and above with regard to this paper are regarded as experienced teachers, while others with less than ten years are regarded as less experienced teachers.

Gender on the other hand, refers to the economic socio-political and cultural attributes and opportunities associated with male and female. The influence of gender in teaching and learning of woodwork trade for students' practical skills has been a major concern to educational researchers for long, yet no consistent result has emerged. However, male teachers seem to be more favourable in practical skills acquisition than their female counterparts.

According to Okoro in Auta (2015) teaching method in vocational technical education include demonstration, field trips and project-based method. Other teaching methods are Computer Assisted Instruction and Artificial Intelligence (AI). However, Nwachukwu (2011) describe the art of demonstration as a process of graphic explanation of selected ideas, facts relationship or phenomenon. The author explained the instances of proper timing (that is, when to present demonstration).

Another training strategy found effective in vocational and technical education is field trip. According to Olaitan, Nwachukwu, Igbo, Onyenachi and Ekong in Oseni (2022) asserted that field trip training model exposes the learner to practical experience in their occupations using different locations and experiences. Field trips help students appreciate the relevance and importance of what they learnt in the classroom. Field trip as a teaching method mainly focuses on firsthand information objects, places, people or process, to enrich, extend, validate or vitalize information from printed materials and other sources, or to try to uncover entirely new data (Nwachukwu, 2011). Thus, it is imperative to determine the teaching methods, required by woodwork teachers for improving students' practical skills in technical colleges in Lagos and Ogun States.

1.1 Statement of the Problem

The performance of technical college students in woodwork technology practice in Nigeria might be faced with some challenges like lack of improved

practical skills among the woodwork technology teachers, inappropriate teaching methods for conducting practical projects, non-qualified woodwork teachers among others. Technical Colleges produce craftsmen who constitute the lower manpower needed in the country's industries. However, observation has shown or revealed that graduates of technical colleges in Nigeria are not readily employed due to dearth of practical skills among the students. This could be as a result of inappropriate teaching methods used by teachers for conducting practical lessons or workshop practices. Also, it is perceived that the poor performance of woodwork technology students in National Business and Technical Examination Board (NABTEB) Examination in practical examination was not encouraging especially in Lagos and Ogun States. Abdullahi (2010) attributed students' lack of practical skills necessary to develop and manage their career lives to the growing gap that exist between students, school and the real world of work. It is therefore, noteworthy that improved practical skills and appropriate use of teaching methods by woodwork teachers could contribute to effective performance of woodwork students in practical skills in technical colleges in Lagos and Ogun States.

1.2 Purpose of the Study

The main purpose of the study was to determine the teaching methods required by woodwork teachers for improving students' practical skills in technical colleges in Lagos and Ogun States. Specifically, the study assessed the following:

- Demonstration teaching method for students' practical skills in woodwork trades in technical colleges.
- Field Trip method of teaching strategy for improved students' practical skills in woodwork trades in technical colleges.
- Project Based method of teaching practical skills for improved students' practical skills in woodwork trades in technical colleges.

1.3 Research Questions

The following research questions guided the study:

- Does demonstration teaching method improve students' practical skills in woodwork trades in technical colleges?
- How does field trip teaching method improve students' practical skills in woodwork trades in technical colleges?

- Does project based teaching method improve students' practical skills in woodwork trades in technical colleges?

1.4 Hypotheses

The following null hypotheses were formulated and tested at .05 level of significance.

- There is no significant difference in the mean ratings of (qualified and unqualified) woodwork teachers on particular teaching method for teaching woodwork trades in technical colleges.
- Significant difference does not exist in the mean ratings of experienced and less experienced woodwork teachers on particular teaching method for teaching woodwork trades in technical colleges.
- There is no significant difference in the mean ratings of male and female woodwork teachers on particular teaching method for teaching woodwork trades in technical colleges.

2. Research Methodology

The descriptive survey design was adopted for the study. A structured questionnaire was used for the

collection of data. The response option of the questionnaire were based on a 4-point rating scale of Strongly Agree (SA) = 4, Agree (A) = 3, Disagree = 2, Strongly Disagree (SD) = 1. The population of the study comprised both qualified and unqualified, experienced and less experienced, male and female teachers of woodwork teaching in the technical colleges in Lagos and Ogun States. A total of 68 teachers of woodwork trades were used for the study. The instrument was validated by three experts in the Department of Industrial Technical Education, Faculty of Education, University of Benin, Benin City. The reliability of the instrument was ascertained using Cronbach Alpha Statistical method and yielded a reliability coefficient of 0.81 which was considered reliable for the study. Copies of the instrument were thereafter administered on the respondents and data collected were analyzed using Mean ($\bar{x}$) and Standard Deviation (SD) to answer the research questions while t-test statistics was used to test the null hypotheses at .05 level of significance. The decision rule was based on any calculated item with a Mean ($\bar{x}$) response equal or above 2.50 is considered as agreed while any calculated item with a mean ($\bar{x}$) response of less than 2.50 was regarded as disagreed. For hypotheses testing, the probability value (p) was used, if the p-value was less than or equal to .05, the null hypothesis was rejected, but if p-value was greater than .05 the null hypothesis was retained.

3. Presentation of Results

Research Question 1: Does demonstration teaching method improve students' practical skills in woodwork trades in technical colleges?

Table 1: Mean and standard deviation on demonstration method improves students' practical skills in woodwork trades in Technical Colleges.

S/N	Item Statements	Mean ($\bar{x}$)	Standard	Remark Deviation (SD)
1.	Using student-centred teaching style for teaching woodwork trade	3.41	0.55	Agree
2.	Teacher should first demonstrate the lesson in the presence of their students	3.51	0.80	Agree
3.	Allowing each student to demonstrate what has been learnt after each lesson	3.07	0.79	Agree
4.	The equipment and materials to be used must be organized at the place where demonstration is to take place.	3.36	0.82	Agree
5.	Using intelligent students to teach other students some woodwork concept.	3.08	0.55	Agree
6.	The topic chosen should fit and arouse the interest of the learner.	4.42	0.48	Agree
7.	Planning details demonstration on paper	3.61	0.74	Agree
8.	Outline the demonstration procedures, introduction, body and summary.	3.07	0.53	Agree
9.	Use key words that is necessary to get the lesson across to the learner in your practical model visual.	3.48	0.67	Agree
10.	Allowing each student to demonstrate what has been learnt after the lesson.	2.70	0.66	Agree
11.	A title should suggest the demonstration subject without telling the whole story.	2.73	0.48	Agree
12.	A neat well-groomed appearance is important.	2.61	0.50	Agree
13.	Arrange equipment and supplies neatly in order of how you would use them and practice the visual model severally prior to demonstration.	2.61	0.50	Agree
14.	Always measure with measuring tape the dimensions in front of your students.	3.58	0.55	Agree
15.	Give room for question and suggestions from the class.	3.49	0.48	Agree
Grand Mean		3.16	0.65	Agree

Table 1 above reveals the extent to which demonstration teaching method improves students' practical skills in technical colleges in Lagos and Ogun States. The respondents rated items 1 to 15 as agreed with a mean rating from 2.51 to 3.61 while the standard deviation also ranges from 0.48 to 0.82. The grand mean indicates a mean of 3.16 which is greater than the benchmark mean of 2.50. Thus, it can be seen that the respondents agreed that demonstration teaching method improves students' practical skills in technical colleges in Lagos and Ogun States.

Research Question 2: How does field trip teaching method improve students' practical skills in woodwork trades in technical colleges?

Table 2: Mean and standard deviation on the field trip teaching method improve students' practical skills in woodwork trades in technical colleges.

S/N	Item Statements	Mean ($\bar{x}$)	Standard	Remark Deviation (SD)
16.	Visiting woodwork technology industries at the end of each lesson for better understanding of some woodwork concepts	5.54	0.53	Agree
17.	Field trips is as effective method of teaching since it helps students acquire useful skills and knowledge.	3.48	0.50	Agree
18.	Field trips sharpens students' observational abilities and helps elicit their interest.	3.45	0.51	Agree
19.	Field trips is useful in developing all senses of students.	3.44	0.53	Agree
20.	Things can be observed and studied through field trip e.g. woodwork machines.	3.57	0.49	Agree
21.	Experienced gained during field trips can motivate students to read and construct models with information gathered from textbooks.	3.50	0.50	Agree
22.	Allowing students to teach themselves the acquired practical skills after the trip what has been learnt after the lesson.	3.51	0.50	Agree
		2.70	0.66	Agree
Grand Mean		3.49	0.50	Agree

Data presented in Table 2 show the mean and standard deviation of the respondents to what extent field trips teaching method improves students' practical skill in woodwork trades in technical colleges.

Research Question 3: Does project based teaching method improve students' practical skills in woodwork trades in technical colleges?

Table 3: Mean and standard deviation on the extent project-based teaching method enhances students' practical skills in woodwork trades in technical colleges.

S/N	Item Statements	Mean ($\bar{x}$)	Standard	Remark Deviation (SD)
23.	Allowing students to engage themselves in practicing what they learned from project.	3.43	0.50	Agree
24.	Using well equipped and organized workshop for practical	3.46	0.50	Agree
25.	Using modern hand tools for teaching during practical class.	3.37	0.57	Agree
26.	Grouping students into small groups during practice and monitoring.	3.50	0.50	Agree
27.	Emphasis should be laid on how to use a particular tool/equipment/machine.	3.53	0.56	Agree
28.	Always inviting woodwork experts to give lectures to students on practical innovations and skills.	3.66	0.48	Agree
29.	Always teaching practicals in a well-organized and equipped workshop.	3.50	0.50	Agree
30.	Project can be prepared by the students and placed on display.	3.41	0.67	Agree
31.	Giving project works model to students constructed at the of the lesson	1.90	0.93	Agree
Grand Mean		3.31	0.58	Agree

Data presented in Table 3 show the mean and standard deviation of the respondent to project based teaching method enhances students' practical skills in woodwork trades in technical colleges. The results further revealed that the respondents agreed on the items 23, 24, 25, 26, 27, 28, 29 and 30. But they disagreed that giving work model to students to construct at the end of each lesson attracted a mean of 1.90 and a standard deviation of 0.93. However, with a grand mean of 3.31 revealed that the respondents agreed that project-based teaching method enhances students' practical skills in woodwork trades in technical colleges in Lagos and Ogun States.

Research Hypothesis 1: There is no significant difference in the mean ratings of (qualified and unqualified) woodwork teachers on particular teaching method for teaching woodwork trades in technical colleges.

Table 4: Independent sample t-test on difference in mean ratings on qualified and unqualified woodwork teachers on particular teaching method to be adopted in teaching woodwork trades in technical colleges.

Qualification Of teachers	N	($\bar{x}$)	Std Deviation	Df	t-test	Sig	Remark
Unqualified	28	217.53	6.03	66	-0.05	0.96	Ho is
Qualified	40	217.62	7.75				accepted

Table 4 shows the independent sample t-test on the difference in the mean rating between qualified and unqualified woodwork teachers on particular teaching method to be adopted in teaching woodwork trades in technical colleges. It can be seen that the degree of freedom df is 66 and the t-test value is 0.05 and level of significance is 0.96 which is greater than the set alpha level of 0.05. Thus, the null hypothesis is accepted. This shows that there is no significant difference in the mean rating between qualified and unqualified woodwork teachers on particular teaching method to be adopted in teaching woodwork.

Research Hypothesis 2: Significant difference does not exist in the mean ratings of experienced and less experienced woodwork teachers on particular teaching method for teaching woodwork trades in technical colleges.

Table 5: Independent sample t-test on difference in mean ratings on less experienced and experienced woodwork teachers on particular teaching method to be adopted in teaching woodwork trades in technical colleges.

Experience of Teachers	N	($\bar{x}$)	Std Deviation	Df	t-test	Sig	Remark
Less Experience	29	217.17	7.94	66	-0.41	0.67	Ho is accepted
Experienced	39	217.89	6.38				

Table 5 shows the independent sample t-test on difference in the mean ratings between experienced and less experienced woodwork teachers on particular teaching method to be adopted in teaching woodwork trades in technical colleges. It can be seen that the degree of freedom is 66 and t-value is -0.41 and level of significance is 0.05. Thus, the null hypothesis is accepted. This shows that there is no significant difference in the mean ratings of less experienced and experienced woodwork teachers on particular teaching method to be adopted in teaching woodwork trades in technical colleges.

Research Hypothesis 3: There is no significant difference in the mean ratings of male and female woodwork teachers on particular teaching method for teaching woodwork trades in technical colleges.

Table 6: Independent sample t-test on difference in mean ratings of male and female woodwork teachers on any teaching method to be used for teaching woodwork trades in technical colleges.

Gender of Teachers	N	($\bar{x}$)	Std Deviation	Df	t-test	Sig	Remark
Male	39	216.69	6.66	66	-1.22	0.22	Ho accepted
Female	29	216.79	6.38				

Table 6 shows the independent sample t-test on difference in the mean rating between male and female woodwork teachers on particular teaching method to be adopted in teaching woodwork trades in technical colleges. It can be seen that the degree of freedom is 66 and t-value is -1.22 and level of significance is 0.22 which is greater than the set alpha level of 0.05. Thus, the null hypothesis is accepted. This shows that there is no significant difference in the mean rating between male and female woodwork teachers on particular teaching method to be adopted in teaching woodwork trades in technical colleges.

4. Discussion of Findings

Study findings for research question one revealed that respondents agreed that demonstration method is

required by woodwork teachers to improve students' practical skills in technical colleges in Lagos and Ogun States. This is corroborated by Nwoke (2019) who pointed out that vocational and technical education is concerned not just about teaching and learning, it is also concerned with producing things that have utility household items, implement, clothing, shelter, food among others for human sustenance. Demonstration method is useful mostly in imparting psychomotor skills and lessons that requires practical knowledge. The gains of using demonstration method in teaching lies in the fact that it bridges the gap between theory and practical, enables learners to become good observers and generate their interest and students see immediate progress as a result of a correct effort and it enables the teachers to teach manipulative and operational skills.

In terms of research question two, the study revealed that the respondents agreed that field trip method is required by woodwork teachers to enhance students' practical skills in technical colleges in Lagos and Ogun States. In view of this, Olaitan, Nwachukwu, Igbo, Onyemachi and Ekong in Oseni (2022) explained that field trip training model exposes learners to practical experience in their occupation using different locations and experiences. The findings is in line with Akubuilu (2010) who noted that field trip is a method of teaching that involves taking the students on an excursion outside the classroom for the purpose of making relevant observation necessary for understanding of the topic under study.

For the project-based method, the participants agreed that allowing students to engage themselves in practicing what they learned from projects using modern hand tools for teaching, using well equipped workshops for practicals among others promotes practical skills in students. Hence, with a ground mean that is higher than the benchmark means the respondents agreed that project-based method is required by woodwork teachers to enhance students' practical skills in technical colleges. This is supported by Nwachukwu (2010) who remarked that technical education project are regarded as concrete evidence of students' accomplishment of his/her educational achievement and as an investment, and that often people judge the worth of a programme by the number and quality of project completed.

The hypothesis tested revealed that there was no significant difference in the mean responses of qualified and unqualified woodwork teachers on particular teaching to be adopted in teaching woodwork. This finding corroborates Filgona, Sababa and Filgona (2016) whose study revealed that there is no significant difference between qualified and unqualified teachers on technical competency. However, the study's finding contradicted Ichazu and Omoregie (2020) study, whose study investigated the influence of teachers' qualification on students' academic performance in senior secondary school Chemistry and found out that there is a significant difference existing between the qualified and non-qualified teachers' competencies impacting on students' academic performance in senior secondary school in Chemistry.

Hypothesis two stated that there is significance in the mean responses between experienced and less experienced woodwork teachers on particular teaching method for teaching woodwork trades in technical colleges. The finding on this method corroborated Alhassan and Aede (2020) whose study investigated

professional competence for technical and vocational education training teachers at technical colleges in Niger State and found that there is no significant difference between experienced and inexperienced teachers on the needed competences.

Results from hypothesis three revealed that, there was no significant difference between male and female woodwork teachers on any particular teaching method to be used for teaching woodwork. The finding of this study corroborates Ibrahim, Adisa, Abdulkadir and Nene (2013) study on gender inequality in the performance of bricklaying and blocklaying skills. In all, these mean that qualification, experience and gender of teachers did not influence the mean responses of woodwork teachers on particular teaching method to be adopted in teaching woodwork.

5. Conclusion

Based on the findings of the study, it is concluded that this study has shown that the participants agreed that demonstration teaching method is required by woodwork teachers to enhance students' practical skills in woodwork trades. Similarly, field trip and project-based teaching methods are highly required by woodwork teachers for practical skill acquisition. Also, the study revealed that qualification of the teachers, experience and gender of the teachers did not influence the mean responses of woodwork teachers on the particular teaching method to be adopted in teaching woodwork trades in technical colleges in Lagos and Ogun States.

6. Recommendations

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

- The identified strategies required improvement needs for teachers of woodwork to form the basis for in-service training programme to be organized by the training institutions.
- Curriculum planners should use the identified strategies improvement needs in planning and developing the curriculum content of the in-service training programme.
- Government should make efforts to provide enough in-service training programmes for woodwork technology teachers. Such in-service training programmes should be in the form of a worksop, post graduate programmes, seminars, conferences and other forms that will assist the teachers of

woodwork in improving their practical skills acquisition strategies.

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The Role of History Education in Shaping Environmental Awareness and Cultural Revivalism among Student-Teachers: A Study of FCT College of Education, Zuba, Abuja

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Abstract. Environmental degradation and cultural erosion have become two of the most pressing challenges confronting Nigeria in the twenty-first century. While environmental challenges such as deforestation, flooding, desertification and pollution continue to threaten sustainable development, the nation's rich cultural heritage is increasingly being undermined by globalization, urbanization and changing social values. This study examines the role of History Education in shaping environmental awareness and promoting cultural revivalism among student-teachers, using the FCT College of Education, Zuba, Abuja, as case study. The study adopts a mixed-methods approach, combining qualitative and quantitative research. Data were generated through structured questionnaires administered to NCE II and NCE III History students and interviews conducted with lecturers in the History Department. Relevant literature and the History curriculum were also reviewed to provide theoretical and contextual support for the study. Findings reveal that History Education can play significant role in promoting environmental consciousness by exposing students to indigenous conservation practices, traditional ecological knowledge and sustainable resource management systems that characterized pre-colonial African societies. The study further establishes that the teaching of Nigerian and African history strengthens students' appreciation of their cultural heritage, thereby promoting cultural identity, patriotism and cultural revivalism. However, the study also identifies inadequate curriculum content, limited instructional resources, insufficient field-based learning opportunities and inadequate attention to environmental history as major constraints.

Keywords: History Education, Environmental Awareness, Cultural Revivalism, Indigenous

Knowledge, Sustainable Development, Teacher Education.

1. Introduction

History has remained one of the most important disciplines for understanding human society, preserving collective memory and promoting responsible citizenship. Beyond its traditional role of documenting past events, History Education serves as an instrument for transmitting societal values, preserving cultural heritage and equipping learners with the knowledge required to address contemporary social challenges. Through the study of historical experiences, individuals develop a better understanding of the interaction between human societies and their physical environment, while also appreciating the cultural values that have sustained communities across generations (Afigbo, 2005). However, in recent decades, environmental degradation has emerged as one of Nigeria's most serious developmental challenges. The country continues to experience widespread deforestation, desertification, flooding, erosion, pollution and indiscriminate exploitation of natural resources. These environmental problems have significant implications for economic development, food security, public health and sustainable livelihoods. At the same time, globalization, rapid urbanization and technological advancement have contributed to the gradual erosion of indigenous cultural values, languages, customs and traditional knowledge systems that once formed the foundation of many Nigerian communities (Babalola & Olawuyi, 2021).

Education is universally acknowledged as one of the most effective instruments for addressing societal challenges and promoting sustainable development.

Among school subjects, History occupies a unique position because it links the past with the present and provides guidance for the future. It enables learners to understand how earlier societies managed their natural environment, organized their social institutions and preserved their cultural heritage. Consequently, History Education provides opportunities for students to appreciate indigenous environmental conservation practices and cultural traditions that remain relevant to contemporary development (Ikime, 1980).

Traditional Nigerian societies developed several indigenous mechanisms for environmental conservation long before the emergence of modern environmental policies. Sacred groves, community forests, traditional land tenure systems, cultural taboos and communal resource management practices served as effective means of protecting biodiversity and ensuring the sustainable use of natural resources. Similarly, indigenous institutions, festivals, languages, crafts and traditional governance systems contributed significantly to the preservation of cultural identity and social cohesion. These historical experiences provide valuable lessons that can be integrated into contemporary History Education to foster environmental awareness and cultural revivalism among young people (Falola, 2003).

Despite the recognized importance of History Education, the subject has often received inadequate attention within the Nigerian educational system. Greater emphasis has frequently been placed on political history and constitutional developments, with relatively limited attention devoted to environmental history, indigenous ecological knowledge and cultural heritage studies. Consequently, many students graduate with limited appreciation of the historical relationship between human societies, their environment and their cultural identity.

As institutions responsible for preparing future teachers, Colleges of Education occupy a strategic position in promoting these values. Student-teachers who acquire sound historical knowledge and develop positive attitudes towards environmental conservation and cultural preservation are better equipped to transfer such values to future generations through classroom instruction. It is against this backdrop that this study investigates the role of History Education in shaping environmental awareness and promoting cultural revivalism among students of the History Department, FCT College of Education, Zuba, Abuja.

1.1 Research Questions

- To what extent does history education influence environmental awareness among History students in FCT College of Education, Zuba?
- To what extent does history promote cultural revivalism among the students?
- What are the challenges to using history education for environmental and cultural goals?

1.2 Justification of the Study

This study is justified on the premise that environmental sustainability and cultural preservation are essential components of national development. In recent years, Nigeria has witnessed increasing environmental degradation arising from deforestation, desertification, flooding, erosion, pollution and poor waste management. At the same time, many indigenous cultural values and practices are gradually disappearing due to westernization, urbanization and globalization.

History education occupies a strategic position in addressing these challenges because it exposes learners to the environmental practices and cultural heritage of past societies. Through the study of history, students gain knowledge of indigenous systems of environmental conservation, traditional methods of resource management, and cultural values that promoted peaceful coexistence and sustainable development.

The findings of this study are, therefore, of immense value to researchers, history lecturers and students, policy makers, curriculum planners and school administrators.

Lecturers: The knowledge gained has provided useful information to history lecturers on steps needed to be taken to elicit Cultural revivalism and environmental awareness.

Students: The outcome of this study has improved students' understanding of history and it has provoked in them the spirit of pride in their identity and Cultural heritage. This sense of belongingness had reinforced community identity and pride.

Curriculum Planners: This study is also of immense value to our curriculum designers by providing procedures and strategies to integrate within the framework of history teaching pedagogical steps that will instill in the student psyche the desire for Cultural revivalism and a holistic approach to their environment.

Researchers: This study had also provided future researchers with some reliable instruments, actions procedures as well as references for future research on the topic.

2. Literature Review

2.1 Conceptual Clarification

2.1.1 History Education

History Education refers to the systematic process of teaching and learning about past events, human experiences, institutions, and civilizations with the aim of developing critical thinking, historical consciousness, responsible citizenship, and national identity. Beyond the acquisition of historical facts, History Education enables learners to appreciate the relationship between the past, the present, and the future while providing lessons applicable to contemporary societal challenges.

History has often been described as the memory of society. Just as memory enables individuals to understand their identity and make informed decisions, History provides societies with knowledge of their collective experiences and guides future development. Consequently, History Education remains indispensable in promoting patriotism, responsible citizenship, and social cohesion.

2.1.2 Environmental Awareness

Environmental awareness refers to the knowledge, attitudes, values, and practices that encourage individuals to understand environmental challenges and participate actively in environmental conservation. It involves developing an appreciation of the relationship between humans and their environment and adopting sustainable practices that protect natural resources for present and future generations.

Environmental awareness extends beyond knowledge acquisition to include behavioural change. Individuals who possess adequate environmental awareness are more likely to engage in responsible environmental practices such as proper waste management, conservation of biodiversity, sustainable utilization of natural resources, and environmental advocacy.

2.1.3 Cultural Revivalism

Cultural revivalism refers to deliberate efforts aimed at reclaiming, preserving, revitalizing, and promoting indigenous cultural values, beliefs, customs,

languages, institutions, festivals, arts, and traditional knowledge systems that may have declined as a result of colonialism, modernization, or globalization.

History Education contributes significantly to cultural revivalism by exposing learners to the achievements of earlier civilizations, indigenous governance systems, traditional institutions, and cultural practices that continue to shape contemporary society. Through this process, learners develop pride in their cultural identity while appreciating Nigeria's cultural diversity.

2.2 Review of Related Literature

History generally connotes the study of the past, which provides the basis for understanding the present and making informed decisions about the future. It is to a people what memory is to an individual. The progress and development of every society depend largely on its ability to preserve its historical experiences and apply the lessons derived from them to contemporary realities (Isichei, 1983).

Teacher Education refers to the professional preparation provided to prospective and serving teachers with the objective of equipping them with the knowledge, skills, competencies, and professional attitudes necessary for effective classroom practice. One of the major goals of teacher education is to produce teachers who are intellectually sound, professionally competent, and capable of adapting to changing educational and societal needs (Fafunwa, 1974).

The relationship between History Education, environmental awareness, and cultural revivalism has attracted increasing scholarly attention in recent years. Several scholars argue that historical knowledge contributes significantly to environmental sustainability by exposing learners to indigenous environmental management systems that existed before the introduction of modern conservation policies (see Leicht et al, 2018; UNESCO, 2021; and Agbedahin, 2019).

UNESCO (2014) maintains that Education for Sustainable Development should draw extensively from indigenous historical knowledge and local cultural experiences in promoting sustainable environmental practices. Similarly, Falola (2003) argues that many pre-colonial African societies maintained environmental sustainability through communal land tenure systems, sacred groves, traditional conservation practices, and cultural taboos that regulated the exploitation of natural resources. According to the author, integrating these historical experiences into History Education provides learners

with practical alternatives for addressing contemporary environmental challenges. Usman (2003), observes that History should be viewed as a holistic discipline dealing with the totality of human experience. Consequently, there exists a strong relationship between the study of History and the physical, social, economic, and environmental experiences of society. Understanding this relationship enables learners to appreciate how historical developments have shaped interactions between people and their environment.

Afigbo (2005) further examined the role of cultural education in preserving and revitalizing traditional practices among youths in Nigeria. The study revealed that History Education that incorporates indigenous cultural heritage strengthens students' sense of identity and belonging while encouraging greater participation in cultural preservation activities. He emphasizes the importance of integrating environmental themes into subjects such as History and Geography. According to the study, exposing students to environmental issues through historical narratives helps them develop a holistic understanding of the consequences of human activities on the environment and encourages sustainable environmental practices.

Ogunniyi (2011) and Ogunyemi (2005) documented how indigenous conservation practices, including Yoruba sacred groves, traditional festivals, and Hausa *fadama* farming systems, have historically contributed to ecosystem preservation. These scholars argue that introducing such indigenous environmental practices into History Education enables learners to appreciate that environmental conservation is deeply rooted in African societies rather than being an entirely foreign concept. Similarly, Afigbo (2005) and Echeruo (1977) contend that History Education serves as an effective instrument for reversing the identity crisis created by colonialism and post-colonial institutions. They argue that exposing learners to pre-colonial African civilizations such as Nok, Benin, Kanem-Borno, and other indigenous political systems promote self-esteem, cultural pride, and national consciousness.

Within the broader international context, Jan Assmann's theory of cultural memory provides an important explanation for cultural revivalism. Assmann (1992) argues that collective memory preserved through historical narratives forms the foundation upon which societies reconstruct cultural identity and revive traditional practices. Historical memory therefore serves as a powerful mechanism for preserving languages, customs, institutions, rituals, and collective values across generations. William (1993), argue that understanding historical human-

environment interactions is crucial for contemporary environmental awareness. By studying how past societies adapted to and managed their environments, we gain insights into sustainable practices and the impacts of environmental changes over time.

Richard (1992), on the other hand, highlighted how historical narratives shape our understanding of environmental issues. The ways in which history is taught and remembered can influence how societies perceive their environmental responsibilities and challenges. For instance, narratives of environmental degradation or stewardship in history can drive current conservation efforts. Similarly, Carolyn (2017) have examined how historical ideas about nature and the environment have evolved. She argued that cultural revivalism can intersect with environmental awareness when traditional ecological knowledge and practices are revived as part of a broader movement to address modern environmental crises. And this is evident to the fact that the intersection of history, cultural revivalism and environmental awareness can best be understood in the increasing recognition of the value of indigenous knowledge in environmental management.

In essence therefore, the role of history education in shaping cultural revivalism and environmental awareness is deeply interwoven. Historical narratives not only influence how cultures reclaim their identities but also how they address environmental challenges. Understanding these dynamics requires a multidisciplinary approach that considers history, culture, and environmental science together.

However, despite the above scholarly contributions, most previous studies have concentrated on universities and secondary schools. Comparatively little attention has been given to Colleges of Education, which remain the principal institutions responsible for producing History teachers for Nigeria's basic education sector. This study therefore seeks to bridge this gap by examining the role of History Education in shaping environmental awareness and cultural revivalism among student-teachers at the FCT College of Education, Zuba.

3. Research Methodology

3.1 Research Design

This study adopted a case study research design, employing both qualitative and quantitative research methods to investigate the role of History Education in shaping environmental awareness and cultural

revivalism among student-teachers at the FCT College of Education, Zuba, Abuja.

The choice of a case study design was informed by its suitability for conducting an in-depth investigation of a contemporary phenomenon within its real-life context. The design enabled the researcher to obtain a comprehensive understanding of how History Education contributes to environmental awareness and cultural revivalism among students in the institution.

To achieve the objectives of the study, both primary and secondary sources of data were utilized. Primary data were generated through questionnaires and interviews, while secondary data were obtained from relevant textbooks, journal articles, official publications, and other scholarly materials on History Education, environmental sustainability, and cultural revivalism. In addition, the History curriculum of the College was reviewed to provide the theoretical and contextual framework for the study.

The adoption of a mixed-methods approach enhanced the credibility of the findings by allowing quantitative data to complement qualitative evidence obtained through interviews and documentary analysis.

3.2 Population of the Study

The population of the study comprised all NCE II and NCE III students of the History Department, FCT College of Education, Zuba, during the 2025/2026 academic session. The population consisted of 89 students, made up of 43 NCE II students and 46 NCE III students.

In addition, the study also included all the academic staff of the History Department. Owing to the relatively small size of the staff population, all the ten (10) lecturers were involved in the study to ensure adequate representation and to obtain comprehensive professional perspectives on the subject under investigation.

3.3 Sample and Sampling Technique

A sample of 50 students was selected from the student population using a simple random sampling technique. The sample comprised:

- 25 students from NCE II
- 25 students from NCE III

This ensured equal representation of both academic levels in the study while minimizing sampling bias.

For the qualitative component, all 10 lecturers in the History Department were purposively selected and interviewed because of their relatively small population and their direct involvement in History Education.

3.4 Instrument for Data Collection

Two principal instruments were employed for data collection:

Questionnaire

A structured questionnaire was designed by the researchers and administered to the selected student respondents. The questionnaire contained both closed-ended and a few open-ended items that sought information on students' perceptions of History Education, environmental awareness, and cultural revivalism.

The questionnaire was organized into sections corresponding to the research questions and objectives of the study.

Interview

A semi-structured interview schedule was administered to lecturers in the History Department. The interview provided opportunities for respondents to express their professional opinions regarding the contribution of History Education to environmental sustainability and cultural preservation.

The interview data complemented the questionnaire responses by providing richer explanations of the issues investigated.

3.5 Validity and Reliability of the Instruments

To ensure the validity of the research instruments, the questionnaire and interview schedule were submitted to experts in History Education and educational research for critical examination.

Their observations, suggestions, and corrections were carefully incorporated before the final administration of the instruments. This process ensured that the instruments adequately measured the variables they were intended to measure and were consistent with the objectives of the study.

The reliability of the instruments was enhanced through careful wording of the questionnaire items, clarity of instructions, and consistency in the administration procedures. These measures improved the dependability of the data generated during the study.

3.6 Method of Data Collection

The researchers personally administered the questionnaires to the selected respondents within the History Department after obtaining the necessary approval from the Head of Department.

Completed questionnaires were retrieved immediately where possible, while interviews with lecturers were conducted at mutually convenient periods. The researcher ensured that respondents were adequately informed about the purpose of the study before participating.

3.7 Method of Data Analysis

Data generated from the study were analyzed using both qualitative and quantitative techniques.

Quantitative data obtained from the questionnaires were analyzed using descriptive statistics, including frequency counts, percentages, tables, and charts, where appropriate.

Qualitative data generated through interviews and documentary review were analyzed using the historical and thematic methods of analysis. Responses from interview participants were carefully examined, categorized into emerging themes, and interpreted in relation to the objectives of the study.

The combination of descriptive statistical analysis and qualitative interpretation enabled the researcher to present comprehensive findings capable of addressing the research questions.

3.8 Ethical Considerations

Ethical principles were strictly observed throughout the conduct of the study.

Participation was voluntary, and respondents were adequately informed about the purpose of the research before completing the questionnaire or participating in the interview.

The anonymity and confidentiality of all participants were guaranteed, and information obtained during the study was used strictly for academic purposes.

4. Results and Discussions

This section presents the analysis and interpretation of data collected from the field in line with the objectives and research questions of the study. Data were obtained through two complementary instruments: a structured questionnaire administered to selected NCE II and NCE III History students and semi-structured interviews conducted with lecturers in the History Department, FCT College of Education, Zuba. Of the total population of 89 students (43 in NCE II and 46 in NCE III), 50 students were selected through simple random sampling, comprising 25 students from NCE II and 25 students from NCE III. In addition, 10 lecturers participated in the interview sessions, providing qualitative insights that complemented the questionnaire findings.

The findings are presented according to the three research questions that guided the study. Quantitative results are first presented using descriptive statistics, followed by qualitative evidence from the interviews. The findings are then interpreted in relation to the reviewed literature.

4.1 Demographic Characteristics of Respondents

Before addressing the research questions, it is important to describe the demographic profile of the respondents. The demographic characteristics of the respondents were analysed based on gender, age, academic level, and course combination. The results are presented in Table 4.1.

Table 4.1: Demographic Characteristics of Student Respondents

Item	Distribution	Details	Population	Percentage
Q1	Gender	Male	20	40%
		Female	30	60%
		Total	50	100%
Q2	Age	Below 18	27	54%
		18 – 22	13	26%
		23 – 27	7	14%
		Above 27	3	6%
		Total	50	100%
Q3	Level	NCE II	25	50%
		NCE III	25	50%
		Total	50	100%
		CRS/HIS	2	4%

Q4	Course Combination	ECO/HIS	14	28%
		ENG/HIS	14	28%
		GEO/HIS	4	8%
		HIS/ISS	12	24%
		HIS/SOS	4	8%
		Total	50	100%

Source: Field Survey, 2026.

Table 4.1 presents the demographic characteristics of the respondents. The gender distribution shows that 30 respondents (60%) were female, while 20 respondents (40%) were male. This indicates that female students constituted the majority of the respondents, suggesting a relatively higher representation of females among the History students sampled for the study.

With respect to age, the majority of the respondents, 27 students (54%), were below 18 years. This was followed by 13 respondents (26%) within the 18–22 years age bracket, while 7 respondents (14%) were between 23 and 27 years. Only 3 respondents (6%) were above 27 years. The findings indicate that the respondents were predominantly young students, which is expected in a College of Education environment and suggests that the study largely captured the perceptions of youths who are at a formative stage of developing environmental awareness and cultural values.

Regarding academic level, the respondents were evenly distributed between NCE II and NCE III, with 25 students (50%) selected from each level. This equal representation ensured a balanced perspective from students at different stages of their academic programme and minimized the possibility of bias arising from overrepresentation of a particular level.

The distribution by course combination reveals that ECO/HIS and ENG/HIS had the highest representation, each accounting for 14 respondents (28%). This was followed by HIS/ISS with 12 respondents (24%). The least represented course combination was CRS/HIS, which accounted for only 2 respondents (4%), while GEO/HIS and HIS/SOS each contributed 4 respondents (8%). This distribution indicates that the respondents were drawn from diverse History-related academic combinations, thereby enhancing the representativeness of the sample and ensuring that the findings reflect the views of students from different disciplinary backgrounds within the History Department.

Overall, the demographic profile suggests that the study captured a diverse group of student-teachers in terms of gender, age, academic level, and course combinations, thereby providing a reliable basis for examining the role of History Education in shaping environmental awareness and cultural revivalism among students of FCT College of Education, Zuba.

4.2 Descriptive Statistics

This subsection presents the analysis and discussion of findings based on the research questions that guided the study. Data obtained from the questionnaires administered to students were analysed using frequencies, percentages, and mean scores, while qualitative data generated through interviews with lecturers were analysed thematically. The presentation of findings follows the sequence of the research questions, with each question being examined through the integration of quantitative and qualitative evidence. This approach provides a comprehensive understanding of the role of History Education in shaping environmental awareness and promoting cultural revivalism among student-teachers at the FCT College of Education, Zuba.

Research Question One: To what extent does History Education influence environmental awareness among students of FCT College of Education, Zuba?

Table 4.2: Students' Perceptions of the Influence of History Education on Environmental Awareness (n = 50)

Item	Statements	SA	A	U	D	SD	Mean	Decision
Q5	History classes taught me about how Nigerians lived with nature in the past	18	26	5	1	0	4.22	Agreed
Q6	I learned about traditional practices like sacred groves, taboos, and seasonal farming through History	19	20	8	3	0	4.10	Agreed
Q7	My History teacher connected past events to present environmental problems	15	27	8	0	0	4.14	Agreed
Q8	History lessons included stories of local heroes, festivals, and cultural values	17	23	9	1	0	4.12	Agreed
Q9	History education made me proud of Nigerian culture	11	29	10	0	0	4.02	Agreed
Q10	I wish History was taught more with local examples from my state/community	19	22	9	0	0	4.20	Agreed

Grand Mean = 4.13 **Source:** Field Survey, 2026.

Respondents generally agreed that History Education positively influences environmental awareness. The results indicate that students perceive History Education as making a meaningful contribution to environmental awareness. The highest mean score (4.22) suggests that respondents strongly acknowledged the role of History lessons in helping them understand historical interactions between Nigerians and their natural environment. Likewise, the high ratings across the remaining items demonstrate that students believe History Education has enhanced their understanding of indigenous conservation practices, contemporary environmental problems, and responsible environmental behaviour. The overall grand mean of 4.13 indicates a consistently favourable perception of the contribution of History Education to environmental awareness among student-teachers.

The lecturers interviewed expressed similar views. They emphasized that History Education exposes learners to indigenous ecological knowledge, sacred groves, communal resource management, traditional farming systems, and other historical conservation practices. According to them, such knowledge helps students appreciate the importance of environmental stewardship and sustainable use of natural resources. However, they also observed that environmental history receives insufficient emphasis in the current curriculum and recommended greater incorporation of local environmental case studies and experiential learning activities.

The convergence between the questionnaire findings and the interview responses strengthens the conclusion that History Education contributes positively to environmental awareness among student-teachers. The findings are consistent with the views of UNESCO (2014), which advocates the integration of indigenous knowledge into education for sustainable development, and Falola (2003), who argues that many African societies historically practiced sustainable environmental management through indigenous institutions and cultural norms. The findings also support Usman (2003)'s position that History is a holistic discipline linking human societies with their physical environment.

Research Question Two: To what extent does History Education promote cultural revitalisation among students of FCT College of Education, Zuba?

To answer this research question, responses to the questionnaire items relating to cultural identity, indigenous knowledge, cultural heritage, and cultural participation were analysed using frequencies, percentages, and mean scores. The quantitative findings were subsequently corroborated with data obtained from the interviews conducted with lecturers in the History Department.

Table 4.3: Students' Perceptions of the Role of History Education in Promoting Cultural Revivalism (n = 50)

Item	Statements	SA	A	U	D	SD	Mean	Decision
Q11	History education has improved my appreciation of Nigerian cultural heritage.	18	22	9	1	0	4.14	Agreed
Q12	History classes encourage the preservation of indigenous traditions.	13	21	15	1	0	3.92	Agreed
Q13	History education strengthens my cultural identity.	17	20	12	1	0	4.06	Agreed
Q14	History lessons have increased my pride in Nigerian culture.	21	17	10	2	0	4.14	Agreed
Q15	History has improved my knowledge of indigenous cultural practices.	16	18	16	0	0	4.00	Agreed
Q16	Learning Nigerian history promotes respect for cultural diversity	8	32	8	2	0	3.92	Agreed
Q17	appreciate the importance of preserving Nigerian cultural heritage.	11	27	12	0	0	3.98	Agreed
Q18	History encourages me to participate in cultural activities.	11	32	6	1	0	4.06	Agreed
Q19	History Education can help revive endangered cultural values.	16	20	13	1	0	4.02	Agreed

Grand Mean = 4.03 **Source:** Field Survey, 2026.

Table 4.3 presents the responses of students on the role of History Education in promoting cultural revivalism. The analysis reveals that all the questionnaire items recorded mean scores above the acceptance benchmark of 3.50, indicating a positive perception of the contribution of History Education to cultural preservation and revivalism. The highest mean score (4.14) was recorded for Items Q15 and Q18, suggesting that respondents strongly agreed that History Education enhances appreciation of Nigeria's cultural heritage and encourages positive attitudes towards indigenous cultural values. Similarly, Items Q17, Q23, and Q24 recorded mean scores above 4.00, indicating that History lessons have increased students' knowledge of indigenous traditions, strengthened their sense of cultural identity, and encouraged greater respect for Nigerian cultural heritage.

Although Items Q16 and Q21 recorded comparatively lower mean scores (3.92), they still exceeded the decision benchmark, implying that respondents generally agreed with the statements. This suggests that while History

Education has made a positive contribution to cultural revitalisation, there remains room for strengthening students' active participation in cultural activities and deepening their knowledge of indigenous traditions. The overall grand mean of 4.03 demonstrates that students perceive History Education as an effective instrument for promoting cultural identity, preserving indigenous knowledge, and revivalism cultural values among student-teachers.

The qualitative data obtained from the interviews with lecturers strongly support the questionnaire findings. The participants unanimously agreed that History Education plays a vital role in preserving Nigeria's cultural heritage by exposing students to indigenous political institutions, traditional leadership systems, festivals, languages, arts, customs, and historical achievements. Several lecturers observed that many young people have become increasingly detached from their cultural heritage as a result of globalization, urbanization, and the influence of foreign cultures. They maintained that the teaching of History provides students with opportunities to rediscover their cultural identity and appreciate the values embedded in indigenous institutions and practices.

The lecturers further emphasized that incorporating local history into classroom instruction, organizing visits to historical sites and museums, and encouraging students to participate in cultural festivals would significantly enhance the effectiveness of History Education in promoting cultural revivalism.

The findings from both the questionnaire and the interviews indicate that History Education contributes significantly to cultural revivalism among student-teachers at FCT College of Education, Zuba. The consistently high mean scores demonstrate that students recognize the role of History in preserving indigenous knowledge, promoting cultural pride, and strengthening national identity. The lecturers' views further reinforce this conclusion by highlighting the importance of local history and cultural heritage in fostering a sense of belonging and continuity among learners.

These findings are consistent with the position of Afigbo (2005), who argues that History Education is an important instrument for restoring cultural identity weakened by colonialism and post-colonial influences. The findings also support Echeruo (1977), who emphasizes that knowledge of indigenous history promotes self-esteem and national consciousness.

Furthermore, the results corroborate Jan Assmann's theory of cultural memory, which holds that historical narratives and collective memory serve as the foundation for preserving and reconstructing cultural identity. By exposing students to indigenous historical experiences, History Education contributes to the transmission of cultural values from one generation to another and encourages the preservation of Nigeria's rich cultural heritage.

Overall, the evidence suggests that History Education remains a valuable tool for promoting cultural revivalism among student-teachers. However, maximizing this potential requires greater emphasis on experiential learning, local history, and indigenous knowledge within the History curriculum.

Research Question Three: What are the challenges associated with the use of History Education in promoting environmental awareness and cultural revivalism among students of FCT College of Education, Zuba?

This research question was addressed using the open-ended responses from the student questionnaire and the semi-structured interviews conducted with lecturers. The responses were analysed thematically to identify recurring issues affecting the effective use of History Education in promoting environmental awareness and cultural *revivalism*.

Table 4.4: Major Challenges Identified by Students and Lecturers

Theme	Students' Responses	Lecturers' Responses	Interpretation
Curriculum limitations	Students indicated that environmental history and indigenous knowledge receive limited attention in classroom instruction.	Lecturers observed that the curriculum places greater emphasis on political and socio-economic history than environmental and cultural themes.	Curriculum enrichment is necessary to strengthen the environmental and cultural dimensions of History Education.
Inadequate instructional materials	Respondents requested more history books, maps, photographs, documentaries and teaching aids.	Lecturers emphasized the shortage of instructional materials and locally relevant historical resources.	Limited teaching resources reduce the effectiveness of History instruction.
Limited field-based learning	Students recommended excursions to museums, historical monuments and heritage sites.	Lecturers supported regular field trips as a means of connecting classroom learning with historical realities.	Experiential learning would enhance students' understanding and appreciation of history.

Declining interest in indigenous culture	Some students acknowledged that many young people pay little attention to traditional cultural practices.	Lecturers attributed this trend to globalization, urbanization and excessive dependence on foreign cultural influences.	History Education should deliberately promote indigenous cultural values among young people.
Institutional support	Students suggested greater institutional encouragement for History-related activities.	Lecturers recommended increased funding, curriculum review and policy support for History Education.	Institutional commitment is essential for improving History teaching and learning.

Source: Field Survey, 2026.

Thematic analysis of the students' open-ended responses, as can be deduced from table 4.4 above, revealed a number of recurring themes:

Curriculum Improvement: Many respondents recommended that the History curriculum should contain more content on environmental conservation, indigenous ecological knowledge and local cultural heritage. Students believed that learning about historical environmental practices would help them better understand present-day environmental challenges.

Experiential Learning: A substantial number of students suggested that History teaching should extend beyond classroom lectures. They recommended regular educational visits to museums, historical monuments, cultural festivals and heritage sites as practical means of strengthening historical understanding and appreciation of indigenous culture.

Community-Based Learning: Several respondents proposed that students should participate in community environmental sanitation, tree-planting campaigns and cultural activities as part of History Education. According to them, such practical experiences would reinforce classroom learning while promoting civic responsibility. On the other hand, the interviews with lecturers produced five dominant themes.

Curriculum Review: Most lecturers observed that the existing curriculum pays insufficient attention to environmental history and indigenous ecological knowledge. They recommended that these themes should receive greater emphasis within History Education programmes.

Indigenous Knowledge Systems: Participants emphasized the importance of documenting and teaching indigenous conservation practices, traditional farming methods, sacred groves, communal land management systems and local conflict resolution mechanisms.

Field-Based Instruction: Nearly all the lecturers advocated regular field trips to museums, archaeological sites, historical monuments and cultural festivals. They argued that direct exposure to

historical sites significantly improves students' understanding and appreciation of historical realities.

Capacity Building: Several participants recommended periodic workshops and professional development programmes for History lecturers to enable them incorporate environmental and cultural themes more effectively into classroom instruction.

Institutional Commitment: The lecturers unanimously stressed that curriculum reform alone would not be sufficient without institutional support. They advocated improved funding, adequate instructional materials, stronger government commitment and partnerships with museums, archives and cultural institutions.

The findings from both the student questionnaire and lecturer interviews demonstrate that the effectiveness of History Education in promoting environmental awareness and cultural revivalism is constrained by several interrelated factors. Although students generally recognized the importance of History Education, they identified practical challenges such as inadequate instructional resources, limited field-based learning opportunities and insufficient emphasis on environmental history. These concerns were reinforced by the lecturers, who additionally highlighted curriculum limitations and inadequate institutional support.

The convergence of these findings suggests that improving the role of History Education requires a comprehensive approach involving curriculum reform, increased investment in teaching resources, expanded experiential learning opportunities and stronger institutional commitment. Addressing these challenges would enhance the capacity of History Education to contribute more effectively to environmental sustainability and cultural preservation.

5. Discussion of Findings

The study set out to examine the role of History Education in shaping environmental awareness and promoting cultural *revivalism* among student-teachers at the FCT College of Education, Zuba. Evidence obtained from both the questionnaire and the

interviews indicates that History Education makes a meaningful contribution to achieving these objectives.

First, the quantitative findings revealed that students generally agreed that History Education has enhanced their environmental awareness. This was further supported by the lecturers' views that historical knowledge exposes learners to indigenous conservation practices and encourages responsible attitudes towards environmental stewardship. These findings are consistent with UNESCO's advocacy for integrating indigenous knowledge into Education for Sustainable Development and with Falola's argument that pre-colonial African societies developed sustainable environmental management practices through cultural institutions.

Second, the findings demonstrated that History Education plays an important role in promoting cultural *revivalism*. Students acknowledged that History lessons strengthened their appreciation of Nigerian cultural heritage, while lecturers emphasized that the study of local history, traditional institutions and indigenous knowledge fosters cultural identity and national consciousness. These findings corroborate the works of Afigbo (2005), Echeruo (1977) and Jan Assmann, who argue that historical knowledge and cultural memory are central to preserving cultural identity across generations.

Finally, the study identified several challenges limiting the effectiveness of History Education, including curriculum limitations, inadequate instructional resources, limited field-based learning opportunities and insufficient institutional support. The consistency of the student and lecturer responses suggests that addressing these challenges would substantially improve the contribution of History Education to environmental sustainability and cultural preservation.

Overall, the integration of quantitative and qualitative evidence demonstrates that History Education remains a strategic instrument for producing environmentally conscious and culturally grounded teachers. However, its full potential can only be realised through sustained curriculum reform, improved teaching resources and stronger institutional support.

6. Conclusion

This study examined the role of History Education in shaping environmental awareness and promoting cultural revitalisation among student-teachers at the FCT College of Education, Zuba, Abuja. The study was motivated by growing concerns over

environmental degradation and the gradual erosion of indigenous cultural values in Nigeria, and the need to explore how History Education can contribute to addressing these challenges.

Using a mixed-methods case study approach, data were collected from fifty (50) History students through questionnaires and from ten (10) lecturers through semi-structured interviews. The combination of quantitative and qualitative data provided a comprehensive understanding of the subject under investigation.

The findings revealed that History Education can play significant role in promoting environmental awareness among student-teachers. Through the study of historical experiences, indigenous conservation practices, traditional ecological knowledge and human-environment interactions, students develop a greater appreciation of environmental sustainability and the need for responsible environmental behaviour. The findings further indicate that History Education can contribute to cultural revitalisation by strengthening students' knowledge of indigenous traditions, cultural heritage, historical achievements and societal values. In this regard, history serves not only as a record of past events but also as a mechanism for preserving collective memory, transmitting cultural values and fostering national identity.

The study also established that despite its positive contributions, the effectiveness of History Education is constrained by several challenges. These include inadequate emphasis on environmental history and indigenous knowledge within the curriculum, limited instructional materials, insufficient field-based learning opportunities, declining interest in indigenous cultural practices among young people, and inadequate institutional support for History-related activities.

Overall, the study concludes that History Education remains a vital instrument for promoting environmental consciousness, cultural preservation and responsible citizenship among student-teachers. By exposing learners to the environmental and cultural experiences of earlier generations, History Education equips future teachers with knowledge and values that can contribute to sustainable development and nation-building.

7. Recommendations

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

Curriculum Enrichment: Curriculum developers and educational authorities should review the History curriculum to incorporate more content on environmental history, indigenous ecological knowledge, climate-related historical experiences and traditional conservation practices. Such enrichment will strengthen the capacity of History Education to address contemporary environmental challenges.

Promotion of Local History: Greater emphasis should be placed on local history, oral traditions and indigenous knowledge systems within History Education programmes. This will enhance students' appreciation of their cultural heritage and strengthen efforts aimed at cultural revivalism.

Increased Field-Based Learning: Educational institutions should organize regular field trips to museums, archives, historical monuments, archaeological sites and cultural festivals. Such experiential learning opportunities will help students connect classroom knowledge with historical realities and cultural experiences.

Provision of Instructional Resources: Government agencies, educational institutions and relevant stakeholders should provide adequate instructional materials, including textbooks, documentaries, maps, archival materials and digital resources, to support effective teaching and learning of History.

Capacity Building for Lecturers: Regular workshops, seminars and professional development programmes should be organized for History lecturers to improve their knowledge of environmental history, indigenous knowledge systems and innovative teaching strategies.

Strengthening Institutional Support: Colleges of Education and other teacher-training institutions should provide greater institutional support for History-related activities, including cultural exhibitions, historical clubs, environmental awareness programmes and community engagement initiatives.

Collaboration with Cultural and Environmental Institutions: History departments should establish partnerships with museums, archives, environmental agencies and cultural organizations to facilitate research, educational visits and practical learning experiences for students.

Encouragement of Community Participation: Students should be encouraged to participate actively in community-based environmental conservation projects, cultural festivals and heritage preservation programmes. Such participation will reinforce historical knowledge while promoting civic responsibility and social engagement.

8. Contribution to Knowledge

This study contributes to the growing body of scholarship on History Education by demonstrating that the discipline extends beyond the study of political events and historical facts. The findings show that History Education can serve as a valuable tool for promoting environmental awareness, preserving indigenous knowledge and revivalism cultural values among student-teachers.

The study also provides empirical evidence from a College of Education setting, an area that has received comparatively limited attention in existing literature. By integrating environmental sustainability and cultural revivalism within the framework of History Education, the study broadens contemporary understanding of the relevance of History in addressing present-day societal challenges.

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Character Education and Pro-Social Behaviour of Secondary School Students in Ikpoba Okha Local Government Area, Edo State

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Abstract. The purpose of this study was to ascertain the connection between character education and pro-social behaviour among secondary school students in Ikpoba Okha Local Government Area of Edo State, Nigeria. Two research questions were posed and two hypotheses were developed and test at .05 level of significance. The study adopted a correlational research design, with a population that consisted of 6,589 senior secondary two (SS2) pupils from the 21 public secondary schools in the study area. Taro Yamene sampling equation was used to choose a sample size of 377 SS2 students for the study. Out of 21 schools, ten (10) public secondary schools were chosen at random for the study. Therefore, respondents were chosen for instrument administration based on a random sample balloting procedure for each sampled school. The researchers developed an instrument titled “Character Education and Students Pro-social Behaviour (CESPBQ)”, this was used to collect data with an overall reliability coefficient of .78 for character education and .83 for items measuring students’ pro-social behaviour. Of the 377 copies of the questionnaire distributed, 7 copies were not utilized for data collection and analysis as they were wrongly filled by some of the respondents. As a result, just 370 of the questionnaire remained, which were utilized for data analysis. Using Pearson Product Moment Correlation (PPMC) statistics to analyse the data, the study conclusion showed that secondary school students’ pro-social behaviour, honesty, and self-discipline have high positive and significant relationship. The researchers came to the conclusion with a recommendation among others that, teachers and parents, through effective relationship and supportive bound, should model desirable character traits in young ones. As such, laudable character traits would encourage students to display honest conducts in schools.

Keywords: Character Education, Pro-Social Behaviour, Honesty, Self-Discipline.

1. Introduction

Character training is essential for successful living of every individual, particularly in the 21st century, where individuals are expected to be found worthy in character and learning for national development. Pala (2011) posited that character education is the disposition and habit which determine the manner one responds to desires, challenge, fear, failure and success. Students learn value, moral ethics and character through the normal realities of their daily lives in schools.

The idea of developing character in students is a perennial and global issue. Ancient Greek philosopher; Socrates, Plato and Aristotle discussed the pursuit of virtue and goodness at length. For instance, Gecan and Mulholland-glaze in Troutman (2014) asserts that Socrates strongly believed that transmitting moral values and traditions of the society in imperative and a part of school duty. In recognition of this, some of the goals of education in Nigeria encapsulated in the National Policy of Education (FRN, 2013) are to produce scholars who are morally sound, patriotic and effective citizens, capable of making responsible decisions and wise judgment. The importance of character education in Nigeria was revived in the early 1990s in an effort to address the increased incidence of anti-social and violent behaviour among pupils, which was linked to a lack of character education. Character education tends to instill in people an awareness of their civil responsibilities, an ability to know what to do for the society and not only for selfish gains. According to Azuka and Andrew (2020), character education is a

catch-all word for instruction that helps kids acquire the necessary abilities and internalize values to help them become tomorrow's leaders. The authors added that areas which should be covered in a good character education programme would include being honest, adopting a conduct that complies with the guidelines and regulations of the school, maintaining respect for others, having self-control and accountability, while treating others fairly with full sense of forgiveness when the need arises.

Most often, students spend more time at school than at home. Integrating character education into the school culture would result in the production of a crop of students with desirable values since the students get significant knowledge, skills, attitudes, and habits from the school that can help them attain their full potential. Williams (2010) commented that character education enhances students' positive self-esteem, multicultural tolerance, display of pro-social behaviour and higher order thinking. Hughes (2018) added that character education can be seen as lessons and activities that develop a student's character, which are embedded in subjects like Social Studies, Civic Education and Religious Knowledge among others. developing social skills, civic responsibility, mutual respect, conflict resolution and bullying prevention and exhibition of pro-social behaviour, such as obedience to rules and regulation of the school are common themes in character education.

One component of character education that pupils must learn in school is self-discipline in order to effectively exhibit pro-social behaviour. Self-discipline is concerned with ability to control behaviours in order to avoid unacceptable behaviour and achieve set goals. It is the ability of an individual to assume some social and oral roles without being asked to, taking responsibility for his or her actions. A self-disciplined person, would create a conducive and stimulating environment for others to actualize and enjoy their moral roles without threatening them, taking responsibility of his or her actions particularly when faced with difficult circumstances. Students who imbibe the character of self-discipline as explained by Bear (2018), are most likely to act, based on what they know is morally right, and do away with immoral behaviours.

Honesty is a universal human value which has to do with adherence to truth, refusal to lie, to cheat and to deceive. According to Tolafari (2010), students who are honest usually display behaviours that benefit others. during the traditional education era, most parents and the extended family members deliberately put temptation in the way of their children to test their

truthfulness. Caution and severe punishments were meted to those children who cheat and who were not truthful. Such condition deters most of them from showing dishonest behaviour. Thus, it is believed that if children are taught why honesty should be their way of life, they will live by them throughout their lives.

Similarly, in modern society, the school is official education institution with authority. Students are expected to honour and respect school heads and teachers who might caution them against immoral conducts. Observing the rules and regulations of the school is an aspect of pro-social behaviour. Teachers need to teach young ones the benefits of displaying pro-social behaviour such as kindness, gratitude and empathy, and also model such characteristics for students to emulate. Teaching of such pro-social behaviour may contribute to a child's social and academic success. Pro-social fosters positive traits that benefit learners and the larger society. Therefore, it is against this backdrop that the researchers sought to understand the relationship between character education and pro-social behaviour of secondary school students in Ikpoba Okha Local Government Area.

1.1 Statement of the Problem

The Nigerian educational system is seen to be injected with anti-social vices that are gradually eroding the confidence in our schools. In the secondary schools, there are standards of behaviour which are expected of a student. Students are expected to be submissive to school authorities, obey school rules and regulations, be punctual and regular at school, respect others, be neat always, well dressed to school, study hard and pass examinations. Students are expected to exhibit some level of discipline as compared to those that had not attended such level of education. But in most cases, the opposite seems to be the case, as school adolescents usually engage in social vices such as thuggery, cultism, indecent dressing, rape, drug abuse, examination malpractice, pre-marital sexually and truancy, resulting in high rates of school drop-out.

It is disheartening to observe that in some parts of Ikpoba Okha Local Government Area, students usually roam the streets during school hours, committing deviant offences such as bullying, stealing, drug abuse, cultism, smoking, assault, excessive aggression against other students. Some students go as far as fighting teachers, and parents. The rate of indiscipline and lack of respect for elders, parents, teachers and constituted authorities is alarming. Negative gang activities, such as cultism is noticed on regular basis. These unethical behaviours,

if not controlled may lead to these students growing up into armed robbers, rapists, terrorists, cultists, ritualists and lawless individuals, thereby impeding development and peaceful coexistence in the state. Therefore, the present study sought to investigate the relationship between character education and pro-social behaviours of secondary school students in Ikpoba Okha Local Government Area.

1.2 Research Questions

To direct the study, the following research questions were developed:

- What relationship exists between the pro-social behaviour and self-discipline of secondary school students in the Ikpoba Okha Local Government Area?
- What relationship exists between honesty and pro-social behaviour of secondary school students in Ikpoba Okha Local Government Area?

1.3 Hypotheses

The research hypotheses listed below were developed and put to the test at .05 significance level:

- There is no significant relationship between self-discipline and pro-social behaviour of secondary school students in Ikpoba Okha Local Government Area.
- There is no significant relationship between honesty and pro-social behaviour of secondary school students in Ikpoba Okha Local Government Area.

2. Theoretical and Conceptual Framework

2.1 Schwartz Theory of Basic Values (1992)

The theory of basic values was proposed by Schwartz, the Past President of the International Association for Cross-cultural Psychology and recipient of the Israel prize in psychology in 1992. As a scholar, Schwartz made important contributions on value research papers in psychology and other fields of human endeavour. According to Schwartz's theory of fundamental human values, values are used to describe individuals, cultural groups, and communities as well as to track changes over time and explain the motives behind attitudes and behaviours. According to Schwartz, every individual possesses a multitude of values that fluctuate in importance, and that individuals and groups have distinct values "priorities" or

"hierarchies". One person may find a certain value to be extremely essential, while it is unimportant to another. According to Schwartz (1992), values influence how acts, policies, and events are chosen or assessed. Individuals make decisions about what is right or wrong, valid or illegitimate, worthwhile or not worth doing depending on the potential impact on their most valued beliefs.

The significance of Schwartz's theory of basic values lies in its clarification that children make decisions about what is right or wrong, legitimate or illegitimate, worthwhile or not, based on the potential representations of their deeply held belief. If teachers teach their students/pupils the consequences of being dishonest, such would serve as deterrent to further actions. Also, children whose teachers' value truthfulness or fairness in their dealings with people and who always frowns at cheating of any form or weight may likely consider such behaviour as legitimate.

2.2 Concept of Character Education

Character education is that education that impacts fundamental ethical principles for both adults and children. Based on the ethical deals they have learnt, individuals adopt attitudes that are characteristics of safe, healthy, and knowledgeable communities – the building blocks of the society. It makes young ones develop habits that promote mutual cooperation and togetherness amongst families, friends, neighbors, communities, and nations. According to Battistich (2012 as cited in Chimezie and Sobekon, 2018), the objectives of Character Education are to produce excellent citizens who comprehend the benefits of moral ideals that contribute to a productive, just, and democratic society. A young individual develops the willingness to work hard, make moral decisions, and live lives with meaning as their character grows. Creating learning environment where students may reach their full potential and accomplish their essential goals is a key component of a successful character programme.

Character education deals with inculcating basic human values into the citizenry of any nation especially the youth. It also results in pupils that are highly ethical, compassionate, courteous, accountable, and possessing integrity and self-control in the classroom. It entails imparting positive qualities that help students function in society. Character education, according to Sakellaridi (2016), is a kind of education that fosters and supports people's intellectual, social, emotional, ethical growth. It's a lifelong process of learning that helps adults and children grow into

moral, considerate, critical, and responsible individuals.

2.3 Concept of Pro-social Behaviour

Pro-social behaviour covers a broad range of actions intended to benefit others. This includes, but is not limited to, cooperation, sharing, helping, charitable giving and volunteering. As such, pro-social behaviour usually entails spending resources, time and effort or sometimes even incurring physical harm for the benefit of others. Pro-social children perform voluntary activities for the help of an individual or group of individuals (Kruglanski and Stroebe, 2012). Pro-sociality is a term synonymous with altruism, cooperation, heroism and trustworthiness (Margana, Bhogal, Bartlett and Farrelly, 2019). The major aspects of prosocial behaviours as noted by Shirin (2020) are empathy, agreeableness, peer acceptance and volunteer activities.

2.4 Self-Discipline and Pro-social Behaviour of Students

The capacity to establish and adhere to a plan or reasonable objective is a sign of self-discipline. According to Wall, Finkel, and Denson (2011), exercising self-control involves refraining from actions that could cause harm to others. It entails honouring pledges and carrying through on agreements. It serves as the cornerstone for numerous other character traits. Self-discipline frequently entails perseverance, upholding long-term obligations, and delaying pleasure for later. It also entails learning to be patient and managing strong feelings like jealousy and rage. Adamu (2020) asserts that parental self-discipline helps children control their behaviour and provides them with the strength of character to make moral decisions. However, if children don't learn self-control, they are more likely to engage in harmful behaviour. They frequently get into harmful situations because they lack the ability to assess or regulate their impulses.

Self-discipline among students is crucial for learning, academic success, and maintaining appropriate classroom behaviour. Students who are highly self-disciplined may be able to better focus on long term achievement goals and re-organized their behaviour to facilitate positive social interaction and relationship. In a study conducted by Grusec and Goodness (2014), self-discipline is strongly correlated with students' healthy behaviours in school. The authors went on to say that, students who are not disciplined are more prone to behave in a way that is not compliant with the established guidelines controlling a classroom setting.

In addition, Bear (2018) stated that through encouraging self-discipline, educators help children become people who know and value right from wrong, take ownership of their actions, value cooperative connections, and genuinely care about and are interested in others.

2.5 Honesty and Pro-social Behaviour of Students

Honesty simply means adherence to truth; the refusal to lie, cheat or deceive (Lambardo, 2009). Honesty could also be interpreted as being truthful with oneself and with others, being trustworthy, loyal, fair and sincere. Honesty is the quality of being truthful, sincere and straightforward in one's dealing with others. An honest person is one who always tells the truth, does not deceive, cheat, steal or hide vital facts from people that need them. Okunloye and Koledoye (2013) described honesty as a state of being straight forward and upright in whatever one does. According to these authors, honesty is the quality of being honest, always telling the truth and never cheating or stealing.

Honesty flourishes in friendship, when friends are faithful to each other. Parents and teachers who are seen as custodians of knowledge should exhibit honest behaviour in the school and in all their dealings, such that students can imitate them. It entails having enough empathy to not deceive people in order to further one's own interests. According to Grusec and Goodness (2014), some parents and teachers provide the most constant and visible models of behaviours associated with character development. Berns (2017) revealed that honesty is an essential value that is needed in all aspects of life; adding that being honest at home predisposes students to being honest in their association with others outside the home. The author added that students whose teachers achieve success by illegitimate means are most likely to imitate such behaviour in order to achieve better grade academically. Bureau and Mageau (2014) earlier conceived that honesty is significantly associated with adolescents' display of honesty in schools, and adherence to school rules.

3. Research Methodology

For the study, a correlational research strategy was adopted. This design is used whenever the researcher wants to find out the magnitude and direction of relationship that exist between the dependent and independent variables (Udoh and Joseph, 2025). Consequently, this design was deemed appropriate for the study since it allowed the researcher to assess the connection between pro-social conduct and character

education is secondary school students in Ikpoba Okha Local Government Area.

The population for the study comprised all the 6,589 senior secondary two (SS2) students in the 21 public secondary schools in Ikpoba Okha Local Government Area (Directorate of Planning and Research Statistics, Edo State Secondary Education Board, Benin City, 2024).

A sample size of 377 senior secondary two (SS2) was selected for the study, using Taro Yamane sampling formulae. Ten (10) public secondary schools were chosen at random from a total of fifteen schools for the study using a basic random sampling technique. Thereafter, a balloting method of random sampling was used in selecting the respondents per sampled school. The researchers developed an instrument titled "Character Education and Students' Pro-social Behaviour Questionnaire (CESPBQ) were used for data collection. the CESPBQ had two sections, A and B. Section A contained 10 items on character education while section B contained 8 items measuring students pro-social behaviour. CESPBQ was measured in a four-point rating scale of: Strongly Agree (SA) = 4; Agree (A) = 3; Disagree (D) = 2; Strongly Disagree (SD) = 1.

In order to determine the instrument's reliability, internal consistency reliability technique was used. Here, the instrument was administered to 40 SS2 students in a selected school not included in the sample. The instrument was administered and data were collated. Data was subjected to correlation and Cronbach Alpha statistics was applied for test of internal consistency of the instrument. This yielded the overall reliability co-efficient of .78 for character education and .83 for items measuring students' pro-social behaviour. This index according to Udoh and

Josph (2025) is a high reliability index since the reliability co-efficient is above .50. As a result, the instrument was deemed reliable for use in the study.

The researcher, together with two research assistants, individually administered the instrument to the respondents in their individual schools. Also, permission from the respective principals was sought to allow the respondents respond to the items in the instrument. In addition to items written on the questionnaire, verbal instructions and clarifications where needed were also given to subjects. Copies of the questionnaire administered were filled according to instructions and collected instantly. Out of the 377 copies of questionnaire issued, 7 copies were not used for data collation and analysis because they were not properly filled by the respondents, while some lost in the process. Hence, the questionnaire instruments were reduced to 370 which were used for data analysis. Pearson Product Moment Correlation (PPMC) statistics were used to analyse the generated data. The research questions were answered using the decision rule presented by Nuunally (2011) as follows:

Coefficient (r) – Relationship
 1.00
 $\pm .71$ to $\pm .99$ – Very high positive relationship
 $\pm .50$ to $\pm .70$ – High positive relationship
 $\pm .35$ to $\pm .49$ – Average or moderate positive relationship
 $\pm .33$ to $\pm .34$ – Weak positive relationship
 $\pm .10$ to $\pm .22$ – Very weak positive relationship

For the null hypotheses, the standard for decision was to reject the research hypotheses when the calculated r-value is greater than or equals to the critical value, and retained when the calculated value is less than the critical value.

4. Results and Discussion of Findings

Research Question 1: What relationship exists between the pro-social behaviour and self-discipline of secondary school pupils in the Ikpoba Okha Local Government Area?

Variables	n	$\frac{\sum x}{\sum y}$	$\frac{\sum x^2}{\sum x^3}$	$\sum xy$	r-value	Remark
Self-Discipline (x)	370	5477	81919	171455	.871	Very High Positive Relationship
Pro-social Behaviors of Students (y)	370	5417	79971			

Table 1 shows a very high positive relationship between self-discipline and pro-social behaviours of secondary school students in Ikpoba Okha Local Government Area. The result yielded a correlation coefficient of .871. This result suggests that if the students cultivate the character of self-discipline from the schools they are more likely to display pro-social behaviours.

Research Question 2: What relationship exists between the honesty and pro-social behaviour of secondary school in Ikpoba Okha Local Government Area?

Table 2: Correlation analysis of responses between self-discipline and pro-social behaviours of secondary school students

Variables	n	$\frac{\sum x}{\sum y}$	$\frac{\sum x^2}{\sum x^3}$	$\sum xy$	r-value	Remark
Honesty (x)	370	5483	82083	175229	.743	Very High Positive Relationship
Pro-social Behaviors of Students (y)	370	5417	79971			

Table 2 shows a very high positive relationship between honesty and pro-social behaviours of secondary school students in Ikpoba Okha Local Government Area. The result yielded a correlation coefficient of .743. This result implies that the more teachers teach the students honest dealings, the greater students would display pro-social behaviours.

Hypotheses Testing

Hypothesis 1

Students' pro-social behaviour and self-discipline in secondary school in Ikpoba Okha Local Government Area do not significantly correlate

Table 3: Pearson Moment Correlation analysis of the relationship between self-discipline and pro-social behaviours of secondary school students

Variables	n	df	r-cal	r-crit	Decision
Honesty (x)	370	368	.743	0.196	Rejected Ho
Pro-social Behaviors of Students (y)					

Source: Field Data (2023) S = Significant: $P < .05$; $df = 368$; critical $r = 0.196$

Table 3 shows that the calculated r-value of .871 exceeded the critical value of 0.196 at the degree of freedom of 368 and .05 significant levels. As a result, the alternative hypothesis is retained and the null hypothesis is rejected. These indices that pro-social behaviour and self-discipline are significantly correlated in secondary school pupils in Ikpoba Okha Local Government Area.

Hypothesis

The pro-social behaviours of secondary school students in the Ikpoba Okha Local Government Area do not significantly correlate with honesty.

Table 4: Pearson Product Moment Correlation analysis of the relationship between honesty and pro-social behaviours of secondary school students

Variables	n	df	r-cal	r-crit	Decision
Honesty (x)	370	368	.743	0.196	Rejected Ho
Pro-social Behaviors of Students (y)					

Source: Field Data (2023) S = Significant: $P < .05$; $df = 368$; critical $r = 0.196$

Table 4 shows that the calculated r – value of .743 exceeded the critical value of 0.196 at the degree of freedom of 368 and at .05 significant levels. As a result, the alternative hypothesis is retained and the null hypothesis is rejected. This suggests that pro-social behaviour and honesty are significantly correlated in secondary school pupils in Ikpoba Okha Local Government Area.

5. Discussion of Findings

The researcher made a combined discussion of findings from the research questions and hypotheses of the study.

The first research question and hypothesis results revealed a very strong, positive correlation between pro-social conduct and self-discipline among secondary school pupils in Ikpoba Okha Local Government Area. This finding is in agreement with the finding of the study conducted by Grusec and

Goodness (2014), that high self-discipline is strongly correlated with students' healthy behaviours in school. The authors added that students who lack self-discipline are most likely to act in a way that is inconsistent with the laid down rules and regulations governing a learning situation. Hence, it is observed from this finding that poor self-discipline encourages behaviours that is not pro-social in nature.

The findings of research question two and hypothesis two demonstrated a strong, positive correlation between secondary school students' pro-social actions and honesty in Ikpoba Okha Local Government Area. This finding is in agreement with the finding of the study conducted by Berns (2017), who found that honesty is the value that is needed in all aspects of life; and that being honest at home disposes students to being honest in school activities. The author added that students whose teachers usually consider illegitimate means to achieve success are most likely to imitate such behaviour in order to achieve better grade academically. This finding is also in tandem with that of Bureau and Mageau (2014), that honesty is significantly associated with adolescents' display of honesty in schools and adherence to school rules. Hence, it is observed from this finding that students who learn honesty as worthwhile character are most likely to display pro-social behaviour in the school.

6. Conclusion and Recommendations

Based on the findings of the study, it is therefore concluded that self-discipline, honesty and respect are essential component of character education that can enhance pro-social behaviours secondary school students. Based on the findings of the study, the following recommendations are made:

- Teachers and parents through affective relationship and supportive bond should ensure that they model desirable character traits which young ones can emulate; as such character traits would encourage them to display honesty conducts in school.
- Teachers should always explain moral rules and principles as well as consequences of moral violations to students so that they can continue to maintain pro-social behaviours essential for self and national development.

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Evaluating Traditional and Contemporary Parenting: Educational Policy Implications for Child-To-Adulthood Development in Nigeria

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Abstract. This study looked at the nature of traditional and modern parenting in Nigeria and their educational policy implications for children from childhood to adulthood in Nigeria. The aim was to examine the effects of changing parenting practices on the educational outcomes, discipline, value orientation and decision-making of school administrators and children from childhood to adulthood in selected states of Nigeria with a descriptive survey design method, which involved questionnaires and interviews in the collection of data. 300 parents, teachers and school administrators were sampled. The results showed that traditional parenting focuses on community work, values, moral discipline, respecting elders and authority to grow into adulthood, while contemporary parenting emphasizes on child autonomy, dialogue, opinion and exposure to digital learning. These models have coexisted and have led to both harmony and disillusionment in the field of education, which has affected students' behaviour, academic motivation, and the relationship between teachers and parents. The study found that effective educational policies in Nigeria should be grounded in insights from both parenting styles to promote complete child development to adulthood. It suggests that policymakers can enhance family education programs, include family involvement as a part of school policies and foster value education in both family and school for a better balance between expectations and goals. The blend of tradition and modernity is crucial for improving teaching and learning results and nurturing responsible adult citizens.

Keywords: Traditional, Contemporary Parenting, Educational Administration, Policy Implications, Child to Adulthood Development.

1. Introduction

Parents are universally recognized as a vital and important determinant of the moral, social, emotional and intellectual development of children and it is a cornerstone of child development (Okafor & Nwankwo, 2022). It determines the attitudes and behaviours of children that impact their lives and learning within the school environment as well as at home. Traditionally, parenting in Nigeria is shaped by cultural norms, religious beliefs, and community values, and is seen as a task of the collective family and community, both as a social and moral duty (Adeniyi, 2021). The job of the grown-up education is to do this. In the past, Nigerian parents stressed respect for their elders, industriousness, honesty, and community service. Children are brought up in a disciplined and moral environment with a view to maintaining family integrity and values in society (Uche & Eze, 2020).

But in Nigeria, parenting has undergone a tremendous transformation with the onset of modernization, urbanization and globalization. The traditional concept of family child care has been replaced by modern methods that are in accordance with Western norms and experiences of global digitalization. In today's world, parents are more likely to take a flexible stance, encouraging conversations, emotional support, and autonomy in their children (Ogunyemi, 2023). Digital technology and a new social and economic landscape have reinforced this change, reshaping the roles and expectations of parents. As such, a child today in Nigeria is raised in an environment that encourages freedom of expression and technological skills over traditional moral discipline and community rearing (Adewale, 2021).

The evolution of these parenting changes has far-reaching ramifications for educational policy and practice. The challenge for schools now is how to deal with children whose families are born to different values and beliefs, and therefore have different lifestyles. The concept of child-centeredness and participatory school governance (Aina & Olayinka, 2022) is pressing for contemporary parents to call for a change in the discipline and conformity approach that traditional parents are using. This puts pressure on the school atmosphere where school leaders are trying to reconcile the traditional concept of discipline with the contemporary notions of students' rights and inclusion.

Moreover, parenting styles tend to manifest in children's schoolwork, social interactions with peers and their attitudes towards authority figures in school. An awareness of these trends is critical in formulating educational policies that will meet Nigeria's changing family structure. Educational policies and administrators should help to reconcile the traditional values and norms with various educational approaches to foster comprehensive learning and character-building. This study aims, therefore, to examine the impact of parenting changes on policy development, school discipline and the development of childhood to adulthood outcomes. It highlights the importance of culturally competent education administration, which can link home and school in the current context in Nigeria (Ezeaku, 2023).

1.1 Statement of the Problem

Over the last few years, the family and parenting structure in Nigeria has experienced consistent changes as a result of socio-cultural, technological and economic influences (Okafor & Nwankwo, 2022). The traditional parenting style is based on community work and discipline, respect for seniors, authority and morality. Today, however, it has been gradually replaced or diluted with modern methods that focus on the voice of the child, their autonomy, conversation and negotiation (Ogunyemi, 2023). Today's parenting has led to a decrease in conventional moral control and adherence to authority, both of which are critical for the administration of the school to be effective (Aina & Olayinka, 2022).

These paradigm shifts have led to certain problems in educational administrative practices. Nowadays, schools in Nigeria are facing challenges of low moral values, indiscipline, poor motivation among students, lack of respect for school authorities, and lack of cooperation between home and school (Adewale, 2021). The expected roles of parents and educators'

conflict, with traditional parents calling for stiffer school discipline, while modern parents find this "repressive" and "outdated. The differences make the job of the school administrators difficult to keep harmony, discipline and effective teaching-learning processes both in the classroom and in the school (Ezeaku, 2023).

Further, the relationship between the new parental style and the management of the school has not been sufficiently considered in Nigeria's educational policies. Likewise, there is a lack of clear policy frameworks that encourage parent involvement in school while at the same time respecting traditional values and the demands of contemporary educational practice (Uche & Eze, 2020). This policy gap has led to inconsistencies in discipline enforcement, a decrease in students' sense of moral responsibility, and a breakdown in communication between home and school, which is expected to resolve that gap between responsible children to adulthood development. This is the problem to be addressed by the study.

1.2 Research Gap

In view of these challenges, the need to explore the impact of traditional and contemporary parenting attitudes on educational administration in Nigeria cannot be overemphasized. An awareness of these influences will support the creation of more culturally inclusive and relevant education policies by policymakers and administrators. If not, the schools can continue to have conflicts between what parents want and what the administration considers its aim, which will then impact student behaviour, performance, and national education outcomes (Adeniyi, 2021). This, therefore, is an attempt to fill the gap with the intention of studying the link between Parenting Style, Child-to-Adulthood development and educational administration with a view of formulating policy recommendations that will be able to blend traditional values and modern trends for the general good of the Nigerian educational system.

1.3 Purpose/objective of the Study

The purpose of the study is to evaluate traditional and contemporary parenting practices with their educational policy implications for child-to-adulthood development; specifically, the following objectives will be the focus:

- To evaluate the influence of traditional and contemporary parenting styles on children's development and academic outcomes of students in schools in Nigeria.

- To examine the policy implications of the co-existence of traditional and contemporary parenting practices for effective educational administration for child-to-adulthood development in Nigeria.

1.4 Research Questions

- How do traditional and contemporary parenting styles influence children's development and academic outcomes of students in schools in Delta State, Nigeria?
- What are the policy implications of the co-existence of traditional and contemporary parenting practices for effective educational administration for child-to-adulthood development in Delta State, Nigeria?

1.5 Research Hypotheses

- There is no significant relationship between traditional and contemporary parenting styles and child development for academic outcomes in Delta State Nigerian.
- There is no significant relationship between the policy implications of traditional and contemporary parenting practices and effective educational administration of child-to-adulthood development in Delta State, Nigeria.

1.6 Significance of the Study

The findings of the study are relevant to both national, state and local authorities, particularly the educational policymakers and school administrators, to understand the need to develop policies that are more inclusive and blend to both parenting practices.

The findings will also facilitate individuals, families and societies to align traditional and modern parenting to achieve better child-to-adulthood development.

1.7 Scope of the Study

The study is limited to the evaluation of traditional and contemporary parenting and its educational policy implications for the child to the adulthood development. Emphasis is on Delta State, South-South Nigeria.

2. Conceptual and Theoretical Underpinnings of Parenting

Parenting is a multidimensional construct, comprising practices, beliefs and the emotional atmosphere in

which caregivers socialize their children (Lansford, 2021). Although classic typologies (authoritative, authoritarian, permissive, and neglectful) are still valuable analytical constructs, it is important to recognize that parents cannot be analyzed without taking into account the cultural, economic, and historical contexts within which they exist (Lansford, 2021). However, cross-cultural research indicates that parenting behaviour can have varying child outcomes as a result of culturally influenced norms and expectations (Lansford, 2021). These theoretical approaches emphasized the need to examine Nigerian parenting in a socio-cultural context as distinct from the Western context.

2.1 Traditional Nigerian Parenting: Features and Educational Consequences

The parental styles found in Nigeria are described as community-oriented, disciplinarian and based on moral education and respect for elders (synthesis studies on Nigerian parenting trends). Here, the extended family is involved in child rearing and socialization emphasizes obedience, duties, and conformity to communal norms (communal responsibility, moral discipline). Empirical studies in Nigeria also connect such practices with increased respect for school authority and clearer notions of duty and behaviour, which help maintain an orderly classroom and greater adherence to school rules (country studies reviewed). But some critics say that traditional expectations of authority can inhibit autonomy and critical thinking, a feature of modern curricula in increasing demand.

2.2 Contemporary Parenting in Nigeria: Urbanization, Media, and the Digital Age

Modern Nigerian parenting is a product of the increasing rate of urbanization, the higher education of mothers and fathers, their exposure to foreign media and the popularization of digital technologies. In recent years, some Nigerian studies have pointed out the gradual transition toward more dialogic and child-centred pedagogies, more attention to negotiation, concerns about emotional support, and increased focus on digital literacy, which have been affected by global parenting discourses and the possibilities of smart devices (digital parenting studies). These strategies can encourage creativity, self-expression and the development of 21st-century competencies, but can also face some challenges such as the loss of community-based norms of behaviour, heightened risk exposure to young people in online environments and the fuzzy boundaries between adult and child authority. Research indicates that while some aspects

of education are better, others are worse; students are more likely to engage more with digital learning resources, but are also more likely to suffer from attention problems and Internet addiction and from dismissing traditional authority structures.

2.3 Parenting Styles and Student Academic/Behavioural Outcomes in Nigeria

The relationship between parenting styles and school outcomes has been the subject of empirical investigation in Nigeria in recent years. Some regional studies show a positive relationship between authoritative (warm but firm) parenting and academic achievement and psychosocial adjustment, while extreme authoritarian and permissive parenting are associated with either poor academic performance or discipline problems (studies from Sokoto, Delta State, Lagos, among others). The results are consistent with the cross-national pattern but show some local variation too, such that in some Nigerian settings firm parental control can also be a source of good academic performance; in others, it can be a source of poor academic performance. Such heterogeneity suggests that assessment needs to be localized and the dangers in extrapolating from any one study or area.

2.4 Parental Involvement, School Policy and Educational Administration

The role of the parent is always highlighted as a key variable linking home parenting practices to school success. The study by the Nigerian researchers shows that good communication between parents and schools, parent involvement in school governance and homework monitoring with students are linked to good discipline and achievement (Lagos district and nationwide studies). But system barriers (poverty, time constraints, poor school outreach, and lack of policies) create obstacles for effective engagement in many communities. Therefore, the educational administrator is faced with the double challenge of formulating policies that can (a) take advantage of the strengths of both traditional and contemporary parenting and (b) reduce parental conflicts with the school over parenting and pedagogy. The following policy interventions were identified in the literature: structured parent-education programs, school-based family liaison officers and family-friendly mechanisms of school governance that take into account cultural values and support contemporary pedagogical goals.

3. Methodology

3.1 Research Design

This study used a descriptive survey research design as this research methodology is suitable for obtaining the opinions, perceptions and experiences of the respondents to the study on traditional and contemporary parenting and its implications for educational administration and child-to-adulthood development in Nigeria. The design allowed the researcher to collect quantitative and qualitative data from both parents and teachers and school administrators who were drawn from a cross-section of the population without manipulating any of the variables. Nworgu (2015) stated that descriptive survey design is appropriate for educational research to describe the existing phenomena as they occur naturally and relationships between the variables.

3.2 Population of the Study

All parents, teachers and school administrators in 1200 purposively selected public and private secondary schools in Delta State, Nigeria constituted the population of this study. The groups were selected due to their complementary roles in child development and educational management. Parenting agency is the family system of values and discipline, and teachers and administrators are the family system in their manifestation and management of values and discipline within the school environment.

3.3 Sample and Sampling Techniques

Thirty parents, 30 teachers, and 30 school administrators were selected as a total of 300 respondents using Taro Yamen Formula. The sample was taken using a multistage sampling technique. Three Local Government Areas (LGAs) were randomly selected from each senatorial zone in Delta State, with the result that a total of three LGAs selected from this state. Delta State, with a total of 3 LGAs, was selected by random selection from each senatorial zone of the state. The five secondary schools were selected by a simple random sampling technique in the second stage, in each of the selected LGAs. Finally, stratified sampling was used to ensure the representation of gender and role of respondents in each school, proportionately. This enabled a balance of views and experiences within the population to be represented (Uzoagulu, 2011).

Taro Yamen Formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where: n= sample size

N =population size
 e =Level of significance (margin of error)
 Given: $N=1200$, $e=0.05$
 $e^2=(0.05)^2=0.0025$
 $N(e^2)=1200 \times 0.0025=3.0$
 $1+N(e^2)=1+3.0=4.0$
 $n=\frac{1200}{4.0} = 1200 \div 4=300$
 $n=300$.

3.4 Instrument for data collection

The major data collection tool used was a structured questionnaire, which was called "Parenting Styles and Educational Administration Questionnaire (PSEAQ)." The questionnaire was divided into four sections, with each item rated on a four-point Likert scale ranging from Strongly Agree (4) to Strongly Disagree (1), with a grand mean of 2.50 and acceptable representing a positive response, while 2.49 or below is rejected, representing a negative response. In addition, the instrument was supplemented by semi-structured interviews with selected school administrators to better understand the implications of the changes in parenting trends for the policy.

3.5 Content and Face Validity

The instrument was subjected to the review of three experts in Educational Administration and policy development of the University of Delta, Agbor, to ensure content and face validity of the instrument. Their input enabled the refinement of unclear statements and matched elements with the study goals. To ensure the reliability of the data, a pilot test was conducted on 30 respondents outside the main study area and the internal consistency of the data was determined using the Cronbach Alpha method with a coefficient of 0.82, which is very high, signifying high internal consistency (Ogunbameru, 2019).

4. Results

Demographic Characteristics of Respondents (N = 285)

Variables Respondent	Category of Respondents	Frequency	Percentage
	Parents	140	49.1%
	Teachers	95	33.3%
	School Administrators	50	17.6%
	Total	285	100.0%
Gender	Male	128	44.9%
	Female	157	55.1%
Age Range (Parents)	Total	285	100.0%
	25–34 years	35	12.2%
	35–44 years	90	31.6%
	45–55 years	115	40.4%
	56 years & above	45	15.8%

3.6 Administration of Instrument for Data Collection

Out of the 300 questionnaires administered to the study respondents by the researcher, with the help of some trained research assistants, a total of 285 questionnaires were recovered from the study respondents. This value represents a 95% retrieval rate, which, according to world best practices, in terms of administering questionnaires, is considered reasonably high. The confidentiality and anonymity of the answers to the questionnaire were guaranteed to provide unbiased answers. The completed questionnaires were collected over a period of three weeks.

3.7 Method of Data Analysis

The quantitative data gathered from the questionnaire were analyzed using descriptive statistics (i.e., mean, frequency count and standard deviation). The hypotheses were tested using inferential statistics, the Pearson Product Moment Correlation (PPMC) and t-test at a 0.05 level of significance. The qualitative data from the interviews were analyzed thematically and the emerging trends and views were discussed with respect to policy implications for educational administration and parenting practices.

3.8 Ethical Considerations

This study was completed within an ethical framework, which was observed throughout the process of conducting this study, to ensure that the study is credible, transparent and respectful to the rights and dignity of the participants. The researcher was aware that studies with human participants, especially on potentially sensitive topics like family practices and parenting, need to be carefully conducted within the required ethical guidelines (Creswell & Creswell, 2018).

	Total	285	100.0%
Years of Experience (Teachers/Admins)	Less than 5 years	35	12.3%
	5–10 years	90	31.6%
	Above 10 years	160	56.1%
	Total	285	100.0%

Rudimentary parenting style, students tend to be rude, aggressive and behave negatively in class. In the case of a traditional parenting style, students tend to be rude, aggressive and behave negatively in class (Mean ($\bar{X}$)).

Table 2: Influence of Traditional and Contemporary Parenting Styles on Students' Behaviour and Academic Performance

S/N	Questionnaire	Mean(x)	Decision
1.	Traditional parenting helps improve students' discipline and respect for authority.	3.52	Agree
2.	Traditional parenting fosters moral development and hard work.	3.48	Agree
3.	The modern parenting style enhances creative and confident children.	3.28	Agree
4.	Students' digital competence is enhanced by contemporary parenthood.	3.16	Agree
5.	Parents today tend to be more interested in negotiation than in obedience.	3.22	Agree

Grand Mean = 3.33 is considered agreed as a positive response, meaning both traditional and contemporary parenting significantly influence child development and academic outcomes of students in Nigeria.

Table 3: Policy Implications for Effective Educational Administration for Child-to-Adulthood Development in Delta State, Nigeria, through Co-existence of Traditional and Contemporary Parenting Practices

S/N	Questionnaire	Mean(x)	Decision
1.	Traditional parents value strong discipline.	3.55	Agree
2.	Modern parents hold an opinion that dialogue and counseling policies are preferred.	3.38	Agree
3.	Implementing school policies is difficult because of competing expectations held by parents.	3.46	Agree
4.	There is a need to improve the way schools respond to variations of parenting situations.	3.41	Agree
5.	Schools should have policies which combine a mixture of traditional and modern family values.	3.52	Agree

The result from Table 3 shows a Grand Mean of 3.46, implying that the coexistence of traditional and modern parenting demands policy changes to connect home–school values.

Table 4: Test of Hypothesis One: There is no significant relationship between traditional and contemporary parenting styles and child development for academic outcomes in Delta State Nigerian.

Statistical Test: r-value: p-value: Decision: Interpretation: Pearson Product Moment Correlation 0.64 0.03

Reject H_0 . Significant positive correlation between parenting styles and student outcomes.

Table 5: Hypothesis Two: There is no significant relationship between the policy implications of traditional and contemporary parenting practices and effective educational administration of child-to-adulthood development in Delta State, Nigeria.

Statistical Test t-cal t-crit (0.05) Decision

Interpretation

Educational administration does not significantly differ when it comes to the policy implications of traditional and contemporary parenting practices. Independent t-test: 3.27 1.96 Reject H_0 : Parenting differences significantly affect educational policy and administrative practices.

Interpretation of Results

The above tabular representation shows that parents' traditional and modern parenting styles have a significant impact on students' academic and behavioural performance. Furthermore, they coexist in Nigeria, posing complex problems and opportunities to the educational administrators. Data confirm the validity of the role of parents and the need for inclusive education policy changes: both null hypotheses were rejected.

Analysis of Research Questions

The analysis of the two research questions that were developed to guide the study, Traditional and Contemporary Parenting in Nigeria: Policy Implications for Educational Administration, is presented in this section. Descriptive data analysis across mean and standard deviation was used to provide insight into the influence of parenting style on the behaviour, academic achievement and direction of education policies of students.

Research Question 1: How do traditional and contemporary parenting styles influence children's development and academic outcomes of students in schools in Delta State, Nigeria?

The presentation of the results revealed that the mean scores of most of the items were between +3.16 and +3.52 and the grand mean was +3.33, which meant that the respondents' responses were highly agreed. This implies that the concepts of traditional and modern parenting are both major factors affecting students' character development, discipline and academic performance.

Respondents concurred that traditional parents have a positive impact on discipline, obedience, moral uprightness and respect for authority, which is reflected in behaviour at school and respect for the school rules. This agrees with the assertion of Adeyemi (2019) that traditional parenting in Nigeria values communal responsibility and reverence for elders, which helps to create responsible learners. Likewise, Olatunji and Ogunyemi (2021) noted that pupils who were brought up by their parents to have discipline tend to be more disciplined in their academic activities.

In contrast, modern parenting styles such as negotiation, emotional support and technology were also found to have a positive impact on student learning and creativity. Children from modern homes showed signs of confidence, having an open mind and being technologically competent, which also made them adaptable to the current trends in learning, participants pointed out. But at times, some of the freedoms and less supervision in modern parenting practices were associated with indiscipline and academic distractions, as mentioned by Adegoke (2020) that permissive parenting can bring about overindulgence and lack of respect for academic authorities.

Overall, this study showed that traditional parenting is still vital in the moral development of children, while modern parenting is important for creativity and self-expression. These two styles are essential to produce well-rounded students and educational administrators should plan policies that build on the strengths of both styles.

Research Question 2: What are the policy implications of the co-existence of traditional and contemporary parenting practices for effective educational administration for child-to-adulthood development in Delta State, Nigeria?

The results obtained from Table 3 indicated mean scores between 3.38 and 3.55 and grand mean is 3.46. This suggests a high level of agreement from respondents that the two parenting styles have a direct impact on educational policy and administration. The findings indicate that traditional parents are more favorable to school rules, corporal punishment, and

moral education, while contemporary parents are more favorable to counseling, child-centered education, and inclusive school governance. Increasingly, there is a variety in the expectations and demands of parents, which can lead to tensions for school leaders in their administration as they try to cater to both the traditional and modern variety of demands (Nwankwo & Okorie, 2018).

In addition, findings indicated that there is a lack of responsiveness of many of the educational policies in Nigeria to the evolving nature of parenthood and the family system. The lack of common values at home and school was a concern raised by the respondents about a lack of discipline and student engagement. It aligns with the assertion of Eze and Okeke (2022) that the success of policy reforms in education requires family influence and socio-cultural changes to be taken into consideration.

Hence, the study reveals that if educational administration is to continue to be relevant, then the school policies should be able to embrace cultural values and contemporary pedagogical approaches. To foster parent participation, to teach values and ethics of the electronic social world, and to support the social and digital lives of modern learners, administrators must establish structures which allow parents to participate.

5. Summary of Analysis

Both analyses of the two research questions indicated that:

- There are differences in parenting styles (traditional and contemporary) that affect behaviour, discipline and learning outcomes of students.
- These parenting styles must be complemented by flexible and accommodating policies within educational administration.
- Balanced approach combining moral discipline and modern learning support: More balanced educational outcomes.

Testing of Hypotheses

The statistical analysis of the two hypotheses was done in this section. The inferential statistics used to test the significance of the relationship and difference between the variables included Pearson Product Moment Correlation (PPMC) and an independent t-test. The hypotheses were tested at a 0.05 level of significance to guide the acceptance or rejection of each null hypothesis.

Hypothesis One: There is no significant relationship between traditional and contemporary parenting styles and child development for academic outcomes in Delta State Nigerian.

Statistical Tool: Pearson Product Moment Correlation (PPMC)

Variables	N	r-cal	p-value	Decision	Interpretation
Parenting Styles and Students' Behaviour/Performance of students/Discipline	285	0.64	0.03	Reject	There is a significant relationship that exists between parenting styles and student outcomes.

The correlation analysis showed that the r value was 0.64 with a p value of 0.03, which is lower than the significance level of 0.05. This means that there is a positive relationship between parenting styles and students' behaviour, discipline and academic performance, which is statistically significant. Thus, the null hypothesis is rejected.

The results indicate that the traditional and contemporary parenting styles have a strong effect on the behaviour and academic performance of students. The children of traditional parenting have demonstrated greater discipline and respect to authority, and children raised by modern parenting have been seen to have greater creativity and confidence. This is in line with Olatunji and Ogunyemi's (2021) findings, which highlight the importance of parenting style in the moral and academic growth of students. Likewise, Adegoke (2020) noted that the direct relationship between home values and students' motivation and behaviour in the classroom.

The idea is that both parenting styles have positive parts that should be identified and harnessed to improve behaviour and academic performance among students if effective school administration is to be attained.

Hypothesis Two: There is no significant relationship between the policy implications of traditional and contemporary parenting practices and effective educational administration of child-to-adulthood development in Delta State, Nigeria.

Statistical Tool: Pearson Product Moment Correlation (PPMC)

Variables	N	t-cal	t-crit (0.05)	p-value	Decision	Interpretation
Traditional Parenting and Contemporary Parenting practices.	285	3.27	1.96	0.02	Reject	There is evidence of some significant policy implications of the two parenting practices.

The t-calculated is 3.27, which is greater than the t-critical value of 1.96 at a level of significance of 0.05, and the p-value is 0.02, which is less than the level of significance. So, we reject the null hypothesis.

This suggests that there is a great distinction between the traditional and modern parenting styles concerning the influence on educational policy and administration. Traditional parenting is more in line with policies that focus on discipline, hierarchy and teacher authority, while contemporary parenting is more in line with participatory decision-making, student-centred learning and inclusivity (Nwankwo & Okorie, 2018; Eze & Okeke, 2022).

The differences pose a challenge for educational administrators to create policies that are flexible and culturally responsive, incorporating the traditional moral values and contemporary education innovations. Schools need structures for administration that are sensitive, respectful, and appropriate to parents' diversity and that foster effective learning and teaching environments.

6. Summary of Findings

- The parenting style profoundly influences the students' behaviour, discipline and learning outcomes.
- Traditional and contemporary parenting styles differ significantly and have an impact on the educational administration in different ways.
- Existing education policies in Nigeria are inadequate to take into consideration changing parenting structures.
- Parents and schools working together enhance student achievement and policy implementation.
- The combination of old and new is a comprehensive base for educational reform and the development of a nation.

The results showed that the traditional and modern parenting styles have a significant effect on the students' behaviour, discipline and academic performance. Students were seen to value rules, obey rules, and behave in a good manner as a result of traditional parenting, which is characterized by

authority, communal responsibility and moral discipline. The finding corroborates Adeyemi (2019), who opined that the traditional Nigerian family is the first moral arena where values are transmitted to children that help to mold their attitudes towards learning and authority.

On the other hand, contemporary parenting, which promotes communication, emotional support, and exposure to technology, was found to enhance creativity, problem-solving skills, and digital literacy. This is in line with what Adegoke (2020) said that students' confidence and independent thinking, which are skills needed in the modern learning environment, are being cultivated in the modern learning environment through modern parenting.

The findings showed that there were significant differences in the policy consequences of traditional and contemporary parenting and their impacts on educational administration. Conventional parents support strict discipline and teacher-centred methods, whereas modern parents believe in participatory policies, guidance-based discipline and child-centred classroom environments. This duality can be a challenge to the administration to ensure that home expectations and school practices are in harmony (Nwankwo & Okorie, 2018).

The other significant conclusion in the study is that of parental participation in good educational management. Collaboration between parents and administrators was linked to higher student achievement, behaviour and engagement among those schools that had such collaboration. This is in line with Adegoke (2020), who believes that home-school collaboration contributes to improved learning experiences. Similarly, Epstein (2018) highlighted that students learn and behave better when parents are involved in student learning and school governance.

The study concludes that parenting style plays a vital role in determining the students' behaviour and academic achievement. Traditional and modern parenting practices coexist, reflecting Nigeria's socio-cultural transformation and, therefore, its need for a similarly dynamic educational policy response. Administrators need to play a mediating role between evolving family expectations and institutional norms and requirements for harmonizing the management of education.

The results essentially reinforce that the quality of the education Nigeria delivers, apart from the curriculum and teachers' quality, also relies on the effectiveness of educational institutions in incorporating the moral

wisdom of traditional parenting with the progressive values of today's family life.

7. Conclusion

This study was an investigation of the policy implications of Traditional and Contemporary Parenting in Nigeria on Educational Administration with emphasis on how parenting styles affect students' behaviour, discipline, academic performance and the implications of the parenting styles for school administration and policy formulation. The results indicated that traditional and contemporary parenting styles have meaningful, but different impacts on children's overall development.

The traditional parenting values, based on communal values, respect for authority and moral discipline, are still very significant in moulding responsible and culturally oriented individuals. It has a rigid and authoritarian nature, which can restrict creativity and openness to communication, however. In contrast, the modern parenting style with flexibility, emotional responsiveness and access to modern technology encourages independence, innovation and confidence, but can also contribute to overindulgence and discipline problems.

An educational administration perspective requires adaptive leadership and inclusive school policies in these dual parenting systems. The school leaders need to be aware that students have different family backgrounds and different expectations, and policy-making and school running should be carried out in a way in which the disciplinary and caring aspects are balanced. This is a reminder that administrative practices should be dynamic, which encourages traditional and modern values and hence effective teaching, learning, and development of morality.

In addition, the study finds that parental participation is still a key element of good school management. Where parents (of all styles) work together with school authorities, students show greater performance and positive social behaviours. The policy of education in Nigeria must therefore adapt to the new situations, but at the same time, traditional values of the Nigerian ethnic group that promote social cohesion and moral uprightness must be maintained.

8. Recommendations

The Federal and State Ministries of Education should consider the realities of parenthood in Nigeria in revisiting policies in educational institutions. Policies should be reflective of both traditional and modern

viewpoints, and promote discipline, emotional growth and digital literacy in students.

Seminars and community workshops should be held by the government, schools and non-governmental organizations and disseminated to parents periodically on how to effectively parent children with a blend of cultural values and modern development needs.

Parents and schools should have a formal, consistent parent-school communication system and moral and academic standards for students should be consistent in both schools and at home.

Teacher education programs should have a component dedicated to family diversity, parenting relationships and how they impact on student learning outcomes to better equip teachers to work with students from diverse backgrounds.

School administrators should embrace culturally responsive leadership methods that respect local traditions but also keep up with international education trends so that the school's policies are accepting and meaningful.

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Impact of Community Insecurity on Employee Productivity: The Mediating Role of Mental Health among Employees in Edo State, Nigeria

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Abstract. This study examined the impact of community insecurity on employee productivity with emphasis on the mediating role of mental health among employees in Edo State. The increasing rate of kidnapping, armed robbery, cult-related violence, and other forms of insecurity within communities has generated psychological distress capable of affecting employees' mental well-being and productivity. The study specifically investigated the extent to which community insecurity affects employees' mental health, the relationship between community insecurity and employee productivity, and the influence of mental health on employee productivity. The study adopted a descriptive survey research design. The population of the study comprised of 2500 employees working in selected public and private organisations in Edo State. A sample size of 200 employees was selected using a multistage sampling procedure involving stratified, purposive, proportionate, and simple random sampling techniques. Data were collected using a structured questionnaire titled "Community Insecurity, Mental Health and Employee Productivity Questionnaire (CIMHEPQ)." The instrument was validated by experts in Educational Psychology, Measurement and Evaluation, and Organizational Psychology, while its reliability was established using Cronbach Alpha statistics. Mean and standard deviation were used to answer the research questions, while Pearson Product Moment Correlation and Multiple Regression Analysis were used to test the hypotheses at 0.05 level of significance. The findings revealed that community insecurity significantly affects employees' mental health and productivity. The study further showed that mental health significantly influences employee productivity. Based on the findings, it was concluded that persistent insecurity within communities contributes to psychological distress, emotional instability, and reduced work performance among employees.

Keywords: Community Insecurity, Employee productivity, Mental Health, Employees, Psychological well-being.

1. Introduction

In recent times, the society has experienced insecurity and socio-economic instability in forms of crime, violence, social unrest including economic challenges such as unemployment, poverty, and inadequate social infrastructure. In Nigeria, insecurity has exerted a great deal of physical consequences and psychological effects on individuals such as increased levels of stress, anxiety, and depression. Previous studies have identified unemployment, high cost of living, and poor funding of social services as major cause of insecurity which sometimes later perpetuate cycles of violence and instability. Omodero (2024) in her study on social factors associated with insecurity in Nigerian society identified high unemployment, low educational attainment, a high cost of living, weak security, poor government, corruption, and inequality as key social factors driving insecurity in Nigeria. Community insecurity refers to the persistent exposure of individuals within a society to unsafe conditions arising from criminal activities, violence, social unrest, and threats to personal safety. Community insecurity has become one of the most serious challenges affecting economic growth and human development. In many developing countries, including Nigeria, community insecurity manifest in different forms such as violence, crime, kidnapping, insurgency, cultism, terrorism and communal conflicts. Studies across conflict-affected societies have argued that insecurity in communities does not only pose a physical threat to lives and property but also disrupts organizational performance through reduced concentration, absenteeism, emotional exhaustion, and low work engagement. These

challenges come with enormous consequences on individuals (Alhassan and Mohammed, 2025).

According to Alhassan and Mohammed, 2025, individuals exposed to chronic insecurity experience, experience heightened levels of anxiety, depression and emotional instability which contribute to poor mental health and reduced work productivity among employees (Alhassan and Mohammed, 2025). A lack of safety, social cohesion and support in a community constitutes community insecurity (Eneh and Eneh, 2025). Understanding the empirical relationship between mental health and employee productivity is relevant for Nigeria's sustainable developments. Mental health is a prerequisite for physical health, workplace productivity and economic growth.

Employee productivity refers to the efficiency and effectiveness with which employees perform assigned tasks toward achieving organizational objectives. Productivity is reflected in employees' output, commitment, punctuality, creativity, and overall job performance. Integrating mental health counselling into the workplace can enhance employee emotional well-being and workplace productivity, contributing to economic development. On the contrary, persistent exposure to insecurity may negatively affect employees' psychological well-being through stress, depression, emotional exhaustion, trauma, anxiety and fear. Employees who experience poor mental health may demonstrate low absenteeism, fatigue, poor decision-making, and reduced commitment to organizational goals. Studies have established that insecurity at workplace is strongly linked to deteriorating mental health and damages organizational performance among workers (Adiyatma and Hasanati, 2025).

Chen et al (2022) explored the relationship between work stress, mental health, and employee performance. The study focused on the influence of work stress on employee performance in SMEs during the COVID-19 pandemic. Using a sample of 196 SMEs from China, the study found that work stress negatively affects employees' performance, particularly by affecting employees' mental health which implies that work-related stress and psychological distress significantly reduced employee performance and mental stability among workers. Similarly, Irvine and Rose (2022) carried out a scoping review and thematic synthesis of qualitative research on the relationship between precarious employment and mental health in Western economies. Systematic searches of primary qualitative research focused on insecure contracts and a broad conceptualization of mental health identified 32 studies. Findings revealed

that insecurity and unstable working environments contributed to mental health problems such as anxiety, depression, emotional fatigue and social withdrawal among employees. The study also showed that exposure to uncertain and threatening environments negatively affected workers' psychological well-being and work performance.

In another study, Adekiya (2023) examined perceived insecurity and task performance among employees in Nigeria and found that job insecurity and fear significantly influenced employee task performance and organizational commitment. Furthermore, Munoz Medina et al (2022) carried out a qualitative study on employees' perceptions of job insecurity and performance. The study revealed that insecurity and uncertainty in work environments generated emotional tension, frustration, fear, and psychological instability among workers. These emotional reactions were found to influence employees' performance and productivity negatively. Onwuka and Achebe (2025) investigated the impact of kidnapping and insecurity on industrial workforce productivity in Nigeria. Findings revealed that persistent insecurity in communities exposed workers to trauma, fear, stress and emotional instability, which consequently reduced organizational productivity and workforce stability.

Similarly, Darvishmotevali et al (2024) demonstrated that insecurity-related psychological distress negatively affected employees' creativity, task performance, and organizational behaviour. Mental health was found to mediate the relationship between insecurity and employee productivity. Okoli et al (2023) also examined the impact of insecurity on the economy and development status of Awka Metropolis with respect to public and private economic activities and the Nigerian economy as a whole. The study relied on primary data generated through structured multifactor questionnaire administered on respondents and was analysed with Analysis of Variance (ANOVA). The result revealed that insecurity has significant impact on the economic activities of private business owners' turnover, top government officials and workers' output.

In Edo State, increasing cases of insecurity have raised concerns regarding the mental health and work performance of employees. Workers who shuttle through unsafe routes or reside in violence-prone communities may experience psychological distress that affects their work efficiency. Despite the growing concern over insecurity in Nigeria, limited empirical studies have examined its impact on employee productivity from a mental health perspective, particularly within Edo State. This study therefore

seeks to investigate the impact of community insecurity on employee productivity with emphasis on mental health among employees in Edo State.
Statement of the Problem

The growing rate of community insecurity in Nigeria has become a serious concern to individuals, organisations, and government agencies. In Edo State, incidents of kidnapping, armed robbery, cult violence, communal clashes, and other criminal activities have created fear and uncertainty among residents and workers. Employees who operate within insecure environments may experience psychological stress, anxiety, emotional instability, and trauma, which can negatively affect their work performance and productivity. Organisations depend largely on employees for the achievement of their goals and objectives. However, when workers are mentally distressed due to insecurity in their communities, their productivity may decline through absenteeism, reduced concentration, low morale, poor interpersonal relationships, and decreased commitment to work. Although several studies have examined workplace stress and job insecurity, limited attention has been given to how instability within the broader community environment affects employee productivity through mental health challenges.

Furthermore, many previous studies focused mainly on organisational factors affecting productivity without adequately considering the psychological implications of insecurity in employees' living environments. This has created a gap in knowledge regarding the relationship between community insecurity, particularly in Edo State. It is against this background that this study seeks to examine the impact of community insecurity on employee productivity with emphasis on the mediating role of mental health among employees in Edo State.

1.1 Purpose of the Study

The main purpose of this study is to examine the impact of community insecurity on employee productivity with emphasis on the mediating role of mental health among employees in Edo State. Specifically, the study seeks to:

- determine the extent to which community insecurity affects employees' mental health in Edo State.
- examine the relationship between community insecurity and employee productivity in Edo State.
- determine whether mental health mediates the relationship between community

insecurity and employee productivity among employees in Edo State.

1.2 Research Questions

The following research questions were raised to guide the study:

- To what extent does community insecurity affect employees' mental health in Edo State?
- What relationship exists between community insecurity and employee productivity among employees in Edo State?
- Does mental health significantly mediate the relationship between community insecurity and employee productivity among employees in Edo State?

1.3 Hypotheses

Ho1: Community insecurity has no significant effect on employees' mental health in Edo State.

Ho2: There is no significant relationship between community insecurity and employee productivity among employees in Edo State.

Ho3: Mental health does not significantly mediate the relationship between community insecurity and employee productivity among employees in Edo State.

2. Research Methodology

The study adopted descriptive survey design. The area of study was in Edo State. The population of the study comprised of 2500 employees working in public and private organisations within Benin City and selected local government areas in Edo State. The sample size of 200 employees were selected which comprised of 100 from public organisations and 100 from private organisations. A multistage sampling procedure was adopted. In stage one, stratified sampling technique was used to group the organisations in Edo State into two: public and private organisations. This was to ensure equal representation of both sectors in the study. In stage two, purposive sampling technique was used to select six organisations because of their relevance to the study and accessibility. In stage three, proportionate sampling was used to distribute the employees across the selected organisations (public organisation – 100 and private organisation – 100). While in stage four, simple random sampling was used to select respondents from each organisation. The rationale for using simple random technique was to give every employee equal opportunity of being selected for the study and reduce sampling bias. A self-developed questionnaire instrument titled,

“Community Insecurity, Mental Health and Employee Productivity Questionnaire (CIMHEPQ)” was used for data collection. The instrument was face validated by three experts. Each from Measurement and Evaluation, Guidance and Counselling, and Organisational Psychology. The instrument was subjected to the test of internal consistency using Cronbach Alpha statistics. The reliability test result yielded an index of 0.85. Mean and standard deviation

were used to answer research questions, while Pearson Product Moment Correlation (PPMC) and Multiple Regression Analysis were used to test the hypotheses at 0.05 level of significance. In view of this, a criterion mean value of 2.50 was used for decision making, and if the mean response is greater than the criterion mean of 2.50, the item is accepted or high extent but if it less than 2.50, then the response is rejected or low extent.

3. Results

The results were presented in accordance with the research questions and hypotheses that guided the study.

Research Question One: To what extent does community insecurity affect employees’ mental health in Edo State?

Table 1: Mean and Standard Deviation on the Extent Community Insecurity affects Employees’ Mental Health in Edo State

S/N	Items	Mean	SD	Decision
1	Community insecurity makes employees feel anxious while going to work	3.42	0.71	Accepted
2	Fear of kidnapping affects employees’ emotional stability	3.35	0.68	Accepted
3	Employees experience psychological stress due to insecurity in their communities	3.47	0.73	Accepted
4	Insecurity contributes to depression and fear among employees	3.29	0.66	Accepted
5	Community violence negatively affects employees’ mental well-being	3.24	0.70	Accepted
6	Employees living in insecure areas experience emotional exhaustion	3.31	0.74	Accepted
	Grand mean	3.35	0.70	Accepted

Table 1 shows that all the items recorded mean scores above the criterion mean of 2.50. This implies that community insecurity affects employees’ mental health to a high extent among employees in Edo State.

Hypothesis One: Community insecurity has no significant effect on employees’ mental health in Edo State.

Table 2: Pearson Product Moment Correlation Analysis on the Effect of Community Insecurity on Employees’ Mental Health in Edo State

Variables	N	R	P-value	Decision
Community Insecurity and Mental Health	200	0.71	0.000	Rejected

Table 2 reveals that the p-value of 0.000 is less than the 0.05 level of significance. Therefore, the null hypothesis is rejected. This indicates that community insecurity significantly affects employees’ mental health in Edo State.

Research Question Two: What relationship exists between community insecurity and employee productivity among employees in Edo State?

Table 3: Mean and Standard Deviation on the Relationship between Community Insecurity and Employee Productivity in Edo State

S/N	Items	Mean	SD	Decision
1	Employees find it difficult to concentrate at work due to insecurity	3.28	0.69	Accepted
2	Community insecurity contributes to absenteeism among employees	3.17	0.72	Accepted
3	Employees’ efficiency reduces when they feel unsafe in their communities	3.40	0.67	Accepted
4	Fear arising from insecurity affects employees punctuality to work	3.12	0.70	Accepted
5	Community insecurity reduces employees’ commitment to organizational goals.	3.26	0.73	Accepted
6	Employee exposed to insecurity perform below expectation	3.19	0.68	Accepted
	Grand Mean	3.24	0.70	Accepted

Table 3 indicates that all the items recorded mean scores above the criterion mean of 2.50. This implies that community insecurity negatively affects employee productivity among employees in Edo State.

Hypothesis Two: There is no significant relationship between community insecurity and employee productivity among employees in Edo State.

Table 4: Pearson Product Moment Correlation Analysis on the Relationship Between Community Insecurity and Employee Productivity in Edo State

Variables	N	r	P-value	Decision
Community Insecurity and Employee Productivity	200	-0.66	0.001	Rejected

Table 4 shows that the p-value of 0.001 is less than 0.05 level of significance. Therefore, the null hypothesis is rejected. This means that there is a significant relationship between community insecurity and employee productivity among employees in Edo State.

Research Question Three: Does mental health significantly mediate the relationship between community insecurity and employee productivity among employees in Edo State?

Table 5: Mean and Standard Deviation on the Mediating Role of Mental Health in the Relationship between Community Insecurity and Employee Productivity in Edo State

S/N	Items	Mean	SD	Decision
1	Community insecurity affects employees' mental health and work output	3.33	0.68	Accepted
2	Employees experiencing fear and anxiety often show reduced productivity	3.29	0.71	Accepted
3	Psychological stress resulting from insecurity affects job performance	3.36	0.69	Accepted
4	Employees' productivity improves when they feel mentally stable	3.18	0.74	Accepted
5	Mental health challenges arising from insecurity reduce work efficiency	3.24	0.72	Accepted
6	Mental health plays an important role in employees' response to insecurity	3.27	0.70	Accepted
	Grand Mean	3.28	0.71	Accepted

Table 5 indicates that all the items recorded mean scores above the criterion mean of 2.50. The grand mean of 3.28 shows that mental health significantly mediates the relationship between community insecurity and employee productivity among employees in Edo State. The standard deviation values indicate that respondents' responses were relatively homogenous.

Hypothesis Three: Mental health does not significantly mediate the relationship between community insecurity and employee productivity among employees in Edo State.

Table 6: Regression Analysis on the Mediating Role of Mental Health in the Relationship Between Community Insecurity and Employee Productivity in Edo State

Variables	Beta	P-value	Decision
Community Insecurity	0.58	0.000	Rejected
Mental Health			
Employee Productivity			

Table 6 reveals that the p-value of 0.000 is less than the 0.05 level of significance. Therefore, the null hypothesis is rejected. This implies that mental health significantly mediates the relationship between community insecurity and employee productivity among employees in Edo State.

4. Discussion of Findings

The findings of the study revealed that community insecurity significantly affects employees' mental health among employees in Edo State. The result showed that exposure to insecurity-related incidents such as kidnapping, armed robbery, cult-related activities, other criminal activities contribute to mental health challenges such as fear, anxiety, and emotional instability among employees. The corresponding hypothesis further confirmed that community insecurity had a significant effect on employees' mental health. This finding is consistent with the study

of Chen et al. (2022), who reported that prolonged exposure to stressful and threatening situations adversely affects employees' psychological well-being and mental health. The finding also agrees with Irvine and Rose (2022), who found that insecurity and unstable working environments contribute to mental health challenges among employees and these mental health difficulties negatively affect their work performance.

Similarly, the result supports the findings of Munoz Medina et al. (2022) and Okoli et al. (2023) whose findings established that insecurity-related experiences generate emotional tension, fear and psychological instability among workers which affects their emotional and psychological well-being. The study further revealed that community insecurity significantly affects employee productivity among employees in Edo State. The hypothesis tested also revealed a significant relationship between community

insecurity and employee productivity. This finding corroborates the work of Adekiya (2023), who found that insecurity-related fears negatively influence employees' job performance and work responsibilities. The finding also supports the study of Onwuka and Achebe (2025), who reported that kidnapping and insecurity significantly affect workforce stability and productivity. The findings equally align with Okoli et al. (2023), who found that insecurity adversely affects economic activities and work performance by reducing employees' willingness and ability to perform optimally.

Furthermore, the findings of the study revealed that mental health significantly influences employee productivity among employees in Edo State. Employees with positive mental health were found to demonstrate higher levels of concentration, commitment, and overall job performance. Conversely, employees experiencing mental health challenges exhibited lower productivity levels. This finding is in line with Chen et al. (2022), who found that mental health is a critical determinant of employee performance. The finding also agrees with Irvine and Rose (2022) who reported that poor mental health conditions negatively affect employees' work performance and organisational commitment. Similarly, Darvishmotevali et al. (2024) found that employees with stable mental health exhibit higher levels of productivity, creativity and work engagement than those experiencing psychological distress. Their findings highlight the importance of mental health in enhancing organisational performance.

The study finally revealed that mental health significantly mediates the relationship between community insecurity and employee productivity among employees in Edo State. This finding suggests that community insecurity affects employee productivity partly through its influence on employees' mental health. This finding is consistent with Darvishmotevali et al. (2024), who found that mental health serves as an important mechanism through which insecurity-related experiences influence employee performance and work outcomes. The finding also agrees with Adiyatma and Hasanati (2025), whose study demonstrated that mental health functions as an intervening factor between environmental stressors and employee performance. The study is equally consistent with Onwuka and Achebe (2025), who emphasized that the productivity consequences of insecurity are largely attributable to the emotional and psychological burden imposed on employees.

5. Conclusion

Based on the findings of this study, it was concluded that community insecurity has significant implications for employees' mental health and productivity among employees in Edo State. The study established that persistent exposure to insecurity such as kidnapping, armed robbery, cult-related violence, and other criminal activities creates fear, anxiety, emotional instability, and psychological stress among employees. These mental health challenges negatively affect employees' concentration, commitment, efficiency, punctuality, and overall productivity in their respective organisations. The study further concluded that mental health plays a crucial mediating role in the relationship between community insecurity and employee productivity. Employees who experience psychological distress due to insecurity are more likely to demonstrate reduced work performance and lower organisational effectiveness. Thus, the existence of a psychologically stable workforce is essential for improved employee productivity and organisational growth. The study also demonstrated that addressing insecurity and promoting employees' mental well-being are important strategies for enhancing productivity and sustaining organisational performance in Edo State.

6. Recommendations

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

- Government and security agencies should strengthen community security measures in order to reduce fear and psychological distress among employees.
- Professional counsellors and mental health practitioners should organize regular psychological awareness programmes, seminars, and workshops for employees on coping strategies, emotional resilience, and stress management.
- Organizations should collaborate with community leaders and security agencies to develop safety initiatives that will enhance employees' sense of security both within and outside the workplace.

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Educational Financing and Quality of University Education in Nigeria: Implications for Educational Management

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Abstract. This study examined the relationship between educational financing and the quality of university education in Nigeria, using four public universities in North-East Nigeria as case studies: University of Maiduguri, Federal University Gashua, Federal University Kashere, and Federal University Wukari. The study adopted a descriptive survey research design with a sample of 400 respondents, including academic staff, administrators, and planning officers from the four universities. Data were collected using a structured questionnaire and analysed using regression analysis at 0.05 level of significance. The findings revealed that educational financing has a significant effect on the quality of infrastructure, teaching staff, instructional materials and learning resources, and research output and academic standards in the four universities. The study concluded that adequate and sustainable financing is essential for ensuring quality university education in Nigeria. It was recommended that the government should increase funding for university education, diversify funding sources, strengthen quality assurance mechanisms, and improve financial management practices in Nigerian universities.

Keywords: Educational financing, quality of university education, educational planning, North-East Nigeria, funding sources, quality assurance

1. Introduction

Education is universally recognised as a fundamental driver of national development. In Nigeria, universities play a critical role in producing the high-level manpower needed for economic growth and social progress. However, the quality of university

education in Nigeria has been a subject of concern for many years, with stakeholders expressing worries about declining standards, inadequate infrastructure, and poor graduate employability (Ineye-Briggs, 2023; Salomi & Alake, 2025).

Educational financing refers to the financial resources, including money and other support, provided to individuals, educational institutions, and programmes to cover the costs of education (Ineye-Briggs, 2023). According to Ubogu and Meso (2018), educational funding is defined as governmental and organisational processes by which revenue is generated (through taxation, tuition fees, and philanthropy) and distributed and expended for the operational and capital support of formal schools.

The relationship between educational financing and quality of university education is well established. Adequate funding is essential for providing quality infrastructure, recruiting and retaining qualified staff, procuring instructional materials, supporting research, and maintaining academic standards (Agha, 2014; Ineye-Briggs, 2023). Conversely, inadequate funding leads to deteriorating infrastructure, low staff morale, poor research output, and declining quality of graduates (Inye-Briggs, 2023; Ojule & Oliobi, 2024). According to Igbineweka (2025), The key aspects of SDG4 conceptualized quality education as aims to improve the quality of education provided, ensuring it's effective and results in relevant skills and knowledge. Which by exclusivity and equity strives to leave no one behind, regardless of gender, disability, or socio-economic status, promoting equality in access to education. For Lifelong Learning that encourages learning opportunities throughout life, from early

childhood education to adult learning and vocational training. Thus, its relevance focuses on ensuring that education provides the necessary skills for employment, global citizenship, and sustainable development (UN www.un.org 2023) (media.unesco.org, Transforming Education Towards SDG4 Education 2030, (2024).

This study is anchored on the Input-Output Model, which is widely used in educational planning and economics. The Input-Output Model posits that the quality of educational outcomes (outputs) is determined by the quality and quantity of inputs provided to the educational system.

In the context of university education, inputs include financial resources, physical facilities, teaching staff, instructional materials, and administrative support. Outputs include graduate quality, research output, and contributions to national development. The model suggests that when inputs are adequate and of good quality, outputs will also be of good quality. Conversely, when inputs are inadequate, outputs will be compromised.

The Input-Output Model has been applied in several studies on educational financing and quality. Agha (2014) used this framework to examine funding university education in Nigeria and its implications on institutional performance. The study found that inadequate funding has negative implications for institutional performance. The model is relevant to this study because it provides a framework for understanding how educational financing (input) affects the quality of university education (output). When universities are adequately funded, they can provide quality infrastructure, recruit qualified staff, procure instructional materials, and support research. These inputs, in turn, lead to quality graduates and research output. The Input-Output Model also highlights the importance of resource factors such as accountability, utilisation, monitoring, reporting, and control. As noted by Salomi and Alake (2025), effective educational planning and funding models are essential for balancing equity and quality in Nigerian education.

Several empirical studies have examined the relationship between educational financing and the quality of university education in Nigeria. Ineye-Briggs (2023) examined inadequate educational funding and its implications for quality education delivery in Nigeria. The study found that inadequate funding of education in Nigeria has been attributed to one of the major factors militating against the development and achievement of educational

objectives. The study revealed that school buildings such as classrooms, libraries, workshops, and hostels are dilapidated, and teachers are demotivated as they have remained stagnant without undergoing promotions. The study recommended that the federal government increase statutory allocations to education by at least 20%.

Ojule and Oliobi (2024) examined challenges in ownership and funding practices of public universities in Nigeria. The study found that challenges in ownership and funding practices of public universities in Nigeria have contributed to retardation in the system's growth and development, poor quality of university programmes and graduates, inconsistent funding efforts, poor ranking, brain drain, and politics of education. The study concluded that university education of good quality is pivotal and critical to Nigeria's economic, political, social and scientific development.

Oladele (2025) investigated students' perception of access to academic financing in higher education in North-Central Nigeria. The study adopted a descriptive research design with students from three higher institutions. The findings revealed a moderate perceived impact of academic financing on access, with significant variations based on age and type of institution. Akomolehin et al. (2026) examined the financing of school physical education programmes in Nigeria, with emphasis on policy gaps and budgetary challenges. The study found that although education spending has increased in nominal terms, budgetary provision remains low and poorly specified. The study recommended clearer budget lines for school programmes and stronger monitoring of policy implementation.

Ubogu and Meso (2018) examined financing education in Nigeria and its implications and options for national development. The study found that inadequate funding of education has negative implications for national development. Ekaette, Owen and Agbo (2019) examined external debts and the financing of education in Nigeria from 1983 to 2018. The study found that external debts have negative implications for the financing of education in Nigeria. Obona, Edim and Edim (2023) examined the impact of poor funding and misappropriation on tertiary education management in Nigeria. The study found that poor funding and misappropriation have negative impacts on tertiary education management. Udoh et al. (2025) examined barriers to human capital development in the education sector of Akwa Ibom State, Nigeria. The study found that inadequate funding is a major barrier to human capital

development. Ogbuagu et al. (2025) examined the impact of financial stress on academic performance of university students in South-East Nigeria. The study found that financial stress has a negative impact on academic performance. Etoru et al. (2025) examined transforming higher education in Sub-Saharan Africa, overcoming 21st-century challenges with practical remedies. The study found that inadequate funding is a major challenge facing higher education in Sub-Saharan Africa.

In North-East Nigeria, the challenges of educational financing are particularly acute. The region has been affected by the Boko Haram insurgency, which has led to the destruction of educational facilities, displacement of students and staff, and disruption of academic activities (Ubogu & Meso, 2018). The four universities selected for this study University of Maiduguri (UNIMAID), Federal University Gashua (FUGASHUA), Federal University Kashere (FUKASHERE), and Federal University Wukari (FUWUKARI) have all experienced significant challenges related to inadequate funding, which have affected the quality of education and the overall performance of the institutions.

According to reports, many universities in North-East Nigeria have experienced poor funding, which has had severe consequences including the loss of accreditation for some programmes, infrastructural decay, and questionable quality of education (Ojule & Oliobi, 2024). The federal government's freeze on creating new federal universities reflects the recognition that existing universities are struggling to cope with rising enrolment and that resources must be allocated more effectively (Salomi & Alake, 2025). This study, therefore, seeks to examine the relationship between educational financing and the quality of university education in Nigeria, using four public universities in North-East Nigeria as case studies, and to explore the implications for educational planning.

1.1 Statement of the Problem

The ideal situation in any well-functioning university system is that universities are adequately funded to provide quality education, with modern infrastructure, well-equipped laboratories and libraries, qualified and motivated staff, adequate instructional materials, and sufficient resources for research, enabling students to receive quality education and the university system to contribute effectively to national development.

The actual situation in the four public universities in North-East Nigeria, however, has fallen far short of

this ideal for many years. These universities have experienced severe funding challenges, with the region particularly affected by the Boko Haram insurgency which has led to the destruction of educational facilities and further exacerbated the funding crisis (Ubogu & Meso, 2018). Several factors contribute to this problem, including inadequate budgetary allocation to education at the federal level, poor financial management and accountability in many universities (Ojule & Oliobi, 2024), rapid growth in student enrolment outpacing funding increases and putting pressure on already stretched resources, and the Boko Haram insurgency leading to destruction of facilities and disruption of academic activities. The consequences are significant, as inadequate funding has led to deteriorating infrastructure with universities lacking adequate lecture theatres, laboratories, libraries, and hostels (Agha, 2014), staff shortages resulting in poor staff-student ratios and affecting teaching quality (Ojule & Oliobi, 2024), declining research output and graduate quality (Ineye-Briggs, 2023), and loss of accreditation for professional programmes. Despite the severity of this problem, there is limited empirical evidence on the specific relationship between educational financing and quality of university education in North-East Nigerian universities. This study, therefore, seeks to fill this gap by examining the effect of educational financing on the quality of university education in four public universities in North-East Nigeria.

1.2 Objectives of the Study

The main objective of this study is to examine the relationship between educational financing and the quality of university education in four public universities in North-East Nigeria. The specific objectives are to:

- Examine the effect of educational financing on the quality of infrastructure in the four universities.
- Determine the effect of educational financing on the quality of teaching staff in the four universities.
- Examine the effect of educational financing on the availability of instructional materials and learning resources in the four universities.
- Determine the effect of educational financing on research output and academic standards in the four universities.

1.3 Research Questions

The following research questions guide this study:

- What is the effect of educational financing on the quality of infrastructure in the four universities?
- What is the effect of educational financing on the quality of teaching staff in the four universities?
- What is the effect of educational financing on the availability of instructional materials and learning resources in the four universities?
- What is the effect of educational financing on research output and academic standards in the four universities?

1.4 Research Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

H₀₁: Educational financing has no significant effect on the quality of infrastructure in the four universities.

H₀₂: Educational financing has no significant effect on the quality of teaching staff in the four universities.

H₀₃: Educational financing has no significant effect on the availability of instructional materials and learning resources in the four universities.

H₀₄: Educational financing has no significant effect on research output and academic standards in the four universities.

2. Research Methodology

This study adopted a descriptive survey research design, which allows for the systematic collection of data from a sample of respondents to describe their characteristics, attitudes, and experiences without manipulating any variables. The study was carried out in four public universities in North-East Nigeria: University of Maiduguri (UNIMAID) in Borno State, Federal University Gashua (FUGASHUA) in Yobe State, Federal University Kashere (FUKASHERE) in

Gombe State, and Federal University Wukari (FUWUKARI) in Taraba State. These universities were selected because they have experienced significant challenges with educational financing due to inadequate funding, poor planning, and the impact of the Boko Haram insurgency.

The population comprised all academic staff and administrators in the four selected universities. The sample consisted of 400 respondents, including university administrators, academic staff, and planning officers, selected using Yamane's formula and stratified random sampling technique to ensure representation across different faculties and departments. The instrument used for data collection was a structured questionnaire titled "Educational Financing and Quality of University Education Questionnaire (EFQUEQ)", designed to elicit information on educational financing practices and the quality of university education in four areas: infrastructure, teaching staff, instructional materials and learning resources, and research output and academic standards, measured on a four-point Likert scale.

The validity of the instrument was established through content and face validity by three experts in educational management and measurement and evaluation. The reliability was established through a pilot test administered to 30 respondents, with Cronbach's alpha coefficients of 0.84. Data were collected through direct administration of the questionnaire over six weeks, with 360 completed questionnaires returned from 400 administered, representing a response rate of 90%. Data were analysed using descriptive statistics (frequency counts, percentages, means, and standard deviations) to answer research questions, while inferential statistics including regression analysis were used to test hypotheses at 0.05 level of significance using SPSS version 27.0.

3. Results

Hypothesis One: Educational financing has no significant effect on the quality of infrastructure in the four universities.

Table 1: Regression Analysis of Educational Financing and Quality of Infrastructure

Variable	B	Std. Error	Beta	t	p-value
Constant	1.45	0.28		5.18	0.000
Educational Financing	0.42	0.06	0.38	7.00	0.000

R = 0.38; R² = 0.14; Adjusted R² = 0.14; F = 49.00; p = 0.000

Results in Table 1 show a regression analysis of the effect of educational financing on the quality of infrastructure. The $\beta = 0.38$, with a p-value = 0.000. Testing at 0.05 alpha level of significance, the p-value is less than alpha level.

Hence, the hypothesis is rejected at $P < 0.05$. Therefore, educational financing has a significant effect on the quality of infrastructure in the four universities.

Hypothesis Two: Educational financing has no significant effect on the quality of teaching staff in the four universities.

Table 2: Regression Analysis of Educational Financing and Quality of Teaching Staff

Variable	B	Std. Error	Beta	t	p-value
Constant	1.50	0.28		5.36	0.000
Educational Financing	0.40	0.06	0.36	6.67	0.000

$R = 0.36$; $R^2 = 0.13$; Adjusted $R^2 = 0.13$; $F = 44.49$; $p = 0.000$

Results in Table 2 show a regression analysis of the effect of educational financing on the quality of teaching staff. The $\beta = 0.36$, with a p -value = 0.000. Testing at 0.05 alpha level of significance, the p -value is less than alpha level. Hence, the hypothesis is rejected at $P < 0.05$. Therefore, educational financing has a significant effect on the quality of teaching staff in the four universities.

Hypothesis Three: Educational financing has no significant effect on the availability of instructional materials and learning resources in the four universities.

Table 3: Regression Analysis of Educational Financing and Availability of Instructional Materials

Variable	B	Std. Error	Beta	t	p-value
Constant	1.55	0.29		5.34	0.000
Educational Financing	0.38	0.06	0.34	6.33	0.000

$R = 0.34$; $R^2 = 0.12$; Adjusted $R^2 = 0.12$; $F = 40.07$; $p = 0.000$

Results in Table 3 show a regression analysis of the effect of educational financing on the availability of instructional materials and learning resources. The $\beta = 0.34$, with a p -value = 0.000. Testing at 0.05 alpha level of significance, the p -value is less than alpha level. Hence, the hypothesis is rejected at $P < 0.05$. Therefore, educational financing has a significant effect on the availability of instructional materials and learning resources in the four universities.

Hypothesis Four: Educational financing has no significant effect on research output and academic standards in the four universities.

Table 4: Regression Analysis of Educational Financing and Research Output/Academic Standards

Variable	B	Std. Error	Beta	t	p-value
Constant	1.40	0.28		5.00	0.000
Educational Financing	0.44	0.06	0.39	7.33	0.000

$R = 0.39$; $R^2 = 0.15$; Adjusted $R^2 = 0.15$; $F = 53.73$; $p = 0.000$

Results in Table 4 show a regression analysis of the effect of educational financing on research output and academic standards. The $\beta = 0.39$, with a p -value = 0.000. Testing at 0.05 alpha level of significance, the p -value is less than alpha level. Hence, the hypothesis is rejected at $P < 0.05$. Therefore, educational financing has a significant effect on research output and academic standards in the four universities.

4. Discussion of Findings

The first finding of this study revealed that educational financing has a significant effect on the quality of infrastructure in the four public universities in North-East Nigeria. The majority of respondents agreed that adequate funding leads to quality infrastructure, that funding determines the availability of lecture theatres and laboratory facilities, and that funding influences the maintenance of existing facilities. These findings are consistent with Ineye-Briggs (2023), who found

that inadequate funding of education has been attributed to one of the major factors militating against the development and achievement of educational objectives. The finding that funding determines the provision of laboratory facilities and lecture theatres is particularly significant. When universities are adequately funded, they can construct and maintain the physical infrastructure needed for quality education. However, when funding is inadequate, infrastructure deteriorates, and students are forced to learn in overcrowded and poorly equipped facilities. This is consistent with the situation in North-East Nigerian universities, where inadequate funding has led to infrastructural decay and the loss of accreditation for some programmes (Ojule & Oliobi, 2024).

The second finding revealed that educational financing has a significant effect on the quality of teaching staff in the four public universities in North-

East Nigeria. The majority of respondents agreed that adequate funding enables the recruitment of qualified staff, that funding determines staff-student ratios, and that funding influences staff development programmes and remuneration. These findings are consistent with Ineye-Briggs (2023), who found that teachers have remained stagnant without undergoing promotions due to inadequate funding. The finding that funding determines staff-student ratios is particularly important. When universities are adequately funded, they can recruit sufficient numbers of qualified academic staff to maintain appropriate staff-student ratios. However, when funding is inadequate, universities are forced to operate with staff shortages, which affects the quality of teaching and learning. This is consistent with the situation in North-East Nigerian universities, where inadequate funding and irregular salary payments have affected staff morale and retention (Ubogu & Meso, 2018).

The third finding revealed that educational financing has a significant effect on the availability of instructional materials and learning resources in the four public universities in North-East Nigeria. The majority of respondents agreed that funding determines the availability of textbooks, journals, and e-resources, and that funding influences the provision of laboratory equipment and teaching aids. These findings are consistent with Salomi and Alake (2025), who found that insufficient funding affects the quality of education. The finding that funding determines the availability of textbooks and journals is particularly significant. When universities are adequately funded, they can procure the instructional materials needed for quality education. However, when funding is inadequate, students are forced to rely on outdated or insufficient materials, which affects the quality of their learning (Obona, Edim & Edim, 2023). As noted by Akomolehin et al. (2026), many schools lacked adequate sports equipment, functional facilities, and dedicated funds for activities.

The fourth finding revealed that educational financing has a significant effect on research output and academic standards in the four public universities in North-East Nigeria. The majority of respondents agreed that funding determines research output, that funding influences the quality of research, and that funding affects the availability of research grants. These findings are consistent with Agha (2014), who found that inadequate funding has led to poor quality of teaching and research, poor conditions of work and insufficient attention to staff development. The finding that funding determines research output is particularly significant. When universities are adequately funded, they can support research activities, provide research

grants, and attract research-active staff. However, when funding is inadequate, research output declines, and academic standards suffer. This is consistent with the situation in North-East Nigerian universities, where inadequate funding has led to the loss of accreditation for some programmes (Ojule & Oliobi, 2024). As noted by Ineye-Briggs (2023), the fact that these problems have remained unattended to by the government shows that our education system will not attain the required quality standard.

5. Conclusion

This study examined the relationship between educational financing and the quality of university education in four public universities in North-East Nigeria: University of Maiduguri, Federal University Gashua, Federal University Kashere, and Federal University Wukari. The study found that educational financing has a significant effect on the quality of infrastructure, teaching staff, instructional materials and learning resources, and research output and academic standards. Adequate funding is essential for providing and maintaining quality infrastructure, recruiting qualified staff, maintaining appropriate staff-student ratios, procuring instructional materials, supporting research activities, and enhancing the quality of graduates. The study concluded that educational financing is a critical determinant of the quality of university education in North-East Nigerian universities. When universities are adequately funded, they can provide quality infrastructure, recruit and retain qualified staff, procure instructional materials, and support research. However, when funding is inadequate, the quality of university education suffers, with implications for graduate quality, research output, and national development.

6. Educational Financing Implications For Educational Management

There are implications that educational managers must face in the reality of times towards educational financing and sustaining the quality of university education. Amongst such implementations is by adopting strategic measures as briefly suggested here below. Educational managers and university administrators face immense pressure to adapt to these fiscal realities: Revenue Diversification, Strategic Cost-Sharing, Prudent Financial Governance and Public-Private Partnerships (PPPs).

Revenue Diversification: Administrators can no longer rely solely on government subventions; they must actively build internal revenue generation mechanisms (such as university consultancies,

agribusiness ventures, and commercialized ICT services).

Strategic Cost-Sharing: Managers face the delicate task of balancing institutional financial sustainability with student affordability, exploring legal stakeholder contributions while mitigating the economic burden on parents.

Prudent Financial Governance: Transparent budgeting, stringent internal auditing, and anti-corruption measures are vital to maximize the impact of scarce resources.

Public-Private Partnerships (PPPs): Managers must cultivate strategic alliances with private corporations and alumni networks to fund hostels, research chairs, and facility maintenance.

The above implications are further buttressed that every Nigerian university needs to aggressively embark on strategic fund-raising programmes and diversified ventures of increased internally generated revenue for resilience and sustainability (Ogbogu, 2011).

7. Recommendations

Based on the findings of this study, the following recommendations are made:

- The Federal Government should increase funding for university education in North-East Nigeria to meet the UNESCO recommended benchmark of 26% of the national budget. This will provide universities with the financial resources needed to improve infrastructure, recruit qualified staff, procure instructional materials, and support research.
- University administrators should diversify funding sources beyond government allocations. This includes exploring public-private partnerships, alumni contributions, endowment funds, and income-generating activities.
- The National Universities Commission and universities should strengthen quality assurance mechanisms to ensure that funds are used effectively and that quality standards are maintained.
- Universities should improve their financial management practices, including budgeting, accountability, and transparency. This will help ensure that resources are used efficiently and effectively.
- University administrators should invest in infrastructure development, including the construction and maintenance of lecture theatres, laboratories, libraries, and hostels.

This will improve the learning environment and the quality of education.

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Awareness and Implementation of Ethn curriculum among Biology Teachers in Secondary School in Obio/Akpor Local Government Area of Rivers State, Nigeria

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Abstract. The teaching and learning Biology in secondary school often relies on conventional methods, examples and contexts foreign to learners' live experiences. And this does not increase learners understanding and comprehension of Biology concept, and engagement. Ethn curriculum offer a way to bridge this gap by integrating indigenous knowledge and local practices into Biology teaching and instruction. This study examined the awareness and implementation of ethn curriculum among secondary school Biology teachers in Obio/Akpor Local Government Area of Rivers State. The population of the study include all the Biology teachers in public secondary school in the study area. The study adopted descriptive survey design. Data was collected from 150 biology teachers selected through random sampling techniques using self-structured questionnaire. This instrument was use to collected data on teachers' awareness of ethn curriculum, the implementation, the perceived benefit and the challenges in Biology teaching and learning. Data collected was analysed using mean statistics. Results indicated that Biology teachers had some awareness of ethn curriculum because they have read some literature on indigenous knowledge and ethn curriculum, but implementation was low. Major challenges identified include time constraints, inadequate training on integrating indigenous knowledge and lack of instructional materials with local examples. It was therefore recommended among others things that: Biology teachers should create opportunities for learners to share indigenous knowledge and experiences related to plant, and animals during classroom interaction. Educational authorities should organise regular workshops, seminars, and professional development programs to improve Biology teachers' understanding of ethn curriculum and its application in classroom instruction.

Keywords: Ethn curriculum, Biology education, Biology teachers, Teacher's awareness, curriculum Implementation, Indigenous knowledge, secondary school education.

1. Introduction

Biology is a subject offered in senior secondary schools. It is a very important subject. The secondary school Biology curriculum is designed to continue students' investigation into natural phenomena, expand learners understanding and awareness in biological sciences and help students' ability to relate scientific knowledge to everyday life in issues of personal community, health, agriculture, among others (Federal ministry of education, in Ndukwe et al, 2021). Green (2026) stated that Biology is the study of living things and their vital processes. The field deals with all the physiochemical aspect of life. As a field of science, Biology helps learners understand the living world and the ways its many species function, evolve, and interact. Nwakamma and Edokpolor (2026) also stated that Biology is foundational to science education and underpins learners understanding of life processes, ecological system and human health. It is one of the major science subjects taught in secondary school in Nigeria (Michael, 2024). The knowledge gain in Biology is relevant, thereby making it essential for national development survival. Despite its importance many learners perform poorly in Biology because of infective teaching method and inability of some teachers to teach Biology using some indigenous knowledge and instructional materials. Also, the teaching of biology in many secondary schools remains largely dependent on conventional instructional approaches that overlook the rich indigenous knowledge available within local communities, consequently, students may perceive

Biology as abstract and disconnected from their immediate environment.

Education serves as an important instrument for preserving cultural heritage, promoting societal development, and facilitating the transmission of knowledge across generation. In contemporary educational practice, there is increasing recognition of need to integrate indigenous knowledge systems into formal school curricula in order to make learning more relevant to learners' culture and environmental contexts. This approach has given rise to the concept of ethnocurriculum, which emphasizes the incorporation of indigenous knowledge, beliefs, values, and practices into teaching and learning processes (UNESCO, 2021; Kim & Dionne, 2023).

Ethnocurriculum refers to the deliberate integration of indigenous knowledge, cultural values, local experiences, and community practices into formal educational programme (Aikenhead & Michell, 2011). It is an educational framework that integrates local indigenous knowledge, cultural traditions and community values into standard subjects. It normally use local heritage to make learning more relevant and to preserve cultural identity (Ugwu, 2018). Ethnocurriculum according to Gandasari, (2026) is an educational vehicle that formalizes indigenous knowledge to ensure the transmission and survival of a community's cultural heritage within the school system. It can also be defined as the method of linking students' cultural background with academic content to improve engagement, literacy, and scientific understanding (Chotimah et al., 2026). It is an approach to curriculum design that actively integrates indigenous and local knowledge system into formal education to challenge colonial education legacies (Rodriguez & Silva, 2025). Pratama et al (2023) opined that ethnocurriculum is a curriculum model where local knowledge, practices and community norms serve as the primary foundation topics for classroom instruction. According to Martinez and Gomez, (2025), ethnocurriculum is a pedagogical structure that prioritizes interaction between different cultural groups, fostering social cohesion and mutual respect within a diverse classroom. Karakus (2021) stated that ethnocurriculum is an educational model that addresses the gap between national curriculum goals and classroom realities by adapting materials to the specific cultural and social realities of the student body. It is a curriculum structure that focused on building student confidence and sense of belonging by affirming their ethnic and cultural identities through course materials (Asiyah et al., 2021). It is a curriculum that validates diverse ways of knowing, treating local or traditional knowledge as equal in

status to formal, standardized academic knowledge (Ferreira, 2025). Hassan (2024) explained that ethnocurriculum is a design framework that aligns educational objectives with the lived experiences and social values of the immediate community, rather than relying solely on abstract, state mandated standards. However, according to Suryani et al (2026) it is a curriculum approach that reconstructs pure science by contextualizing it's within the familiar cultural practices and ecological knowledge of a specific community.

Within Biology education, ethnocurriculum provide opportunities for linking scientific concepts with indigenous ecological knowledge, traditional medicinal practices, local biodiversity, conservation methods, and culturally embedded understanding of organisms (Mckinley & Smith, 2019). Such integration promotes culturally responsive teaching and enables learners to connect scientific knowledge with their everyday experiences. Indigenous knowledge in Biology is the local traditional understanding of plants, animals, and many ecosystems that communities build up over many generations. It includes traditional medicine, animal behaviour tracking, and sustainable farming methods (Rafiu et al 2025). According to Cheryl and Gregory (2020), indigenous knowledge is a body of observation, oral and written knowledge, innovations, practices, and beliefs developed by tribes and indigenous people through interaction and experience with environment. It is applied to phenomena across biological and other system and can be developed over millennia.

The implementation of ethnocurriculum in Biology teaching has been identified as a means of bridging the gap between scientific knowledge and indigenous ways of knowing (Battiste, 2013). Through the incorporation of local examples, community resources, and culturally relevant learning experiences, teachers can enhance students' understanding, engagement, and appreciation of Biology concepts. More so, ethnocurriculum contributes to the preservation and transmission of indigenous knowledge systems that are increasing threatened by modernization and globalization (UNESCO, 2021). The successful implementation of ethnocurriculum will depend on teachers' awareness, knowledge, and willingness to integrate indigenous perspectives into classroom instruction (Gay, 2018). Teachers who possess adequate awareness of ethnocurriculum are more likely to adopt culturally responsive teaching practices and utilize local examples and instructional materials while teaching. Conversely, limited awareness, inadequate teacher

training and professional development, lack of instructional materials and indigenous knowledge resources may hinder effective implementation and reduce opportunities for meaningful learning experiences (Mhakure & Otulaaja, 2024).

Popoola et al (2025) investigated the influence of indigenous practices on senior secondary Biology students' academic performance in Osun State, Nigeria. It was a survey research design involving 100 senior secondary learners. Data was collected using structured questionnaire and analysed using descriptive statistics and Pearson Product-Moment Correlation. The study found significant positive relationships between the integration of indigenous practices and learners' academic performance as well as self-concept. The authors concluded that indigenous knowledge enriches Biology learning and recommended its systematic integration into the Biology curriculum. The study supports the need for greater implementation of ethnocurriculum in Biology teaching. This present study is on Awareness and Implementation of Ethnocurriculum among Biology Teachers in Secondary School in Obio/Akpor Local Government area of Rivers State, Nigeria. Akachukwu and Okoye (2025) examined the effects of integrating ethno-biology and Indigenous knowledge systems into secondary school Biology instruction in South- East Nigeria. The researchers adopted a quasi-experimental pre-test, post-test, non- equivalent control group design involving secondary school learners. Data was analysed using Analysis of Covariance. The finding showed that learners taught through indigenous knowledge system-integration demonstrated significantly higher conceptual understanding, classroom engagement, and retention than those taught using conventional methods. The study recommended the formal integration of ethnocurriculum into the secondary school Biology curriculum and regular teacher training in indigenous knowledge system. Adam et al (2025) investigated the effectiveness of the culture-Techno-Contextual Approach in improving Biology learning among senior secondary school students in Lagos State, Nigeria. An explanatory sequential mixed-methods design was adopted with 121 students participating in the study. Data were collected using critical thinking test in nutrition and interview schedules. The findings indicated that integrating cultural experiences and local contexts into Biology teaching significantly improved students' critical thinking and classroom participation. The finding also reinforces the importance of ethnocurriculum in improving Biology instruction. This present study is on Awareness and Implementation of Ethnocurriculum among Biology Teachers in Secondary School in Obio/Akpor

Local Government area of Rivers State, Nigeria.

In Obio/Akpor Local Government Area of Rivers State, communities possess diverse indigenous knowledge related to environmental management, medicinal plants, agriculture, biodiversity conservation, and health practices. These knowledge systems represent valuable educational resources that can enrich Biology teaching and learning. However, there is limited empirical evidence regarding the extent to which Biology teachers in the area are aware of ethnocurriculum and the degree of which they implement it in classroom practice. Against this background, this study investigates the awareness and implementation of ethnocurriculum among Biology teachers in secondary schools in Obio/Akpor LGA of Rivers State.

1.1 Statement of Problem

The inculcation and integration of indigenous knowledge into formal education has gained increasing attention among educators, curriculum developers, and policymakers because of its potential to make learning more relevant, meaningful and culturally responsive. In Biology Education, ethnocurriculum provides opportunities for connecting scientific concepts with local knowledge, cultural practices, and community experiences. Such integration is expected to enhance students' understanding of Biological concepts, promote environmental awareness, and preserve valuable indigenous knowledge system. Despite this importance, the teaching of Biology in many secondary schools continues to be dominated by conventional instructional approaches that rely heavily on prescribed textbooks and standardized content. Consequently, locally available knowledge related to medicinal plants, biodiversity, conservation, environmental management, agriculture, and other biological practices is often underutilized during instruction. This situation may contribute to a disconnection between classroom learning and the realities of learners' immediate environment. The successful integration of ethnocurriculum depends largely on teachers who serve as the sole curriculum implementer. However, there are concerns that many Biology teachers may have limited awareness of ethnocurriculum and insufficient preparation for incorporating indigenous knowledge into their teaching practices. Even where awareness exists, some factors such as inadequate training, lack of instructional materials, limited institutional support, and curriculum constraints may hinder effective implementation.

In Obio/Akpor Local Government Area of Rivers State, communities possess rich indigenous knowledge that could serve as valuable resources for Biology teaching and learning. However, the extent to which Biology teachers are aware of ethnocurriculum and the degree to which they implement it in classroom practice are not properly documented. The absence of empirical evidence on this issue makes it difficult for educational stakeholders to design appropriate interventions aimed at promoting culturally relevant Biology education. Therefore, the problem of this study is to determine if Biology teachers in the study area are aware of ethnocurriculum and if the implement during Biology teaching in secondary schools and to identify the factors that may influence its effective integration into Biology instruction.

1.2 Objective of the study

The main purpose of this study was to investigate awareness and implementation of ethnocurriculum among Biology teachers in secondary schools in Obio/Akpor Local Government Area of Rivers State. Specifically, the study:

- Determine whether secondary school Biology teachers are aware of ethnocurriculum .
- Examine if Biology teachers implement ethnocurriculum in the teaching of Biology in secondary.
- Determine the perceived benefits of implementing ethnocurriculum in Biology teaching among secondary school teachers.
- Determine the challenges affecting the implementation of ethnocurriculum among Biology teachers in secondary schools.

3. Results

Research Question 1: Are secondary school Biology teachers aware of ethnocurriculum in Obio/Akpor Local Government Area of Rivers State?

Table 1: Mean Scores of respondents on the awareness of ethnocurriculum among Biology teachers in secondary schools in Obio/Akpor Local Government Area of Rivers State.

S/N	Question Item	Mean	Decision
1	I am familiar with the concept of ethnocurriculum.	3.2	Accepted
2	Most teachers understand the objective of ethnocurriculum in science education.	3.0	Accepted
3	Ethnocurriculum involves integrating indigenous knowledge into classroom instruction.	3.1	Accepted
4	I am aware of indigenous biological knowledge available within my community	3.2	Accepted
5	I understand how indigenous knowledge can support Biology teaching.	3.3	Accepted

1.3 Research questions

The following research questions were raised to guide the study

- Are secondary school Biology teachers aware of ethnocurriculum in Obio/Akpor Local Government Area of Rivers State?
- Do Biology teachers implement ethnocurriculum during teaching of Biology?
- What are the perceived benefits of implementing ethnocurriculum in Biology teaching?
- What challenges affect the implementation of ethnocurriculum among Biology teachers?

2. Research Methodology

This study adopted the descriptive survey research design. The population of the study is made up of all the Biology teachers in Obio/Akpor Local Government Area of Rivers State. A sample of 150 Biology teachers was selected through simple random sampling technique. Data was collected using the researcher structured questionnaire titled Awareness and Implementation of Ethnocurriculum among Biology Teachers (AIEBT). It consisted of 4 sections. Section A elicited information on biology teachers' awareness of ethno curriculum, section B elicited information of the implementation of ethnocurriculum, section C elicited information on the perceived benefit of ethnocurriculum while section D elicited information the challenges faced by Biology teacher in the implementation of ethnocurriculum in the teaching and learning. Each of these sections has five items structured on a 4 point modified Likert scale of strongly agree (SA) 4 points, Agreed (A) 3 points, Disagreed (D) 2 points and strongly disagreed (SD) 1 point. Research questions were answered using mean rating and any rating found to be below 2.50 was rejected.

The mean ratings of 3.2 for item one indicates that the respondents are familiar with the concept ethnocurriculum. Also, the rating of 3.0 for number two item shows that the respondents understand the objective of ethnocurriculum in science education. Similarly, the mean rating of 3.1 in item number three shows that respondents are aware that ethnocurriculum involve the integration of indigenous knowledge into Biology classroom instruction. In the same vein, the mean rating of 3.2 in item number four indicates that the respondents are aware of indigenous biological knowledge available within their community. Again the mean rating of 3.3 in item number five indicate that the respondents understand how indigenous knowledge can support Biology teaching in senior secondary school.

Research Question 2: Do Biology teachers implement ethnocurriculum during teaching of Biology?

Table 2: Mean score of respondents on Biology teachers implementation of ethnocurriculum during teaching of Biology

S/N	Question Item	Mean	Decision
6	Once in a while I incorporate indigenous biological knowledge into my Biology lessons.	3.0	Accepted
7	I use local examples to explain Biology concept sometimes.	3.2	Accepted
8	I discuss traditional uses of plants during Biology instruction e.g. Bryophylum.	3.3	Accepted
9	The biology curriculum does not adequately promote indigenous knowledge integration.	3.3	Accepted
10	Ethnocurriculum is relevant to secondary school Biology	3.1	Accepted

The mean rating of 3.1 for item number six indicates that the respondents accepted that they Incorporate indigenous biological knowledge into their Biology lessons. Also, the mean rating of 3.0 for item number seven shows that respondents accepted the fact that they use local examples to explain biology concept. Again, the mean rating of 3.3 in item eight indicates that respondents discuss traditional uses of plants during Biology instruction, similarly the mean rating of 3.3 for item nine indicates that the Biology curriculum does not adequately promote indigenous knowledge integration. In the same vein on item ten with a mean rating of 3.1 indicates that respondents' acceptance that ethnocurriculum is relevant to secondary school Biology.

Research Question 3: What are the perceived benefits of implementing ethnocurriculum in Biology teaching?

Table 3: Mean scores of respondents on the perceived benefits of implementing ethnocurriculum in Biology teaching.

S/N	Question Item	Mean	Decision
11	The integration of indigenous knowledge improves classroom participation in Biology teaching and learning.	3.2	Accepted
12	Ethnocurriculum promote respect for local culture and tradition.	3.0	Accepted
13	Learners understand better when local examples are used.	3.1	Accepted
14	Practical Biology lessons sometimes involve local materials and resources.	3.2	Accepted
15	Teachers relate Biology topics to local cultural practices.	3.2	Accepted

The mean rating of 3.2 for item eleven indicates that the respondents are of the opinion that integration of indigenous knowledge improves biology classroom participation. Also, the mean rating of 3.0 for question item twelve indicates the respondent acceptance of the fact that ethnocurriculum promote respect for local culture and tradition. In the same vein, by the mean rating of 3.2 for item number thirteen the respondents accepted that learners understand better when local examples are used. Similarly, the mean rating of 3.2 for items fourteen and fifteen respectively indicates that respondent agreed that practical biology lessons sometimes involve local materials and resources, and also relate Biology topics to cultural practice.

Research Question 4: What challenges affect the implementation of ethnocurriculum among Biology Teachers?

Table 4: Mean scores of respondents on challenges affecting the implementation of ethnocurriculum among Biology teachers.

S/N	Question Item	Mean	Decision
16	Many Biology teachers have received training on ethnocurriculum.	1.7	Rejected
17	The Biology curriculum adequately promotes indigenous knowledge integration.	1.9	Rejected
18	Lack of teaching materials promote the use of ethno curriculum in Biology	1.7	Rejected
19	Some teachers do not use community-based example to explain Biology concepts because it safes it time	1.9	Rejected
20	I have a lot of time to always use indigenous knowledge in Biology class.	1.8	Rejected

The mean rating of 1.7 for item sixteen indicates that the respondents rejected that many of them have received training on ethnocurriculum. Also, the mean rating of 1.9 for question item seventeen indicates that the respondents rejected that the Biology curriculum adequately promote indigenous knowledge integration. Similarly, the mean rating of 1.7 for item eighteen indicates that the respondents rejected that lack of teaching materials promotes the use of ethnocurriculum. In the same vein the mean rating of 1.7, for item nineteen, the respondents rejected some teacher does not use community-based examples to explain Biology concepts. Lastly on item number twenty with mean rating of 1.8, the respondents rejected that Biology have a lot of time to implement ethnocurriculum during biology lesson.

From the analysis of data presented above, the following major findings were made:

- Biology teachers in Obio/Akpor local government area are aware of ethnocurriculum in teaching and learning of Biology.
- Biology teachers implement ethnocurriculum in the teaching of Biology but this implementation is low.
- Biology teachers in Obio/Akpor local government are aware of the benefits of implementing ethnocurriculum in Biology teaching?
- There are challenges affecting the implementation of ethnocurriculum among Biology teachers.

4. Discussion

4.1 Awareness of ethnocurriculum among Biology teachers in secondary schools

The Biology teachers are aware of ethnocurriculum in teaching and learning of Biology because they are familiar with the concept of ethnocurriculum, most teachers understand the objective of ethnocurriculum in science education, they are aware that ethnocurriculum involves integrating indigenous knowledge into classroom instruction, teachers are aware of indigenous biological knowledge available within their community. And they understand how indigenous knowledge can support Biology teaching. This study is in line with Akachukwu and Okoye (2025) who noted that students taught through indigenous knowledge system-integrated instruction demonstrate significantly higher conceptual understanding, classroom engagement, and retention than those taught using conventional methods. This is

because Biology teachers are aware of ethno curriculum hence they are able to use it during teaching.

4.2 Teachers' implementation of ethnocurriculum in the teaching of Biology

The finding of this also revealed that Biology teachers implement ethnocurriculum in the teaching of Biology but this implementation is low because once in a while Biology teacher incorporate indigenous biological knowledge into Biology lessons, they use local examples to explain Biology concept, sometimes, they discuss traditional uses of plants during Biology instruction, Biology curriculum does not adequately promote indigenous knowledge integration, and ethnocurriculum is relevant to secondary school Biology. This result is in consonant with Adam et al (2025) whose findings indicated that integrating ethno curriculum into Biology teaching significantly improved students' critical thinking and classroom participation.

4.3 Perceived benefits of implementing ethnocurriculum in Biology teaching

The result of this study showed that Biology teachers in Obio/Akpor local government are aware of the benefits of implementing ethnocurriculum in Biology teaching because the integration of indigenous knowledge improves classroom participation in Biology teaching and learning, ethnocurriculum promote respect for local culture and tradition, learners understand better when local examples are used, practical biology lessons sometimes involve local materials and resources, teachers relate biology topics to local cultural practices. This result is in line with finding of Adam et al (2025) whose finding reinforces the importance of ethnocurriculum in improving Biology instruction. The result also corroborates with the study of Akachukwu and Okoye (2025) who noted that students taught through indigenous knowledge system-integrated instruction demonstrate significantly higher conceptual understanding, classroom engagement, and retention than those taught using conventional methods. This study is also in consonant with Popoola (2025) who noted significant positive relationships between the integration of indigenous practices and students' academic performance and also state that indigenous knowledge enriches Biology learning.

4.4 Challenges affecting the implementation of ethnocurriculum among Biology teachers in secondary schools

The result of this study showed that there are challenges affecting the implementation of ethnocurriculum among Biology teachers, many Biology teachers have not received any training on ethnocurriculum, the Biology curriculum does not adequately promote indigenous knowledge integration, lack of teaching materials, some teachers' inability to use community-based example in explaining biology concepts due to time constraints. This result is in line with the study of Mhakure & Otulaaja, (2024); Gay, G. (2018) who stated in their study that that Biology teachers often experience difficulty implementing ethnocurriculum because of extensive nature of the secondary school curriculum and the limited time allocated for classroom instruction.

5. Conclusion

This study examined the awareness and implementation of ethnocurriculum among Biology teachers in secondary schools. The findings revealed that Biology teachers possessed a moderate level of awareness of ethnocurriculum, indicating that while many teachers are familiar with the concept and recognize its relevance to Biology education, this awareness has not translated into effective classroom practice due to some challenges. The study further established that integrating of indigenous knowledge into Biology instruction remains limited in secondary school. This study also identified major barriers to the implementation of ethnocurriculum which includes time constraints, inadequate training on integrating indigenous knowledge into Biology instruction, and lack of instructional materials containing relevant local examples. These challenges restrict teachers' ability to incorporate culturally relevant teaching approaches that could enhance students' understanding of Biology concept and promote appreciation of indigenous knowledge systems.

Based on these finding, it is concluded that improving teachers' awareness alone is insufficient to ensure the successful implementation of ethnocurriculum. Effective implementation requires sustained professional development, adequate instructional resources, supportive curriculum policies, and institutional commitment. Addressing these challenges will strengthen the integration of ethnocurriculum into Biology teaching, improve the quality and relevance of Biology education, and contribute to the preservation and transmission of valuable indigenous knowledge for sustainable national development.

6. Recommendations

Based on the findings of this study, the following recommendations are made:

- School administrators should encourage Biology teachers to utilize locally available biological resources, indigenous examples and community experiences to enrich classroom instruction.
- Ministry of Education and educational agencies should organize regular workshops, seminars, and in-service training programmes to enhance Biology teachers' awareness and competence in implementing ethnocurriculum.
- Curriculum planners should incorporate indigenous biological knowledge and cultural practices into the secondary school Biology curriculum to make learning more relevant to learners' immediate. And they should also endeavour to enrich curriculum contents with ethno-Biology practices from different localities in subsequent curriculum review to help the learners appreciate and sustain their culture for future.
- Teacher education institute should include ethnocurriculum studies in their training programmes to prepare future teachers for culturally responsive teaching practices.
- Government and relevant educational stakeholders should develop and provide instructional materials, teachers' guide and resource manuals that support the effective implementation in of ethnocurriculum in Biology.
- Biology teachers should create opportunities for learners to share indigenous knowledge and experiences related to plant, and animals during classroom interaction.
- Educational authorities should organise regular workshops, seminars, and professional development programs to improve biology teachers' understanding of ethnocurriculum and its application in classroom instruction.
- Relevant educational stakeholders should develop and distribute instructional materials that integrate indigenous knowledge with conventional Biology concept.
- Universities, Colleges of Education and Teacher education institutions should include ethnocurriculum studies in their training programmes to prepare future teachers culturally responsive teaching practices.

- Biology teachers should be encouraged to adopt learners-centered instructional strategies, including field trips, project-based learning and community-based investigations, to promote the practical application of ethnocurriculum.

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Intended, Taught, and Tested: A Curriculum Alignment Analysis of the Mathematical Modelling Component of Nigeria's Further Mathematics Curriculum

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Abstract. Curriculum reform can fail not because any single component is broken, but because the intended curriculum, the taught curriculum, and the tested curriculum drift out of alignment with one another. This paper applies curriculum alignment theory (Cohen, 1987; Porter, 2002) to the Mathematical Modelling component introduced into Nigeria's Further Mathematics Curriculum (FMC) in 2011, mapping all 17 prescribed topics across Senior Secondary I-III against two independent data sources: a documentary content analysis of the Further Mathematics textbooks in use, and a proforma analysis of West African Examinations Council (WAEC) and National Examination Council (NECO) papers for 2014 and 2015. Findings show reasonable alignment between the intended and taught curriculum, with textbooks adequately treating 13 of the 17 prescribed topics (76.5%), but almost total misalignment between the intended/taught curriculum and the tested curriculum: across four examination administrations (WAEC 2014, WAEC 2015, NECO 2014, NECO 2015), only one, NECO 2015, included any Mathematical Modelling items at all, amounting to three items in total. Drawing on washback theory (Alderson & Wall, 1993), the paper argues that this near-total absence of examination alignment removes the principal external incentive that typically sustains attention to new curriculum content in Nigerian secondary schools, regardless of how well that content is otherwise resourced or textbook-supported. The paper recommends coordinated action between curriculum developers and examination bodies as a precondition for durable implementation of newly introduced mathematics content, both for the Mathematical Modelling component specifically and for Nigeria's 2025 NERDC curriculum reform more broadly.

Keywords: Curriculum alignment, washback, Mathematical Modelling, Further Mathematics Curriculum, Examination Bodies.

1. Introduction

Curriculum reform is often evaluated as though it had a single point of failure: either the new content is written into the syllabus and reform succeeds, or it is not and reform fails. Curriculum alignment theory offers a more precise diagnostic. Cohen (1987) distinguished between the intended curriculum, what policy documents specify should be taught, the taught or enacted curriculum, what is actually delivered in classrooms and embodied in the instructional materials teachers use, and the tested or assessed curriculum, what external examinations actually measure. Instructional alignment theory holds that the closer these three curricula track one another, the larger the effect of instruction on measured learning; where they diverge, instructional effort and assessment outcomes decouple from one another, undermining reform regardless of how well any single curriculum is designed (Cohen, 1987; Porter, 2002).

This paper applies that three-way alignment lens to a specific case: the Mathematical Modelling component introduced into Nigeria's Further Mathematics Curriculum (FMC) in 2011. Two companion analyses have already examined this reform from other angles, one treating textbook and material availability as implementation infrastructure, another examining teacher-level training needs. This paper asks a different, more structural question: independent of resourcing and teacher capacity, how well did the intended curriculum (the 17 Mathematical Modelling topics specified in the FMC), the taught curriculum (as embodied in the textbooks teachers actually used), and the tested curriculum (as embodied in WAEC and NECO examination papers) align with one another? Where alignment breaks down, curriculum alignment theory predicts that reform intent will not reliably translate into classroom priority, however well the content is otherwise supported.

1.1 Statement of the Problem

No prior study had mapped the Mathematical Modelling component of the FMC across all three levels of curriculum alignment, intended, taught, and tested, for the same set of prescribed topics. Without this mapping, it is not possible to determine whether implementation shortfalls in this component stem from a genuine curriculum-to-textbook gap, a curriculum-to-assessment gap, or both, each of which implies a different remedy. This study addressed that gap by constructing a topic-level alignment analysis of all 17 Mathematical Modelling topics prescribed in the FMC against textbook treatment and WAEC/NECO examination coverage.

2. Literature Review

2.1 Instructional Alignment Theory

Cohen (1987) argued that when the stimulus conditions of instruction, curriculum, and assessment are closely matched, the resulting effect on measured achievement is substantially larger than that produced by most other instructional interventions. Porter (2002) operationalized this insight into tools for measuring the content of instruction, instructional materials, and assessments as content maps, allowing researchers to compare what standards specify, what textbooks cover, and what tests measure on a common scale. Both traditions converge on a central claim relevant here: curriculum documents alone do not determine what is taught or what is learned; alignment across the intended, taught, and tested curriculum does.

2.2 Washback and the Role of External Examinations

In education systems where external, high-stakes examinations dominate the credentialing pathway, as is the case with WAEC and NECO in Nigerian secondary education, the tested curriculum exerts a particularly strong influence on classroom priority, a phenomenon Alderson and Wall (1993) termed washback: the extent to which a test's content and format shape what and how teachers teach, independent of curriculum documents. Where washback is positive, examinations reinforce curriculum intent; where a reform component is essentially untested, washback theory predicts that teachers and schools, operating under real time and resource constraints, will rationally deprioritize it relative to examinable content, whatever the curriculum document says should be taught.

3. Methodology

3.1 Research Design and Sample

The study used a descriptive, documentary content-analysis design. Two independent data sources were analyzed against the intended curriculum, defined as the 17 Mathematical Modelling topics prescribed across SSS I-III in the FMC. The taught curriculum was operationalized through a structured teacher-rated instrument (Mathematical Modeling Evaluation Questionnaire II, MMEQ II) assessing the extent to which Further Mathematics textbooks in use treated each of the 17 topics, completed by the 40 sampled Further Mathematics teachers drawn from 26 public and private senior secondary schools in Edo South Senatorial District. The tested curriculum was operationalized through a proforma content analysis of WAEC and NECO Further Mathematics examination papers for the 2014 and 2015 examination cycles, the first two cycles administered after the reform's introduction, recording the number of objective and theory items addressing Mathematical Modelling content in each administration.

3.2 Instrument, Validity, and Reliability

MMEQ II used a four-point Likert-type response format, with a scale midpoint of 2.5 as the decision threshold for adequacy: mean scores at or above 2.5 were classified as adequately treated, and scores below 2.5 as not adequately treated. The instrument was content-validated by measurement and evaluation specialist, and piloted with Further Mathematics teachers in three non-sampled schools, yielding a Cronbach's alpha of 0.714 for the textbook-adequacy subscale, (Omorogiuwa, 2006).

3.3 Method of Data Analysis

Descriptive statistics (means and standard deviations against the 2.5 threshold) were used to classify each of the 17 topics as adequately or not adequately treated by textbooks. WAEC/NECO proforma data were analyzed as frequency counts of objective and theory items per examination administration. An overall alignment index was then computed for each curriculum pairing: the proportion of topics adequately treated by textbooks (intended-taught alignment), and the proportion of examination administrations containing any Mathematical Modelling item (taught/intended-tested alignment).

4. Results

4.1 Intended-Taught Alignment: Topic-Level Textbook Coverage

Table 1 maps all 17 Mathematical Modelling topics prescribed in the FMC against their treatment in the Further Mathematics textbooks in use.

Table 1: Curriculum-Textbook Alignment Matrix for the 17 Mathematical Modelling Topics (N = 40 teacher raters)

Class Level	Topic	Mean	Textbook-Adequate?
SSS I	Definition of Operations Research	2.68	Yes
SSS I	History and Nature of Operations Research	2.40	No
SSS I	Models of Operations Research	2.38	No
SSS I	Practical Application of Models	2.27	No
SSS II	Concept of Inventory	2.72	Yes
SSS II	Definition of Terms (holding, demand, ordering, EOQ)	2.60	Yes
SSS II	Concept of Replacement	2.53	Yes
SSS II	Individual Replacement of Sudden Failure Items	2.50	Yes
SSS II	Replacement of Items that Wear Off Gradually	2.37	No
SSS III	Dependent and Independent Variables	2.75	Yes
SSS III	Construction of Models	2.61	Yes
SSS III	Methodology of Modelling	2.60	Yes
SSS III	Application of Modelling	2.60	Yes
SSS III	Introduction to Games Theory	2.57	Yes
SSS III	Description of Types of Games	2.61	Yes
SSS III	Solution of Two-Person Zero-Sum Games	2.52	Yes
SSS III	Matrix Games	2.68	Yes

Of the 17 prescribed topics, 13 (76.5%) were adequately treated by the textbooks in use, and 4 (23.5%) were not. The four gaps clustered at two points: the SSS I foundational topics (History and Nature of Operations Research; Models of Operations Research; Practical Application of Models), where three of four topics fell short, and a single SSS II topic (Replacement of Items that Wear Off Gradually). By SSS III, all eight topics, covering Model Construction and Games Theory, the most applied content in the component, were adequately treated. On this measure, intended-taught alignment for Mathematical Modelling was moderately strong overall, but weakest exactly where students first encounter the component.

4.2 Taught/Intended-Tested Alignment: Examination Coverage

Table 2 reports Mathematical Modelling item counts across the four examination administrations available in the two years immediately following the reform's introduction.

Table 2: Examination Alignment Index for Mathematical Modelling, 2014-2015

Examination Administration	Objective Items	Theory Items	Any MM Content?
WAEC 2014	0	0	No
WAEC 2015	0	0	No
NECO 2014	0	0	No
NECO 2015	2	1 (parts a & b)	Yes

Of the four examination administrations analyzed, only one, NECO 2015, contained any Mathematical Modelling content at all, an alignment rate of 25%. In total, three items across two years and two

examination bodies addressed a curriculum component spanning 17 distinct topics across three class levels. WAEC, the examination body used by the larger share of Nigerian secondary school

candidates, tested the component in neither year examined.

5. Discussion

Reading through Cohen's (1987) and Porter's (2002) alignment framework, these findings locate the Mathematical Modelling reform's principal structural weakness precisely: not in the intended-taught relationship, where alignment was reasonably strong at 76.5%, but in the relationship between the intended/taught curriculum and the tested curriculum, where alignment was close to zero. This distinction matters for remedy. A textbook-adequacy gap is addressed by revising textbooks; an examination-alignment gap can only be addressed by the examination bodies themselves changing what they test, a lever entirely outside the control of curriculum developers, textbook authors, or classroom teachers.

Washback theory (Alderson & Wall, 1993) explains why the examination gap is likely to matter more than its small item count might suggest. In examination-driven systems such as Nigeria's, teachers and school administrators face strong incentives to allocate instructional time toward examinable content. A component that is well-treated in textbooks but tested in only one of four examination administrations, and never by WAEC, sends a clear signal about relative priority, regardless of what the curriculum document intends. This may help explain why teacher training-need findings reported elsewhere in this evaluation program showed persistently low self-rated competence in the more applied Mathematical Modelling strands: without examination pressure reinforcing these topics, neither teachers nor schools have a strong external incentive to invest scarce professional development time in them, even where textbook support exists. This interpretation extends beyond what the present documentary data can directly confirm, since classroom-level instructional time was not observed directly, and should be read as a plausible mechanism rather than a directly measured effect.

The pattern also has clear implications for Nigeria's 2025 NERDC curriculum reform (NERDC, 2025). Any newly introduced content area that follows the same trajectory, reasonable textbook alignment but negligible examination alignment, is, on this evidence, likely to remain under-prioritized in classrooms regardless of how well it is otherwise resourced. Coordinating curriculum revision with examination body assessment blueprints from the outset, rather than treating examination alignment as a downstream concern, is therefore a structural precondition for reform durability, not merely a desirable add-on.

6. Recommendations

Based on these findings, the following recommendations are offered:

- WAEC and NECO should be formally engaged during curriculum development, not after curriculum launch, so that examination blueprints are updated to reflect new content areas from the first examination cycle following a reform, rather than years afterward.
- The Mathematical Association of Nigeria (MAN) should monitor and publicly report examination-alignment indices, of the kind constructed in this study, for newly introduced mathematics curriculum content, providing an early warning indicator of washback risk independent of resourcing indicators.
- Textbook authors and NERDC curriculum reviewers should prioritize revision of the SSS I foundational topics identified here as the weakest point of textbook alignment, since foundational gaps are likely to compound across the three-year sequence.
- Curriculum planners overseeing the 2025 NERDC reform should build a formal intended-taught-tested alignment audit, of the kind demonstrated in this study, into the standard curriculum evaluation cycle for all newly introduced content areas.

7. Conclusion

Applying curriculum alignment theory to the Mathematical Modelling component of the Further Mathematics Curriculum reveals a reform that succeeded reasonably well at aligning intended content with textbook treatment, but failed almost entirely to align either with what external examinations actually tested. Because Nigerian secondary education operates within an examination-driven system, this tested-curriculum gap represents the most consequential structural weakness identified across this evaluation program, one that textbook revision or teacher training alone cannot resolve. As Nigeria implements its 2025 NERDC curriculum reform which extends to other countries, treating examination alignment as a first-order design requirement, rather than a downstream implementation detail, is likely to matter more for reform durability than any other single factor examined in this analysis.

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Standard Operating Procedures for Student Retention in Conflict-Affected Areas of Benue State, Nigeria

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Abstract. Protracted armed conflict in Benue State, Nigeria, characterised by farmer–herder clashes, communal violence, militia attacks, banditry and kidnapping, has resulted in school closures, population displacement and persistent disruption to educational continuity. Despite these conditions, conflict-affected schools continue to operate without context-specific Standard Operating Procedures (SOPs) for student retention, leaving attendance monitoring, learner reintegration, crisis communication and staff responsibilities largely dependent on individual initiative. This study developed empirically grounded recommendations for SOPs to strengthen student retention in public primary and secondary schools across seven conflict-affected Local Government Areas of Benue State. Guided by Bronfenbrenner's (1979) Ecological Systems Theory and resilience theory, the study adopted a descriptive survey design. A sample of 380 teachers and school administrators, selected using the Krejcie and Morgan (1970) table, completed the researcher-developed Standard Operating Procedures for Student Retention Questionnaire (SOPSRQ). The instrument was validated by experts and yielded an overall Cronbach's alpha coefficient above 0.80. Data were analysed using mean and standard deviation with a criterion mean of 2.50. The findings revealed that insecurity, parental fear, displacement, economic hardship and institutional disorganisation were perceived as major challenges to student retention. Schools employed adaptive strategies such as teacher-led catch-up support, community engagement and attendance monitoring, but these remained largely informal and dependent on individual initiative. Respondents further identified procedural gaps requiring formalisation and endorsed documentation systems, policy-aligned written procedures, early identification of at-risk learners, defined staff responsibilities, reintegration procedures and crisis communication protocols as essential SOP components. The study recommends that school administrators develop and implement written SOPs, the Benue State Ministry of Education

provide standardised templates aligned with national and international frameworks, and development partners strengthen school capacity for SOP implementation. The study provides context-specific evidence for institutionalising student retention practices in conflict-affected schools in Benue State.

Keywords: Standard Operating Procedures; student retention; armed conflict; education in emergencies; resilience; Benue State.

1. Introduction

Benue State has, over the past decade, attained an ignominious height at the centre of operations associated with a spectrum of armed violence in Nigeria. This violence stems from farmer–herder clashes, communal conflicts, militia incursions and coordinated raids by armed groups – often involving sophisticated weaponry and operating with apparent impunity across rural and border areas (Ojewale & Onuoha, 2025). A particularly devastating episode unfolded in mid-June 2025 in Yelewata, Guma Local Government Area, when gunmen let themselves loose on a sanguinary spree, killing between 100 and 200 inhabitants – burning many alive, shooting or mutilating others and displacing thousands (Odeh James & Ekani, 2025). A presidential visit was prompted by the attack, and directives for intensified security measures were issued, yet violence persisted in surrounding communities such as Udei, Ukohol and Daudu. Additional lives were reportedly claimed in subsequent incidents in late June and July 2025, including over 50 residents and 10 security personnel, through ambushes and raids, alongside widespread arson that destroyed homes, barns and infrastructure (Ekani, 2025).

Similar patterns of violence have occurred across Ukum, Kwande, Gwer West, Agatu, Otukpo, Katsina-Ala and Logo Local Government Areas, with many attacks launched in border areas

adjoining Nasarawa and Taraba States. These incidents involve night raids, reprisals, abductions, and territorial incursions amid competition over grazing land, ethnic tensions, and criminal exploitation. These attacks have persisted into 2026, with reports of further killings in communities such as Tse-Kaseve and Otobi Akpa, contributing to ongoing instability (Barnabas Aid, 2026; Olikita, 2026). The violence has resulted in over 2.1 million internally displaced persons (IDPs), leading to estimates that rank Benue State second only to Borno State in IDP figures in Nigeria (United Nations Children's Fund [UNICEF], 2025; International Organization for Migration [IOM], 2026). A significant proportion – around 60% – of these IDPs are children, many of whom reside in camps or host communities where access to basic necessities remains limited. In specific episodes, such as attacks in areas like Guma, Gwer West, Agatu and Ukum, thousands have been forcibly uprooted, with over 3,000 displaced in single incidents in recent years (Amnesty International, 2025). This displacement has directly contributed to educational instability, as families flee their homes, often abandoning schooling amid immediate survival priorities.

This pattern of recurrent, multi-actor violence has triggered widespread school closures, heightened absenteeism, and plummeting enrolment rates, particularly in Sankera (Katsina-Ala, Ukum, Logo), where statistical analyses reveal significant negative shifts in student engagement ($t=26.108$, $p<0.001$) and teacher motivation ($t=17.654$, $p<0.001$) (Jato & Iornumbe, 2025). Displacement compounds these issues, blocking children from access to formal education while inflicting psychological trauma on these very children. For instance, in Guma Local Government Area alone, as of 2023, more than 50 schools remained closed, with over 90% non-functional due to persistent insecurity, teacher flight to urban centres, and overgrown, unused classrooms like those at Inudu Local Government Educational Authority (LGEA) Primary School (Admin III, 2024). UNESCO estimates nearly 20 million Nigerian children out of school nationally, with Benue's conflict zones contributing markedly through surges in dropouts, as seen in fluctuating enrolments in Agatu, Guma and Logo amid ongoing banditry (Admin III, 2024).

In the face of ongoing security challenges to the continuity of schooling for children in Benue State, temporary learning arrangements aimed at student retention are often established in schools. However, these retention measures often collapse due to resource shortages, teacher unavailability, or renewed insecurity, thereby revealing the inadequacy of fragmented, reactive measures. Analyses from scholars and organisations indicate

that such protracted, identity-linked violence in Nigeria's fragile Middle Belt regions undermines immediate safety and long-term societal development through interconnected mechanisms: physical destruction of facilities, educator flight or demotivation, widespread psychosocial harm, and eroded institutional trust (Jones & Naylor, 2022; International Crisis Group assessments). Informal community or school-level adaptations frequently falter against the coordinated scale and duration of threats, exposing systemic shortcomings in the maintenance of educational access and continuity.

The entrenched and intensifying character of insecurity in Benue State compels the exigency for the establishment of formalised standard operating procedures – defined as step-by-step instructions designed to ensure the safety of learners and the continuity of education by providing predictable, coordinated responses to security threats and resource instability (Inter-Agency Network for Education in Emergencies [INEE], 2024). Such procedures have the potential to transform fragmented coping mechanisms into coherent institutional strategies, embed resilience within school governance structures, and systematically address multidimensional retention challenges. This study, by grounding procedural development in empirical realities and stakeholder perspectives, seeks to contribute to a contextually responsive framework capable of sustaining educational participation amidst protracted insecurity. In so doing, it addresses a pressing need to move from reactive adaptation to structured preparedness in safeguarding the right to education within conflict-affected schooling contexts.

1.1 Statement of the Problem

Despite persistent armed conflicts and displacement in Benue State, schooling in many affected communities continues to operate without formally articulated, context-specific standard operating procedures designed to safeguard student retention during periods of insecurity. While schools frequently reopen after attacks or temporary closures, the absence of institutionalised operational frameworks means that decisions relating to attendance continuity, learner reintegration, staff redeployment, safety coordination, and academic recovery are often improvised at the discretion of individual administrators. This procedural vacuum creates variability in operational realities across schools and Local Government Areas: there is no unified structure to direct preparedness, response and recovery efforts specifically focused on retaining learners. Although national and international education-in-emergencies frameworks exist – such as the Minimum Standards for Education: Preparedness, Response, Recovery

developed by the Inter-Agency Network for Education in Emergencies (INEE, 2024) and Nigeria's National Policy on Safety, Security and Violence-Free Schools issued by the Federal Ministry of Education Nigeria (FME, 2021) – their translation into school-level operational mechanisms within conflict-affected communities in Benue remains unclear and uneven. There is limited empirical evidence on how schools currently structure their internal responses to insecurity, what elements of those responses are systematic or merely ad hoc, and the extent to which existing practices are sufficient to sustain continuous enrolment and progression. In particular, there is no consolidated body of knowledge documenting how frontline educational actors conceptualise retention risks during conflict, how they prioritise competing administrative demands, and what procedural components they consider essential for institutional stability. This study seeks to address this problem by reporting findings to inform empirically grounded, formalised standard operating procedures designed to systematically strengthen student retention in conflict-affected schooling contexts of Benue State.

1.2 Objectives of the Study

The study had one broad objective and four specific objectives, derived from the research concerns and aligned with the diagnostic, evaluative, prescriptive and participatory dimensions of the inquiry.

Broad Objective

To develop informed, context-specific recommendations standard operating procedures that enhance student retention in conflict-affected schools in Benue State, Nigeria, by drawing on the experiences and insights of teachers and school administrators.

Specific Objectives

Diagnostic Objective: To identify challenges to student retention during conflicts in Benue State that teachers and administrators consider as justification for developing Standard Operating Procedures.

Evaluative Objective; To examine existing school-based strategies for student retention during armed conflicts that teachers and school administrators regard as central to informed establishment of standard operating procedures in Benue State's schooling context.

Prescriptive Objective: To determine factors affecting student retention during conflicts in Benue State that teachers and school administrators identify as inadequately addressed by existing practices, thereby requiring formalisation through Standard Operating Procedures.

Participatory Objective: To explore components that teachers and school administrators rate as central to effective standard operating procedures for maximising student retention during conflicts in Benue State.

1.4 Research Questions

- What challenges to student retention during conflicts in Benue State do teachers and administrators consider as justification for the development of Standard Operating Procedures?
- What existing school-based strategies for student retention during armed conflicts do teachers and school administrators regard as central to informed establishment of standard operating procedures in the schooling context of Benue State?
- Which factors affecting student retention during conflicts in Benue State do teachers and school administrators identify as inadequately addressed by existing practices and therefore requiring formalisation through Standard Operating Procedures?
- What components do teachers and school administrators rate as central to effective standard operating procedures for maximising student retention during conflicts in Benue State?

2. Theoretical Framework

This study adopts a socio-ecological resilience framework that integrates Urie Bronfenbrenner's bio-ecological model of human development with resilience theory as applied to education in emergencies. Bronfenbrenner's (1979) bio-ecological model conceptualises educational outcomes as products of dynamic operations across nested systems: the microsystem, the mesosystem, the exosystem, the macrosystem and the chronosystem. The microsystem includes classroom practices, peer relations, and family support, which interact with the mesosystem of school–family linkages, the exosystem of community insecurity and administrative policies, the macrosystem of socio-cultural norms and conflict dynamics, and the chronosystem representing the temporal dimension of protracted or recurrent violence. In conflict-affected contexts, exosystemic shocks – such as displacement, attacks on communities, or infrastructural destruction – cascade downward, destabilising microsystem processes including regular attendance, psychosocial safety, and instructional continuity. Empirical research demonstrates that such systemic disruptions significantly undermine sustained educational participation (Burde et al., 2017). Student retention,

therefore, cannot be reduced to individual motivation; it is shaped by structurally mediated ecological interactions.

Resilience theory complements this perspective by emphasising positive adaptation in the face of adversity (Masten, 2014). Within educational systems, resilience encompasses absorptive, adaptive, and transformative capacities that enable institutions to withstand shocks, adjust operationally, and implement structural improvements (Duchek, 2020). In EiE contexts, protective processes often emerge informally at micro- and mesosystem levels—for example, teacher-led outreach, flexible scheduling, or community partnerships. While such adaptations reflect local ingenuity, their ad hoc character limits consistency, scalability, and sustainability, particularly in settings of chronic instability (Novelli et al., 2015).

The critical analytical progression from ecological disruption to formal procedural codification lies in the process of institutionalisation. Organisational resilience literature underscores that adaptive practices achieve durability only when embedded within structured routines and governance mechanisms (Duchek, 2020). Formalised standard operating procedures operate primarily at the meso- and exosystem levels as regulatory and coordinating instruments that stabilise microsystem practices amid exosystemic volatility. Through the codification of roles, response protocols, communication pathways and monitoring processes, standard operating procedures translate experiential knowledge into replicable institutional standards. In doing so, they reduce reliance on individual improvisation, enhance accountability, and facilitate systematic learning and refinement over time.

This orientation aligns with global EiE principles, including those articulated in the Minimum Standards for Education: Preparedness, Response, Recovery developed by the Inter-Agency Network for Education in Emergencies (INEE, 2024), which emphasise structured preparedness and continuity mechanisms. Within a socio-ecological resilience lens, standard operating procedures are therefore not merely administrative artefacts but strategic instruments for institutionalising protective processes across ecological layers. They function to coordinate stakeholder action, embed resilience within school governance structures, and sustain student retention amid recurrent conflict. By synthesising ecological systems theory with organisational and educational resilience scholarship, this framework provides a coherent theoretical foundation for examining how stakeholder-informed standard operating procedures

can systematically strengthen student retention in conflict-affected schooling environments.

3. Literature Review

3.1 The Concept of Standard Operating Procedures

Standard operating procedures can be defined as codified, repeatable protocols that guide institutional responses to recurring or complex scenarios (Higgins & Walker, 2012). In education contexts, standard operating procedures formalise informal strategies into structured routines that enhance consistency, accountability and continuity – particularly in crises where disruption is frequent. Globally, standard operating procedures for schools’ cover emergency preparedness, hazard-specific response measures, and coordination with community actors such as first responders (International Federation of Red Cross and Red Crescent Societies [IFRC], n.d.; U.S. Department of Education et al., 2013). Within education in emergencies (EiE), formalised standard operating procedures are integral to embedding protective processes across ecological layers and strengthening organisational resilience (Duchek, 2020; Inter-Agency Network for Education in Emergencies [INEE], 2024).

3.2 The Concept of Student Retention

Student retention is defined as sustained enrolment, attendance, and academic progression within formal schooling. In conflict-affected contexts, retention is shaped by protective factors spanning individual, relational, and systemic levels, including safe learning environments, psychosocial support, and adaptive pedagogy (Masten, 2014; Burde et al., 2017). Retention is undermined by armed conflict, displacement, and economic shocks through the disruption of classroom continuity, the increase in absenteeism, and the triggering of withdrawal from school (Akresh & de Walque, 2008; Jones & Naylor, 2022). This literature recognises that retention in fragile settings is not only a function of learner motivation but also of schools’ capacity to sustain operations and coordinate adaptive responses amid instability.

3.3 Conflict-Affected Context of Schooling

Education in conflict settings experiences multifaceted disruptions. Direct impacts are manifested in attacks on school infrastructure, school closures, and the use of school buildings for non-educational purposes, while indirect impacts are reflected in trauma, household economic losses, and community displacement (Burde et al., 2017; Novelli et al., 2015). In Nigeria, reduced school

attendance, teacher shortages, and disrupted learning continuity have been caused by farmer–herder clashes, communal violence, and insurgency in the North Central and North East regions (Adeyi et al., 2024; Jones & Naylor, 2022). In Benue State specifically, school closures and the displacement of learners and educators have been brought about by flooding, communal violence, and recurring insecurity, thereby eroding established patterns of school participation and engagement. Across Urie Bronfenbrenner’s (1979) ecological systems, these disruptions cascade, and microsystem interactions – such as classroom engagement and family–school linkages – that are critical for retention are weakened. Schools often respond through informal adaptive measures, including teacher-led outreach, flexible timetables, temporary learning spaces, and psychosocial support. While these strategies reflect local resilience, their ad hoc nature limits consistency, scalability, and sustainability, particularly in protracted conflict contexts (Novelli et al., 2015; Duchek, 2020).

3.4 Global and Local Standards for Schooling Continuity

Global standards for schooling continuity prioritise safe, inclusive, and equitable access to learning in crisis contexts. The Inter-Agency Network for Education in Emergencies (INEE, 2024) Minimum Standards for Education establish benchmarks across preparedness, response and recovery, including safe facilities, psychosocial support, and coordination mechanisms designed to sustain educational continuity. Complementary global frameworks such as the Safe Schools Declaration (adopted in 2015) reinforce protection of learners and educational infrastructure in situations of armed conflict and advocate alignment of national responses with international commitments (Safe Schools Declaration, 2015). Recent UNESCO reporting (2024) highlights a global spike in attacks on schools, students, and teachers, with thousands of incidents recorded worldwide and increasing recognition of the need for systematic protective measures in educational settings. Similarly, the Education Under Attack reports by the Global Coalition to Protect Education from Attack (GCPEA, 2022, 2024) document tens of thousands of attacks, military use of schools, and interference with learning continuity, reinforcing the global imperative for institutionalised protective and continuity frameworks.

In the Nigerian context, the National Policy on Safety, Security and Violence-Free Schools (Federal Ministry of Education, 2021) provides a national framework mandating comprehensive safety planning, early warning mechanisms, and conflict response processes at school and system levels. The

policy prohibits militarisation of schools, outlines procedures for violence prevention, and emphasises community involvement in safety efforts. Despite these frameworks’ alignment with global standards, evidence suggests that many Nigerian schools lack fully operationalised standard operating procedures tailored to recurrent conflict scenarios.

3.5 The Formalisation Gap in Conflict-Affected Schooling Context of Benue State

Despite global and national standards advocating structured responses, a formalisation gap is observed in Benue State’s schooling system. In conflict-affected communities, reactive strategies have been developed by schools to sustain learning amid farmer–herder violence, communal clashes, and displacement, including the establishment of temporary learning spaces, the implementation of community outreach efforts, and the adoption of adaptive timetables. However, these practices are largely informal, fragmented, and vulnerable to disruption by resource shortages, leadership turnover, or renewed violence (Adeyi et al., 2024; Internal Displacement Monitoring Centre, 2023).

Although the INEE Minimum Standards (2024) and national policy frameworks emphasise institutionalised planning and coordinated action, few studies have examined school-level codification of retention-focused standard operating procedures in Benue’s conflict-affected communities. Informal strategies often lack monitoring, evaluation and integration across ecological layers, limiting institutional resilience and restricting the ability of schools to maintain long term continuity of learning. A context-specific, stakeholder-informed framework of standard operating procedures would bridge this gap by translating experiential knowledge into structured protocols, improving coordination between micro, meso, and exosystem actors, and embedding adaptive capacities within school governance structures (Duchek, 2020; Novelli et al., 2015).

The need for empirically grounded standard operating procedures capable of strengthening student retention in conflict-affected schooling contexts such as Benue State is underscored by this synthesis, and it is demonstrated how global and local standards can inform an actionable, school-level procedural framework.

4. Research Methodology

The study adopted a descriptive survey research design to examine the perceptions of teachers and school administrators regarding challenges to student retention in conflict-affected schools, existing school-based retention strategies,

inadequately addressed retention factors requiring formalisation, and essential components of standard operating procedures (SOPs) for improving student retention. The study was conducted in conflict-affected Local Government Areas of Benue State, Nigeria, where recurrent farmer–herder clashes, communal violence, militia attacks, banditry and kidnappings have caused displacement, school closures and widespread educational disruption. The target population comprised all teachers and school administrators in public primary and secondary schools across seven high-conflict Local Government Areas – Guma, Gwer West, Ukum, Agatu, Kwande, Katsina-Ala and Logo – with an estimated population of 24,890 educators (19,700 primary and 5,190 secondary). Using the Krejcie and Morgan (1970) table, a sample of 380 participants (approximately 300 primary and 80 secondary educators) was determined to provide adequate representation while accommodating the logistical realities of conflict-affected communities. Data were collected using a researcher-developed instrument, the *Standard Operating Procedures for Student Retention Questionnaire* (SOPSRQ), comprising 40 items organised into four sections assessing: (i) challenges necessitating SOP development, (ii) existing school-based retention strategies, (iii) inadequately addressed retention factors requiring formalisation, and (iv) essential components of effective SOPs. Responses were rated on a four-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (4). The

instrument was developed from established literature on education in emergencies, student retention and conflict-sensitive school management. Face and content validity were established through the evaluation of three experts in educational research methodology and conflict-affected education, whose recommendations were incorporated before the final administration. Reliability was established through a pilot study involving 30 educators from a conflict-affected Local Government Area outside the study area using Cronbach's alpha, with coefficients meeting the minimum acceptable threshold of 0.70 for each section and exceeding 0.80 for the overall instrument. The questionnaires were administered by the researcher and trained research assistants during school visits, cluster meetings and other safe locations over a six-week period. Completed questionnaires were retrieved on-site where possible, while follow-up visits addressed non-response. Data were analysed using mean and standard deviation, with mean scores ranked to identify the most and least endorsed challenges, strategies, implementation gaps and SOP components. Cross-tabulations and subgroup means were also computed to describe variations in perceptions. A criterion mean of 2.50 served as the decision benchmark, with items scoring 2.50 or above interpreted as accepted and recommended for inclusion in the proposed standard operating procedures.

5. Presentation of Results

Research Question One: What challenges to student retention during conflicts in Benue State do teachers and administrators consider as justification for the development of Standard Operating Procedures?

Table 1: Descriptive Statistics for Challenges to Student Retention During Conflicts in Benue State

Rank	Challenge to Student Retention During Conflicts	Mean	SD	Decision
1	Insecurity in the community reduces students' regular attendance.	3.49	0.95	Accepted
2	Fear of violence discourages parents from sending their children to school consistently.	3.18	1.20	Accepted
3	Displacement of families increases student dropout.	3.15	0.62	Accepted
4	Economic hardship caused by conflict forces students to leave school.	3.14	0.96	Accepted
5	Damage to school facilities disrupts students' continuity of learning.	3.07	1.04	Accepted
5	Emotional stress caused by insecurity affects students' willingness to remain in school.	3.07	0.55	Accepted
7	Irregular teacher attendance due to insecurity affects student retention.	2.99	0.82	Accepted
8	Unsafe routes to school reduce student attendance.	2.96	0.99	Accepted
9	Poor communication between school and parents during crises contributes to dropout.	2.72	0.94	Accepted
10	Lack of organised school response during crises worsens student dropout.	2.50	1.20	Accepted

Note. Criterion mean = 2.50. Mean scores of 2.50 and above were accepted, while mean scores below 2.50 were rejected.

Table 1 shows that all ten identified factors recorded mean scores equal to or above the criterion mean of 2.50, indicating that respondents agreed that each constituted a challenge to student retention during conflicts in Benue State.

Research Question Two: What existing school-based strategies for student retention during armed conflicts do teachers and school administrators regard as central to informed establishment of standard operating procedures in the schooling context of Benue State?

Table 2: Descriptive Statistics for Existing School-Based Student Retention Strategies During Armed Conflicts in Benue State

Rank	Existing School-Based Student Retention Strategy	Mean	SD	Decision
1	Teacher support for students to catch up after missed classes.	3.53	0.90	Accepted
2	Regular monitoring of student attendance.	3.22	1.17	Accepted
3	Engagement of community leaders to support student attendance.	3.20	0.64	Accepted
4	Communication with parents during crisis situations.	3.18	0.96	Accepted
5	Staff discussions on student dropout-related issues.	3.16	0.54	Accepted
6	Teacher follow-up of students with prolonged absenteeism.	3.09	1.05	Accepted
7	Collaboration with community members to improve student safety.	3.08	0.95	Accepted
8	Identification of students at risk of dropping out.	3.05	0.85	Accepted
9	Provision of emotional and counselling support to conflict-affected students.	2.92	0.87	Accepted
10	Adjustment of academic activities during periods of insecurity.	2.60	1.21	Accepted

Note. Criterion mean = 2.50. Mean scores of 2.50 and above were accepted, while mean scores below 2.50 were rejected.

Table 2 presents the descriptive statistics for existing school-based strategies for promoting student retention during armed conflicts in Benue State. The results indicate that all ten identified strategies recorded mean scores equal to or above the criterion mean of 2.50, indicating that respondents agreed that these constitute existing school-based strategies for promoting student retention during periods of armed conflict.

Research Question Three: Which factors affecting student retention during conflicts in Benue State do teachers and school administrators identify as inadequately addressed by existing practices and therefore requiring formalisation through Standard Operating Procedures?

Table 3: Descriptive Statistics for Factors Affecting Student Retention During Conflicts Requiring Formalisation Through Standard Operating Procedures in Benue State

Rank	Factor Requiring Formalisation Through Standard Operating Procedures	Mean	SD	Decision
1	Limited documentation of interventions for at-risk students.	3.44	1.00	Accepted
2	Absence of written guidelines for handling student dropout during conflict.	3.13	1.22	Accepted
2	Undefined written staff roles in student retention management.	3.13	0.54	Accepted
4	Absence of a written crisis communication plan.	3.07	0.97	Accepted
5	Lack of a written process for responding to prolonged student absence.	3.06	1.03	Accepted
6	Inconsistent implementation of student retention efforts across the school.	3.02	0.56	Accepted
7	Lack of a written coordination plan with community or security groups.	2.93	0.82	Accepted
8	Absence of a written procedure for reintegrating displaced students.	2.87	1.00	Accepted
9	Dependence on individual staff initiative for student retention efforts.	2.86	1.04	Accepted
10	Absence of a standard record-keeping system for tracking at-risk students.	2.54	1.21	Accepted

Note. Criterion mean = 2.50. Mean scores of 2.50 and above were accepted, while mean scores below 2.50 were rejected.

Table 3 presents the descriptive statistics for factors affecting student retention during conflicts that respondents identified as inadequately addressed by existing school practices and therefore requiring formalisation through Standard Operating Procedures (SOPs). The results indicate that all ten identified factors recorded mean scores equal to or above the criterion mean of 2.50, indicating that respondents agreed that each factor requires formalisation through written Standard Operating Procedures.

Research Question Four: What components do teachers and school administrators rate as central to effective Standard Operating Procedures for maximising student retention during conflicts in Benue State?

Table 4: Descriptive Statistics for Components of Effective Standard Operating Procedures for Maximising Student Retention During Conflicts in Benue State

Rank	Component of Effective Standard Operating Procedures	Mean	SD	Decision
1	Provision of standard forms for documenting student retention cases.	3.51	0.96	Endorsed
2	Alignment of written procedures with state education policies.	3.39	0.63	Endorsed
3	Establishment of an early identification system for at-risk students.	3.28	1.03	Endorsed
4	Development of clear written procedures for student retention during conflict.	3.21	1.21	Endorsed
5	Inclusion of an attendance monitoring system in written procedures.	3.13	0.67	Endorsed
6	Inclusion of procedures for reintegrating displaced or returning students.	3.12	0.99	Endorsed
7	Definition of staff responsibilities for preventing student dropout.	3.06	1.07	Endorsed
8	Inclusion of referral guidelines for emotional or psychosocial support.	2.97	0.86	Endorsed
9	Regular review of written procedures by school management.	2.93	1.03	Endorsed
10	Inclusion of parent communication procedures during crises.	2.72	0.94	Endorsed

Note. Criterion mean = 2.50. Components with mean scores of 2.50 and above were endorsed for inclusion in the proposed Standard Operating Procedures, while those with mean scores below 2.50 were not endorsed.

Table 4 presents the descriptive statistics for components of effective Standard Operating Procedures (SOPs) for maximising student retention during conflicts in Benue State. The results indicate that all ten proposed components recorded mean scores equal to or above the criterion mean of 2.50, indicating that respondents endorsed each component for inclusion in effective Standard Operating Procedures for promoting student retention during periods of conflict.

6. Discussion of Findings

6.1 Challenges to Student Retention Justifying the Development of Standard Operating Procedures

All ten identified factors were accepted as challenges to student retention during periods of armed conflict. The prominence of insecurity in the community reducing students' regular attendance ($M = 3.49$) underscores the extent to which physical insecurity remains the principal barrier to educational continuity in Benue's conflict-affected communities. Burde et al. (2017) identified proximity of violence as one of the strongest predictors of reduced attendance, establishing the foundational empirical basis for this pattern, while Jato and Iornumbe (2025) provide more recent and geographically specific corroboration through statistically significant negative shifts in student engagement ($t = 26.108$, $p < .001$) and teacher motivation ($t = 17.654$, $p < .001$) recorded in Benue's Sankera sub-region. Jones and Naylor (2022) further documented in the Nigerian context how recurring farmer-herder clashes generate attendance disruptions that persist well beyond the immediate episode of violence, a pattern directly applicable to the multi-actor insecurity characterising the seven Local Government Areas studied here. The high ranking of fear of violence discouraging parental enrolment decisions ($M = 3.18$) indicates that caregiver risk perception operates as an independent retention barrier, distinct from the direct effects of physical insecurity on learners themselves. UNESCO (2024) documented that communities frequently withdraw children even when schools have not been directly targeted, confirming that perceived rather than actual threat is sufficient to suppress attendance, while the International Rescue Committee (2018) established that safety assurance for parents is a prerequisite for consistent enrolment rather than a supplementary intervention. The ranking of displacement as a driver of dropout ($M = 3.15$) reflects the acute IDP profile of Benue State, where the International Organisation for Migration (2026) recorded over 2.1 million displaced persons, approximately 60% of them children. Adeyi et al. (2024) found that multiple-relocation displacement

events produce cumulative educational setbacks that are difficult to reverse in the absence of structured reintegration mechanisms, situating the present finding within a well-documented pattern of compounding disadvantage.

Economic hardship ($M = 3.14$) and facility damage disrupting learning continuity ($M = 3.07$) were similarly accepted as significant challenges. The Inter-Agency Network for Education in Emergencies (2024) identifies conflict-induced livelihood disruption as one of the most persistent indirect retention barriers, while the Global Coalition to Protect Education from Attack (2022, 2024) documented infrastructure damage as functioning both as a direct barrier through school closures and as a symbolic one, communicating to communities that schools are no longer safe or functional spaces. The acceptance of poor crisis communication as a challenge ($M = 2.72$) is noteworthy because, read alongside Research Questions Two and Three, it reveals that frontline educators are already cognisant of the institutional inadequacies that formalised standard operating procedures would systematically address. Even the lowest-ranked item – lack of organised school response worsening dropout ($M = 2.50$) – reached the decision threshold, indicating that institutional disorganisation itself is perceived as an active contributor to retention failure rather than a neutral condition. Bronfenbrenner (1979) provides the theoretical scaffolding for this cascading pattern: exosystemic shocks destabilise mesosystem and microsystem processes, and the absence of stabilising governance structures at meso and exosystem levels intensifies the disruption experienced at the level of classrooms, family-school relationships and individual learners' daily routines.

6.2 Existing School-Based Strategies Perceived as Central to Informed Standard Operating Procedure Development

All ten identified practices were perceived as existing school-based student retention strategies. The primacy accorded to teacher support for catch-up after missed classes ($M = 3.53$) indicates that individual teacher responsiveness to learner absence is widely regarded as the most available retention mechanism in Benue's conflict-affected schools. Jones and Naylor (2022) identified the same practice as a primary differentiating factor between schools that maintained functioning operations and those that collapsed during insecurity episodes in North Central Nigeria, and Adeyi et al. (2024) similarly found that teacher-level initiative constitutes the frontline of retention effort where institutionalised support structures are absent. The data indicate,

however, that this practice is perceived to operate without the procedural frameworks that would render it consistent, monitorable and sustainable – a limitation with clear structural implications. Bronfenbrenner's (1979) ecological model accounts for this vulnerability: protective processes operating exclusively at the microsystem level, without embedding within meso and exosystem governance structures, remain exposed when exosystemic shocks intensify. Duchek (2020) captures the same constraint in organisational terms by distinguishing between absorptive capacity, which enables organisations to improvise responses to shocks, and transformative capacity, which entails structural restructuring for sustained performance under chronic adversity. The pattern of findings for this research question suggests that schools demonstrate the former but lack the institutional architecture required for the latter.

Community leader engagement ($M = 3.20$) and parent communication during crises ($M = 3.18$) were both perceived as established strategies, indicating that schools regard community partnerships and family communication as practical mechanisms for sustaining student participation during insecurity. The Inter-Agency Network for Education in Emergencies (2024) endorses community engagement as a preparedness benchmark rather than merely a crisis response, and the Global Partnership for Education Knowledge and Innovation Exchange (2023) found that timely family-school communication during insecurity significantly increases the likelihood of prompt re-enrolment following disruption, lending empirical weight to the recognition of these practices. The comparatively lower means for at-risk student identification ($M = 3.05$) and psychosocial support ($M = 2.92$) suggest that these practices are perceived as less consistently implemented. Adeyi et al. (2024) found early identification systems to be among the most structurally under-developed features of Nigerian EiE practice, and the United Nations Children's Fund (2025) established that unaddressed trauma translates directly into prolonged absence, indicating that the inconsistency reflected in these ratings carries direct consequences for retention outcomes.

The lowest-ranked accepted strategy – academic activity adjustment during insecurity ($M = 2.60$) – indicates that flexible scheduling is perceived as the least embedded of the existing practices. Burde et al. (2017) noted that adaptive scheduling is among the most difficult EiE strategies to sustain without institutional backing, and Novelli et al. (2015) established that ad hoc adaptive practices are inherently limited in scalability and sustainability under conditions of chronic insecurity. Taken together, the findings across this research question

reflect a pattern of locally generated resilience that, in Duchek's (2020) terms, has not yet been institutionalised into the replicable governance routines necessary for durability.

6.3 Factors Inadequately Addressed by Existing Practices and Requiring Formalisation Through Standard Operating Procedures

All ten identified factors were accepted as procedural gaps requiring formalisation through standard operating procedures. The ranking of limited documentation of interventions for at-risk students as the most critical gap ($M = 3.44$) indicates that the absence of systematic tracking mechanisms is perceived as the most consequential institutional deficit in Benue's conflict-affected schools. Adeyi et al. (2024) found that where such mechanisms are absent, schools reinvent responses without institutional learning, producing cyclical improvisation rather than cumulative improvement. The Inter-Agency Network for Education in Emergencies (2024) specifies learner monitoring as a minimum preparedness standard, and Jones and Naylor (2022) documented the same documentation deficit as a systemic feature of conflict-affected Nigerian schools, confirming that the present finding reflects a recognisable national pattern rather than an isolated local shortcoming.

The equal ranking of the absence of written dropout guidelines and undefined staff roles in retention management (both $M = 3.13$) indicates that the absence of written role clarity is perceived as generating precisely the operational variability that the study's problem statement describes. Ouchi (1977) established that role ambiguity and the absence of codified procedures are primary mechanisms through which institutional inconsistency is produced, while Bush (2011) argued in educational management contexts that clearly defined staff responsibilities are a prerequisite for accountable governance. The Federal Ministry of Education Nigeria's (2021) national policy envisions such structures at school level, yet Jones and Naylor (2022) documented that this intent has not been operationalised in conflict-affected communities across Nigeria, situating the present gap within a broader systemic failure of policy translation.

The absence of a written crisis communication plan ($M = 3.07$) acquires particular significance when read against Research Question Two's finding that parent communication was among the most widely recognised existing strategies ($M = 3.18$). The gap between performing a practice and having a documented procedure for it is precisely the formalisation deficit that Novelli et al. (2015) identify as the mechanism through which informal

adaptation breaks down under sustained pressure, because practices sustained through individual initiative cannot be monitored, corrected or maintained when those individuals are displaced or unavailable. The acceptance of dependence on individual staff initiative as an inadequately addressed gap ($M = 2.86$) is given further contextual force by Jato and Iornumbe's (2025) evidence of significant teacher motivation decline in Benue's conflict zones, indicating that schools are perceived to rely on individual initiative as their primary retention mechanism in an environment of diminishing staff capacity. Bronfenbrenner (1979) accounts for the structural vulnerability this produces – protective processes unsupported by meso and exosystem governance structures are fragile under sustained exosystemic pressure – while Duchek (2020) frames the institutional implication: without systematic monitoring and learning mechanisms embedded in formal procedures, organisations cannot develop the transformative resilience required for sustained performance under chronic adversity.

6.4 Components Endorsed as Central to Effective Standard Operating Procedures for Maximising Student Retention

All ten proposed components were endorsed above the criterion mean. The prominence of standard forms for documenting student retention cases ($M = 3.51$) indicates that respondents regarded documentation infrastructure as the foundation of any effective procedural framework. The Global Partnership for Education Knowledge and Innovation Exchange (2023) found that schools in conflict-affected contexts with formalised documentation systems demonstrate greater consistency in retention outcomes than those relying on informal records, and the International Rescue Committee (2018) identified case documentation as the basis for accountable and replicable intervention in fragile settings. The primacy of this component reflects an assessment by educators living with the operational consequences of its absence: no other SOP component can function effectively without the tracking and accountability infrastructure that documentation provides.

The endorsement of alignment with state education policies as the second most important component ($M = 3.39$) indicates that respondents regarded vertical policy coherence as essential to procedural legitimacy and sustainability. Jones and Naylor (2022) observed that EiE interventions in Nigeria lacking such alignment tended to atrophy when external support was withdrawn, lending direct empirical grounding to this perception. The endorsement of an early identification system for at-risk students ($M = 3.28$) and clear written retention

procedures ($M = 3.21$) confirms a preference for proactive over reactive mechanisms. The Global Partnership for Education Knowledge and Innovation Exchange (2023) documented early warning systems as among the most cost-effective features of conflict-sensitive education, and Jones and Naylor (2022) argued that effective Nigerian EiE practice embeds these systems into governance structures before crises intensify. Attendance monitoring ($M = 3.13$) and reintegration procedures for displaced students ($M = 3.12$) extend this proactive orientation, supported by the United Nations Children's Fund's (2025) finding that structured reintegration pathways are among the most consistently absent yet most urgently needed components of EiE practice in Nigerian displacement contexts. Bronfenbrenner's (1979) framework reinforces the systemic logic of these endorsements: proactive meso-level governance mechanisms stabilise the microsystem processes – daily attendance, classroom engagement, family-school relationships – that protracted exosystemic shocks progressively erode.

The endorsement of defined staff responsibilities ($M = 3.06$) indicates that respondents regarded explicit role assignment as necessary for accountability in retention management. Bush (2011) argues that clearly articulated responsibilities within governance structures are the mechanism through which educational organisations translate policy intentions into consistent practice, and Ouchi (1977) established that accountability is achievable only when roles are codified rather than assumed. The comparatively lower endorsement of psychosocial support referral guidelines ($M = 2.97$) most plausibly reflects a tension between recognised importance and perceived capacity for operationalisation in settings with limited mental health infrastructure. Masten (2014) established psychosocial wellbeing as a prerequisite for sustained academic engagement, and the Inter-Agency Network for Education in Emergencies (2024) lists psychosocial support as a minimum EiE standard; Novelli et al. (2015) documented a parallel tension in their analysis of EiE implementation gaps in fragile states, suggesting this is a recurring structural challenge rather than a context-specific shortcoming. The endorsement of regular procedural review ($M = 2.93$) embodies what Duchek (2020) identifies as the transformative dimension of organisational resilience – the institutional capacity to learn from responses and continuously refine practice rather than repeating the same reactive improvisations across successive crises.

Parent communication procedures during crises, though the lowest-endorsed component ($M = 2.72$), complete a coherent empirical narrative that runs

across all four research questions. Poor crisis communication was accepted as a significant retention challenge in Research Question One; caregiver communication was perceived as an existing informal strategy in Research Question Two; the absence of a written communication plan was accepted as a critical formalisation gap in Research Question Three; and communication procedures were endorsed as a necessary SOP component here. This convergence is substantively significant. It demonstrates that the path from recognised challenge to formalised procedural response is traceable in the perceptions of frontline educators themselves, and it reinforces the central argument of this study: that conflict-affected schools in Benue State possess meaningful adaptive practices broadly consistent with global EiE principles, but that these practices remain fragile, inconsistent and vulnerable to collapse without the codification, role clarity and governance embedding that contextually grounded standard operating procedures can provide.

7. Conclusion

Conflict-affected schools in Benue State operate within a protracted security environment in which informal, reactive retention practices are no longer sufficient to sustain educational continuity. Although schools have developed adaptive strategies in response to insecurity, these practices remain largely dependent on individual initiative, inconsistently implemented, and insufficiently supported by formal institutional structures. Consequently, the procedural gaps identified by respondents highlight the need to move beyond ad hoc responses towards the systematic institutionalisation of student retention practices through clearly defined Standard Operating Procedures. The SOP components identified by frontline educators provide a contextually grounded and stakeholder-informed framework for strengthening student retention in conflict-affected schools. Their consistency with the Inter-Agency Network for Education in Emergencies (2024) Minimum Standards and the Federal Ministry of Education Nigeria's (2021) national policy framework demonstrates that the proposed procedures are both empirically supported and aligned with existing policy expectations. The findings therefore provide an evidence base for the Benue State Ministry of Education, Local Government Education Authorities, school administrators and development partners to develop, adopt and implement Standard Operating Procedures that assign clear responsibilities, establish written protocols, strengthen documentation and monitoring systems, and embed institutional accountability for student retention. Ultimately, safeguarding the right to education

during conflict requires not only resilient educators and communities but also resilient institutional systems designed to sustain learning despite prolonged insecurity.

8. Recommendations

On the basis of the findings of this study, the following recommendations are made:

School administrators in conflict-affected Local Government Areas of Benue State should develop and implement written Standard Operating Procedures (SOPs) for student retention that clearly define staff responsibilities, establish procedures for attendance monitoring, crisis communication, learner reintegration and documentation of at-risk students, and provide for periodic review to ensure continued relevance under changing security conditions.

Local Government Education Authorities should establish formal coordination mechanisms involving school administrators, community leaders and relevant security agencies to strengthen community participation in student retention efforts. Existing informal collaboration should be institutionalised through clearly defined roles, communication channels and accountability arrangements.

The Benue State Ministry of Education should develop and disseminate standardised SOP templates for use in conflict-affected schools and ensure that school-level procedures are aligned with the National Policy on Safety, Security and Violence-Free Schools (Federal Ministry of Education Nigeria, 2021) and the Minimum Standards for Education of the Inter-Agency Network for Education in Emergencies (2024). Compliance with SOP implementation should form part of routine school supervision and quality assurance activities.

The Benue State Government, in collaboration with relevant development partners, should strengthen psychosocial support services in conflict-affected schools through the deployment or training of school counsellors, establishment of referral pathways and provision of resources that enable schools to respond effectively to the emotional and psychological needs of conflict-affected learners.

Development partners and non-governmental organisations supporting education in Benue State should complement infrastructure support with sustained capacity-building programmes that equip school administrators and teachers with the knowledge and skills required to implement, monitor and periodically review Standard Operating Procedures for student retention in conflict-affected schools.

Researchers should undertake implementation and evaluation studies to examine the effectiveness, adaptability and sustainability of the proposed

Standard Operating Procedures across different conflict-affected educational contexts, with particular attention to differences between primary and secondary schools and to changes in conflict intensity over time.

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Blended Learning and Utilisation: An Effective Means of Teaching and Learning of Stem in University of Maiduguri, Borno State, Nigeria

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Abstract. The study examined the utilisation of blended learning in teaching and learning of STEM in university of Maiduguri with specific objectives to examine the extent to which blended learning provides flexible and accessible learning opportunities in teaching STEM, assess the role of multimedia tools in enhancing students understanding of STEM concepts through blended learning, evaluate how blended learning promotes student centered approaches in the teaching and learning of STEM and determine how interactive and collaborative features of blended learning influence the teaching and learning of STEM. Research Design adopted was descriptive survey research design. The population of this study comprises all STEM lecturers and undergraduate students of Science Education at the University of Maiduguri, Borno State. The sample size for this study comprises 200 undergraduate science education students, with 50 students drawn from each academic level and 15 Science education lecturers were selected. The instrument for data collection was a structured questionnaire developed by the researchers. Descriptive statistics such as frequencies, percentages were employed to answer the research questions based on respondents' opinions. The findings among others revealed that blended learning provides significant flexibility and accessibility in STEM (Science education), With regard to the role of multimedia, the results indicated that the use of tools such as videos, animations, and simulations improves students' understanding of STEM concepts, Based on the findings, the study concludes that blended learning significantly improves the teaching and learning of STEM in higher institutions and Recommended that Universities and colleges should provide adequate technological infrastructure such as reliable internet access, learning management systems, and multimedia facilities to support blended learning, Regular training workshops and seminars should be organized to build lecturers' capacity on the

effective use of multimedia tools and online teaching platforms, Students should be given orientation on how to effectively utilize blended learning platforms for independent and collaborative learning, Blended learning strategies should be integrated into the STEM curriculum to ensure a balanced mix of face-to-face and online learning activities, Institutions should adopt continuous monitoring and evaluation mechanisms to assess the effectiveness of blended learning and make improvements where necessary and Lecturers should design activities that encourage group work, peer-to-peer learning, and student-lecturer interaction to maximize the collaborative benefits of blended learning.

Keywords: Utilisation, Blended Learning, Teaching and Learning Stem

1. Introduction

Science, Technology, Education and Mathematics are branches of natural and applied sciences, deals with the study of living and non-living objects, including their structure, function, growth, evolution, distribution, and taxonomy. They are core subjects taught in Nigerian tertiary institutions as a foundational component of the natural and applied science curriculum. In universities such as the University of Maiduguri, STEM is not only central to scientific literacy but also essential for students pursuing careers in health sciences, agriculture, biotechnology, and education (Okebukola, 2021). The teaching of STEM aims to cultivate scientific knowledge, critical thinking, and problem-solving skills among students.

Despite its importance, teaching STEM effectively has faced various challenges. Traditional lecture based instructional approaches are still widely used, which often results in limited students' engagement, passive learning, and there is no comparison

between theoretical knowledge and real-life application (Yusuf & Adigun, 2022). Furthermore, the abstract and experimental nature of STEM concepts such as cellular process, chemical bondings and ecological interactions necessitates teaching strategies that can provide visual and interactive experiences (Eze, 2023). When these needs are unmet, students tend to develop misconceptions, reduced interest, and poor academic performance in STEM.

In addition, the global COVID-19 pandemic exposed and exacerbated the weaknesses of conventional teaching models. The temporary closure of educational institutions forced a shift to remote learning and highlighted the necessity for adaptive, flexible, and technology-integrated teaching methods, especially in science education (Oni & Lawal, 2021). This shift emphasized the need to explore alternative pedagogical practices such as blended learning that may improve the teaching and learning of STEM in universities, especially in developing contexts like Nigeria. Blended learning refers to the integration of traditional face-to-face classroom instruction with online or digital learning experiences. This hybrid model allows students to engage in personalized, self-paced, and flexible learning while maintaining instructor-led classroom interactions (Garrison & Vaughan, 2020). In the context of higher education, blended learning typically includes a mix of synchronous and asynchronous teaching, use of digital tools such as Learning Management Systems (LMS), multimedia content, virtual laboratories, online assessments, and discussion forums (Hrastinski, 2022).

Blended learning has been widely recognized as a promising pedagogical approach for improving student learning outcomes, enhancing instructional delivery, and fostering deeper understanding, especially in science disciplines like Science Education (Adamu & Obielodan, 2023). It accommodates diverse learning styles, encourages learner autonomy, and allows for differentiated instruction. In particular, the multimedia features of blended learning such as animations, simulations, and virtual experiments are beneficial in teaching abstract and complex STEM concepts (Bawa & Katcha, 2021).

Nevertheless, the successful adoption of blended learning depends on several factors including availability of technological infrastructure, digital literacy among faculty and students, institutional support, and pedagogical readiness (Salami & James, 2022). In the Nigerian context, many institutions, especially in the northern part of the country like Borno State, face infrastructural and socio-economic challenges that can hinder the

effective implementation of blended learning models (Umar & Goni, 2021). Therefore, there is a growing need to assess how blended learning is utilized in specific settings such as the University of Maiduguri, with a focus on its application in teaching and learning of STEM subjects.

The Nigerian higher education sector has seen gradual efforts to embrace technology in teaching, especially since the aftermath of the COVID-19 pandemic. Government policies, international development programs, and institutional initiatives have encouraged universities to integrate ICT tools into academic delivery (NOUN, 2022). In the University of Maiduguri, several blended learning initiatives have been introduced in response to both global educational trends and local disruptions, including insecurity in the North-East region.

Despite the push towards digitalization, the extent and quality of blended learning utilization in Nigerian universities remain uneven. Limited access to internet connectivity, unreliable power supply, insufficient technical support, and lack of digital competencies continue to constrain its effectiveness (Olanrewaju & Mustapha, 2020). Additionally, lecturers and students often receive little or no training on how to maximize blended learning platforms, which affects the quality of teaching and learning outcomes (Ezeanya & Udo, 2023).

This is particularly crucial for science-based courses like STEM, where hands-on experimentation, laboratory work, and visualizations are essential components of learning. Blended learning, when used effectively, can supplement these through virtual simulations, recorded lab procedures, interactive models, and other e-learning tools. Therefore, evaluating how well blended learning is being utilized in teaching STEM can provide insights into its effectiveness, challenges, and opportunities for improvement.

The University of Maiduguri, located in the North-Eastern region of Nigeria, plays a vital role in the development of education and research in Borno State and beyond. Given the insecurity challenges posed by insurgency in the region, the university has had to adapt its academic operations, including exploring flexible learning options like blended learning to maintain continuity in education (Ahmed, 2021). As a result, the use of technology in teaching and learning has become not only an academic innovation but also a necessity for resilience.

Assessing the utilization of blended learning in teaching STEM at the University of Maiduguri is therefore important for several reasons. Firstly, it provides evidence-based insight into how digital

pedagogies are shaping science education in crisis affected areas. Secondly, it helps to identify the specific benefits and limitations of blended learning in the context of STEM instruction. Finally, it informs institutional policy and pedagogical strategies aimed at enhancing teaching effectiveness, student engagement, and academic performance.

The foregoing discussion has highlighted the critical importance of teaching STEM as a foundational science education discipline and the limitations posed by traditional instructional approaches. It has also examined the growing relevance and pedagogical potential of blended learning as a modern instructional model that enhances interactivity, engagement, and learner autonomy. However, the success of blended learning depends on various contextual factors such as infrastructure, digital literacy, and faculty preparedness, especially within under-resourced and conflict-prone environments like Borno State.

As such, the University of Maiduguri represents a unique academic setting where the utilization of blended learning in teaching STEM deserves critical assessment. This is particularly crucial as the institution continues to navigate the challenges of higher education delivery in the face of insecurity, limited resources, and growing demands for innovation in pedagogy.

In summary, while STEM remains a crucial discipline for national development and scientific advancement, its effective teaching is hindered by conventional methods that do not align with modern learning needs. Blended learning offers an alternative pedagogical approach that combines the strengths of traditional and digital methods to enhance science education. Yet, its utilization and impact must be assessed within specific institutional and regional contexts. Given its academic and geographical relevance, the University of Maiduguri provides an ideal setting for investigating how blended learning is applied in teaching STEM and what implications it holds for educational improvement in Nigeria.

STEM as a foundational natural and applied science subjects plays a critical role in the development of scientific knowledge, innovation, and national development. In higher education, particularly at the University of Maiduguri, STEM is offered as core courses for students in life sciences, medical sciences, education, and agriculture. However, over the years, there has been consistent concern about the low academic performance, reduced interest, and disengagement of students in STEM courses. This trend has been attributed in large part to the continued dominance of traditional face-to-face

teaching methods, which often do not cater to students' diverse learning needs or promote deep conceptual understanding (Yusuf & Adigun, 2022).

To address this problem, educational stakeholders and institutions have promoted the integration of Information and Communication Technology (ICT) in teaching through approaches such as blended learning. Blended learning combines traditional classroom methods with online digital media, allowing students greater flexibility, interactivity, and access to a variety of learning resources. This approach has shown significant promise in improving teaching and learning outcomes in science-based courses globally (Garrison & Vaughan, 2020). However, its utilization in Nigerian universities, including the University of Maiduguri, remains largely under explored and under researched.

Moreover, the unique socio-political context of Borno State characterized by a history of insurgency and infrastructural instability has made it even more urgent for institutions like the University of Maiduguri to embrace resilient and adaptable pedagogical models. Despite this need, there appears to be little empirical data on the extent to which blended learning is being utilized in teaching and learning of STEM at the university, what forms it takes, how effective it is, and what challenges educators and students face in its application.

Additionally, most previous studies have focused broadly on ICT integration in education, with few specifically targeting blended learning in STEM instruction. Even fewer have looked into the practical implementation and evaluation of blended learning in a conflict-affected area such as Borno State. This leaves a significant gap in knowledge and practice, making it difficult for educational planners, policy-makers, and instructors to develop evidence-based strategies for improving the teaching and learning of STEM through blended learning in this region.

It is against this background that this study becomes imperative. There is a pressing need to systematically assess how blended learning is being utilized in the teaching of STEM at the University of Maiduguri. Such an assessment will help to determine whether blended learning has been effectively integrated into the instructional process, what technological and pedagogical resources are available, what challenges are being faced, and how students perceive its impact on their understanding of STEM concepts. The findings will serve as a foundation for recommending strategies to improve teaching effectiveness, enhance students' engagement, and ultimately boost academic performance in STEM subjects.

1.1 Objectives of the Study

The main objective of this study is to assess the utilization of blended learning in the teaching and learning of STEM at the University of Maiduguri, Borno State, Nigeria.

The specific objectives were to:

- Examine the extent to which blended learning provides flexible and accessible learning opportunities in teaching STEM at the University of Maiduguri.
- Assess the role of multimedia tools in enhancing students' understanding of STEM concepts through blended learning.
- Evaluate how blended learning promotes student-centered approaches in the teaching and learning of STEM.
- Determine how interactive and collaborative features of blended learning influence the teaching and learning of STEM.

1.2 Research Questions

- To what extent does blended learning provide flexible and accessible learning opportunities in the teaching and learning of STEM subjects?
- How do multimedia tools used in blended learning enhance students' understanding of STEM concepts?
- In what ways does blended learning promote student-centered teaching and learning approaches in STEM subjects?
- How do the interactive and collaborative components of blended learning influence the teaching and learning of STEM subjects?

2. Literature Review

Conceptual Framework: A conceptual framework serves as a guide that illustrates the relationships between variables in a research study. It helps the researcher visualize how the independent variables (inputs) affect the dependent variable (outcome), and it provides a foundation for interpreting findings and drawing conclusions.

In this study, the focus is on how blended learning, as the independent variable, influences the teaching and learning of STEM at the university level. The framework is built upon the premise that integrating digital and face-to-face methods can enhance students' understanding, participation, and overall academic performance in STEM subjects.

Blended learning is an instructional strategy that merges traditional classroom teaching with online or digital learning experiences, creating a more flexible

and engaging learning environment. In the context of higher education, especially in science-related disciplines like Science, Technology, Engineering, and Mathematics, this approach is increasingly adopted to enhance students' understanding of complex concepts. By allowing learners to interact with content both physically and virtually, blended learning provides an opportunity to improve access, personalize instruction, and support a range of learning styles.

Flexibility in learning is a central benefit of blended instruction. It allows students to determine when, where, and how they engage with content, making it particularly useful in contexts where students face challenges related to time, distance, or limited resources. For science education students, this means they can review recorded lectures, watch simulations of biological processes, and complete interactive tasks outside of regular class hours. This level of accessibility supports independent learning and reinforces classroom instruction. The use of multimedia tools is an essential feature of blended learning that contributes significantly to the teaching of STEM. Topics such as cellular respiration, genetics, and ecological systems are often abstract and difficult for students to visualize through text alone. Incorporating videos, animations, simulations, and virtual labs helps to break down complex processes, making them easier to understand. Multimedia instruction also supports cognitive engagement by appealing to both visual and auditory learning channels, leading to improved retention and academic performance.

Blended learning promotes a shift from teacher-centered instruction to a more student-centered approach. This pedagogical model encourages active participation, critical thinking, and collaborative problem-solving. Students are no longer passive recipients of knowledge but are given the opportunity to explore, ask questions, and interact with learning materials at their own pace. In Science education, where observation, inquiry, and experimentation are vital, student-centered learning leads to deeper understanding and application of scientific knowledge.

Furthermore, interactive and collaborative features of blended learning enhance communication among students and between students and instructors. Through discussion forums, group chats, shared digital workspaces, and peer feedback mechanisms, learners engage in meaningful exchanges that promote teamwork and reinforce concepts. In Biology, this type of collaborative learning mirrors the nature of real scientific inquiry, which often involves cooperation and shared investigation. The integration of blended learning into the teaching of STEM in Nigerian universities responds to global

trends and educational demands for more dynamic, inclusive, and technology-enhanced learning environments. As institutions adapt to evolving teaching methods, understanding the conceptual

foundation of blended learning becomes essential for evaluating its effectiveness in improving both teaching practices and student outcomes.

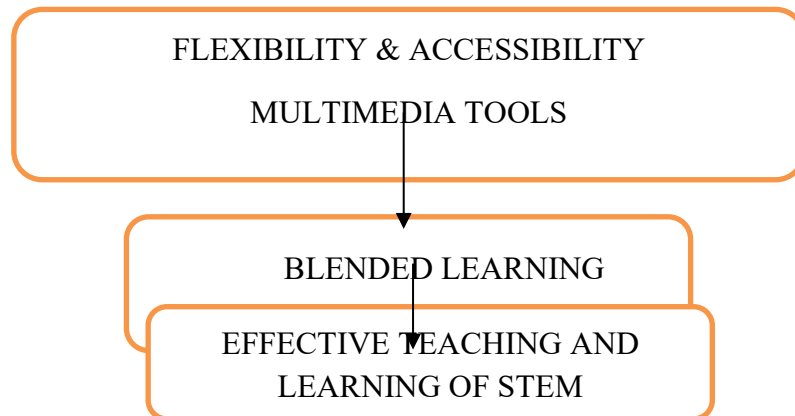


Fig. 1: Concept of Blended Learning

2.1 Concept of Blended Learning

Blended learning is a modern instructional approach that merges traditional face-to-face teaching methods with online learning tools and resources to create a more flexible and engaging learning environment. It allows students to benefit from the structured interaction of classroom settings while leveraging the accessibility and interactivity of digital platforms.

According to Singh and Thurman (2020), blended learning is “an instructional approach that combines online and in person learning experiences, where the learner has some control over time, place, path, or pace.” This model of learning enables students to take responsibility for their learning process while still benefiting from teacher guidance and peer collaboration.

Blended learning is not just about using technology in education; rather, it involves a pedagogical redesign that integrates technology in meaningful ways to improve learning outcomes. Research has shown that blended learning improves student motivation, learning flexibility, and academic achievement (Alammery, 2021). The approach is especially effective in science subjects like Biology, mathematics, chemistry, physics, technology and engineering where students can combine practical experiments with virtual simulations and interactive content.

2.2 Tools and Models of Blended Teaching and Learning

Blended learning utilizes a variety of digital tools and structured models to enhance instruction, foster

collaboration, and personalize learning experiences. These tools, when effectively integrated, support interactive, flexible, and student-centered education across different subject areas, including STEM. One of the foundational tools in blended learning is the Learning Management System (LMS), which acts as the central hub for organizing course materials, tracking student progress, and enabling communication between teachers and learners; common LMS platforms include Moodle, Google Classroom, Canvas, and Blackboard.

To support real-time engagement, video conferencing tools such as Zoom, Microsoft Teams, and Google Meet are frequently used for live lectures, virtual group discussions, and teacher-student interaction. In addition, content creation tools like Edpuzzle, Nearpod, PowerPoint (with audio/video narration), and Canva empower educators to design multimedia-rich lessons that enhance student engagement and understanding. For evaluating learning outcomes, both formative and summative assessment tools such as Kahoot!, Quizizz, Google Forms, and Socrative are employed, allowing teachers to gather data on student performance and provide timely feedback.

Collaboration and peer learning are further facilitated by digital collaboration tools including Padlet, Jamboard, discussion boards embedded in LMS platforms, and even instant messaging platforms like WhatsApp and Telegram, which are increasingly used in informal academic communication and group work, especially in contexts with limited access to formal tools. In science education, particularly Biology, subject-specific tools like PhET Interactive Simulations, Labster’s virtual lab environments, and BioMan

games play a critical role in enabling students to explore complex scientific processes through digital experimentation.

2.3 Benefits and Challenges of Blended Learning

Blended learning offers numerous benefits that make it an attractive instructional strategy in both formal and informal educational settings. Its most prominent advantage lies in its flexibility and convenience, allowing learners to access course materials anytime and from any location, thereby enabling self-paced learning. This flexibility is particularly beneficial for adult learners, students in remote areas, and those with demanding schedules. Alammary (2021) observed that students appreciate having control over their learning pace, which enhances their autonomy and sense of responsibility.

Another key advantage is the improvement in student engagement, as blended environments often integrate multimedia elements such as videos, simulations, interactive quizzes, and gamified activities. These elements cater to various learning styles visual, auditory, and kinesthetic and foster deeper interest in learning. Supporting this, Lo and Hew (2022) found that the use of interactive technologies significantly enhances motivation and active participation, especially in science-based subjects like STEM subjects.

Additionally, blended learning promotes personalized instruction, as it allows teachers to analyze learner data and adjust their strategies based on individual strengths, weaknesses, and progress. Boelens et al. (2020) emphasized that adaptive technologies and formative assessments facilitate differentiated learning pathways. Furthermore, blended learning environments encourage collaboration and communication, as students engage in group discussions, share ideas via online forums, and co-create content using tools like Google Docs and LMS-integrated discussion boards. According to Owston et al. (2021), this environment fosters peer-to-peer interaction and improves teamwork competencies.

From an institutional perspective, blended learning offers cost-effectiveness and resource efficiency, enabling schools and universities to reduce expenditures on infrastructure, printed materials, and physical resources while maintaining educational quality. Singh and Thurman (2020) noted that digital delivery models can lower operating costs significantly. Most notably, the resilience of blended learning became evident during the COVID-19 pandemic, as it enabled educational continuity when schools were closed, illustrating its value in emergency and post-pandemic education planning.

2.4 Teaching of STEM

The teaching of STEM is a dynamic process aimed at imparting scientific knowledge, critical thinking, and practical skills related to living organisms, their functions, and their interactions with the environment. As a core science subject, STEM plays a central role in shaping students' understanding of health, agriculture, environmental sustainability, biotechnology, mathematics, technology, and engineering. The teaching of STEM has evolved from being predominantly teacher-centred and textbook-driven to adopting more learner-centred, inquiry-based, and technology-enhanced approaches (Mayer, 2021).

In modern classrooms, particularly in secondary schools and higher education, STEM educators use diverse pedagogical strategies such as demonstrations, laboratory experiments, field studies, digital simulations, and problem-solving activities to engage students and enhance conceptual understanding. Blended learning, which combines online and face-to-face instruction, has become increasingly popular, especially after the COVID-19 pandemic highlighted the need for flexible and resilient teaching models (Iro, Ugwu, & Abubakar, 2022).

However, the teaching of STEM faces significant challenges, particularly in resource-constrained environments like many Nigerian schools. These challenges include limited laboratory infrastructure, inadequate instructional materials, overcrowded classrooms, and insufficient teacher training in the use of emerging technologies (Nwachukwu, Agbo, & Oguche, 2023). Despite these barriers, research shows that when Biology is taught using interactive multimedia tools, collaborative activities, and student-centered methodologies, students show improved academic achievement and retention of complex biological concepts (Singh & Thurman, 2020).

Additionally, curriculum reforms and teacher professional development programs are essential for improving the quality of Biology teaching. Training teachers to use virtual labs, simulations, and digital microscopes, for example, can help compensate for the lack of physical resources, while fostering scientific inquiry and critical analysis among students.

In Nigerian universities, the traditional approach to teaching is primarily teacher-centered, characterized by face-to-face lectures, chalk-and-talk methods, printed handouts, and minimal student interaction, where students are passive recipients of information. In contrast, the modern or blended learning approach combines face-to-face instruction with

online technologies such as Zoom, Moodle, Google Classroom, and multimedia tools, allowing students to engage in both synchronous and asynchronous learning environments (Adedoyin & Soykan, 2020). While traditional methods offer structure and familiarity, they often limit flexibility, discourage active participation, and lack real-time feedback mechanisms. Modern approaches, on the other hand, promote student-centered learning by incorporating videos, simulations, online quizzes, forums, and collaborative tools that foster critical thinking, engagement, and individualized learning (Boelens et al., 2020; Iro et al., 2022).

Science education in Nigeria faces numerous challenges that hinder effective teaching and learning, especially at the secondary and tertiary levels. One of the most critical challenges is inadequate instructional materials, including lack of up-to-date textbooks, laboratory equipment, visual aids, and digital resources that are essential for practical and conceptual understanding of biological processes (Iro et al., 2022). Many schools and universities operate with poorly equipped laboratories, which limits hands-on experiments and reduces students' scientific inquiry skills, thus making the subjects abstract and difficult to comprehend (Eze et al., 2021).

2.5 Blended Learning and Flexibility in Teaching and Learning STEM

Blended learning introduces a significant level of flexibility into teaching and learning of STEM by enabling instructors to combine traditional face-to-face classroom methods with digital learning tools that allow for asynchronous and self-paced learning. This instructional model is particularly beneficial in STEM, subjects that requires both theoretical understanding and practical engagement, as it allows educators to present complex topics such as cell division, genetics, and ecological systems through animations, virtual labs, recorded lectures, and interactive content and many more in STEM subjects (Singh & Thurman, 2020). Flexibility is enhanced as students are no longer confined to physical classrooms; they can access materials at any time and location, review difficult concepts repeatedly, and engage with learning resources tailored to their pace and preferences (Boelens et al., 2020).

In the context of teaching and learning STEM in Nigeria, where infrastructural constraints and teacher shortages often hinder effective instruction, blended learning offers a sustainable solution. It provides the opportunity for teachers to deliver core concepts through in-person lessons while reinforcing them with online resources such as quizzes, video demonstrations of laboratory procedures, and peer discussions via digital platforms like Google Classroom or Moodle (Iro,

et al., 2022). This flexible approach accommodates diverse student needs, especially in large classrooms where personalized instruction may be limited.

Blended learning offers remarkable time and location flexibility by allowing students and teachers to access educational content and participate in learning activities without the limitations of a fixed schedule or physical classroom. This flexibility enables learners to engage with Biology topics such as photosynthesis, human anatomy, and genetics at their own convenience, whether during the day or night, and from any location with internet access or digital resources (Singh & Thurman, 2020). Through platforms like Google Classroom, Moodle, and mobile-based applications, students can download lecture slides, watch experiment demonstrations, complete assignments, and join discussion forums asynchronously, which is especially beneficial for those balancing academic work with family, employment, or other personal responsibilities (Eze et al., 2021).

Blended learning integrates both asynchronous and synchronous tools to provide a balanced and flexible learning experience, especially in subjects like STEM where visualization, interaction, and experimentation are must to practical contents. Asynchronous tools refer to digital resources that students can access at their convenience without real-time interaction, such as recorded lecture videos, discussion forums, email, e-books, virtual simulations, and learning management systems like Moodle or Google Classroom. These tools allow learners to study at their own pace, revisit challenging STEM topics such as DNA replication or photosynthesis and reflect on feedback before responding and so many in STEM subjects (Singh & Thurman, 2020).

2.6 Role of Multimedia Tools in Enhancing STEM Understanding

Multimedia tools play a vital role in enhancing students' understanding of STEM subjects by transforming abstract and complex scientific concepts into interactive, visual, and engaging learning experiences. In topics such as cell structure, photosynthesis, gene expression, and ecological cycles, multimedia resources including animations, videos, simulations, virtual labs, interactive diagrams, and augmented reality help bridge the gap between theoretical explanations and real-world STEM processes (Singh & Thurman, 2020). These tools provide dynamic representations that are more effective than static textbook images, making it easier for students to visualize microscopic and molecular phenomena that are otherwise difficult to grasp through traditional methods alone.

For example, 3D animations and virtual dissections allow students to explore human anatomy or cellular components in a detailed and repeatable manner, encouraging active learning and critical thinking. This is particularly important in settings where access to physical laboratories or live specimens is limited, as multimedia can simulate hands on experience (Iro et al., 2022). Moreover, interactive tools such as quizzes, gamified activities, and drag and drop exercises promote learner participation and immediate feedback, which boosts retention and deepens conceptual understanding.

In Nigerian secondary and tertiary institutions, the integration of multimedia into Biology instruction has shown promising results. A study by Eze, Chinedu-Eze and Bello (2021) revealed that students who learned STEM through blended models incorporating multimedia tools performed significantly better in assessments than those taught through lecture-only methods. Additionally, multimedia facilitates inclusive learning by catering to various learning styles visual, auditory, and kinesthetic and can be adapted for students with special needs.

3. Definition and Types of Multimedia Tools (Animations, Simulations, Videos, Virtual Labs)

Multimedia tools refers to digital resources that combine two or more types of media such as text, audio, images, animation, and video to create rich, interactive educational experiences. In Science education, multimedia tools are used to simplify abstract scientific concepts, support visual learning, and stimulate engagement among students (Singh & Thurman, 2020). These tools are especially effective when integrated into blended learning environments where students can access materials both online and offline.

There are several types of multimedia tools commonly used in STEM teaching. Animations are short, moving graphical sequences that visually demonstrate STEM processes such as biology, mitosis, protein synthesis, or photosynthesis, making them easier to understand. Simulations are interactive programs that mimic real-world STEM experiments or systems, allowing students to manipulate variables in virtual environments for example, modeling population genetics or testing enzyme activity under different conditions (Boelens et al., 2020).

Videos, another popular tool, include recorded lectures, documentary clips, or experiment demonstrations, which provide learners with auditory and visual explanations of complex topics. Videos help to contextualize theory by showing real-

life applications and scientific practices. Virtual labs replicate laboratory experiments in a computer-generated environment, enabling students to perform STEM practicals such as microscope use, dissections, and chemical testing without the need for physical lab equipment. This is particularly useful in under-resourced schools or during remote learning (Eze et al., 2021).

3.1 The Multimedia Principles and Cognitive Load Theory

The multimedia principle, rooted in the Cognitive Theory of Multimedia Learning by Mayer, asserts that learners understand and retain information more effectively when it is presented using both words (spoken or written) and relevant images (such as diagrams, animations, or videos) rather than through text alone (Mayer, 2021). This principle is particularly valuable in Science education, where complex and abstract topics such as cellular respiration, genetic inheritance, or the structure of the heart require visual representation to facilitate deeper understanding.

Closely related is the cognitive load theory, which explains how the human brain processes and stores information. According to this theory, learners have a limited capacity for processing information at one time, and instructional materials must be designed to avoid overwhelming this capacity (Sweller, van Merriënboer & Paas, 2019). There are three types of cognitive load: intrinsic load (the complexity of the content itself), extraneous load (unnecessary or poorly designed material that distracts learners), and germane load (the mental effort required to form new knowledge structures).

3.2 Evidence of Multimedia Improving STEM Concept Retention

Multiple studies conducted in recent years have provided compelling evidence that the use of multimedia tools significantly improves students' retention and understanding of Biology concepts. For instance, Eze, Chinedu-Eze, and Bello (2021) found that Nigerian university students exposed to Biology instruction using multimedia such as animations and video simulations scored higher on post-instruction tests and retained information longer than those taught using traditional lecture methods. The interactive nature of multimedia enhances cognitive engagement by allowing learners to visualize dynamic processes like mitosis, ecological interactions, and photosynthesis. Challenges in Multimedia Use (Infrastructure, Teacher Skill etc).

Despite its numerous benefits, the effective use of multimedia in Biology education faces several

challenges, particularly in developing contexts such as Nigeria. One of the foremost issues is inadequate infrastructure, including limited access to computers, projectors, stable electricity, and reliable internet connections in many schools and universities (Eze, Chinedu-Eze & Bello, 2021). In rural and under-resourced institutions, the absence of basic digital tools hinders the integration of videos, simulations, and virtual labs into the curriculum.

Another significant barrier is the lack of technical skills among teachers, many of whom have limited training in using multimedia platforms or designing digital content. Iro, Ugwu, and Abubakar (2022) observed that while younger teachers tend to be more digitally literate, a large portion of science educators are either unfamiliar with or resistant to adopting new technologies due to insufficient professional development opportunities and fear of complexity. As a result, even when tools are available, they are underutilized or used ineffectively.

3.3 Blended Learning and Student-Centred Approaches

Blended learning promotes student-centred approaches by shifting the focus of instruction from the teacher to the learner, allowing students to take greater control of their learning pace, style, and engagement with content. In a blended environment, learners interact with both face-to-face and digital elements, such as videos, simulations, and online discussions, which enable personalized and flexible learning paths (Singh & Thurman, 2020). This model encourages autonomy and responsibility as students are no longer passive recipients of knowledge but active participants in the learning process.

Through tools like learning management systems (LMS), quizzes, multimedia content, and collaborative platforms, blended learning supports differentiated instruction tailored to learners' individual needs and preferences. This personalization is a core feature of student-centered education, which emphasizes critical thinking, inquiry, and real-world application rather than rote memorization (Mayer, 2021). For instance, STEM students may review interactive videos on photosynthesis at their own pace online, then return to the classroom for collaborative problem-solving or experiments related to plant physiology.

3.4 Comparison of Teacher-Centred vs. Student-centred Instruction

Teacher-centred instruction is a traditional approach where the teacher serves as the primary source of knowledge, controlling the flow of content, pace of

delivery, and classroom interactions. In this model, students typically assume passive roles, listening to lectures, taking notes, and memorizing facts, often with limited opportunities for critical thinking or active engagement (Eze, Chinedu-Eze & Bello, 2021). This approach, while efficient for covering large amounts of material quickly, often limits deep understanding, especially in science subjects like Biology that require inquiry, visualization, and practical application.

In contrast, student-centered instruction focuses on the learners' needs, abilities, and interests, allowing them to actively participate in constructing knowledge. This method encourages collaboration, exploration, and problem solving, and is especially compatible with blended learning, where digital tools support personalized learning paths, peer interaction, and independent study (Singh & Thurman, 2020). In a student-centred STEM class, for example, students might watch animations of the circulatory system online, engage in group discussions, and conduct hands-on experiments to test hypotheses.

While teacher-centered methods are often still dominant in many Nigerian classrooms due to curriculum pressures and large class sizes, student-centred instruction is increasingly being recognized as more effective for long-term retention and higher-order thinking. Iro, Ugwu, and Abubakar (2022) found that STEM students exposed to student-centred, technology-enhanced instruction displayed greater engagement, motivation, and performance compared to those in traditional lecture settings.

3.5 How Blended Learning Encourages Active, Self-directed Learning

Blended learning encourages active and self-directed learning by combining traditional face-to-face instruction with digital platforms that give students greater control over how, when, and where they learn. This model shifts the responsibilities of learning from the teacher to the learners, enabling students to set their own pace, revisit content as needed and engages with materials that suit their preferred learning styles (Singh & Thurman, 2020). In Biology education, for example, students can review virtual lab simulations or video tutorials on topics like photosynthesis or cell division outside class hours, thereby reinforcing understanding through independent exploration.

By integrating tools such as online quizzes, discussion forums, video lectures, and interactive simulations, blended learning environments allow students to take initiative, monitor their progress, and develop metacognitive skills the ability to plan, evaluate, and adjust their learning strategies (Mayer,

2021). These experiences not only deepen engagement but also foster lifelong learning habits, a key goal of 21st-century education.

Iro, Ugwu, and Abubakar (2022) reported that students in Nigerian universities who engaged with blended learning platforms demonstrated greater motivation and self-discipline, often taking responsibility for their academic progress through consistent interaction with digital content and peer collaboration. Similarly, Nwachukwu et al. (2023) found that blended learning helped students become more confident in seeking information, solving problems, and asking questions, as opposed to depending solely on instructors.

3.6 Strategies (Flipped Classroom, Inquiry-based Learning)

Within blended learning environments, flipped classroom and inquiry-based learning have emerged as powerful strategies that promote student engagement, critical thinking, and deeper understanding of scientific concepts. The flipped classroom model reverses the traditional teaching sequence by having student's access instructional materials such as recorded lectures, animations, and reading resources at home, while classroom time is reserved for active learning activities like discussions, group work, or experiments (Mayer, 2021). This approach allows STEM students, for instance, to study the theory behind genetics or human anatomy online, then apply the knowledge through classroom experiments or problem-solving sessions.

Inquiry-based learning, on the other hand, emphasizes student exploration, questioning, and investigation, enabling learners to construct their own understanding of scientific phenomena. In a blended STEM class, this may involve students using online simulations to explore ecological systems, formulating hypotheses, and presenting their findings during in-person sessions. According to Iro, Ugwu, and Abubakar (2022), inquiry-based activities integrated with digital platforms foster scientific reasoning and help students link theoretical content to real-life applications.

3.7 Research Evidence Linking Student-Centredness to Better Learning Outcomes

Recent research provides strong evidence that student-centred instructional approaches, particularly within blended learning environments, are linked to improved academic performance, engagement, and long-term retention in science education. Unlike traditional lecture-based models, student-centred strategies prioritize learner autonomy, critical thinking, and hands-on

exploration qualities that enhance understanding and application of complex STEM concepts (Singh & Thurman, 2020). For example, science education students who engage in problem based and inquiry driven tasks, supported by digital tools, are more likely to develop analytical skills and retain content more effectively.

In a large scale study of Nigerian universities, Iro, Ugwu, and Abubakar (2022) found that students exposed to student-centred, technology-enhanced instruction demonstrated significantly better academic outcomes and reported higher motivation levels compared to their peers in teacher-centred classrooms. Similarly, Nwachukwu, Agbo, and Oguiche (2023) showed that when learners are encouraged to direct their own learning such as through multimedia resources, flipped classroom formats, and peer collaboration they are more engaged and achieve deeper understanding, especially in STEM courses like Biology, chemistry, mathematics etc.

3.8 Interactivity and Collaboration in Blended Learning

Interactivity and collaboration are core elements of blended learning that significantly enhance student engagement, motivation, and academic outcomes by promoting meaningful exchanges among learners and between learners and content. In a blended learning environment, interactivity is achieved through digital tools such as simulations, online quizzes, discussion boards, live chats, and interactive videos, which allow students to engage actively with subject matter rather than passively receiving information (Mayer, 2021). In STEM education, for instance, virtual labs and interactive animations of cellular processes help learners visualize and manipulate biological systems, thus deepening conceptual understanding.

Collaboration, on the other hand, is facilitated through both online and face-to-face platforms that support teamwork, peer review, and joint problem-solving. Tools such as Google Docs, discussion forums, and Learning Management Systems (LMS) enable students to work together on assignments, share ideas, and provide feedback across time and space. This collaborative dynamic fosters a sense of community and accountability, which is crucial for sustained academic engagement (Singh & Thurman, 2020).

Research by Iro, Ugwu, and Abubakar (2022) in Nigerian universities revealed that students who frequently interacted with peers and instructors in blended environments demonstrated higher levels of participation and improved academic performance. These students reported feeling more supported and intellectually stimulated, especially during online

group projects and face-to-face brainstorming sessions in science-related courses.

In blended learning environments, several digital tools are used to facilitate interaction and collaboration, including discussion boards, breakout rooms, peer review systems, and group projects, all of which are essential for creating engaging and student-centered educational experiences. Discussion boards, often integrated into Learning Management Systems (LMS), provide asynchronous platforms where students can ask questions, exchange ideas, and reflect on course content at their own pace. In STEM classes, this might involve students debating the ethical implications of genetic modification or clarifying complex processes like mitosis through peer-to-peer explanations (Singh & Thurman, 2020).

Breakout rooms, commonly used during synchronous video sessions on platforms like Zoom or Microsoft Teams, enable smaller groups of students to work collaboratively on tasks, engage in real-time discussions, and solve problems interactively. This is especially valuable in scientific inquiry and lab-based simulations, where students benefit from immediate feedback and teamwork (Nwachukwu et al., 2023).

The literature reviewed has established that blended learning a strategic integration of traditional face-to-face methods with digital and online tools has the potential to significantly improve science education, particularly Biology, by fostering student-centered learning, interaction, flexibility, and conceptual understanding. The review highlighted key components of blended learning including multimedia tools, asynchronous and synchronous delivery modes, collaborative strategies, and student engagement techniques. It also outlined the theoretical frameworks supporting blended learning, such as social learning theory and cognitive load theory, which explain how interaction and multimedia enhance comprehension and critical thinking.

Research findings show that the use of multimedia tools like simulations, animations, and virtual labs can enhance students' retention of complex biological concepts, while flexible learning models accommodate diverse student needs across time, location, and device accessibility. Additionally, blended learning has been found to promote active participation, peer interaction, and collaborative problem-solving, which are essential for fostering scientific inquiry and lifelong learning. However, challenges persist, especially in developing countries like Nigeria, where technological limitations, lack of infrastructure, and digital illiteracy can hinder the effective implementation of

interactive and blended learning strategies. Furthermore, disparities in access to devices, internet connectivity, and teacher training were frequently noted as obstacles to equity in educational outcomes.

Despite the growing body of international literature on blended learning, few empirical studies have specifically focused on its application in Science education within Nigerian universities. Most existing studies either address general e-learning or focus broadly on science education without examining how blended approaches impact the flexibility, interactivity, and conceptual understanding in STEM specifically.

4. Research Methodology

Research Design of This study adopted a descriptive survey research design. The descriptive survey design was deemed suitable for this study because it enables the researcher to systematically collect, analyze, and interpret data about the current practices and perceptions surrounding the use of blended learning in teaching STEM at the University of Maiduguri. The design allows for the gathering of factual information from a sample of respondents through the use of structured instruments such as questionnaires and, where applicable, interviews or observations.

This design does not involve manipulating variables but rather seeks to assess and describe how blended learning is currently being utilized by lecturers and students in the Science Education Department. It also provides insight into the challenges and effectiveness of this instructional approach in a real-world academic setting.

According to Nworgu (2022), descriptive survey design is most appropriate when the aim is to describe and interpret existing conditions, attitudes, or practices. Thus, this design enabled the researcher to evaluate the extent of blended learning application, stakeholders' opinions, and the challenges faced in its implementation.

The population of this study comprises all STEM lecturers and undergraduate students in the Department of Science Education at the University of Maiduguri, Borno State. The target population includes lecturers who are involved in teaching STEM courses and students who are currently enrolled in STEM related programs across different academic levels (100–400 level). 32 academic staff (lecturers, assistant lecturers, and technologists), 850 undergraduate students enrolled in STEM and related courses

This population was selected because they are directly involved in the teaching and learning process where blended learning methods are likely to be adopted. Due to the large number of students and time constraints, a sample was drawn from the population using stratified random sampling for students and purposive sampling for lecturers. Stratified random sampling was used to ensure fair representation of students across all levels (100 to 400 levels). A proportionate number of students were selected from each level. Purposive sampling was used to select lecturers who are actively engaged in teaching STEM subjects and are knowledgeable about the blended learning approach. The sample size for this study comprises 200 undergraduate STEM students, with 50 students drawn from each academic level. In addition, 15 Science education lecturers were selected, specifically those actively engaged in teaching and involved with e-learning platforms.

The instrument for data collection in this study was a structured questionnaire developed by the researchers. The questionnaire was titled Experiences, Perceptions and Challenges Questionnaire (EPCQ). The questionnaire was designed to obtain relevant information from both science education lecturers and students regarding their experiences, perceptions, and challenges associated with the utilization of blended learning in

the teaching and learning of STEM. The questionnaire was divided into two versions one for lecturers and one for students to suit their different roles and experiences within the blended learning framework. The questionnaires were personally administered by the researchers to ensure accuracy and a high response rate. Separate versions of the questionnaire were designed for the two groups of respondents. For the lecturers, the questionnaires were distributed in their offices or during departmental meetings. For the students, copies were administered during lectures. In addition, for respondents who preferred digital participation or were unavailable to complete the questionnaire in person, a Google Form version was prepared and shared through WhatsApp and departmental groups. This ensured wider accessibility and inclusiveness in data collection.

The data collected from the respondents were carefully organized, coded, and analyzed using appropriate statistical tools in order to answer the research questions. Descriptive statistics such as frequencies, percentages were employed to summarize responses from the questionnaire. These measures were useful in assessing the extent of blended learning utilization, perceptions, and challenges. Frequency and percentage distributions were used to present respondents' opinion

5. Data Analysis and Results

Research Question 1: To what extent does blended learning provide flexible and accessible learning opportunities in the teaching and learning of STEM?

Table 4.1: Flexibility and Accessibility of Blended Learning

S/No.	Items	SA (4)	A (3)	D (2)	SD (1)
	Blended learning allows flexible access to STEM learning resources.	70 (34.83%)	85 (42.29%)	30 (14.93%)	16 (7.96%)
	Online platforms make it easier to revisit STEM lectures.	60 (29.85%)	90 (44.78%)	32 (15.92%)	19 (9.45%)
	Blended learning reduces barriers related to time and place of learning.	55 (27.36%)	88 (43.78%)	38 (18.91%)	20 (9.95%)
	Blended learning increases accessibility to STEM resources.	68 (33.83%)	80 (39.80%)	35 (17.41%)	18 (8.96%)

Source: (Field Survey, 2025)

The results in Table 4.2 show that blended learning provides considerable flexibility and accessibility in the teaching of STEM. A majority of respondents (77.12%) agreed that blended learning allows flexible access to STEM teaching and learning resources, while only 22.89% disagreed. Similarly, 74.63% of students agreed that online platforms make it easier to revisit STEM lectures, compared to 25.37% who disagreed. On whether blended learning reduces barriers related to time and place of learning, 71.14% were in agreement, while 28.86% disagreed. Furthermore, 73.63% of respondents confirmed that blended learning increases accessibility to STEM resources, whereas 26.37% expressed contrary views.

Research Question 2: How do multimedia tools used in blended learning enhance students' understanding of STEM concepts?

Table 4.3: Role of Multimedia in Enhancing Understanding

S/No.	Items	SA (4)	A (3)	D (2)	SD (1)
	Multimedia tools (videos, simulations, animations) improve my understanding of STEM.	72 (35.82%)	92 (45.77%)	25 (12.44%)	12 (5.97%)
	Visual and audio resources enhance retention of STEM concepts.	65 (32.34%)	89 (44.28%)	30 (14.93%)	17 (8.46%)
	Multimedia makes STEM lessons more engaging and interactive.	70 (34.83%)	85 (42.29%)	28 (13.93%)	18 (8.95%)
	Lecturers effectively apply multimedia tools in teaching and learning of STEM.	55 (27.36%)	80 (39.80%)	40 (19.90%)	26 (12.94%)

Source: (Field Survey, 2025)

The results in Table 4.3 indicate that multimedia tools play a significant role in enhancing students' understanding of STEM concepts. A large proportion of respondents (81.59%) agreed that multimedia resources such as videos, simulations, and animations improve their understanding of STEM, while only 18.41% disagreed. Similarly, 76.62% affirmed that visual and audio resources enhance their retention of STEM concepts, compared to 23.39% who disagreed. On the aspect of engagement, 77.12% of students agreed that multimedia makes STEM lessons more engaging and interactive, whereas 22.88% disagreed. However, when asked whether lecturers effectively applied multimedia tools in their teaching, the level of agreement dropped to 67.16%, while 32.84% of respondents expressed disagreement.

Research Question 3: In what ways does blended learning promote student-centred teaching approaches in STEM?

Table 4.4: Student-Centered Learning through Blended Approaches

S/No.	Items	SA (4)	A (3)	D (2)	SD (1)
	Blended learning encourages independent learning.	62 (30.85%)	90 (44.78%)	30 (14.93%)	19 (9.45%)
	Students are more actively involved in learning STEM through blended learning.	58 (28.86%)	92 (45.77%)	32 (15.92%)	19 (9.45%)
	Blended learning promotes problem-solving and critical thinking.	70 (34.83%)	80 (39.80%)	30 (14.93%)	21 (10.45%)
	Students control the pace of learning better in blended learning.	64 (31.84%)	86 (42.79%)	30 (14.93%)	21 (10.45%)

Source: (Field Survey, 2025)

The results presented in Table 4.4 show that blended learning significantly promotes student-centered approaches in the teaching and learning of STEM. A majority of respondents (75.63%) agreed that blended learning encourages independent learning, while 24.38% disagreed. Similarly, 74.63% of the students indicated that they were more actively involved in learning STEM through blended learning, compared to 25.37% who disagreed. In terms of problem-solving and critical thinking, 74.63% of the respondents agreed that blended learning enhances these skills, while 25.38% disagreed. Additionally, 74.63% affirmed that blended learning gives them better control over the pace of learning, while 25.38% expressed contrary views.

Research Question 4: How do interactive and collaborative components of blended learning influence STEM teaching and learning?

Table 4.5: Influence of Interactivity and Collaboration

S/No.	Item	SA (4)	A (3)	D (2)	SD (1)
	Blended learning promotes collaboration through group projects/discussions.	72 (35.82%)	88 (43.78%)	28 (13.93%)	13 (6.47%)
	Online platforms enhance student-lecturer interaction.	60 (29.85%)	95 (47.26%)	28 (13.93%)	18 (8.95%)
	Feedback from lecturers is faster in blended learning.	55 (27.36%)	89 (44.28%)	35 (17.41%)	22 (10.95%)
	Peer-to-peer learning is enhanced in blended learning.	65 (32.34%)	87 (43.28%)	30 (14.93%)	19 (9.45%)

Source: (Field Survey, 2025)

The results in Table 4.5 indicate that interactive and collaborative components of blended learning have a strong positive influence on Biology teaching and learning. A total of 79.60% of respondents agreed that blended learning promotes collaboration through group projects and discussions, while only 20.40% disagreed. Similarly, 77.11% of the students affirmed that online platforms enhance student-lecturer interaction, compared to 22.88% who

disagreed. In terms of lecturer feedback, 71.64% agreed that feedback is faster in blended learning, while 28.36% disagreed. Furthermore, 75.62% of respondents agreed that peer-to-peer learning is enhanced under blended learning approaches, while 24.38% did not share this view.

6. Findings

The study examined the influence of blended learning on the teaching and learning of STEM, focusing on four key dimensions: flexibility and accessibility, the role of multimedia, student-centered approaches, and interactivity and collaboration.

The findings revealed that blended learning provides significant flexibility and accessibility in STEM (Science education). A majority of respondents agreed that blended learning allows students to access resources at their convenience, revisit lectures online, and overcome barriers of time and location. This demonstrates that blended learning widens opportunities for learning beyond the traditional classroom setting.

With regard to the role of multimedia, the results indicated that the use of tools such as videos, animations, and simulations improves students' understanding of Biology concepts. Respondents also affirmed that multimedia enhances retention, makes lessons more engaging, and promotes interactive learning. However, a few students expressed concerns that lecturers do not always apply multimedia tools effectively.

The study further showed that blended learning strongly promotes student-centered approaches in STEM. Most students agreed that it encourages independent learning, enhances active participation, develops critical thinking and problem-solving skills, and gives learners greater control over the pace of their studies. This implies that blended learning shifts the focus from teacher-led instruction to a more learner-driven process.

Finally, the results highlighted the positive effect of interactivity and collaboration within blended learning environments. The majority of respondents affirmed that it encourages group projects, enhances peer-to-peer learning, strengthens student-lecturer interactions, and ensures faster feedback from lecturers. These findings suggest that blended learning fosters a more collaborative and supportive learning atmosphere, which is essential for effective STEM (Science education).

7. Discussion

The study examined the extent, role, and challenges of blended learning in STEM teaching and learning at the University of Maiduguri. The findings provide valuable insights into how blended learning influences the teaching and learning of STEM subjects. The discussion is presented in line with the four research questions.

The results indicated that blended learning significantly enhances flexibility and accessibility in the teaching of STEM. Students agreed that it enables them to access resources anytime, revisit lectures online, and overcome limitations of time and place. This finding aligns with Garrison and Vaughan (2008), who argue that blended learning expands opportunities for lifelong learning by allowing learners to engage with materials at their convenience. Similarly, Owston, York, and Murtha (2013) emphasize that flexibility is one of the most appealing features of blended learning, as it accommodates diverse student needs. In the context of STEM, this flexibility is particularly important, as it allows students to engage with complex scientific concepts repeatedly until mastery is achieved.

The study revealed that multimedia tools such as videos, simulations, and animations improve comprehension and retention of STEM concepts. Respondents noted that multimedia makes lessons more engaging and interactive. This supports the findings of Mayer (2009), whose Cognitive Theory of Multimedia Learning explains that learners understand better when information is presented through both visual and auditory channels. Similarly, Clark and Mayer (2016) highlight that multimedia creates richer learning experiences, which is crucial for subjects like STEM where abstract concepts often require visualization. However, the study also noted that some lecturers do not always utilize multimedia tools effectively, echoing findings by Bates and Sangrà (2011) that the success of blended learning largely depends on the instructor's ability to integrate technology meaningfully.

Another key finding is that blended learning encourages independent learning, active participation, problem-solving, and critical thinking. Students also reported that it gives them greater control over the pace of learning. This outcome is consistent with constructivist theories, which emphasize learner autonomy and active engagement in knowledge construction (Jonassen, 1999). Similar studies, such as those by Bonk and Graham (2012), suggest that blended learning shifts the focus from teacher-led instruction to student-centered approaches, thereby fostering deeper learning. In STEM, where analytical and problem-solving skills are essential, blended learning appears to provide an effective framework for nurturing these competencies.

The results further showed that blended learning enhances interactivity and collaboration among students and between students and lecturers. Students reported that it supports group projects, improves peer-to-peer learning, increases lecturer-student interaction, and allows for faster feedback.

These findings support the work of Hrastinski (2008), who notes that online components of blended learning encourage dialogue and collaboration, both of which are critical for effective learning. Moreover, this aligns with Vygotsky's (1978) social constructivist perspective, which highlights the role of social interaction in knowledge construction. In STEM education, collaborative projects and interactive feedback are vital for applying theoretical concepts to real-life problem-solving. Taken together, the findings of this study demonstrate that blended learning enhances flexibility, supports multimedia-based instruction, promotes student-centered learning, and strengthens collaboration in Biology education. These results corroborate the growing body of literature affirming that blended learning improves both teaching effectiveness and student learning outcomes when implemented effectively. However, the study also reveals that the effectiveness of blended learning depends on the commitment and technological competence of lecturers, which suggests the need for ongoing training and institutional support.

8. Conclusion

Based on the findings, the study concludes that blended learning significantly improves the teaching and learning of STEM in higher institutions. It provides learners with greater accessibility to resources, enriches understanding through multimedia, encourages independent and student-centered learning, and fosters interactivity and collaboration among students and lecturers. However, the study also concludes that the effectiveness of blended learning depends largely on the readiness and competence of lecturers to adopt and apply technological tools effectively. Without adequate training and institutional support, the full benefits of blended learning may not be realized.

9. Recommendations

In light of the findings and conclusions, the following recommendations were made:

Institutional Support: Universities and colleges should provide adequate technological infrastructure such as reliable internet access, learning management systems, and multimedia facilities to support blended learning.

Training for Lecturers: Regular training workshops and seminars should be organized to build lecturers' capacity in the effective use of multimedia tools and online teaching platforms.

Students Orientation: Students should be given orientation on how to effectively utilize blended learning platforms for independent and collaborative learning.

Curriculum Integration: Blended learning strategies should be integrated into the Science Education curriculum to ensure a balanced mix of face-to-face and online learning activities.

Continuous Assessment: Institutions should adopt continuous monitoring and evaluation mechanisms to assess the effectiveness of blended learning and make improvements where necessary.

Encouraging Collaboration: Lecturers should design activities that encourage group work, peer-to-peer learning, and student-lecturer interaction to maximize the collaborative benefits of blended learning.

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Effects of Postgraduate Training and Research Grants on Publication Output and Teacher Quality in South West Nigerian Universities

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Abstract. Universities worldwide increasingly recognize postgraduate training and research grants as critical tools for enhancing academic productivity and teacher quality. In Nigeria, public universities allocate substantial resources toward staff development through postgraduate sponsorships, conference support, and competitive research grants. Despite these efforts, disparities remain in publication output, research visibility, and teaching effectiveness among academic staff in South-West Nigerian universities. This study employed a descriptive survey design involving 360 full-time academic staff across selected federal and state universities in the six South-West states. Data were collected via the Postgraduate Training and Research Grant Questionnaire (PTRGQ) and the Teacher Quality Assessment Scale (TQAS). The findings revealed that postgraduate training significantly enhances research skills, publication productivity, and teaching effectiveness, with items such as improved academic writing and research confidence recording mean scores of 3.52 and 3.48 respectively, on a 4-point scale. Similarly, research grants positively influence publication quantity and quality, with a grand mean of 3.46, indicating a high influence on scholarly output. Correlational analyses showed significant positive relationships: postgraduate training and publication output ($r = 0.684$, $p < 0.001$), research grants and publication output ($r = 0.713$, $p < 0.001$), as well as postgraduate training and teacher quality ($r = 0.691$, $p < 0.001$). The study underscores the importance of continuous investment in postgraduate education and research funding, recommending increased government support, equitable grant access, and institutional policies that foster research and pedagogical excellence to sustain university development in Nigeria.

Keywords: Postgraduate Training, Research Grants, Publication Output, Teacher Quality, Academic Productivity, South-West Nigeria

1. Introduction

Higher education remains the engine of national development because universities are responsible for producing skilled manpower, generating new knowledge, and providing innovative solutions to societal problems. The quality of any university system depends largely on the competence, research productivity, and instructional effectiveness of its academic staff. Consequently, universities across the world invest heavily in postgraduate training and research funding to improve lecturers' professional competence and institutional performance.

In contemporary higher education, postgraduate training has become one of the most effective strategies for enhancing academic staff capacity. Through masters, doctoral, and postdoctoral programmes, lecturers acquire advanced knowledge, specialized research skills, innovative teaching methods, leadership competencies, and international academic exposure. Such training strengthens lecturers' ability to conduct high-quality research, supervise postgraduate students, publish in reputable journals, and deliver effective instruction. Universities that consistently invest in postgraduate staff development often experience higher research productivity, stronger international collaborations, and improved global rankings.

Research grants constitute another important mechanism for strengthening university research capacity. Research funding enables lecturers to conduct empirical investigations, purchase research equipment, collect data, attend conferences, collaborate with international scholars, and publish findings in high-impact journals. In developed countries, competitive research grants have contributed significantly to scientific discoveries, technological innovation, institutional reputation, and economic development. Funding agencies such as government ministries, education trust funds, development partners, and international organizations increasingly emphasize research

grants as essential tools for promoting knowledge production.

In Nigeria, the Federal Government, through agencies such as the Tertiary Education Trust Fund (TETFund), National Research Fund (NRF), and various international donor organizations, has introduced several intervention programmes aimed at strengthening postgraduate education and research among university lecturers. These interventions include academic staff training, conference sponsorship, institutional research grants, manuscript development support, and collaborative research funding. Many universities have equally established internal research grant schemes to encourage innovative research and improve publication output.

Despite these interventions, concerns continue to exist regarding the relatively low research productivity of many academic staff in Nigerian public universities. Several studies have reported inadequate research funding, limited access to postgraduate training opportunities, poor research infrastructure, heavy teaching workload, insufficient mentorship, delayed grant disbursement, and limited international collaboration as major factors constraining academic productivity. Consequently, many lecturers publish fewer articles in high-impact journals, experience slow career progression, and face challenges in maintaining high teaching quality.

Teacher quality has become one of the most important indicators of university effectiveness. Quality lecturers possess deep subject knowledge, sound pedagogical competence, research skills, professional ethics, communication ability, digital literacy, innovation, and commitment to continuous professional development. Such lecturers effectively integrate research findings into classroom instruction, mentor students, supervise research projects, and contribute meaningfully to institutional development. Therefore, improving teacher quality requires continuous investment in postgraduate education and research capacity building.

Publication output remains one of the principal indicators used worldwide to evaluate academic performance. Universities increasingly assess lecturers based on the number of peer-reviewed journal articles, books, conference papers, patents, citations, research impact, and international collaborations. High publication output enhances institutional visibility, improves global university rankings, attracts research funding, promotes innovation, and strengthens evidence-based policymaking. Conversely, low publication productivity limits institutional competitiveness and reduces opportunities for international recognition.

South-West Nigeria hosts some of the country's oldest and most research-intensive public universities. These institutions have benefited from numerous postgraduate training programmes and research funding initiatives over the years. Nevertheless, differences continue to exist in staff research productivity, publication quality, grant acquisition, and teaching effectiveness across universities. While some institutions demonstrate impressive research achievements, others continue to experience limited publication output despite substantial investment in staff development.

It is against this background that this study investigates the effects of postgraduate training and research grants on publication output and teacher quality among academic staff in public universities in South-West Nigeria. The study seeks to provide empirical evidence that can guide policymakers, university administrators, funding agencies, and educational stakeholders in strengthening staff development policies, improving research funding mechanisms, and enhancing the overall quality of higher education in Nigeria.

1.1 Statement of the Problem

The quality of university education is fundamentally linked to the competence of academic staff, their research productivity, and their ability to effectively transmit knowledge to students. Recognizing this, various stakeholders including governments, university authorities, and funding agencies have invested significant resources into postgraduate training programs and research grants aimed at enhancing lecturers' professional skills and research capacities. These initiatives are designed to boost publication outputs, improve instructional delivery, foster innovation, and elevate the global competitiveness of Nigerian universities. In Nigeria, numerous staff development efforts have been implemented through channels such as the Tertiary Education Trust Fund (TETFund), institutional postgraduate sponsorships, research grants, conference sponsorships, and international collaborations. These programs aim to equip lecturers with advanced qualifications, bolster research skills, facilitate scholarly publications, and improve teaching effectiveness. However, despite these concerted efforts, concerns persist regarding the relatively low publication output of many academic staff, limited research visibility, inadequate international collaboration, and disparities in teacher quality across public universities.

Furthermore, reports from university ranking agencies and research assessment bodies reveal that while some Nigerian universities demonstrate

growth in research publications and international citations, many institutions still lag behind in research productivity compared to universities in other developing countries. Several challenges hinder lecturers' research efforts, including limited access to postgraduate training opportunities, insufficient research funding, lack of mentorship, inadequate research infrastructure, high teaching loads, bureaucratic delays in grant administration, and limited institutional support. These obstacles often diminish lecturers' capacity to conduct high-quality research and publish in reputable journals. Teacher quality remains a significant concern, as postgraduate education is expected to enhance pedagogical skills, research abilities, critical thinking, curriculum development, and student supervision. Nonetheless, evidence indicates considerable variation in teaching quality among lecturers, partly due to limited opportunities for continuous professional development. This situation hampers lecturers' ability to adopt innovative teaching methods, incorporate current research into their instruction, and effectively mentor students. Although some universities in South-West Nigeria have benefited from government-funded postgraduate programs and research grants, disparities in research output, grant acquisition, and teacher quality persist across institutions. While previous studies have explored staff development, research funding, and teaching effectiveness separately, few have examined the combined impact of postgraduate training and research grants on both publication productivity and teacher quality. This gap limits the availability of comprehensive evidence for policy formulation and institutional decision-making. Therefore, this study aims to investigate the effects of postgraduate training and research grants on publication output and teacher quality among academic staff in South-West Nigerian public universities, providing empirical insights to inform strategies for enhancing staff development, research funding mechanisms, and the overall quality of university education.

1.2 Purpose of the Study

The main purpose of this study is to examine the effects of postgraduate training and research grants on publication output and teacher quality in public universities in South-West Nigeria.

Specifically, the study seeks to:

- determine the extent to which postgraduate training influences publication output among academic staff in public universities in South-West Nigeria.
- examine the influence of research grants on publication output among academic staff.

- determine the extent to which postgraduate training enhances teacher quality in public universities.
- examine the influence of research grants on teacher quality among academic staff.
-
- determine the joint effects of postgraduate training and research grants on publication output and teacher quality in public universities in South-West Nigeria.

1.3 Research Questions

The following research questions will guide the study:

- To what extent does postgraduate training influence publication output among academic staff in public universities in South-West Nigeria?
- What is the influence of research grants on publication output among academic staff?
- To what extent does postgraduate training enhance teacher quality in public universities in South-West Nigeria?
-
- What influence do research grants have on teacher quality among academic staff?

1.4 Research Hypotheses

The following null hypotheses will be tested at the 0.05 level of significance:

H₀₁: There is no significant relationship between postgraduate training and publication output among academic staff in public universities in South-West Nigeria.

H₀₂: There is no significant relationship between research grants and publication output among academic staff in public universities in South-West Nigeria.

H₀₃: There is no significant relationship between postgraduate training and teacher quality among academic staff in public universities in South-West Nigeria.

1.5 Scope of the Study

This study focuses on the effects of postgraduate training and research grants on publication output and teacher quality among academic staff in public universities located in South-West Nigeria. The study covers selected federal and state universities across the six states in the South-West geopolitical zone, namely Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti States.

The study is restricted to full-time academic staff who have participated in postgraduate training programmes and/or benefited from institutional, national, or international research grants. The major variables investigated include postgraduate training, research grants, publication output, and teacher quality. Publication output will be measured using indicators such as journal publications, conference papers, books, book chapters, and scholarly research productivity, while teacher quality will be assessed in terms of instructional competence, research competence, student supervision, curriculum delivery, professional development, and classroom effectiveness.

2. Literature Review

2.1 Concept of Postgraduate Training

Postgraduate training is a structured programme of advanced education undertaken after the completion of a bachelor's degree to improve professional competence, research capability, and specialized knowledge. It includes postgraduate diploma (PGD), master's, doctoral (Ph.D.), and postdoctoral programmes designed to prepare academics for teaching, research, innovation, and leadership responsibilities within higher education institutions. In universities, postgraduate training serves as a major avenue for developing highly skilled academic staff capable of generating new knowledge and contributing to national development.

According to Altbach and Salmi (2021), postgraduate training is the foundation upon which research-intensive universities build their academic excellence because it equips scholars with advanced theoretical knowledge, methodological competence, analytical skills, and research ethics necessary for conducting high-quality research. Through postgraduate education, lecturers acquire competencies in scientific inquiry, academic writing, grant proposal development, scholarly communication, and interdisciplinary collaboration. These competencies enhance both teaching effectiveness and research productivity.

The National Universities Commission (NUC, 2022) views postgraduate training as an essential component of academic staff development aimed at improving instructional quality, expanding research capacity, and promoting innovation in Nigerian universities. The Commission emphasizes that universities should continually encourage lecturers to pursue higher qualifications to strengthen institutional competitiveness and improve the quality of graduates.

Postgraduate training contributes significantly to the professional growth of lecturers. During postgraduate studies, academic staff are exposed to current theories, advanced statistical techniques, research methodologies, digital technologies, curriculum development, instructional strategies, and scholarly publishing practices. Such exposure broadens their intellectual capacity and enhances their ability to solve educational and societal problems through evidence-based research.

Recent studies have shown that postgraduate training improves lecturers' confidence in conducting independent research and publishing in reputable journals. Aina and Oyetunde (2023) reported that lecturers who completed doctoral training demonstrated significantly higher research productivity than those possessing only master's degrees. Similarly, Adewale and Ibrahim (2022) found that postgraduate education significantly improves teaching competence through increased mastery of subject content, curriculum planning, learner-centered instructional strategies, and effective student assessment.

Internationally, postgraduate training has become a major criterion for academic promotion and institutional ranking. Universities encourage continuous staff development because lecturers with advanced qualifications contribute more effectively to research output, innovation, curriculum development, postgraduate supervision, and institutional administration. Consequently, many governments allocate substantial resources to postgraduate scholarships and academic exchange programmes to strengthen higher education systems.

Despite these benefits, postgraduate training in many developing countries continues to face several challenges. These include inadequate funding, limited scholarship opportunities, shortage of experienced supervisors, poor research infrastructure, prolonged duration of postgraduate programmes, and insufficient institutional support. These constraints often delay academic staff development and reduce the overall effectiveness of postgraduate education.

Overall, postgraduate training remains one of the most effective strategies for enhancing lecturers' research competence, publication productivity, instructional effectiveness, leadership capacity, and professional development. Universities that consistently invest in postgraduate staff development are better positioned to achieve academic excellence, improve institutional reputation, and contribute meaningfully to national socio-economic development.

2.2 Concept of Research Grants

Research grants are financial resources awarded by governments, universities, donor agencies, private organizations, and international institutions to support research activities aimed at generating new knowledge, solving societal problems, and promoting innovation. Unlike loans, research grants are non-repayable funds provided to qualified researchers based on the quality, originality, relevance, and feasibility of proposed research projects.

Research grants play an important role in strengthening university research capacity by providing the financial resources needed for data collection, laboratory experiments, procurement of research equipment, software acquisition, fieldwork, publication fees, conference participation, research assistants, and dissemination of findings. They enable researchers to undertake comprehensive investigations that would otherwise be impossible because of financial constraints.

According to UNESCO (2021), research grants are among the strongest indicators of research capacity because they promote scientific productivity, interdisciplinary collaboration, innovation, and international research partnerships. Universities with robust grant support systems generally produce higher numbers of quality publications, patents, technological innovations, and policy-relevant research outputs.

In Nigeria, research grants are provided through several agencies, including the Tertiary Education Trust Fund (TETFund), National Research Fund (NRF), Petroleum Technology Development Fund (PTDF), National Information Technology Development Agency (NITDA), and various international organizations such as the British Council, World Bank, African Union, Carnegie Corporation, and the Commonwealth Scholarship Commission. These agencies support research projects that address national development priorities while strengthening institutional research capacity.

Research grants improve publication output by enabling researchers to access quality research facilities, purchase current literature, subscribe to scholarly databases, employ research assistants, conduct large-scale surveys, and publish in high-impact international journals. In addition, grant-funded research often encourages collaboration among researchers from different universities and countries, thereby increasing research quality, citation impact, and international visibility.

Several empirical studies have demonstrated a positive relationship between research grants and

publication productivity. Yusuf and Bello (2022) found that lecturers who received competitive research grants published significantly more journal articles than those who had never received research funding. Similarly, Ojo and Adebisi (2023) reported that research funding positively influences citation rates, collaborative publications, conference participation, and academic career progression.

Research grants also contribute to improving teacher quality. Lecturers who actively engage in funded research remain current with emerging knowledge in their disciplines, integrate recent findings into classroom teaching, supervise students more effectively, and develop stronger problem-solving and critical-thinking skills. Consequently, research-active lecturers often demonstrate greater instructional competence and professional confidence than their counterparts who have limited research exposure.

2.3 Concept of Publication Output

Publication output refers to the total scholarly works produced by academic staff within a given period as evidence of research productivity and intellectual contribution. It is one of the most widely accepted indicators for measuring academic performance, research competence, institutional reputation, and career advancement in higher education. Publication output includes peer-reviewed journal articles, conference papers, books, book chapters, monographs, technical reports, policy briefs, patents, and other scholarly publications that disseminate research findings to the academic community and society.

According to Creswell and Creswell (2018), publication output represents the culmination of the research process through which newly generated knowledge is subjected to peer review, validated, and made available for scholarly discourse. It enables researchers to communicate findings, contribute to existing knowledge, and stimulate further investigation in their respective disciplines.

The National Universities Commission (NUC, 2022) regards publication output as a key performance indicator for evaluating academic staff in Nigerian universities. Academic promotions, appointments, tenure decisions, and institutional accreditation exercises place considerable emphasis on the quantity, quality, and impact of scholarly publications. Consequently, lecturers are expected to publish consistently in reputable national and international journals while contributing to books, conference proceedings, and collaborative research projects.

Publication output serves several important functions within the university system. First, it promotes knowledge creation and dissemination by making research findings available to scholars, policymakers, industries, and society. Second, it enhances institutional visibility through citations, journal indexing, and international collaborations. Third, it contributes to innovation by providing evidence-based solutions to social, economic, technological, and educational problems. Fourth, publication output supports academic career progression because promotion in most universities depends largely on scholarly productivity.

In recent years, universities have increasingly emphasized the quality rather than merely the quantity of publications. Publications appearing in internationally indexed journals such as Scopus, Web of Science, and other reputable databases receive greater recognition because they undergo rigorous peer review and have wider international visibility. Such publications often attract higher citation rates, improve institutional rankings, and strengthen universities' global competitiveness.

Several factors influence publication output among university lecturers. These include academic qualifications, research competence, availability of research grants, institutional support, mentorship, workload, access to research facilities, collaboration with experienced researchers, digital literacy, and availability of current scholarly literature. Lecturers who receive adequate institutional support and research funding generally produce more publications than those operating under limited resources.

Aina and Oladipo (2022) found that research productivity among university lecturers is significantly influenced by postgraduate qualifications, access to research funding, collaborative networks, and institutional encouragement. Similarly, Yusuf and Bello (2023) reported that lecturers with doctoral degrees and regular research grant support consistently publish more articles in high-impact journals than lecturers with limited research opportunities.

2.4 Concept of Teacher Quality

Teacher quality refers to the combination of professional knowledge, pedagogical competence, research capability, instructional effectiveness, ethical conduct, communication skills, and continuous professional development that enable lecturers to facilitate meaningful learning and contribute to institutional excellence. Within the university system, teacher quality extends beyond classroom teaching to include research productivity, student supervision, curriculum development,

academic leadership, community service, and scholarly engagement.

UNESCO (2021) defines teacher quality as the capacity of educators to possess the knowledge, skills, attitudes, and professional competencies necessary for promoting effective teaching, learning, and research. Quality teachers continuously update their knowledge, adopt innovative instructional strategies, integrate technology into teaching, and create learning environments that encourage critical thinking, creativity, and lifelong learning.

The National Universities Commission (NUC, 2022) identifies teacher quality as one of the most important determinants of university effectiveness. According to the Commission, lecturers should demonstrate mastery of subject content, competence in teaching methodologies, commitment to research, effective student assessment practices, professional ethics, and continuous academic development. These qualities contribute significantly to producing competent graduates capable of meeting national and global workforce demands.

Teacher quality is multidimensional and encompasses several components. The first is subject matter competence, which refers to lecturers' depth of knowledge and understanding of their academic disciplines. Lecturers with strong content knowledge are better equipped to explain complex concepts, relate theory to practice, and respond effectively to students' questions.

The second dimension is pedagogical competence, which involves the ability to plan instruction, select appropriate teaching methods, manage classrooms, assess students effectively, and employ learner-centered approaches. Advances in educational technology have further expanded pedagogical competence to include digital literacy, online teaching, virtual learning management, and technology-enhanced instruction.

Another important component of teacher quality is research competence. University lecturers are expected not only to teach but also to generate new knowledge through research. Research-active lecturers enrich classroom instruction by integrating current findings into teaching, exposing students to contemporary developments, and supervising undergraduate and postgraduate research projects effectively.

Professional development also constitutes an essential dimension of teacher quality. Continuous participation in postgraduate education, workshops, seminars, conferences, academic exchange programmes, and collaborative research enhances

lecturers' competencies and enables them to adapt to emerging trends in higher education. Such development improves teaching effectiveness, research productivity, leadership capacity, and institutional performance.

Empirical evidence consistently shows that high-quality teachers contribute significantly to students' academic achievement and institutional development. Adewale and Ibrahim (2022) found that lecturers who regularly engage in professional development activities demonstrate higher teaching effectiveness, stronger research competence, and improved student mentoring. Likewise, Ojo and Akinwale (2023) reported that postgraduate training positively influences lecturers' classroom delivery, curriculum implementation, assessment practices, and supervision of postgraduate students.

Therefore, teacher quality remains a fundamental pillar of university effectiveness because it directly influences students' learning outcomes, research productivity, institutional reputation, graduate employability, and national development. Sustained investment in academic staff development is essential for maintaining high standards of teaching and research in Nigerian public universities.

2.5 Relationship between Postgraduate Training and Publication Output

Postgraduate training provides lecturers with advanced research skills, methodological competence, academic writing abilities, and exposure to contemporary scholarly practices, all of which significantly improve publication output. Through master's, doctoral, and postdoctoral programmes, academic staff acquire competencies in research design, statistical analysis, scholarly communication, grant proposal writing, and scientific publishing.

Studies have consistently shown that lecturers who possess doctoral qualifications publish more peer-reviewed journal articles, books, conference papers, and research reports than those with lower qualifications. Postgraduate training also exposes researchers to international collaborations, research ethics, digital libraries, and publication standards required by reputable journals. Consequently, universities that invest heavily in postgraduate staff development often record higher research productivity, stronger citation impact, and improved institutional rankings.

Furthermore, postgraduate education strengthens critical thinking, innovation, and problem-solving abilities, enabling lecturers to undertake independent research that contributes to knowledge generation and national development. These

competencies increase the likelihood of publishing in high-impact journals and participating in multidisciplinary research projects.

2.6 Relationship between Research Grants and Publication Output

Research grants have become one of the most significant determinants of publication output in contemporary universities. The availability of adequate research funding enables academic staff to conduct rigorous investigations, purchase research materials, collect quality data, attend academic conferences, employ research assistants, access sophisticated laboratory facilities, and publish their findings in reputable national and international journals. Consequently, research grants enhance both the quantity and quality of scholarly publications produced by university lecturers.

According to UNESCO (2021), research funding strengthens institutional research capacity by providing the financial resources required for scientific inquiry and innovation. Universities with effective research grant schemes generally produce more peer-reviewed publications, receive higher citation rates, and enjoy greater international visibility than institutions with limited research funding.

Research grants improve publication output by removing many of the financial constraints associated with academic research. Fieldwork, laboratory experiments, data analysis software, internet access, publication processing charges, conference participation, and research dissemination require substantial financial investment. Without adequate funding, lecturers often find it difficult to conduct comprehensive studies capable of meeting the standards of reputable international journals.

Another important contribution of research grants is the promotion of collaborative research. Grant-funded projects frequently involve researchers from different universities, disciplines, and countries. Such collaborations encourage the exchange of ideas, improve research quality, increase citation impact, and enhance opportunities for publishing in high-impact journals. International collaborations also expose researchers to emerging research methodologies and global best practices.

Research grants further improve publication productivity by reducing lecturers' dependence on personal financial resources. In many Nigerian universities, lecturers finance research activities from their salaries because institutional funding is inadequate. This situation limits the scope and quality of research undertaken. Competitive

research grants therefore provide an alternative source of funding that allows researchers to conduct more comprehensive and innovative investigations.

Empirical studies consistently report a positive relationship between research grants and publication output. Yusuf and Bello (2022) found that academic staff who received competitive research grants produced significantly more journal publications than those who relied solely on personal funding. Similarly, Ojo and Adebisi (2023) reported that research funding positively influences publication quality, citation impact, international collaboration, and career advancement among university lecturers.

2.7 Relationship between Postgraduate Training and Teacher Quality

Teacher quality is largely influenced by the level of professional education and continuous capacity development received by academic staff. Postgraduate training equips lecturers with advanced disciplinary knowledge, pedagogical skills, research competence, leadership abilities, and professional ethics required for effective teaching and learning in higher education institutions. Consequently, lecturers who undergo postgraduate education are generally better prepared to deliver quality instruction, supervise research, mentor students, and contribute to institutional development.

One of the primary objectives of postgraduate training is to improve instructional competence. During master's and doctoral programmes, lecturers acquire deeper understanding of subject content, modern instructional strategies, curriculum design, learner-centered teaching methods, educational technologies, and assessment techniques. These competencies enable lecturers to deliver more effective classroom instruction while promoting critical thinking, creativity, and problem-solving among students.

Postgraduate education also strengthens research competence, which constitutes an important dimension of teacher quality. University lecturers are expected to integrate current research findings into classroom teaching, supervise undergraduate and postgraduate research projects, publish scholarly works, and contribute to knowledge generation. Through postgraduate training, lecturers acquire the methodological and analytical skills necessary to perform these responsibilities effectively.

Another important contribution of postgraduate training is the development of critical thinking and lifelong learning skills. Academic staff who engage in advanced studies become more innovative, reflective, and adaptable to changes occurring

within higher education. They are better positioned to adopt emerging technologies, implement digital teaching strategies, and respond effectively to evolving educational needs.

Postgraduate programmes equally promote professional confidence and academic leadership. Exposure to seminars, conferences, workshops, scholarly debates, and collaborative research enhances lecturers' communication skills, leadership capacity, teamwork, and professional networks. These experiences contribute significantly to improving classroom effectiveness and institutional service.

Empirical evidence supports the positive influence of postgraduate training on teacher quality. Adewale and Ibrahim (2022) found that lecturers possessing doctoral qualifications demonstrated significantly higher instructional competence, research supervision skills, curriculum implementation ability, and student mentoring than those with lower academic qualifications. Likewise, Aina and Oyetunde (2023) reported that postgraduate education enhances lecturers' confidence, teaching effectiveness, innovation, and commitment to professional excellence.

Nevertheless, postgraduate training alone may not automatically guarantee improved teacher quality. Institutional support, continuous professional development, access to instructional resources, motivation, mentoring, and conducive working environments are equally necessary for translating acquired knowledge into effective teaching practice. Universities must therefore complement postgraduate education with regular workshops, conferences, research support, and performance evaluation.

2.8 Relationship between Research Grants and Teacher Quality

Research grants contribute significantly to teacher quality by providing lecturers with opportunities to engage in continuous research, innovation, and professional development. Academic staff who receive research funding are exposed to new knowledge, emerging technologies, international collaborations, and evidence-based teaching practices that enhance instructional effectiveness and professional competence.

Research-active lecturers continuously update their knowledge through funded research projects. The knowledge generated from these investigations is often incorporated into classroom instruction, thereby enriching students' learning experiences with current information and practical applications. This integration of research and teaching improves

curriculum delivery and strengthens students' understanding of contemporary issues within their disciplines.

Research grants also promote the acquisition of modern research equipment, digital technologies, software applications, laboratory facilities, and instructional materials that improve both research activities and classroom teaching. Lecturers who have access to these resources are better equipped to demonstrate practical concepts, supervise research projects, and provide students with hands-on learning experiences.

Participation in grant-funded research frequently requires attendance at conferences, workshops, seminars, and international collaborative meetings. These activities expose lecturers to global best practices in teaching, assessment, curriculum innovation, and educational technology. The knowledge and experience gained from such engagements contribute significantly to improving teacher quality.

Empirical studies consistently indicate that lecturers who receive competitive research grants demonstrate higher levels of instructional competence and professional effectiveness than those without research funding. Ojo and Adebisi (2023) reported that grant-supported lecturers were more innovative in classroom teaching, integrated current research findings into instruction, and demonstrated stronger student supervision skills. Similarly, Yusuf and Bello (2022) found that research funding significantly improved lecturers' professional confidence, teaching quality, and academic leadership.

Despite these benefits, inadequate access to research grants continues to limit teacher quality in many Nigerian public universities. Financial constraints, weak institutional support, limited grant-writing skills, and insufficient research infrastructure reduce lecturers' opportunities for continuous professional growth and innovation.

3. Empirical Review

Several empirical studies have investigated the relationship between postgraduate training, research funding, publication output, and teacher quality in higher education institutions. However, findings vary across countries and institutional contexts.

Adewale and Ibrahim (2022) examined the influence of postgraduate education on lecturers' research productivity in selected Nigerian universities using a descriptive survey design involving 420 academic staff. The study found that lecturers with doctoral qualifications produced

significantly more journal publications and demonstrated higher instructional competence than lecturers with only master's degrees. The researchers concluded that postgraduate education positively influences both research productivity and teacher quality.

Yusuf and Bello (2022) investigated the effect of research grants on publication output among academic staff in federal universities in Nigeria. Using Pearson Product Moment Correlation and multiple regression analysis, the study revealed a significant positive relationship between research funding and publication productivity. Lecturers who benefited from competitive research grants published more articles in indexed journals and participated more frequently in international conferences than their counterparts without grant support.

Ojo and Adebisi (2023) assessed the contribution of TETFund research grants to academic productivity in South-West Nigerian universities. The study adopted a survey research design involving 360 lecturers from six public universities. Findings indicated that research grants significantly improved publication output, international collaboration, citation impact, and postgraduate supervision. However, delays in grant disbursement and administrative bottlenecks reduced the overall effectiveness of the funding scheme.

Aina and Oyetunde (2023) examined postgraduate training and teacher effectiveness among university lecturers in Nigeria. The study reported that postgraduate education significantly enhanced instructional competence, curriculum implementation, student assessment, classroom management, and research supervision. The authors recommended continuous investment in postgraduate staff development programmes to improve university education.

Although previous studies have established positive relationships among postgraduate training, research grants, publication output, and teacher quality, most examined these variables independently. Few studies have investigated the combined effects of postgraduate training and research grants on both publication output and teacher quality among academic staff in public universities in South-West Nigeria. This gap provides the justification for the present study by offering a more comprehensive understanding of how these two staff development strategies jointly influence academic productivity and instructional effectiveness.

4. Theoretical Framework

4.1 Human Capital Theory

This study is anchored on the Human Capital Theory propounded by Theodore W. Schultz (1961) and later expanded by Gary Becker (1964). The theory posits that investment in education, training, research, and skill acquisition enhances individuals' knowledge, competencies, productivity, and overall performance. Human Capital Theory regards education as an investment rather than consumption because the knowledge and skills acquired improve workers' efficiency and contribute to organizational and national development.

According to Schultz (1961), education is one of the most valuable forms of investment that societies can make because it increases people's productive capacities. He argued that expenditure on education, training, health, and research should be viewed as investments capable of generating long-term economic and social returns. Similarly, Becker (1964) explained that individuals who receive higher levels of education and professional training become more productive because they acquire specialized knowledge, technical competence, innovative skills, and greater problem-solving abilities.

Within higher education, Human Capital Theory emphasizes that universities should continually invest in the professional development of academic staff through postgraduate education, research training, conferences, workshops, and other capacity-building programmes. Such investments improve lecturers' research competence, teaching effectiveness, publication productivity, leadership capacity, and overall institutional performance.

Postgraduate training represents one of the most important forms of human capital investment in universities. Through master's, doctoral, and postdoctoral programmes, lecturers acquire advanced knowledge, research methodologies, analytical competence, scientific writing skills, grant proposal development techniques, and leadership abilities. These competencies enable them to produce quality research, publish in reputable journals, supervise postgraduate students effectively, and improve classroom instruction.

Research grants also constitute an important investment in human capital. Financial support provided through institutional, governmental, and international funding agencies enables lecturers to undertake innovative research, acquire laboratory equipment, collect quality data, participate in conferences, collaborate internationally, and disseminate research findings through scholarly publications. These opportunities significantly improve research productivity and professional competence.

Human Capital Theory further argues that organizations that invest in employee development achieve higher productivity than those that neglect staff training. Universities that continuously sponsor lecturers for postgraduate studies and provide adequate research funding are therefore expected to record higher publication output, better teaching quality, stronger research culture, improved institutional reputation, and greater global competitiveness.

Empirical studies support the assumptions of Human Capital Theory. Adewale and Ibrahim (2022) observed that lecturers with doctoral qualifications demonstrated higher teaching effectiveness and research productivity than those with lower academic qualifications. Similarly, Yusuf and Bello (2022) found that research funding significantly improved publication output and academic performance among university lecturers. These findings reinforce the argument that investment in academic staff development produces measurable improvements in institutional performance.

4.2 Application of Human Capital Theory to the Study

Human Capital Theory provides a strong theoretical basis for understanding the relationship between postgraduate training, research grants, publication output, and teacher quality in public universities in South-West Nigeria. The theory explains that continuous investment in academic staff development enhances lecturers' productivity and improves institutional performance.

The relevance of the theory to this study is presented below.

Human Capital Investment	Expected Improvement	Expected Outcome
Postgraduate Training	Advanced knowledge, research competence, pedagogical skills	Improved teacher quality
Research Grants	Research funding, collaboration, conference participation, access to facilities	Increased publication output
Professional Development	Workshops, seminars, mentorship and academic networking	Improved instructional effectiveness
Research Experience	Scientific writing, innovation, supervision competence	Higher research productivity
Continuous Capacity Building	Acquisition of modern knowledge and skills	Better institutional performance

The theory suggests that lecturers who receive postgraduate education and research grants become more competent in teaching, research, innovation, and community service. Consequently, they are expected to publish more scholarly articles, supervise students more effectively, employ innovative teaching methods, and contribute significantly to university development.

In relation to this study, postgraduate training and research grants are regarded as investments in academic staff, while publication output and teacher quality represent the returns on those investments. The theory therefore predicts that increased investment in staff development will lead to improved academic productivity and higher-quality teaching.

5. Research Methodology

This study adopted a descriptive survey research design because it is appropriate for investigating the existing effects of postgraduate training and research grants on publication output and teacher quality among academic staff in public universities in South-West Nigeria. The design enabled the researcher to obtain relevant information directly from respondents without manipulating any of the study variables. The population comprised all full-time academic staff in selected federal and state public universities across the six South-West states of Nigeria. A multistage sampling procedure was employed to select the participating universities and respondents. Data were collected using a structured questionnaire titled Postgraduate Training, Research Grants, Publication Output and Teacher Quality Questionnaire (PTRGPTQ). The instrument consisted of sections covering respondents' demographic characteristics, postgraduate training, research grants, publication output, and teacher quality, and was designed using a four-point Likert rating scale ranging from Strongly Agree (4) to Strongly Disagree (1).

The instrument was subjected to face and content validation by experts in Educational Management and Measurement and Evaluation to ensure its appropriateness for the study. Reliability was established using the Cronbach Alpha reliability method, which yielded an acceptable coefficient indicating high internal consistency. The questionnaire was administered to the respondents with the assistance of trained research assistants, and all completed copies were retrieved for analysis. Data collected were analyzed using both descriptive and inferential statistics. Mean and Standard Deviation were used to answer the research questions, while Pearson Product Moment Correlation (PPMC), Independent Samples t-test, and Multiple Regression Analysis were employed to test the hypotheses at the 0.05 level of significance. Statistical analyses were carried out using the Statistical Package for the Social Sciences (SPSS) Version 26.

Decision Rule: Mean score of 2.50 and above = Agree (High Extent); Mean score below 2.50 = Disagree (Low Extent).

6. Results

Research Question One: To what extent does postgraduate training influence publication output among academic staff in public universities in South-West Nigeria?

Table 4.1: Mean Scores on the Influence of Postgraduate Training on Publication Output (N = 360)

S/N	Items	Mean ($\bar{X}$)	SD	Decision
1	Postgraduate training has improved my research skills.	3.45	0.64	Agree
2	My postgraduate education has increased my ability to publish in reputable journals.	3.37	0.71	Agree
3	Advanced research methodology acquired during postgraduate training has enhanced my publication output.	3.41	0.69	Agree
4	Postgraduate training has improved my academic writing skills.	3.52	0.61	Agree
5	Postgraduate training has increased my confidence in conducting independent research.	3.48	0.66	Agree
Grand Mean		3.45	0.66	High Extent

Table 4.1 shows that respondents agreed that postgraduate training positively influences publication output. All the items recorded mean scores above the criterion mean of 2.50. Specifically, postgraduate training improving academic writing skills recorded the highest mean score (Mean = 3.52, SD = 0.61), while increased ability to publish in reputable journals recorded a mean score of 3.37 (SD = 0.71). The grand mean of 3.45 indicates that postgraduate training influences publication output to a high extent among academic staff in public universities in South-West Nigeria.

Research Question Two: What influence do research grants have on publication output among academic staff?

Table 4.2: Mean Scores on the Influence of Research Grants on Publication Output (N = 360)

S/N	Items	Mean ($\bar{X}$)	SD	Decision
1	Research grants enable me to conduct quality research.	3.46	0.63	Agree
2	Research grants have increased my journal publications.	3.40	0.67	Agree
3	Research grants facilitate conference participation and collaboration.	3.51	0.60	Agree
4	Availability of research grants improves research quality.	3.48	0.64	Agree
5	Research grants encourage innovative research.	3.44	0.66	Agree
Grand Mean		3.46	0.64	High Influence

Table 4.2 indicates that respondents agreed that research grants positively influence publication output. The highest-rated item was conference participation and collaboration (Mean = 3.51, SD = 0.60), while increased journal publications recorded a mean score of 3.40 (SD = 0.67). The overall grand mean of 3.46 indicates that research grants exert a high positive influence on publication output.

Research Question Three: To what extent does postgraduate training enhance teacher quality among academic staff?

Table 4.3: Mean Scores on Postgraduate Training and Teacher Quality (N = 360)

S/N	Items	Mean ($\bar{X}$)	SD	Decision
1	Postgraduate training has improved my classroom teaching.	3.43	0.65	Agree
2	Postgraduate education has strengthened my pedagogical competence.	3.39	0.70	Agree
3	My postgraduate education has enhanced student supervision.	3.50	0.61	Agree
4	Postgraduate training has improved curriculum delivery.	3.46	0.64	Agree
5	Postgraduate training has improved my professional competence.	3.54	0.59	Agree
Grand Mean		3.46	0.64	High Extent

Table 4.3 reveals that respondents agreed that postgraduate training significantly enhances teacher quality. All the items recorded mean scores above the benchmark of 2.50. The highest-rated item was improvement in professional competence (Mean = 3.54, SD = 0.59). The grand mean of 3.46 indicates that postgraduate training enhances teacher quality to a high extent.

Research Question Four: What influence do research grants have on teacher quality among academic staff?

Table 4.4: Mean Scores on Research Grants and Teacher Quality (N = 360)

S/N	Items	Mean ($\bar{X}$)	SD	Decision
1	Research grants improve my instructional effectiveness.	3.35	0.71	Agree
2	Research grants expose me to current knowledge.	3.52	0.60	Agree
3	Research grants improve student supervision.	3.43	0.65	Agree
4	Research grants improve classroom innovation.	3.39	0.68	Agree
5	Research grants improve professional development.	3.48	0.63	Agree
Grand Mean		3.43	0.65	High Influence

Table 4.4 indicates that respondents agreed that research grants positively influence teacher quality. The highest mean score was recorded for exposure to current knowledge (Mean = 3.52, SD = 0.60). The grand mean of 3.43 indicates a high positive influence of research grants on teacher quality.

Test of Hypothesis One

H₀₁: There is no significant relationship between postgraduate training and publication output among academic staff in public universities in South-West Nigeria.

Table 4.5: Pearson Product Moment Correlation Showing the Relationship between Postgraduate Training and Publication Output (N = 360)

Variables	N	Mean	SD	r	p-value	Decision
Postgraduate Training	360	3.45	0.66	.684	.000	Significant
Publication Output	360	3.42	0.63			

Since the calculated **p-value (.000)** is less than the **0.05** level of significance, the null hypothesis is **rejected**. This indicates that there is a **significant positive relationship** between postgraduate training and publication output among academic staff in public universities in South-West Nigeria.

Test of Hypothesis Two

H₀₂: There is no significant relationship between research grants and publication output among academic staff in public universities in South-West Nigeria.

Table 4.6: Pearson Product Moment Correlation Showing the Relationship between Research Grants and Publication Output (N = 360)

Variables	N	Mean	SD	r	p-value	Decision
Research Grants	360	3.46	0.64	.713	.000	Significant
Publication Output	360	3.42	0.63			

Table 4.6 presents the Pearson Product Moment Correlation analysis showing the relationship between research grants and publication output among academic staff in public universities in South-West Nigeria. The findings revealed a **strong positive relationship** between research grants and publication output (**r = 0.713, p = 0.000**). Since the calculated p-value (**0.000**) is less than the 0.05 level of significance, the null hypothesis is **rejected**. This implies that research grants have a significant positive relationship with publication output among academic staff in public universities in South-West Nigeria. The result further suggests that increased access to research grants enhances lecturers' ability to conduct quality research and publish in reputable scholarly journals.

Test of Hypothesis Three

H₀₃: There is no significant relationship between postgraduate training and teacher quality among academic staff in public universities in South-West Nigeria.

Table 4.7: Pearson Product Moment Correlation Showing the Relationship between Postgraduate Training and Teacher Quality (N = 360)

Variables	N	Mean	SD	r	p-value	Decision
Postgraduate Training	360	3.45	0.66	.691	.000	Significant
Teacher Quality	360	3.44	0.65			

Table 4.7 shows the Pearson Product Moment Correlation analysis examining the relationship between postgraduate training and teacher quality among academic staff in public universities in South-West Nigeria. The analysis revealed a **significant positive relationship** between postgraduate training and teacher quality (**r = 0.691, p = 0.000**). Since the p-value (**0.000**) is less than the 0.05 level of significance, the null hypothesis is **rejected**. Therefore, there is a significant positive relationship between postgraduate training and teacher quality among academic staff in public universities in South-West Nigeria. This finding indicates that lecturers who receive postgraduate training are more likely to demonstrate improved

instructional competence, research capability, professional development, and overall teaching effectiveness.

7. Discussion of Findings

The findings of this study revealed that postgraduate training has a significant positive influence on publication output among academic staff in public universities in South-West Nigeria. The respondents agreed that postgraduate education enhanced their research competence, academic writing skills, ability to conduct independent research, and capacity to publish in reputable scholarly journals. This finding supports the assumptions of Human

Capital Theory, which posits that investment in education and professional development improves individual productivity and organizational performance. The finding is consistent with Adewale and Ibrahim (2022), who reported that lecturers with higher academic qualifications demonstrated significantly greater research productivity than their counterparts with lower qualifications. Similarly, Aina and Oyetunde (2023) found that postgraduate education enhances lecturers' research competence, publication productivity, and scholarly visibility. The significant positive relationship established between postgraduate training and publication output further confirms that continuous investment in advanced education contributes to increased academic productivity in Nigerian universities.

The study also established that research grants significantly influence publication output among academic staff. Respondents agreed that research grants facilitated quality research, conference participation, collaboration with other scholars, and increased scholarly publications. The significant positive relationship between research grants and publication output indicates that adequate funding remains a critical determinant of research productivity in universities. This finding corroborates Yusuf and Bello (2022), who observed that lecturers receiving competitive research grants produced significantly more peer-reviewed publications than those without grant support. The finding also agrees with Ojo and Adebisi (2023), who concluded that research funding contributes to higher publication quality, greater citation impact, and stronger international research collaborations. The result emphasizes the importance of sustained investment in research funding as a strategy for improving institutional research performance and global competitiveness.

Furthermore, the findings revealed that postgraduate training significantly enhances teacher quality among academic staff in public universities. Respondents agreed that postgraduate education improved instructional competence, curriculum delivery, research supervision, pedagogical skills, and overall professional competence. The significant relationship observed between postgraduate training and teacher quality aligns with the Human Capital Theory, which maintains that education enhances workers' knowledge, skills, and efficiency. This finding is in agreement with Aina and Oyetunde (2023), who reported that postgraduate education strengthens lecturers' teaching effectiveness, classroom innovation, and research supervision. Similarly, Adewale and Ibrahim (2022) found that lecturers possessing doctoral qualifications demonstrated superior instructional competence and student mentoring

abilities. The findings therefore suggest that postgraduate education remains an effective strategy for improving the quality of teaching and learning in Nigerian universities.

Overall, the findings demonstrate that postgraduate training and research grants are complementary mechanisms for enhancing academic productivity and teacher quality. While postgraduate education equips lecturers with advanced knowledge and research competence, research grants provide the financial resources necessary to translate acquired knowledge into quality research outputs. The combined influence of these interventions contributes significantly to improved publication output, enhanced instructional effectiveness, institutional reputation, and sustainable university development in South-West Nigeria.

8. Conclusion

Based on the findings of this study, it is concluded that postgraduate training and research grants play significant roles in improving publication output and teacher quality among academic staff in public universities in South-West Nigeria. The study established that postgraduate training enhances lecturers' research competence, academic writing skills, pedagogical effectiveness, professional development, and capacity for independent scholarly inquiry. Similarly, research grants provide the financial and institutional support required for conducting quality research, participating in academic conferences, establishing collaborative networks, and publishing in reputable journals.

The study further concludes that significant positive relationships exist between postgraduate training and publication output, research grants and publication output, as well as postgraduate training and teacher quality. These findings underscore the importance of continuous investment in staff development and research funding as essential strategies for strengthening higher education in Nigeria. Universities that prioritize postgraduate education and research support are more likely to improve research productivity, teaching effectiveness, institutional visibility, and international competitiveness.

Therefore, achieving excellence in teaching and research requires sustained commitment from governments, university management, funding agencies, and other educational stakeholders to provide adequate opportunities for postgraduate training and equitable access to research grants for academic staff.

9. Recommendations

Based on the findings and conclusions of this study, the following recommendations are made:

- University management should expand postgraduate staff development programmes by sponsoring more academic staff for master's, doctoral, and postdoctoral studies to improve research competence and instructional quality.
- Federal and State Governments, through agencies such as TETFund and the National Research Fund (NRF), should increase funding for research grants to enable lecturers to undertake high-quality and innovative research.
- Universities should establish transparent and equitable institutional research grant schemes that provide equal opportunities for deserving academic staff to access research funding.
- Academic staff should be encouraged to participate regularly in grant-writing workshops, research methodology training, conferences, seminars, and international collaborative research programmes to improve their research competitiveness.
- University management should strengthen mentorship programmes by pairing early-career academics with experienced researchers to improve publication output, grant acquisition, and professional development.
- Universities should provide adequate research infrastructure, including modern laboratories, digital libraries, high-speed internet facilities, statistical software, and research support services to enhance academic productivity.
- Promotion policies should continue to recognize quality research publications and effective teaching while encouraging collaboration, innovation, and continuous professional development among academic staff.

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Enrolment Projection and Resource Allocation in Nigerian Universities: Implications for Educational Management

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Abstract. This study examined the effect of enrolment projection on resource allocation in five public universities in South-South Nigeria: University of Benin, Ambrose Alli University, Delta State University, University of Calabar, and University of Uyo. The study adopted a descriptive survey research design with a sample of 250 respondents selected from the five universities. Data were collected using a structured questionnaire and analysed using descriptive statistics. The findings revealed that enrolment projection has a significant effect on the allocation of teaching staff, physical facilities and infrastructure, instructional materials and learning resources, and financial resources in the universities studied. The study concluded that enrolment projection is a critical tool for effective resource allocation in Nigerian universities. It was recommended that universities should develop robust enrolment projection models, align resource allocation with projected enrolment, and ensure regular monitoring and evaluation of resource utilisation.

Keywords: Enrolment projection, resource allocation, teaching staff, physical facilities, instructional materials, financial resources, educational planning, South-South Nigeria

1. Introduction

Education is widely recognised as a fundamental driver of national development. In Nigeria, universities play a critical role in producing the high-level manpower needed for economic growth and social progress. However, the rapid expansion of university education in Nigeria has created significant challenges in terms of resource allocation and utilisation. The demand for university education has grown tremendously over the years, with over two million qualified candidates competing for fewer than

500,000 university admission spaces annually (Agile, 2018). This widening gap between demand and supply has put immense pressure on existing university resources.

Enrolment projection refers to the process of estimating future student numbers based on past trends, current data, and various assumptions about future developments. It is an essential tool for educational planning, as it provides the basis for determining the resources needed to accommodate projected student populations. According to Etor, Ekanem and Sule (2020), projection serves as the basis for determining available resources, other school characteristics, and how well they could be distributed and utilised. Enrolment projection enables the government to assess the performance of its policy objectives and determine the cost of education programmes.

Resource allocation in Nigerian universities involves the distribution of financial, human, and material resources to various departments, faculties, and programmes. The National Universities Commission (NUC) plays a central role in this process, using student-teacher ratios and other criteria to determine funding allocations (Salomi & Alake, 2025). However, the rapid growth in student enrolment has often outpaced the allocation of resources, leading to overcrowding, inadequate facilities, and declining quality of education.

The relationship between enrolment projection and resource allocation is critical for effective educational planning. When enrolment projections are accurate, universities can plan for the recruitment of teaching staff, the construction of physical facilities, the procurement of instructional materials, and the allocation of financial resources. However, when

projections are inaccurate or when resources are not allocated in line with projected enrolment, universities face significant challenges in maintaining quality education. In Nigeria, the challenges of enrolment projection and resource allocation are particularly acute. The federal government has announced a seven-year freeze on creating new federal universities to allow the government to refocus resources on improving existing institutions by upgrading facilities, recruiting qualified staff, and expanding their carrying capacity (Federal Ministry of Education, 2025). This policy reflects the recognition that existing universities are struggling to cope with rising enrolment and that resources must be allocated more effectively. This study, therefore, seeks to examine the effect of enrolment projection on resource allocation in Nigerian universities and to explore the implications for educational planning.

1.1 Statement of the Problem

The ideal situation in any well-functioning university system is that enrolment projections are accurate and resources are allocated in line with projected student numbers, ensuring adequate numbers of qualified teaching staff, sufficient physical facilities and infrastructure, appropriate instructional materials and learning resources, and adequate financial resources to support teaching and learning. In this ideal scenario, students receive quality education, and the university system contributes effectively to national development.

The actual situation in the five South-South Nigerian universities studied, however, falls far short of this ideal. Student enrolment has grown tremendously over the years due to increasing demand and government policies aimed at expanding access, but resource allocation has not kept pace with enrolment growth. Many of these universities face significant shortages of teaching staff, with staff-student ratios far exceeding the NUC recommended ratio of 1:30 (Salomi & Alake, 2025). Physical facilities and infrastructure are inadequate, with many students lacking access to lecture theatres, laboratories, libraries, and hostels, while instructional materials and learning resources are insufficient, and financial resources are inadequate to meet growing needs (Ofor-Douglas, 2024; Etor, Ekanem & Sule, 2020). Several factors contribute to this problem, including the lack of accurate and reliable data on student enrolment which makes accurate projections difficult (David, 2020), inadequate planning for resource allocation based on historical patterns rather than projected needs, insufficient funding for university education with Nigeria's education budget falling below the

UNESCO recommended benchmark of 15-20% of national budget, and limited capacity for effective resource management in many universities (Ofor-Douglas, 2024). The consequences are significant, as overcrowded lecture theatres, inadequate laboratory facilities, and shortages of teaching staff undermine the quality of education, students struggle to access learning resources, universities struggle to maintain academic standards, the quality of graduates' declines, and the university system fails to produce the high-level manpower needed for national development. Despite the severity of this problem, there is limited empirical evidence on the specific effect of enrolment projection on resource allocation in South-South Nigerian universities. This study, therefore, seeks to fill this gap by examining the effect of enrolment projection on the allocation of teaching staff, physical facilities, instructional materials, and financial resources in five public universities in South-South Nigeria.

1.1 Objectives of the Study

The main objective of this study is to examine the effect of enrolment projection on resource allocation in five public universities in South-South Nigeria. The specific objectives are to:

- Examine the effect of enrolment projection on the allocation of teaching staff in the five universities.
- Determine the effect of enrolment projection on the allocation of physical facilities and infrastructure in the five universities.
- Examine the effect of enrolment projection on the allocation of instructional materials and learning resources in the five universities.
- Determine the effect of enrolment projection on the allocation of financial resources in the five universities.

1.2 Research Questions

The following research questions guide this study:

- What is the effect of enrolment projection on the allocation of teaching staff in the five South-South Nigerian universities?
- What is the effect of enrolment projection on the allocation of physical facilities and infrastructure in the five South-South Nigerian universities?
- What is the effect of enrolment projection on the allocation of instructional materials and learning resources in the five South-South Nigerian universities?

- What is the effect of enrolment projection on the allocation of financial resources in the five South-South Nigerian universities?

2. Theoretical Framework

This study was anchored on the Systems Theory, originally developed by Ludwig von Bertalanffy (1968). The theory posits that organisations are complex systems composed of interrelated and interdependent parts that work together to achieve common goals. According to this theory, a system is a set of interconnected parts that function together to form a whole. If one part of the system performs poorly, it affects all other parts and the overall performance of the organisation. The theory also highlights the importance of feedback and adaptation, suggesting that organisations must continuously adjust to changes in their environment to remain effective.

The Systems Theory is relevant to this study because it provides a framework for understanding how enrolment projection and resource allocation interact to influence the performance of Nigerian universities. The university system can be viewed as a system composed of various subsystems, including enrolment, teaching staff, physical facilities, instructional materials, and financial resources. Each of these subsystems must function effectively for the overall system to achieve its goals. When enrolment projection is accurate, it provides the basis for effective resource allocation, enabling the university system to function optimally. However, when enrolment projection is inaccurate or resources are not allocated in line with projected enrolment, the system experiences dysfunction, leading to overcrowding, inadequate facilities, and declining quality of education. By applying the Systems Theory, this study examines how enrolment projection affects different types of resources and how these effects interact to influence the overall performance of Nigerian universities.

3. Empirical Studies

Several empirical studies have examined the relationship between enrolment projection and resource allocation in Nigerian universities and other contexts. These studies provide valuable insights into the nature, causes, and consequences of the relationship. Etor, Ekanem and Sule (2020) examined access and resource allocation to education in Nigeria. The study found that projection serves as the basis for determining available resources, other school characteristics, and how well they could be distributed and utilised. The study also noted that enrolment

projection enables the government to assess the performance of its policy objectives and determine the cost of education programmes. This study is relevant as it establishes the fundamental role of projection in educational planning. Amaewhule and Anunobi (2025) examined the effect of educational resources planning on students' academic success in public universities in Rivers State. The study adopted a descriptive research design with a sample of 206 students selected from three public universities. The findings revealed that well-planned educational resources positively affect students' academic success. The study recommended that public universities should improve their planning to provide adequate educational resources and prioritise identifying and correcting resource gaps.

Ofor-Douglas (2024) examined resource allocation and uneven development in Nigerian universities. The study found that resource allocation deals with how the resources available in the organisation are distributed and utilised. The study identified inadequate funding, dilapidated infrastructure, and human resources as key issues affecting Nigerian universities. The study recommended that there should be an increase in the development of infrastructure, human resources, and funding to support universities. Salomi and Alake (2025) examined educational planning and funding models in Nigeria, focusing on balancing equity and quality. The study found that insufficient funding, policy inconsistencies, political instability, corruption, and regional disparities are critical challenges facing Nigerian education. The study recommended enhanced funding strategies, strengthened data-driven planning, and inclusive policies for marginalised groups.

David (2020) explored enrolment projection techniques and implications for educational administrators in Akwa Ibom State, Nigeria. The study found that accurate enrolment projections are essential for effective educational planning and resource allocation. The study recommended that educational administrators should adopt robust enrolment projection techniques. Ekim (2020) examined the Delphi method for enrolment projection in rural school districts. The study found that the Delphi method is effective for enrolment projection in contexts where data is limited. The study recommended that educational planners should adopt the Delphi method for enrolment projection.

Agile (2018) examined expanding access to education opportunity in Nigeria. The study found that rising numbers of children and youths are unable to gain admission into schools to actualise their educational

and career dreams. The study highlighted the need for equitable and adequate resources to existing schools to ensure qualitative education. Udoma (2018) presented the breakdown of the 2019 Federal Government of Nigeria Budget Proposal. The study found that the budget for education was inadequate to meet the needs of the sector. Etor, Mbon and Ekanem (2013) examined primary education as a foundation for qualitative higher education in Nigeria. The study found that primary education is a foundation for qualitative higher education and that adequate resource allocation at all levels is essential.

4. Methodology

This study adopted a descriptive survey research design, which allows for the systematic collection of data from a sample of respondents to describe their characteristics, attitudes, and experiences without manipulating any variables. The study was carried out in five public universities in South-South Nigeria: University of Benin (UNIBEN), Ambrose Alli University (AAU), Delta State University (DELSU), University of Calabar (UNICAL), and University of Uyo (UNIUYO). These universities were selected because they represent a mix of federal and state institutions and have all experienced significant growth in student enrolment in recent years.

The population comprised all academic staff and administrators in the five selected universities. The sample consisted of 250 respondents, including university administrators, academic staff, and

planning officers, selected using Yamane's formula and stratified random sampling technique. The instrument used for data collection was a structured questionnaire titled "Enrolment Projection and Resource Allocation Questionnaire (EPRAQ)", designed to elicit information on enrolment projection practices and resource allocation in four areas: teaching staff, physical facilities, instructional materials, and financial resources. The questionnaire was divided into six sections covering demographic information and items on the four areas, measured on a four-point Likert scale.

The validity of the instrument was established through content and face validity by three experts in educational management and measurement and evaluation, leading to revisions and removal of some items. The reliability was established through a pilot test administered to 30 respondents, with Cronbach's alpha coefficients of 0.87. Data were collected through direct administration of the questionnaire over six weeks, with 220 completed questionnaires returned from 250 administered, representing a response rate of 88%. Data were analysed using descriptive statistics (means, and standard deviations) to answer research questions using SPSS version 27.0.

5. Results

Research Question 1: What is the effect of enrolment projection on the allocation of teaching staff in the five South-South Nigerian universities?

Table 1: Effect of Enrolment Projection on Allocation of Teaching Staff

S/N	Item	Mean	Std. Deviation	Decision
1	Enrolment projection guides the recruitment of teaching staff	3.72	0.52	Agree
2	Teaching staff are allocated based on projected student numbers	3.65	0.56	Agree
3	Enrolment projection influences staff-student ratios	3.78	0.48	Agree
4	Projected enrolment determines the number of teaching staff needed	3.58	0.60	Agree
5	Accurate enrolment projection leads to adequate staff allocation	3.62	0.58	Agree
6	Enrolment projection helps in planning for staff development	3.55	0.62	Agree
7	Staff allocation is reviewed based on enrolment changes	3.48	0.64	Agree
8	Enrolment projection ensures equitable distribution of teaching staff	3.70	0.54	Agree

Source: Field Survey, 2026

The data in Table 1 show the effect of enrolment projection on the allocation of teaching staff. The mean scores for all items are above 2.5, indicating that respondents agree that enrolment projection has a significant effect on the allocation of teaching staff. The highest mean score (3.78) was recorded for the item "Enrolment projection influences staff-student ratios," indicating that enrolment projection is a key determinant of staff-student ratios. The mean score for "Enrolment projection guides the recruitment of teaching staff" was 3.72, and "Enrolment projection ensures equitable distribution of teaching staff" was 3.70, confirming the positive effect of enrolment projection on teaching staff allocation.

Research Question 2: What is the effect of enrolment projection on the allocation of physical facilities and infrastructure in the five South-South Nigerian universities?

Table 2: Effect of Enrolment Projection on Allocation of Physical Facilities and Infrastructure

S/N	Item	Mean	Std. Deviation	Decision
1	Enrolment projection guides the construction of new facilities	3.74	0.50	Agree
2	Physical facilities are allocated based on projected student numbers	3.68	0.54	Agree
3	Enrolment projection influences the provision of lecture theatres	3.76	0.48	Agree
4	Projected enrolment determines the need for laboratory facilities	3.62	0.56	Agree
5	Accurate enrolment projection leads to adequate facility provision	3.70	0.52	Agree
6	Enrolment projection helps in planning for hostel accommodation	3.58	0.58	Agree
7	Facility allocation is reviewed based on enrolment changes	3.52	0.60	Agree
8	Enrolment projection ensures equitable distribution of facilities	3.66	0.54	Agree

Source: Field Survey, 2026

Table 2 presents the effect of enrolment projection on the allocation of physical facilities and infrastructure. All items have mean scores above 2.5, indicating that respondents agree that enrolment projection has a significant effect on the allocation of physical facilities and infrastructure. The highest mean score (3.76) was recorded for "Enrolment projection influences the provision of lecture theatres," indicating that enrolment projection is a key determinant of the provision of lecture theatres. The mean score for "Enrolment projection guides the construction of new facilities" was 3.74, and "Accurate enrolment projection leads to adequate facility provision" was 3.70, confirming the positive effect of enrolment projection on physical facilities allocation.

Research Question 3: What is the effect of enrolment projection on the allocation of instructional materials and learning resources in the five South-South Nigerian universities?

Table 3: Effect of Enrolment Projection on Allocation of Instructional Materials and Learning Resources

S/N	Item	Mean	Std. Deviation	Decision
1	Enrolment projection guides the procurement of instructional materials	3.68	0.54	Agree
2	Learning resources are allocated based on projected student numbers	3.62	0.56	Agree
3	Enrolment projection influences the provision of library resources	3.72	0.50	Agree
4	Projected enrolment determines the need for textbooks and journals	3.58	0.58	Agree
5	Accurate enrolment projection leads to adequate learning resources	3.66	0.54	Agree
6	Enrolment projection helps in planning for e-learning resources	3.55	0.60	Agree
7	Learning resource allocation is reviewed based on enrolment changes	3.50	0.62	Agree
8	Enrolment projection ensures equitable distribution of learning resources	3.62	0.56	Agree

Source: Field Survey, 2026

Table 3 shows the effect of enrolment projection on the allocation of instructional materials and learning resources. All items have mean scores above 2.5, indicating that respondents agree that enrolment projection has a significant effect on the allocation of instructional materials and learning resources. The highest mean score (3.72) was recorded for "Enrolment projection influences the provision of library resources," indicating that enrolment projection is a key determinant of the provision of library resources. This is consistent with Amaewhule and Anunobi (2025), who found that well-planned educational resources positively affect students' academic success. The mean score for "Enrolment projection guides the procurement of instructional materials" was 3.68, and "Accurate enrolment projection leads to adequate learning resources" was 3.66, confirming the positive effect of enrolment projection on instructional materials allocation.

Research Question 4: What is the effect of enrolment projection on the allocation of financial resources in the five South-South Nigerian universities?

Table 4: Effect of Enrolment Projection on Allocation of Financial Resources

S/N	Item	Mean	Std. Deviation	Decision
1	Enrolment projection guides the allocation of financial resources	3.74	0.50	Agree
2	Financial resources are allocated based on projected student numbers	3.68	0.54	Agree
3	Enrolment projection influences the university budget	3.78	0.48	Agree
4	Projected enrolment determines the funding needs of the university	3.62	0.56	Agree
5	Accurate enrolment projection leads to adequate financial allocation	3.72	0.52	Agree
6	Enrolment projection helps in planning for recurrent expenditure	3.58	0.58	Agree
7	Financial allocation is reviewed based on enrolment changes	3.52	0.60	Agree
8	Enrolment projection ensures equitable distribution of financial resources	3.66	0.54	Agree

Source: Field Survey, 2026

Table 4 presents the effect of enrolment projection on the allocation of financial resources. All items have mean scores above 2.5, indicating that respondents agree that enrolment projection has a significant effect on the allocation of financial resources. The highest mean score (3.78) was recorded for "Enrolment projection influences the university budget," indicating that enrolment projection is a key determinant of the university budget. The mean score for "Enrolment projection guides the allocation of financial resources" was 3.74, and "Accurate enrolment projection leads to adequate financial allocation" was 3.72, confirming the positive effect of enrolment projection on financial resource allocation.

6. Discussion of Findings

The first finding of this study revealed that enrolment projection has a significant effect on the allocation of teaching staff in the five South-South Nigerian universities. The majority of respondents agreed that enrolment projection guides the recruitment of teaching staff, that teaching staff are allocated based on projected student numbers, and that enrolment projection influences staff-student ratios. These findings are consistent with Etor, Ekanem and Sule (2020), who found that projection serves as the basis for determining available resources and how they could be distributed and utilised. The findings are also consistent with Salomi and Alake (2025), who established that the staff-student ratio shall be 1:30 for all programmes. The finding that enrolment projection influences staff-student ratios is particularly significant. When enrolment projections are accurate, universities can plan for the recruitment of adequate numbers of teaching staff to maintain appropriate staff-student ratios. However, when projections are inaccurate, universities may face shortages or surpluses of teaching staff, which can affect the quality of education. This is consistent with Ofor-Douglas (2024), who found that the staff-student ratio in many Nigerian universities is far above the recommended benchmark.

The second finding revealed that enrolment projection has a significant effect on the allocation of physical facilities and infrastructure in the five South-South Nigerian universities. The majority of respondents agreed that enrolment projection guides the construction of new facilities, that physical facilities are allocated based on projected student numbers, and that enrolment projection influences the provision of lecture theatres. These findings are consistent with Ofor-Douglas (2024), who reported that the rapid growth in student enrolment has outpaced the

provision of physical facilities, leading to overcrowding and inadequate learning environments.

The finding that enrolment projection influences the provision of lecture theatres and laboratory facilities is particularly important. As enrolment increases, the demand for lecture theatres, laboratories, and other physical facilities also increases. When enrolment projections are accurate, universities can plan for the construction of new facilities to meet this demand. However, when projections are inaccurate or when resources are not allocated in line with projected enrolment, universities face significant shortages of physical facilities. The finding that accurate enrolment projection leads to adequate facility provision is consistent with the argument that effective educational planning requires the alignment of resources with projected student numbers.

The third finding revealed that enrolment projection has a significant effect on the allocation of instructional materials and learning resources in the five South-South Nigerian universities. The majority of respondents agreed that enrolment projection guides the procurement of instructional materials, that learning resources are allocated based on projected student numbers, and that enrolment projection influences the provision of library resources. These findings are consistent with Amaewhule and Anunobi (2025), who found that well-planned educational resources positively affect students' academic success. The finding that enrolment projection influences the provision of library resources is particularly significant. As enrolment increases, the demand for library resources, including textbooks, journals, and e-resources, also increases. When enrolment projections are accurate, universities can plan for the procurement of adequate instructional materials to meet this demand. However, when projections are inaccurate or when resources are not allocated in line with projected enrolment, students may face shortages of essential learning resources. The finding that accurate enrolment projection leads to adequate learning resources is consistent with the argument that effective educational planning requires the alignment of resources with projected student numbers.

The fourth finding revealed that enrolment projection has a significant effect on the allocation of financial resources in the five South-South Nigerian universities. The majority of respondents agreed that enrolment projection guides the allocation of financial resources, that financial resources are allocated based on projected student numbers, and that enrolment projection influences the university budget. These findings are consistent with Salomi and Alake (2025),

who found that insufficient funding, policy inconsistencies, political instability, corruption, and regional disparities are critical challenges facing Nigerian education. The finding that enrolment projection influences the university budget is particularly significant. When enrolment projections are accurate, universities can plan for the allocation of financial resources to meet the needs of projected student numbers. However, when projections are inaccurate or when resources are not allocated in line with projected enrolment, universities may face budget shortfalls or surpluses, which can affect the quality of education. The finding that accurate enrolment projection leads to adequate financial allocation is consistent with the argument that effective educational planning requires the alignment of financial resources with projected student numbers.

7. Conclusion

This study examined the effect of enrolment projection on resource allocation in five public universities in South-South Nigeria: University of Benin, Ambrose Alli University, Delta State University, University of Calabar, and University of Uyo. The study found that enrolment projection has a significant effect on the allocation of teaching staff, physical facilities and infrastructure, instructional materials and learning resources, and financial resources. Universities use enrolment projections to guide the recruitment of teaching staff, construction of new facilities, procurement of instructional materials, and allocation of financial resources. However, the rapid growth in enrolment has often outpaced the provision of resources, leading to infrastructure gaps, staff shortages, and inadequate learning materials. The study concluded that enrolment projection is a critical tool for effective resource allocation in Nigerian universities. When enrolment projections are accurate and resources are allocated in line with projected enrolment, universities can provide quality education. However, when projections are inaccurate or resources are not aligned with projected enrolment, universities face significant challenges in maintaining quality education.

8. Implications for Educational Management

The Implications of Enrolment projection and resource allocation in educational management required educational managers or administrators to reconsider management strategies for planning, diversified financing, equitable distribution of finance and resources, and data-driven governance in our present realities.

Strategic Planning: Administrators must ground admissions caps in actual carrying capacities stipulated by the National Universities Commission (NUC) rather than purely revenue-driven quotas. This enable institutions to adjust to the proper utilization of the NUC guidelines and admit incoming students within the allotted quotas.

Diversified Financing: Educational managers need to aggressively pursue alternative revenue streams, such as alumni endowments, public-private partnerships, and commercialized research, rather than depending solely on statutory allocations.

Equitable Distribution: Internal resource allocation models must shift from centralized, opaque frameworks toward transparent, needs-based distribution that directly supports high-demand or resource-deficient academic units.

Data-Driven Governance: Investing in robust management information systems (MIS) allows institutions to track enrolment patterns accurately and execute preemptive facility and staff planning.

9. Recommendations

Based on the findings of this study, the following recommendations are made:

The five universities studied and other Nigerian universities should develop robust enrolment projection models that use accurate and reliable data. This will help universities plan for the recruitment of teaching staff, the construction of physical facilities, the procurement of instructional materials, and the allocation of financial resources.

The National Universities Commission and university administrators should ensure that resource allocation is aligned with projected enrolment. This includes the allocation of teaching staff, physical facilities, instructional materials, and financial resources based on projected student numbers.

Universities should invest in data collection and management systems to ensure the availability of accurate and reliable data on student enrolment. This will improve the accuracy of enrolment projections and the effectiveness of resource allocation.

The government should increase funding for university education to meet the UNESCO recommended benchmark of 15-20% of the national budget. This will provide universities with the

financial resources needed to accommodate growing enrolment and maintain quality education.

Universities should strengthen the capacity of their academic planning units to develop accurate enrolment projections and to plan for effective resource allocation. This includes training staff in enrolment projection techniques and resource allocation models.

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Assessment of Effect of Cognitive Behavioral Therapy on Physical and Emotional Resilience of Abandoned In-School Adolescent in Taraba State Orphanage Home, Nigeria

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Abstract. The study was prompted by the poor coping state of abandoned in-school adolescents in Taraba orphanage home. The main objective of the study was to determine, the resilience, profile of abandoned in school adolescents, the effect of cognitive Behavioural therapy on physical and emotional resilience of abandon in-school adolescents. The population of the study comprised of 40 abandoned in-school adolescents in Taraba orphanage home. The sample consisted of all the 40 abandoned in-school adolescents in Methodist orphanage home Taraba, the sample comprised of both male and female abandoned in-school adolescents who have experienced abandonment. Out of the sample 20 were assigned to experimental group and 20 to control group. The study adopted experimental research design, specifically pre-test, post-test control experimental design. Two research questions were formulated to facilitate the study which were the following: To what extent does exposure to cognitive behavioural therapy enhance the resilience of abandoned in-school adolescents and what is the resilience profile of abandoned in-school adolescents and also three propounded as stated, there is no significant difference between the resilience pre-mean scores of abandoned in-school adolescents in experimental and control group, there is no significant difference between the physical resilience post mean scores of experimental and control groups and there is no significant difference between the emotional resilience post-test mean scores of adolescent in-school adolescents experimental and control groups. The instruments used for the study were resilience scale for abandoned in-school adolescents (RSFAIA) and observation scale for abandoned in-school adolescents (OSFAIA), the reliability for the resilience scale for in-school abandoned adolescents

instrument was 0.81 and the observation scale for in school abandoned adolescent was 0.879. Research question one to two were answered using mean score and standard deviation while hypothesis one to three were tested using t-test statistics. Result from the study showed that prior to intervention abandoned in-school suffered from physical and emotional consequences of abandonment, results also revealed that exposure to cognitive Behavioural Therapy (CBT) greatly improved their physical and emotional resilience's base on the funding of the study it was recommended that Behavioural should adopted in helping abandoned in-school adolescents develop resilience.

Keywords: Cognitive Therapy, Resilience, Abandoned Adolescents and orphanage Home

1. Introduction

Child abandonment is relatively a common occurrence, It has been an act of parents and caregivers since the Early times, but even today modern enlightened society children still eject children from their homes and are abandoned on the street and motor parks (child sponsor, 2010ected). Abandonment refers to the physical, Social Emotional and Cognitive neglect of a dependent or ward by a legal guidance, parent or the society as in whole, it is the neglect of the required or needed responsibility towards a dependent. Abandonment may not usually stem from loss of parents through death or divorce but can also result from inadequate physical and emotional care. Experience of abandonment can lead to trauma. Abandonment is a form of child abuse, which creates many problems. It's a global issue that has attracted serious attention Many children all over the world, are subjected to

psychological, emotional, physical and social abandonment.

It is actually difficult to understand Why any person especially parents, whom God has used to bring a child to the world will abandon the child. Many factors may be responsible for child abandonment such as Poverty, culture, religion and ignorance and lack of economic resources to provide basic needs of children, peoples way of life and lack of Awareness on child upbringing, all these can make parents abandon children (Dapanfilis, 2006).

According to Mamka (2016) abandonment can produce a sense of psychological and Physical effects on the affected Person. It Induces a feeling of shame, Low self-esteem and inferiority Complex. Also, Khara and Dolan (2014) stated that an abandoned adolescent is likely to exhibit fear, worthlessness guilt and will be under the impression that he/she has been abandoned for some wrong doings and will Keep on analyzing what the wrong is and will feel guiltier. Due to the guilt the child will tend to withdraw from people in the society. Some abandoned adolescents may resort to alcohol, smoking or drugs and may consider this habit as a way of dealing with problems. There are different forms of abandonment: Medical, Nutritional, educational, emotional and physical.

Gilbert (2010), defined resilience as the ability of humans to bounce back after difficulties so as to be able to cope with living. Resilience in children can be seen in four aspects of their development namely: physical, social, emotional, and cognitive. Physical resilience deals with the ability of abandoned in-school adolescents to cope with Challenges, maintain Stamina and strength in the face of adversity. Emotional; resilience is the ability of the abandoned in-school adolescents to maintain emotional stability or to bounce back after suffering despite challenges.

Resilience is a crucial ingredient for happy and healthy life. It is what determines how high we rise above what threatened to weigh us down. Adolescents refers to in-school abandonment children between age of 12-18 years in Taraba Orphanage Home. The increasing rate in the number of abandoned adolescents in Nigeria, particularly northern Nigeria is an issue of concern to parents, educationists and psychologists. These could be as a result of terrorists and Boko haram attacks in the region. These has created fear and worries in the minds of people. According to Internally Displaced Monitoring Centre (2016) more than 60% the total number of 2,152,000 internally displaced persons in northern Nigeria are abandoned adolescents.

Lamont (2010) asserts that Cognitive Behavioural Therapy (CBT) is a short-term, goal-oriented psychotherapy treatment that takes a hands-on, practical approach to problem-solving. Its goal is to change patterns of thinking or behaviour that are behind people's difficulties, and to change the way they feel. It is used to help treat a wide range of issues in a person's life, from sleeping difficulties or relationship problems, to drug and alcohol abuse or anxiety and depression. CBT works by changing people's attitudes and their behaviour by focusing on the thoughts, images, beliefs and attitudes that are held (a person's cognitive processes) and how these processes relate to the way a person behaves, as a way of dealing with emotional problems. Mills (2006) observed that an important advantage of cognitive behavioural therapy is that it tends to be short, taking five to ten months for most emotional problems. Clients attend one session per week, each session lasting approximately 50 minutes. During this time, the client and therapist work together to understand what the problems are and develop new strategies for tackling them. CBT introduces patients to a set of principles that they can apply whenever they need to, and that'll last them a lifetime.

Cognitive Behavioural Therapy (CBT) is based on a combination of the basic principles from behavioural and cognitive psychology. It is different from historical approaches to psychotherapy, such as the psychoanalytic approach where the therapist looks for the unconscious meaning behind behaviours and then formulates a diagnosis. Instead, CBT is "problem-focused" and "action-oriented", meaning it is used to treat specific problems related to a diagnosed mental disorder and the therapist's role is to assist the client in finding and practising effective strategies to address the identified goals and decrease symptoms of the disorder. CBT is based on the belief that thought distortions and maladaptive behaviours play a role in the development and maintenance of psychological disorders, and that symptom associated with distress can be reduced by teaching new information-processing skills and coping mechanisms.

In Taraba state, there is quite an increase in the number of abandoned adolescent due to attacks by bandits and Boko haram in the region. Many are captured on daily basis, and many killed Children were left without adults to cater for them. Many of these children left on the streets and Orphanage homes. Abandonment is detrimental to adolescents' life. Then the question that comes to mind how can these victims of abandoned adolescents overcome or cope with the devastating situation and traumatic experiences in life? The researcher is prompted to carry out this research to find out to what extent can coping strategies such as cognitive enhance the resilience of abandon in-school adolescents.?

Research has shown that there is a dearth of local empirical studies on effect of cognitive behavioral therapy on the resilience of abandoned in-school adolescents in Taraba Orphanage Home, Nigeria. This is part of the prompting for the study.

1.1 Objective of the Study

Objective of the Study are to find out:

- The resilience profile of abandoned in-school adolescent in Taraba State Orphanage home
- Effectiveness of cognitive behavioural therapy on physical resilience of abandoned in-school adolescents in Taraba Orphanage
- Effectiveness of cognitive behavioural therapy on emotional resilience of abandoned in-school adolescents in Taraba Orphanage

1.2 Research Question

- What is the resilience profile of abandoned in-school adolescents in Taraba state
- To what extent does exposure to CBT affect the resilience of Abandoned in-school Adolescents in Taraba orphanage home.

1.3 Hypotheses

- There is no difference between resilience pre-test mean Scores of Abandoned Adolescent in experimental and control groups.
- There is no significant difference between the physical resilience post-test and mean scores of experimental and control groups.
- There is no significant difference between emotional post-test and mean scores of experimental and control groups.

1.4 Significance of the Study

The study would benefit the following Students, parent teachers, government, social workers' psychologists and researchers, to students it will help them get information and literature on similar researches they intend to carry out and also educate them on how to handle issues of abandonment.

To teachers the study will enlighten them on the types of abandonments, causes, identify types of

abandonment symptoms and victims so as to assist them overcome the trauma and to send them to psychologists for therapy. The study will create to parents' awareness by educating them on what abandonment is, it will also reduce the rate of child abandonment and child abuse among parents and enlighten them on how to handle issues of abandonment.

Psychologists will benefit also from the study and counselors the study has shown the effectiveness of Cognitive Behavioural Therapy in treating physical and emotional problems. This knowledge can also be transferred to other traumatic situations. To the government the study will be of importance for it will enlighten them on laws and policies to enact so as to control abandonment.

2. Research Methodology

The Study employed experimental design specifically, the pre-test posttest Control and experimental research design. Random Sampling technique was used to assign adolescents students into experimental and control groups. The Population of the study consisted of all the 40 abandoned in-school adolescents, 25 males and 15 females in Methodist Orphanage Home Taraba state. Out of this sample 20 were assigned to experimental group and 20 to Control group. The experimental group was exposed to treatment while the Control was not. The two groups were pretested and post-tested, so as to be able to ascertain if there was a difference in the resilience of those exposed to cognitive behavioural therapy and those who were not. No sampling of orphanage home was carried out because there was only one orphanage home in Taraba State as of the time of the research.

The instruments used for data collection were resilience scale for Abandoned In-school adolescents (RSFAIA) and observation schedule for Abandoned In-school Adolescents (OSFAIA). A pilot Study was conducted on a different population in Adamawa, which has the same geographical Location and a measure of reliability of the RSFAIA was established using the test-retest method. The reliability coefficient for resilience scale Abandoned In-school Adolescent (RSFAIA) was 0.81 using Alpha Cronbach Method and the Observation Schedule for abandoned In-school Adolescent (OSFAIA) was 0.879 using Alpha Cronbach method

3. Results

The results of the study were organized and presented in tabular forms according to the research questions and hypotheses.

Research Questions

Question One: What was the resilience profile of abandoned in-school adolescents before exposure to CBT?

Table 1: Mean Scores of Resilience Profile of Abandoned in-school Adolescents before Exposure to CBT

Group	N	$\bar{X}$	SD	S. E	Profile
Experimental	20	38.00	4.64	1.037	Low
Control	20	38.44	4.64	1.036	Low

NB: Criterion; $\bar{X} < 49$ = Low, $\bar{X} \geq 50$ = High, N = 40. S.E = Standard error of mean.

Table 1 showed that both the experimental group and the control group have the respective mean scores, $M=38.00$, $SD=4.64$ and $M=38.44$, $SD=4.64$ below the mean bench mark of 50.0. This implies that all the abandoned in-school adolescents in orphanage had low resilience before exposure to CBT.

Question Two: To what extent does exposure to CBT affect the resilience of abandoned in-school adolescents?

Table 2: Mean Scores on extent to which CBT Affect Resilience of Abandoned In-school Adolescents after exposure

Group	N		Pre test	Post test
Experimental	20	$\bar{X}$	38.00	84.84
		SD	4.64	3.29
Control	20	Mean	38.44	36.81
		SD	4.64	4.08

NB: Criterion; $\bar{X} < 49$ = Low, $\bar{X} \geq 50$ = High, N = 40

Table 2 analysis revealed that the posttest means scores of the experimental group ($M=84.84$) is above the average criterion mean of 50.0 and greater than that of the control group ($M=36.81$). The posttest mean scores of the experimental group are also greater than the pretest mean scores of both the experimental (38.00) and the control groups (38.44) respectively. This s

Hypotheses

Hypothesis One: There is no significant difference between the resilience pre-test mean scores of abandoned in-school adolescents in the experimental and control groups.

Table 3: Summary of t-test Analysis of Pre-test Resilience of Abandoned In-school Adolescents in the Experimental and Control Group

Group	N	$\bar{X}$	SD	df	$t_{cal.}$	p-value	Level of sig.
Experimental	20	38.00	4.64	38	-0.298	0.062	0.05
Control	20	38.44	4.64				

$P > .05$

$t_{\alpha/2} = 2.021$

Table 3 indicated that the t-calculated value (-0.298) is less than the crucial t-value (-2.021). This implies that the null hypothesis is accepted. Also, given that the p-value (0.062) is greater than the level of significance (0.05), the study therefore, concludes that there is no significant difference between the mean scores of the control and experimental groups of abandoned in-school adolescents before exposure to CBT.

However, findings from the observation made on the resilience pre-test mean scores of abandoned in-school adolescents in the experimental and control groups revealed that the mean difference (1.36) and the effect size (0.195) of observers rating between the experimental and the control groups on the resilience of abandoned in-school adolescents is not large. This means that observation shows that in-school abandoned adolescents had low resilience before the exposure to CBT intervention.

Hypothesis Two: There is no significant difference between the physical resilience posttest mean scores of the control and experimental group after treatment.

Table 4: Summary of t-test Analysis of Physical Resilience of Abandoned In-school Adolescents in the Experimental and Control Group

Group	N	$\bar{X}$	SD	Df	$t_{cal.}$	p-value	Level of sig.
Experimental	20	85.88	4.24	38	25.09	0.044	0.05
Control	20	37.25	7.56				

$P < 0.05$

$t_{\alpha/2} = 2.021$

Table 4 results showed that the t.cal. value of 25.09 is greater than the critical t-value (2.021) and the p-value of 0.044 is less than the level of significance ($\alpha = 0.05$). Thus, the null hypothesis is rejected and the study concludes that there is a significant difference in the physical resilience of abandoned in-school adolescents treated with cognitive behavioural therapy ($M=85.88$, $SD=4.24$) and those who were not ($M=37.25$, $SD=7.56$), $t(38) = 25.09$, $p<.05$. This implies that cognitive behavioural therapy has significant effects on the physical resilience of abandoned in-school adolescents in the orphanages.

Furthermore, findings from the observation made on physical resilience of abandoned in-school adolescents in Taraba Orphanage revealed that the mean difference (36.21) and the effect size (0.959) of observers rating between the experimental and the control groups on physical resilience of abandoned in-school adolescents is very large. It implies that observation shows that in-school abandoned adolescents had very high physical resilience scores after exposure to CBT intervention. In other words, CBT has effects on physical resilience of in-school abandoned adolescents.

Hypothesis Three: There is no significant difference between the emotional resilience post-test mean scores of the experimental and control group.

Table 5: Summary of t-test Analysis of Emotional Resilience of Abandoned In-school Adolescents in the Experimental and Control Group

Group	N	$\bar{X}$	SD	df	t-cal.	p-value	Level of sig.
Experimental	20	63.24	4.31	38	30.41	0.042	0.05
Control	20	27.23	3.09				
P<.05							$\alpha/2=2.021$

4. Discussion

The current study explored the effects of CBT on resilience of abandoned in-school adolescents in Taraba Orphanage Home and discovered that both the experimental group and the control group had low resilience before the exposure to CBT. Prior to interventions, abandoned in-school adolescents suffered physical and emotional consequences of negligence. In terms of physical recuperation from the abandonment, these students were observed to have no physical strength to embark on strenuous activities, lack good health, relaxation, body mass and structure.

Emotionally, they had distorting mood, lack passion, self-esteem, and calmness, and were reserved, upset, and not happily determined. Furthermore, their interaction with other people and ability to show gratitude, politeness, sharing things and participate in social activities were very poor. Also, they encountered difficulty while recalling from memories, lack concentration, composure, comprehension and academic understanding. The finding confirmed the position of Canadian Red Cross (2014), which noted that abandoned children face situation as inattentive to the basic necessities in life such as; clothing, shelter, health, diet, education, good hygiene, supervision, medical and dental care, adequate rest, safe environment, moral guidance and discipline, exercise and fresh air. This is attributed to the fact that they had no experience of the thought to lighten the load of unnecessary baggage of emotional worries and use the extra energy to pursue other important things in life.

The finding further confirms the findings of American Institute for Cognitive Behavioural Therapy, (2009) who noted that lack of exposure to CBT which is used for wide range of psychological problems such as abandonment, depression, anxiety, anger, marital conflict, loneliness, abuses, alcohol abuse and dependence and personality problems accounted for their low resilience. Introducing abandoned adolescents to CBT would help them learn effective self-help skills that are useful for academic tasks, and change ways they think, feel behave and act.

The pre-test to determine whether the two groups are equivalent before administering the treatment showed that there is no significant difference in the resilience of abandoned in-school adolescents in the experimental group and those in the control group. They have similar resilience before exposure to CBT. This implies that the ability of the in-school adolescents to get out of traumatic experience of abandonment before CBT interventions was at stake. Withholding CBT interventions which are psycho-educational that teaches students strategies for controlling and changing personal-social behaviors negatively affect physical and emotional reduce organizational and learning skills, and decrease adolescents' strategies to overcome anxiety and other barriers to success. The findings further revealed that applying CBT will enhance students' motivation and beliefs about their ability to perform tasks.

Result also revealed that CBT highly affect the resilience of the abandoned in-school adolescents. The exposure of students to CBT greatly influences

their physical and emotional resilience. This confirmed the affirmation that intervening in the issues of abandoned in-school adolescents who experienced physical, emotional, cognitive or social neglect of a dependent by a legal guardian, parent or the society (Agbade, 2013), using CBT would boost their resilience. This finding corroborates Pavuluri, Graczyk, Henry, Carbray, Heidenreich and Miklowitz (2004) who discovered that child and family – focused cognitive-behavioural therapy for pediatric bipolar disorder had significantly reduced bipolar symptoms compared to participants who received no treatment with cognitive behavioural therapy. Similar study by Silverman and Viswesvaran (2008) using evidence - based psychosocial treatment for phobic and anxiety disorders in adolescents revealed that individual and group CBT, with or without parent involvement was effective for adolescents with anxiety disorders. Also, the study conducted by Thimm and Antonsen (2014) had a bearing with the current finding. The study concurred that cognitive behavioural group therapy for depression in routine practice significantly reduced depression and anxiety among patients who received group therapy of CBT for depression.

After the treatment, findings revealed significant difference in the physical resilience of abandoned in-school adolescents treated with cognitive behavioural therapy and those who were not. It suggests that cognitive behavioural therapy has significant effects on the physical resilience of abandoned in-school adolescents in the orphanage. CBT intervention has helped lessen physical harm due to abandonment in form of energy loss, cuts, bruises and burns. This finding has bearing with the finding of Oakley (2016) who discovered that CBT also affect adolescent's physical performance, physical strength to embark on strenuous activities, good health, relaxation, body mass and structure. For the neglected adolescents to overcome physical abuse, it requires CBT interventions which consist of collaborative effort between social workers, parents and concerned individuals to assist the neglected.

More so, findings discovered significant difference between the emotional resilience of abandoned in-school adolescents treated with cognitive behavioural therapy and those in the control group. Consequently, cognitive behavioural therapy has significant effects on the emotional resilience of abandoned adolescents in the orphanages. CBT had helped these adolescents regain from the impact of being emotionally abandoned such as lack of affection, attachment to caregiver, and being placed at risk of harm such as witnessing domestic violence, being depressed, have fear, lack of confidence and being shy to express shame, take to drugs or even attempt suicide.

This finding corroborates the findings of Osborn and Bush (2005) who discovered concurred in their study titled: An evaluation of the friend's programme: a cognitive behavioral therapy intervention to promote Emotional Resilience found lower rate of anxiety and significant improvement in the level of self-esteem of those treated with CBT. The result also agrees with the findings of NICE (2007) which showed that cognitive behavioural therapy (CBT) is an effective intervention for child anxiety disorders. This explains that resilience support interventions improve emotional and psychological health, helps build resiliency and protect abandoned in-school adolescents against emotional and behavioural problems, violence and crime, teenage pregnancy and misuse of drugs and alcohol National Institute of Clinical Excellence.

5. Findings

In the pre-test, adolescents in control and experimental group had low resilience profile before exposure to cognitive therapy. After exposure to cognitive behavior therapy, the experimental group had a higher achievement mean score in the post-test. This suggests that CBT highly improved the resilience of the abandoned in-school adolescents. CBT enhanced physical resilience of abandoned in-school adolescents in orphanage home in Taraba State. CBT improved the emotional resilience of abandoned in-school adolescents in orphanage home in Taraba State.

6. Conclusion

The study aimed at finding out effects of cognitive behavioral therapy on resilience of abandoned in-school adolescents in orphanage in Taraba state. The study was to ascertain whether CBT can help the abandoned in-school adolescents in orphanage develop physical and emotional resilience despite their abandonment.

Based on the findings from data analysis and interpretations, it was discovered that exposure to CBT has great effects on abandoned in-school adolescents' resilience. Those who were exposed to CBT had better physical and emotional resilience than those were not.

This shows that talking therapy is important to abandoned in-school adolescents, for it helps them cope in life. It is important to note that, talk therapy can make abandoned adolescents cope in life and therefore, the government should make provision of such to neglected and abandoned people in the society. Furthermore, the government should give attention to orphanage children and other places

where children are cared for, by visiting and giving them talks that will encourage them forget about their experience and forge to be great, leaders of tomorrow, especially in Nigerians present situation of insurgency and crisis, which has led to the abandonment of many children.

Emotional table indicated that t.cal value 30.41 is greater than the critical t-value (2.041). Also, the level of P-Value of 0.042 is less than level of significance, $\alpha = 0.05$ and $df = 38$. It implies that the null hypothesis is rejected hence there is a significant difference between the emotional resilience of abandoned In-school Adolescents treated with cognitive behavioural therapy ($M=63.24$, $SD=4.31$) and those in the control group ($M=27.23$, $SD=3.09$). Consequently, cognitive behavioural therapy has significant effects on the emotional resilience of abandoned adolescents in the orphanage.

In addition, findings from the observation of emotional resilience of abandoned in-school adolescents in Taraba Orphanage showed that the mean difference (36.01) and the effect size (0.961) of observers rating between the experimental and the control groups on emotional resilience of abandoned in-school adolescents is extremely large. It suggests that observers rated emotional resilience of in-school abandoned adolescents as very high after treated with CBT intervention. In other words, CBT has been observed to have effects on emotional resilience of in-school abandoned adolescents.

7. Recommendations

Symposium should be organized and abandoned adolescents should be enlightened on issues concerning coping strategies and development of resilience to hardship.

In building resilience in abandoned in-school adolescents, effort should be directed at both the reduction of negative outcomes or maladjustments as well as promotion of positive adaptation or competence.

Timing of intervention of promotion of resilience is crucial variable that should be considered.

Teachers of abandoned in-school adolescents' children should assist them with their academic work.

The study could be extended to other states with in abandoned in-school adolescents' orphanages and in North East and Nigeria.

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An AI-Powered, Multilingual Pedagogical Support Framework for Integrated Science Teacher Education in Resource-Constrained Nigerian Contexts

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Abstract. Integrated Science teacher education is central to developing scientifically literate learners capable of understanding and applying concepts across biology, chemistry, physics, and environmental science. However, teacher education programmes in many Nigerian contexts face persistent challenges, including limited instructional resources, inadequate pedagogical support, linguistic diversity, and uneven access to digital technologies. This paper presents the architecture and Python reference implementation of an adaptive, multilingual AI-powered pedagogical support framework for Integrated Science teacher education, designed for deployment in Nigerian colleges of education. The framework organizes classroom interaction as a three-stage input, processing and output pipeline. A Bloom's-Taxonomy-tagged instructional corpus feeds a Low-Rank Adaptation (LoRA)-fine-tuned LLaMA language model, teacher voice queries in Hausa are transcribed with a fine-tuned XLSR-Wav2Vec2 speech recognizer and translated for processing, and generated instructional content is delivered back to teachers as text and synthesized Hausa speech. Through voice-based and local-language interaction, the system promotes inclusive and context-responsive science teaching while embedding ethical safeguards. We situate this design against recent advances in African-language natural language processing and low-resource speech recognition, provide worked code for every pipeline stage, and outline an evaluation plan combining automatic speech-recognition and translation metrics with teacher-facing usability assessment across partner colleges of education. The framework is offered as a reusable, extensible architecture for AI-supported, multilingual teacher education.

Keywords: Integrated Science teacher education; artificial intelligence in education; low-resource natural language processing; Hausa speech recognition; Bloom's Taxonomy; multilingual pedagogy; Africa

1. Introduction

Integrated Science is designed to provide learners with a coherent understanding of scientific concepts by linking ideas across biology, chemistry, physics, and environmental science (Yakubu, 2024; Zhai et al., 2021). Effective teaching of Integrated Science requires teachers who possess strong content knowledge, the ability to connect concepts across disciplines, and the pedagogical skills to facilitate inquiry-based and learner-centred instruction (Holmes et al., 2024). Teacher education institutions therefore play a critical role in preparing pre-service teachers to meet these demands.

In Nigeria, Integrated Science teacher education faces systemic challenges. These include shortages of qualified instructors, limited access to up-to-date teaching materials, overcrowded classrooms, and the use of languages of instruction that may not align with learners' linguistic backgrounds (UNESCO, 2023). As a result, pre-service teachers often struggle to develop confidence in explaining abstract scientific concepts, integrating multiple science domains, and engaging learners effectively (Cukurova, Luckin, & Kent, 2020).

Recent advances in large language models (LLMs) and speech technologies have begun to narrow this gap. Large-scale multilingual evaluations show that even the strongest open and commercial LLMs still under-perform on African languages when compared

to English (Ojo et al., 2024), and dedicated adaptation efforts such as Luga-Llama have only recently started to bridge this divide for languages including Hausa, Yoruba, Swahili, and Zulu by combining curated African-language text with high-quality English educational material during continual pretraining (Buzaaba, Wettig, Adelani, & Fellbaum, 2025). On the speech side, self-supervised architectures such as wav2vec 2.0 (Baeviski, Zhou, Mohamed, & Auli, 2020) and its cross-lingual variant XLSR (Conneau, Baeviski, Collobert, Mohamed, & Auli, 2021) have made low-resource automatic speech recognition (ASR) increasingly viable, and recent work fine-tuning these models on Hausa corpora, augmented with LLM-generated synthetic speech, has pushed word-error rates for African languages into a practically usable range (DeRenzi, Dixon, Farhi, & Resch, 2025).

Artificial Intelligence (AI) systems can provide adaptive instructional support, generate pedagogically relevant content, and facilitate interactive learning experiences (Zawacki-Richter, Marín, Bond, & Gouverneur, 2019; Bonner, Lege, & Frazier, 2023). When aligned with science education principles and local classroom realities, such technologies can complement traditional teacher training rather than replace it.

This study adopts an interdisciplinary research approach to explore how AI can be used as a pedagogical support tool for Integrated Science teacher education. By combining insights from science education, cognitive learning theories, linguistics, and computer science, the study proposes a framework that addresses both instructional and contextual challenges within Nigerian teacher education programmes.

The remainder of the article is divided as follows. Section 2 situates the framework within the current literature; Section 3 describes the system architecture and provides a Python reference implementation of the core technical contribution, i.e., LoRA fine-tuning of LLaMA on the Integrated Science corpus, as well as the output stage i.e., **Instructional response generation and Hausa text-to-speech** pipeline stage; Section 4 demonstrates a worked classroom scenario; Section 5 outlines the evaluation plan and expected outcomes; Section 6 addresses ethical considerations and privacy; and Section 7 discusses the implications and limitations of the framework.

2. Related Work

2.1 Integrated Science Pedagogy and Teacher Preparation

Research in science education consistently emphasizes the importance of integrated approaches to teaching science, where learners are supported to make meaningful connections across scientific disciplines rather than studying biology, chemistry, and physics in isolation (Zhai, He, Liu, & Kuo, 2021). Integrated Science teaching has been shown to enhance conceptual understanding, scientific reasoning, and the application of knowledge to real-world problems, particularly when inquiry-based pedagogies are employed (Cukurova et al., 2020).

Studies in teacher education highlight persistent challenges in preparing Integrated Science teachers, especially in low-resource contexts. These challenges include limited exposure to practical teaching strategies, inadequate instructional materials, and insufficient opportunities for reflective practice during training (Yakubu, 2024; UNESCO, 2023). Without adequate pedagogical support, pre-service teachers often struggle to integrate scientific concepts and manage learner-centred classroom activities effectively.

2.2 AI and Large Language Models in Teacher Education

The growing body of research on AI in education demonstrates its potential in intelligent tutoring systems, adaptive learning platforms, and automated feedback mechanisms to support teaching and learning (Zawacki-Richter et al., 2019). LLMs, in particular, have shown promise in generating curriculum-aligned explanations, assessment questions, and instructional prompts that support higher-order thinking (Bonner et al., 2023; Holmes, Porayska-Pomsta, & Holstein, 2024). However, much of this research is concentrated in high-resource contexts and does not explicitly address Integrated Science teacher education for low-resource languages.

Elkins, Kochmar, Cheung, and Serban (2024) show that quiz items generated by LLMs are rated as pedagogically sound by teachers only when the intended Bloom's-Taxonomy level is made explicit in the prompt; when left unconstrained, generated activities tend to cluster at the lower, "remember/understand" end of the taxonomy. This finding directly motivates embedding Bloom's-level metadata into the training corpus and generation prompts of the present framework (Section 3.2), rather than relying on an unconstrained LLM to infer cognitive demand. Luckin, Moss, and Holmes (2022) further argue that teacher-facing AI tools succeed only when paired with structured AI-literacy support for the

teachers who use them, a consideration reflected in the deployment plan in Section 5.

2.3 Low-Resource, Multilingual NLP for African Languages

The performance gap between English and low-resource African languages in LLMs is still very wide. AfroBench, a large-scale evaluation covering a number of African languages and multiple task categories, found that both open models such as LLaMA and Gemma, and commercial systems such as GPT-4o and Gemini perform poorly compared to their English counterparts, with the gap widest for generation tasks and languages using non-Latin orthographies (Ojo et al., 2024). Targeted continual-pretraining efforts are narrowing this gap. For example, Lugha-Llama adapts a LLaMA-3.1 base model (Touvron et al., 2023) to sixteen African languages by mixing curated African-language text with high-quality English educational documents, improving performance on the IrokoBench and AfriQA benchmarks (Buzaaba et al., 2025). Adelani et al. (2022) established an earlier foundation for this line of work, showing that pre-trained multilingual models can be adapted to African languages with only a few thousand parallel sentences, a data setting realistic for a single teacher-education programme to reproduce for domain-specific content.

On the speech side, wav2vec 2.0 (Baevski et al., 2020) and its multilingual variant XLSR (Conneau et al., 2021) remain dominant self-supervised backbones for low-resource ASR; XLSR is adopted in the present framework because cross-lingual pretraining substantially outperforms monolingual training when labelled Hausa speech data is scarce. DeRenzi et al. (2025) recently showed that LLM-generated synthetic text, converted to speech and used to augment ASR fine-tuning, can match real-data-only baselines for Hausa at well under one percent of the cost of collecting equivalent real data, an approach directly applicable to extending this framework's speech pipeline once a Bloom's-tagged Integrated Science text corpus exists (Section 3.2).

2.4 Multilingual Pedagogy and Ethical Considerations

Multilingual education research underscores the importance of language flexibility in science classrooms, especially in African contexts characterized by linguistic diversity. Translanguaging practices, where teachers and learners draw on multiple languages, have been shown to enhance comprehension and learner participation in science lessons (García & Wei, 2014; Makalela, 2018). Advances in multilingual AI and speech technologies offer opportunities to support such practices, yet ethical concerns related to bias, data privacy and cultural relevance remain serious issues (Birhane, 2021; UNESCO, 2023).

Overall, the literature reveals a clear gap in research that combines AI, science education, linguistics, and ethical governance to support Integrated Science teacher education in African contexts. Addressing this gap requires the development of pedagogically grounded, multilingual, and context-aware AI frameworks tailored to the realities of teacher education programmes.

The framework presented below responds directly to this gap by aligning a domain-specific, Bloom's instructional corpus with African-language speech and translation components, and by specifying the reference implementation in Python, for the two core sections of the model, so that other Integrated Science programmes can adapt it to their own languages and curricula.

3. The Proposed Framework

The proposed framework conceptualizes classroom interaction as a structured pipeline consisting of three interrelated stages: input, processing, and output (See Figure 1). The design emphasizes pedagogical grounding, multilingual accessibility, and ethical responsibility within resource-constrained educational contexts.

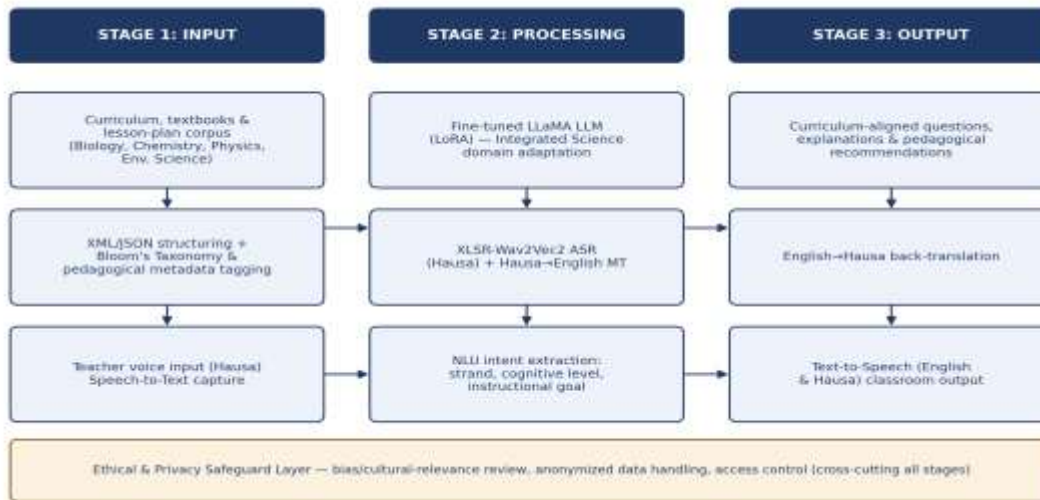


Figure 1. Three Stage Classroom Interaction Pipeline Diagram (With a cross-cutting ethical and privacy safeguard layer).

3.1 Input Stage: Corpus Curation and Bloom's-Taxonomy Tagging

At the input stage, the foundational intelligence of the system is established through the curation of pedagogically relevant Integrated Science datasets. These include Integrated Science curricula, lesson plans, textbooks, and teacher education guides covering biology, chemistry, physics, and environmental science, sourced from colleges and universities of education in Nigeria. The collected materials are digitized, cleaned, and transformed into a structured XML format to ensure machine readability and compatibility with the Llama LLM ingestion pipeline.

To strengthen instructional relevance, the dataset is enriched with pedagogical metadata, including learning objectives, common student misconceptions, suggested teaching strategies, and inquiry-based activities. Each content unit is annotated with its corresponding Bloom's Taxonomy level. This metadata-driven approach ensures that AI-generated outputs align with intended cognitive demands and support the development of scientific reasoning and conceptual integration central to Integrated Science teaching. In addition to text-based inputs, the framework supports teacher voice input through Speech-to-Text mechanisms, enabling real-time interaction in local languages.

3.2 Processing Stage: Domain Fine-Tuning and Hausa Speech Understanding

The processing stage is based on a transformer-based LLM, specifically the LLaMA architecture, fine-tuned

on Integrated Science educational data to enhance domain relevance and pedagogical accuracy. Prompt-engineering strategies guide the model to generate localized instructional outputs, such as inquiry-oriented questions, explanations, and classroom prompts tailored to Integrated Science topics.

Rather than full-parameter fine-tuning, which is computationally difficult for most Nigerian teacher-training institutions, the reference implementation uses Low-Rank Adaptation (LoRA), which freezes the pretrained LLaMA-2 weights (Touvron et al., 2023) and trains small rank-decomposition update matrices injected into the attention projections (Hu et al., 2022). This reduces the number of trainable parameters by several orders of magnitude and permits fine-tuning on a single consumer-grade GPU, a practical requirement given the infrastructure constraints noted in Section 1. Listing 1 shows the fine-tuning routine, including the instruction-formatting template that conditions each generation on subject strand and Bloom's level.

Listing 1. LoRA fine-tuning of LLaMA on the Integrated Science corpus (Python)

```

from datasets import load_dataset
from transformers import (AutoModelForCausalLM,
                          AutoTokenizer,
                          TrainingArguments, Trainer,
                          DataCollatorForLanguageModeling)
from peft import LoraConfig, get_peft_model, TaskType

```

```

BASE_MODEL = "meta-llama/Llama-2-7b-hf" #
Touvron et al., 2023

```

```

def build_lora_model(base_model_name: str =
BASE_MODEL):

```

```

tokenizer = AutoTokenizer.from_pretrained(base_model_name)
tokenizer.pad_token = tokenizer.eos_token
model = AutoModelForCausalLM.from_pretrained(
    base_model_name, load_in_8bit=True,
    device_map="auto")

lora_cfg = LoraConfig( # Hu et al.,
2022
    r=16, lora_alpha=32, lora_dropout=0.05,
    target_modules=["q_proj", "v_proj"],
    task_type=TaskType.CAUSAL_LM,
)
model = get_peft_model(model, lora_cfg)
model.print_trainable_parameters()
return model, tokenizer

def format_example(example, tokenizer, max_len: int
= 512):
    prompt = (
        f"### Subject: {example['subject_strand']}\n"
        f"### Bloom Level:
{example['bloom_level']}\n"
        f"### Instruction: Generate an inquiry-based
classroom "
        f"prompt on '{example['topic']}'.\n"
        f"### Response: {example['text_en']}"
    )
    return tokenizer(prompt, truncation=True,
max_length=max_len,
padding="max_length")

def fine_tune(corpus_path: str, output_dir: str = "isc-
llama-lora"):
    dataset = load_dataset("json",
data_files=corpus_path)["train"]
    model, tokenizer = build_lora_model()
    tokenized = dataset.map(lambda ex:
format_example(ex, tokenizer))

    args = TrainingArguments(
        output_dir=output_dir,
        per_device_train_batch_size=4,
        gradient_accumulation_steps=4,
        num_train_epochs=3,
        learning_rate=2e-4, fp16=True,
        logging_steps=20,
        save_strategy="epoch",
    )
    collator = DataCollatorForLanguageModeling(tokenizer,
mlm=False)
    trainer = Trainer(model=model, args=args,
train_dataset=tokenized,
data_collator=collator)
    
```

```

trainer.train()
model.save_pretrained(output_dir)
return model, tokenizer
    
```

To support multilingual interaction, teacher voice queries in Hausa are processed using a fine-tuned XLSR-Wav2Vec 2.0 self-supervised learning model for speech recognition. This model is selected for its robustness in low-resource and noisy environments and its ability to perform effective cross-lingual transfer when trained on curated Hausa speech corpora.

The section implements this transcription step, building on the pretrained multilingual checkpoint of Conneau et al. (2021), fine-tuned on Hausa audio. DeRenzi et al. (2025) demonstrate that this checkpoint family can be improved further with modest amounts of LLM-generated synthetic speech, offering a lower-cost path to expanding the training corpus beyond what any single institution could record on its own. The transcribed Hausa input is translated into English for LLM processing, where Natural Language Understanding modules extract pedagogical intent, instructional preferences, and cognitive level requirements. This intent extraction mechanism enables personalization by aligning generated content with specific classroom contexts and instructional goals.

The translation step will adopt a general-purpose multilingual MT model as a placeholder. Adelani et al. (2022) show that adapting such models with only a few thousand in-domain parallel sentences meaningfully improves translation quality for African languages; this is the intended upgrade path once an Integrated-Science-specific Hausa-English parallel corpus is collected during the pilot described in Section 5.

Following content generation, the system translates outputs back into Hausa to maximize accessibility. Although this multi-stage machine translation process may introduce latency and minor translation errors, it represents a pragmatic interim solution pending the deployment of fully end-to-end translanguaging LLMs capable of direct pedagogical generation in African languages.

3.3 Output Stage: Instructional Resource Generation and Speech Synthesis

At the output stage, the system delivers structured instructional resources to pre-service Integrated Science teachers. These outputs include curriculum-aligned questions with model answers, explanatory notes, and adaptive pedagogical recommendations

such as learner grouping strategies, use of visual aids, or inquiry-based classroom activities. Text-to-Speech technologies convert textual outputs into audible formats in both English and Hausa, addressing literacy barriers and supporting flexible classroom use.

Listing 2 implements response generation from the fine-tuned LLM together with Hausa speech synthesis using a massively multilingual TTS checkpoint. The orchestration layer coordinates all modules into a coherent, real-time workflow that is transparent to the end user that realizes the full voice-in/voice-out interaction loop described conceptually above and shown in Figure 1.

Listing 2. Instructional response generation and Hausa text-to-speech (Python)

```
import torch, torchaudio
from transformers import VitsModel, AutoTokenizer
```

```
HAUSA_TTS_CHECKPOINT = "facebook/mms-tts-hau" # Massively Multilingual Speech TTS
```

```
def generate_instructional_response(model, tokenizer,
intent: dict) -> str:
```

```
    prompt = (
        f"### Subject: {intent['strand']}\n"
        f"### Bloom Level: {intent['bloom_level']}\n"
        f"### Instruction: {intent['query']}\n###"
    )
    Response:"
    inputs = tokenizer(prompt, return_tensors="pt")
    output_ids = model.generate(**inputs,
max_new_tokens=200, temperature=0.7)
    return tokenizer.decode(output_ids[0],
skip_special_tokens=True)
```

```
class HausaTextToSpeech:
    def __init__(self, checkpoint: str =
HAUSA_TTS_CHECKPOINT):
        self.tokenizer =
AutoTokenizer.from_pretrained(checkpoint)
        self.model =
VitsModel.from_pretrained(checkpoint)

    def synthesize(self, hausu_text: str, out_path: str =
"response.wav") -> str:
        inputs = self.tokenizer(hausu_text,
return_tensors="pt")
        with torch.no_grad():
            waveform = self.model(**inputs).waveform
            torchaudio.save(out_path, waveform,
self.model.config.sampling_rate)
        return out_path
```

4. Illustrative Walkthrough

To ground the architecture in a concrete classroom scenario, consider a pre-service teacher preparing a lesson on the water cycle, a topic that spans physics (evaporation and energy transfer), chemistry (phase change), and environmental science (the hydrological cycle's ecological role), making it a natural test of the framework's conceptual-integration goal. The teacher poses a question aloud in Hausa; Table 1 traces representative inputs and outputs through the pipeline at four Bloom's-Taxonomy levels, illustrating how the same underlying topic yields cognitively differentiated instructional prompts.

Table 1. Example of Contextual Questions & Answers for AI in Education (*Illustrative, hand-authored outputs intended to demonstrate the pipeline design; not yet generated by a running system.*)

Bloom Level	Teacher Query (Hausa)	English Gloss	AI-Generated Instructional Prompt
<i>Understand</i>	Ta yaya ake bayyana yanayin zagayowar ruwa?	How is the water cycle explained?	Ask learners to describe, in their own words, how evaporation and condensation work together to move water between the land, ocean, and atmosphere.
<i>Apply</i>	Ta yaya za a nuna zagayowar ruwa a aji?	How can the water cycle be demonstrated in class?	Guide learners through a simple evaporation-condensation demonstration using a covered basin of warm water, then have them label each stage of the cycle on the resulting condensation.
<i>Analyze</i>	Wace alaka ke tsakanin zafi da yawan tururi?	What is the relationship between heat and rate of evaporation?	Have learners compare evaporation rates of water samples at two temperatures and analyze which variables (surface area, temperature, humidity) most affect the rate.
<i>Evaluate</i>	Ta yaya sauyin yanayi zai shafi zagayowar ruwa?	How might climate change affect the water cycle?	Ask learners to evaluate competing predictions about regional rainfall change under warming, citing evidence for and against each claim.

Internally, the Hausa query is transcribed by Listing 3, translated and intent-tagged by Listing 4, passed to the fine-tuned LLM via the prompt template in Listing 2, and the English response is back-translated and voiced in Hausa via Listing 5, the full loop implemented in Listing 6. Because the Bloom's level is fixed by the input tag rather than left to the model to infer, the four rows in Table 1 remain cognitively distinct even though they share a single topic, directly addressing the tendency of unconstrained LLMs to default to lower-order phrasing (Elkins et al., 2024).

Note on implementation status: Listings 1–2 and the architectural description of the system constitute a reference implementation only. None of the components above have been executed end-to-end there has been no LoRA training run, no live Hausa ASR/TTS test, and no integration test of the full ClassroomInteractionPipeline. The code is provided to make the design concrete and reproducible, not as evidence of a working system; see the Limitations subsection in Section 7 for further update.

5. Evaluation Plan and Expected Outcomes

The expected outcomes of this research include:

- A conceptual framework for AI-supported Integrated Science teacher education.
- Improved access to pedagogically relevant and curriculum-aligned instructional support for pre-service Integrated Science teachers.
- Enhanced capacity of teachers to integrate concepts across science disciplines and adopt inquiry-based teaching strategies.
- Increased inclusivity through multilingual and voice-based pedagogical support.
- A foundation for future empirical studies and scalable deployment of AI tools in Integrated Science teacher education programmes.

For the speech and translation components, word-error rate (WER) will be reported for the fine-tuned XLSR-Wav2Vec2 model on held-out Hausa classroom speech, benchmarked against the sub-15% range reported for fine-tuned Hausa ASR in comparable recent work (DeRenzi et al., 2025), with BLEU/chrF scores tracked for the Hausa-English translation stage before and after in-domain adaptation (Adelani et al., 2022). For pedagogical alignment, independent raters will score a sample of AI-generated prompts against their intended Bloom's-Taxonomy level, following the inter-rater protocol used to validate Bloom-conditioned question generation (Elkins et al., 2024). For overall usability and adoption, a structured survey and think-aloud sessions with pre-service teachers across partner colleges of education will assess

perceived usefulness, ease of use, and trust, consistent with technology-acceptance approaches used elsewhere in Sub-Saharan African higher education. These components together constitute a mixed-methods pilot to be conducted following the present design-and-implementation phase, rather than a claim of completed empirical validation.

6. Ethical and Privacy Considerations

Ethical AI principles are embedded throughout the framework. Regular evaluations are conducted to identify and mitigate bias, cultural insensitivity, or pedagogical misalignment in generated content. Privacy safeguards are implemented through anonymized data handling, secure storage, and strict access controls to protect institutional and user confidentiality. These measures ensure that the framework supports Integrated Science teacher education responsibly while maintaining teacher trust.

7. Limitations and Conclusion

Before the conclusion, three limitations are worth stating plainly. First, this framework has not yet been implemented or evaluated end-to-end: the architecture, code listings, and the Table 1 walkthrough describe an intended design, not a deployed or tested system. Second, the reference implementation depends on components that do not yet exist for this domain, a Bloom's-tagged Integrated Science corpus, a curated Hausa speech corpus, and an in-domain Hausa-English parallel corpus, and Hausa to English translation part explicitly uses a general-purpose multilingual MT model as a placeholder pending that data. Third, this framework's architecture closely parallels a related AI-powered pedagogical support framework for general teacher education developed by overlapping authors, readers should be aware of this relationship, and any submission of this paper should cite that related work explicitly and summarize rather than re-describe the shared architecture, to avoid the appearance of duplicate or overlapping publication.

This paper has presented the design, architecture, and Python reference implementation of an AI-powered, multilingual pedagogical support framework for Integrated Science teacher education in resource-constrained African contexts, structuring classroom interaction as an input-processing-output pipeline that combines curriculum curation and Bloom's-Taxonomy tagging, LoRA-fine-tuned LLM generation paired with fine-tuned Hausa speech recognition and translation, and bilingual text-and-speech delivery. The framework operationalizes the

three objectives set out for this research: strengthening lesson planning and conceptual integration, embedding pedagogical principles into AI-generated content, and enabling inclusive, voice-based, multilingual interaction. Future work will execute the evaluation plan outlined in Section 5 across selected colleges of education, extend the speech and translation components to additional Nigerian languages, and explore end-to-end translanguaging.

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School Resource Planning and Development and Students' Academic Performance in Public Secondary Schools in Bayelsa State, Nigeria

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Abstract. The study examined school resource planning and development and students' academic performance in Bayelsa State. Five research questions were raised to guide the study. It adopted the descriptive research design. The population of the study comprised 3631 teachers in public secondary schools as well as NECO examination results of students from 2019-2023 in Bayelsa State. A sample size of 360 teachers was selected using the Taro Yamane formula. The multistage sampling procedure was adopted to select the sampled teachers. Data were collected using two instruments; a researcher designed questionnaire; titled School Resource Planning and Development Questionnaire (SRPDQ) and a proforma; NECO Result Extraction Form (NECOREF) to determine the areas of School Resource Planning and Development indicators in place, and Students' Academic Performance were measured using the average percentage pass rates of five credits including English Language and Mathematics in the National Examinations Council (NECO) Senior School Certificate Examination for 2019-2023 academic sessions. The findings revealed that the level of resource planning and development, and students' academic performance were high, respectively in Bayelsa State, among others. Based on the findings, it recommended that resources planning and development must be given more attention as it influences and determines performance.

Keywords: School resource, Planning, Development, Academic performance, Pattern. Introduction.

1. Introduction

The effectiveness of education as a fundamental instrument for national development, social transformation, and human capital formation has been universally acknowledged. This is because through it, individuals are equipped with the knowledge, skills, attitudes, and competencies required for productive participation in society. Education is a catalyst for economic growth and sustainable development. The attainment of the Sustainable Development Goal (SDG) 4, which emphasizes inclusive and equitable quality education for all, places emphasis on the importance of effective educational planning, adequate resource allocation, and efficient school management as catalyst for improved learning outcomes (UNESCO, 2021). The secondary education level in Nigeria occupies a strategic position within the nation's education delivery system. It is often described as the intermediary/transition level of education as it links both basic and tertiary levels of education. It prepares students for employment, entrepreneurship, and lifelong learning (Federal Republic of Nigeria (FRN), 2013). Hence, proper planning, development, and effective utilization of educational resources is essential for optimal success.

Educational planning is a vital management function, which involves forecasting of future requirements, a systematic process of setting goals, defining objectives and developing strategies to achieve desired educational outcomes, mobilization of resources, implementation of educational programmes, and evaluation of outcomes (Nyam & Danian, 2024). It is also a strategic process for coordinating education

policies, research, data management, resource allocation, and institutional development to improve educational service delivery in Nigeria (Federal Ministry of Education (FME), 2022). Therefore, effective educational planning creates the foundation upon which schools organize their human, financial, physical, and instructional resources to achieve institutional goals efficiently.

School resource planning entails a systematic process of educational administrators identifying, forecasting, acquiring, allocating, coordinating, monitoring, and evaluating the needed resources required for effective instructional delivery and school administration (Wandera, Kamugisha, Barasa, Nalubega & Mbayo, 2025).

Resource planning encompasses human resources such as qualified teachers, principals, laboratory technologists, librarians, counsellors, and support staff; financial resources including government grants, internally generated revenue, and community contributions; physical resources comprising classrooms, laboratories, libraries, workshops, furniture, water supply, electricity, and sporting facilities; as well as instructional resources such as textbooks, computers, internet facilities, laboratory equipment, multimedia technologies, and teaching aids. According to Nwadiani and Ugolo (2011) “physical resources show glaringly that a school is existing in a particular location; and give an instant impression about its quality based on the observed state of architectural fineness”.

Resource development complements planning. It therefore refers to the creation, enhancement, and procurement of resources (such as educational materials, learning tools, human resources, and infrastructure) that support and improve the quality of teaching and learning (Wandera, Kamugisha, Barasa, Nalubega & Mbayo, 2025). It emphasizes the continuous improvement, expansion, maintenance, modernization, and sustainability of these resources to meet the changing demands of quality education. According to Wandera, Kamugisha, Barasa, Nalubega & Mbayo (2025) resource development process would include designing the content, selecting appropriate technology (such as; tablets or online platforms), and providing training for teachers to integrate these modules into their classrooms.

Several scholars have continued to emphasize the importance of school resources as adequate resources enhance effective curriculum implementation, improves classroom instruction, promotes students' motivation to learn, and creates an enabling

environment for academic excellence (Oduru, Basil, Woyengikari, & Christopher, 2024; Igenegbai, & Osagiobare, 2024; Igenegbai, Marchie, 2022). Nwadiani and Ugolo (2011) posited that teachers would become proud and their performance at school increased simply by a modest, beautified, and creative exterior which suggests the purpose why a school building exists. On the flipside, resources inadequacy often results to overcrowded classrooms, poor teaching, limited practical learning experiences, poor instructional supervision, teacher frustration, and declining students' academic achievement (Ewhrudjakpo, & Kpee, 2024). Therefore, effective planning and development of school resources have become indispensable responsibilities of school administrators in their quest to improving the quality of education.

The National Policy on Education emphasizes the need for adequate funding, effective planning, proper management, employment of qualified personnel, and sufficient educational facilities as catalyst for achieving national educational objectives. Furthermore, it posits that educational institutions should provide environments conducive for learning supported by competent teachers, adequate instructional materials, functional infrastructure, and effective administrative leadership (FRN, 2013). These provisions are pointers to the fundamental place of school resource planning and development for the attainment of students' academic achievement and overall improvement of the quality of education in Nigeria. However, earlier studies such as Nwadiani and Ugolo (2011) revealed that of the 1,783 quantities of facilities required by the sampled schools in Bayelsa State, only 843 quantities of facilities were available, which represented 40% adequacy of facilities required. This they rated as grossly inadequate. They revealed that toilet facilities for students were grossly inadequate for use. Only, four schools had functional water closet toilets provided for students. The situation was the same for teachers' toilets, and staffrooms, which recorded only 42.6% and 92.4% adequacy.

The foremost parameter for assessing the quality and effectiveness of education remains students' academic performance. Generally, academic performance connotes the extent to which students achieve expected learning outcomes as measured through classroom assessments, internal examinations, and standardized external examinations. The performance of students in the Senior School Certificate Examination (SSCE) conducted by the National Examinations Council (NECO) and the West African Examinations Council (WAEC) provides objective

measures for assessing students' academic achievement and school effectiveness, in Nigeria. It is very common to hear students, parents, stakeholder, and school administrators describe schools as effective based on past performance of students in WAEC/NECO. The results of external examinations remain a veritable assessment yardstick by governments, educational planners, employers, tertiary institutions, and parents to evaluate the quality of education to make policy decisions.

Several studies have revealed the relationship between resources and students' performance. Madawaki and Abdulkadir (2026), in a study of secondary schools in Katsina State, observed that financial, human and physical resource allocation significantly predicted teaching quality, with human-resource allocation, which include even deployment of teacher and provision of professional development emerged as the major individual factor. Adekunle (2024) revealed that infrastructural facilities have high level contribution to academic performance of secondary school students in external examinations and infrastructural facilities have significant positive relationship with students' academic performance in external examinations.

Ali et al. (2020), examined instructional-material availability and students' academic performance in senior secondary schools in Maiduguri Metropolis, Borno State. Using a correlational design and students' examination results over five consecutive academic sessions, the study reported a significant relationship between the availability of instructional materials and students' academic performance. In the same vein, Azi and Dajan (2022) investigated the use of instructional materials in teaching Economics in Jos-North Local Government Area of Plateau State. Their experimental study found that students exposed to instruction supported by instructional materials performed better than students in the control group. Ibe-Moses et al. (2024) investigated instructional materials and students' performance in Mathematics in public and private secondary schools in Ikenne Local Government Area of Ogun State. The study reinforces the continuing importance of instructional materials in the teaching and learning process.

The imperative of resource development was echoed by Madawaki and Abdulkadir (2026) who found that inadequate maintenance funding could contribute to dysfunctional laboratories and consequently constrain educational delivery. Thus, buttressing the point that resource development should be understood as a continuous process, rather than a one-time provision of resources. Continuous development and planning strategies are imperative.

The government of Bayelsa State has acknowledged the imperativeness of resource planning and development for improved school effectiveness and students' academic performance. Hence, it has put in place several strategies in this regard. These include, the establishment of the Bayelsa State Teacher Training Registration and Certification Board (TTRCB); which regularly train all categories of teachers. According to the TTRCB over 5000 teachers, vice principals, principals, and head masters have been engaged in intensive capacity development training and certification training between 2018-2026. Similarly, the State established the Bayelsa State Education Development Trust Fund (EDTF), which has been responsible for funding and provision of needed resources across all levels of education; basic, secondary, tertiary, technical.

Successive administrations in Bayelsa State have shown massive commitment to investing in education. There has been recruitment of teachers to address deficit in core subject areas, classroom construction, laboratory development, school rehabilitation, and educational reforms. stakeholders continue to express concern over persistent differences in academic performance among public secondary schools. Recent empirical studies conducted within Bayelsa State indicate that the availability and quality of school resources significantly influence students' performance in external examinations (Oduru, Basil, Woyengikari, & Christopher, 2024; Ewhrudjakpo, & Kpee, 2024). Schools with better infrastructural facilities, instructional materials, effective instructional supervision and educational leadership generally demonstrate improved academic outcomes compared with schools characterized by inadequate resources. These findings suggest that the effective planning and management of educational resources may be as important as their availability in determining students' learning outcomes.

Although, previous studies have assessed individual components of school resources, which include; infrastructure, instructional materials, teacher availability and quality, school leadership, and supervision, majority have examined these variables independently. Comparatively, fewer studies have conceptualized school resource planning and development as integrated administrative processes which involve needs assessment, budgeting, procurement, allocation, maintenance, monitoring, evaluation, and continuous improvement. This is in spite of the fact that effective resource planning requires the harmonious coordination of these

components in other to achieve optimal educational outcomes.

Furthermore, it is equally expedient to ascertain the relationship between school resource planning and development on students' performance. This is because performance of students is the most glaring evidence of education quality. Therefore, this study assessed the influence of school resource planning and development on students' academic performance in public secondary schools in Bayelsa State using NECO examination results as the criterion measure of academic achievement.

1.1 Statement of the Problem

The quality of secondary education in Nigeria is often evaluated by students' performance in standardized external examinations. Over the years, the performance of students in senior school certificate examination (SSCE) has remained a major concern to governments, educational planners, school administrators, parents, and other stakeholders. While some public secondary schools consistently record commendable performance, many others continue to experience poor pass rates, especially in core subjects such as English Language and Mathematics. This persistent variation in academic performance raises critical questions about the effectiveness of school management practices and the adequacy of educational resources available in public secondary schools.

Several factors have been advanced to explain students' poor academic performance, including inadequate funding, shortage of qualified teachers, poor instructional supervision, students' socio-economic background, ineffective school leadership, examination malpractice, and lack of parental support. However, one factor that has continued to receive considerable attention is the planning and development of school resources. Effective school resource planning ensures that available human, financial, physical, and instructional resources are strategically identified, allocated, utilized, monitored, and maintained to achieve educational objectives. Similarly, resource development focuses on expanding and improving the quantity and quality of these resources to meet the changing needs of schools. Where these processes are weak or poorly coordinated, the capacity of schools to provide quality teaching and learning is significantly diminished.

The government of Bayelsa State have shown great commitment to improving the state of school resources as well as putting strategic planning and development

mechanisms in place. There has been sustained government investment in education through the construction of school buildings, recruitment of teachers, provision of instructional materials, and implementation of educational reforms. It still remains a puzzle as to the extent of this investment in ensuring school effectiveness. Has the performance of students, especially in external examination like NECO significantly improved? Therefore, this study seeks to assess the link between school resource planning and development and students' academic performance in public secondary schools in Bayelsa State, using NECO examination results as the measure of academic performance.

1.2 Research Questions

The following research questions were raised to guide the study:

- What is the level of school resource development in public secondary schools in Bayelsa State?
- What is the level of students' academic performance based on their NECO examination results in public secondary schools in Bayelsa State?
- What are the major areas of school resource planning in public secondary schools in Bayelsa State?
- What are the major areas of school resource development in public secondary schools in Bayelsa State?
- What is the pattern of students' academic performance based on NECO examination results in public secondary schools in Bayelsa State?

2. Research Methodology

This study adopted a descriptive research design. The population of the study comprised 3631 teachers in public secondary schools as well as NECO examination results of students from 2019-2023 in Bayelsa State. A sample size of 360 teachers was selected using the Taro Yamane formula. The multistage sampling procedure was adopted to select the sampled teachers. Data were collected using two instruments; a researcher designed questionnaire; titled School Resource Planning and Development Questionnaire (SRPDQ) and a proforma; NECO Result Extraction Form (NECO-REF) to determine the areas of School Resource Planning and Development indicators in place, and Students' Academic Performance were measured using the average percentage pass rates of five credits including English

Language and Mathematics in the National Examinations Council (NECO) Senior School Certificate Examination for 2019-2023 academic sessions. The instrument was validated by experts in Educational Management. The internal consistency of the questionnaire items was determined by analyzing data obtained from a pilot test using the Cronbach's alpha coefficient and a reliability coefficient of 0.70

was obtained. Copies of the questionnaire were administered on sampled teachers, while NECO results for 2019-2023 academic sessions were obtained with official approval from relevant authorities. The data collected were coded and analyzed using descriptive statistics; Mean, Percentage, and Ranking.

3. Findings / Results

Research Question One: What is the level of school resource development in public secondary schools in Bayelsa State?

Table 1: Level of School Resource Development in Public Secondary Schools in Bayelsa State.

Resource Category	Respondents	Mean	Remark
Physical Facilities	360	2.72	High
Human Resources	360	3.24	High
Financial Resources	360	2.43	Low
Grand Mean	360	2.80	High

Scale: below 2.5, low, 2.5 and above, high.

Table 1 indicates that the level of school resource development in public schools in Bayelsa State is high with a mean of 2.80. The mean rating indicates that human resources development is highest, followed by physical resources development. Financial resources development is however low.

Research Question Two: What is the level of students' academic performance based on NECO examination results in public secondary schools in Bayelsa State?

Table 2: Percentage of Students with 5 Credits & Above Including English Language & Mathematics in NECO (2019-2023) in public secondary schools in Bayelsa State

Year	Total Candidates	5 Credits & Above Incl. E&M	Percentage	Remark
2019	4764	4494	94	Very High
2020	5455	5039	92	Very High
2021	7843	7428	95	Very High
2022	6736	6129	91	Very High
2023	5528	4762	86	High
Average	30,326	27,852	92	Very High

Scale: 0-49 low, 50-69 moderate, 70-89 high, 90-100 very high.

Table 2 shows that the level of students' academic performance is very high. Specifically, the performance of students remained very high in 2019, 2020, 2021, and 2022 academic sessions. While, in 2023 academic session the performance was high.

Research Question Three: What are the major areas of school resource planning in public secondary schools in Bayelsa State?

Table 3: Major Areas of School Resource Planning in public secondary schools in Bayelsa State

Planning Area	Respondents	Mean	Rank
Needs Assessment	360	3.45	1 st
Budgeting	360	3.22	2 nd
Monitoring & Evaluation	360	2.98	3 rd
Maintenance Planning	360	2.34	4 th

Table 3 presents the major areas of planning as Needs Assessment had (3.45), followed by Budgeting (3.22), Monitoring and Evaluation (2.98). Maintenance planning (2.34) was the least area.

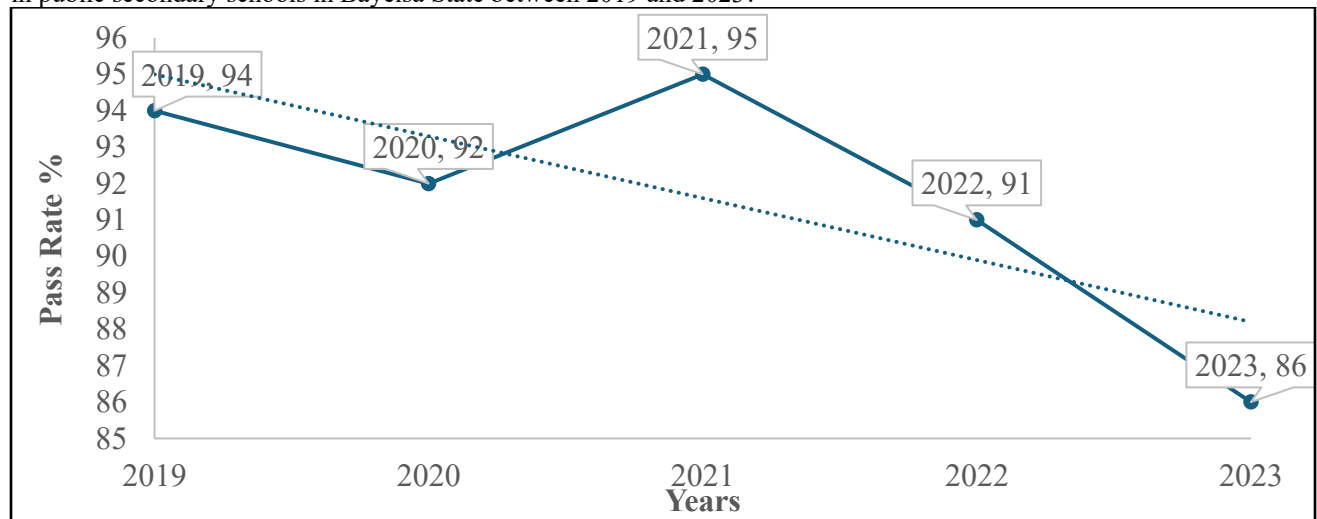
Research Question Four: What are the major areas of school resource development in public secondary schools in Bayelsa State?

Table 4: Major Areas of School Resource Development in public secondary schools in Bayelsa State

Development Area	Respondents	Mean	Rank
Teacher Training	360	3.23	1 st
Teacher Recruitment	360	3.10	2 nd
Classroom Construction/Renovation	360	2.88	3 rd
Provision of Textbooks	360	2.75	4 th
Furniture Provision	360	2.50	5 th
ICT & Internet Facilities	360	1.65	6 th

Table 4 shows the major areas of development in public secondary schools in Bayelsa State. Data indicates teacher training as 1st with a mean of 3.23, followed by teacher recruitment (3.10), classroom construction/renovation (2.88), provision of textbooks (2.75), and provision of furniture (2.50). The provision of ICT and internet facilities is the least area of development with a mean of 1.65.

Research Question Five: What is the pattern of students' academic performance based on NECO examination results in public secondary schools in Bayelsa State between 2019 and 2023?


Figure 1: Pattern of NECO Performance 2019-2023

The data in Figure 1 indicates a non-consistent pattern in students' performance, not strictly upward or downward trend. The performance moved downward from 2019 to 2020 at 94% pass to 92%. However, it moved upward to 95% in 2021, which is the year with the highest performance rate. There was again a downward trend from 2022 at 91% and consistently to 2023 at 86%, which was the year with the least performance rate.

4. Discussion of Findings

The study examined school resource planning and development and students' academic performance in public secondary schools in Bayelsa State. The findings revealed that the level of school resource development in public schools in Bayelsa State is high with a mean of 2.80. The mean scores of the various indicators of school resource development, which include human resources development and physical resources development were high. This suggests that

priority is given to the availability, deployment, training, and welfare of teachers in public secondary schools in Bayelsa State. This is equally the situation of physical resources. The findings indicate a departure from the state of neglect revealed by Nwadiani and Ugolo (2011) that the situation of resources in Bayelsa State public secondary schools was grossly inadequate. Financial resources development is however low. This indicates that the provision of finance for school heads and teachers to carry out administrative and sundry tasks (impress) is poorly executed.

On the level of students' academic performance in public secondary schools in Bayelsa State, the findings revealed that it is very high. This means that majority of students who finish from public secondary schools in Bayelsa State had the requisite credit passes in five subjects to advance for further studies. This finding is very exciting because Bayelsa State has been classified as an educationally disadvantaged state in

Nigeria. Hence, the very high performance of students as shown from their performance in a national examination (NECO) indicates that a lot has been achieved educationally in Bayelsa State. This can be linked to the level of resource development in the state, as the adequacy of resources makes teachers become proud and their performance at school increased simply by a modest, beautified, and creative exterior which suggests the purpose for a school building to exist (Nwadiani & Ugolo, 2011). The availability and quality of school resources significantly influence students' performance in external examinations (Oduru, Basil, Woyengikari, & Christopher, 2024; Ewruhjakpo, & Kpee, 2024)

The findings further revealed the major areas of planning as; needs assessment, followed by budgeting, monitoring and evaluation as well as maintenance planning. This indicates that a concerted effort at ensuring a very organized and result oriented process is put in place. Several agencies and directorates in these areas have been put in place to ensure consistency. These include; the Education Development Trust Fund (EDTF) for budgeting and financing, the Directorate of Supervision, for monitoring and evaluation of the school process, among others.

Furthermore, the findings indicated the major areas of development in public secondary schools in Bayelsa State to include; teacher training, teacher recruitment, classroom construction/renovation, provision of textbooks, and provision of furniture. The establishment of the Teachers Training Registration and Certification Board (TTRCB), which continue to engage teachers for intensive capacity development training has become a culture among teachers. Teachers have moved from the point of resistance and unwillingness to participate in capacity development training in Bayelsa State to looking forward to it. This is same for recruitment of qualified teachers to fill vacant positions in schools across the state. This is same in the areas of provision of physical infrastructures. However, little has been achieved in making public schools ICT and internet compliant. Although, the State Basic Education Board (SUBEB) introduced the Bayelsa Prime, which involved the use of ICT enabled gadgets for teaching and monitoring. This has not been extended to secondary schools, even though teachers have received trainings on ICT at different intervals.

On the pattern of students' academic performance, the findings indicated an inconsistent pattern /trend in the performance of students across the five years under review. Although, the performance remained high, as even 2023 (the year with the least percentage

performance) recorded 86% performance, this trend gives some concern. This is because, the goal is to maintain and improve on the performance of students' year after year and not to move from very high to high and maybe unfortunately, back to low if care is not taken.

5. Conclusion

Based on the findings of the study, it is concluded that the level of academic performance of students in public secondary schools in Bayelsa State is very high. Furthermore, it was concluded that school resource planning and development influence students' academic performance.

6. Recommendations

The following recommendations are put forward on the bases of its findings:

- The high level of school resource development should be maintained and improved upon, especially on the aspect of financial resource development. The practice of provision of funds for administrative operations in school should be adequately catered for.
- The level of academic performance should be maintained and improved upon. Resources should be made available and in appropriate proportion to stimulate teachers and students to achieve their best always.
- The areas of school resource planning should be expanded. Agencies should be created or existing agencies should be given mandates on these major areas. This will enhance efficiency.
- There should be improvement in the areas of resource development, especially on ICT and internet facilities provision. ICT & internet has become the medium for external examinations; therefore, they must be available for students and teachers use.
- The pattern of students' academic performance needs to move upward or remain at equilibrium, always. Therefore, resources planning and development must be given more attention as it influences and determines performance.

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Artificial Intelligence, User Psychology and Service Delivery in Academic Libraries in Nigerian Universities

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Abstract. This study examined the relationship between artificial intelligence, user psychology, and service delivery in academic libraries in Nigerian universities. The study investigated how the adoption of artificial intelligence technologies influences users' psychological responses, including perception, trust, satisfaction, acceptance, and information-seeking behaviour, as well as the effectiveness of library service delivery. A descriptive survey research design was adopted. The population comprised undergraduate students, postgraduate students, lecturers, and library staff from selected federal, state, and private universities in Nigeria. A sample of 600 respondents was selected using multistage sampling techniques involving purposive, stratified, and simple random sampling methods. Data were collected using a structured questionnaire titled Artificial Intelligence, User Psychology, and Library Service Delivery Questionnaire (AIUPLSDQ). Face and content validity were established by experts in educational psychology, library and information science, and measurement and evaluation, while reliability coefficients ranging from 0.78 to 0.91 were obtained using Cronbach's alpha method. Data were analyzed using descriptive statistics such as frequency counts, percentages, mean, and standard deviation, while Pearson Product Moment Correlation, t-test, and multiple regression analyses were used to test the hypotheses at 0.05 level of significance. Pearson correlation and regression analyses revealed a significant positive relationship between artificial intelligence adoption and service delivery in academic libraries, $r(598) = .684, p < .05$. Findings also revealed that artificial intelligence usage significantly influenced users' psychological responses, while user psychology significantly predicted service delivery effectiveness in academic libraries. Findings imply that effective integration of artificial intelligence technologies can enhance users' psychological

acceptance and improve the quality, accessibility, and responsiveness of academic library services in Nigerian universities. The study therefore recommended increased investment in AI technologies, digital infrastructure, and continuous user and staff training to enhance effective utilization of AI-based library services.

Keywords: Artificial Intelligence, User Psychology, Academic Libraries, Service Delivery, Nigerian Universities.

1. Introduction

The rapid advancement of digital technologies has transformed the operations and service delivery systems of academic libraries worldwide. Academic libraries have evolved from traditional repositories of books into digital knowledge centers that support teaching, learning, research, and information exchange. Among the technologies driving this transformation, Artificial Intelligence (AI) has emerged as a major innovation in information management and library service delivery. Artificial intelligence refers to the simulation of human intelligence by computer systems to perform tasks such as learning, reasoning, problem-solving, natural language processing, and decision-making (Russell & Norvig, 2021). In academic libraries, AI technologies are increasingly used for cataloguing, indexing, virtual reference services, information retrieval, recommendation systems, chatbots, and automated circulation services (Akinola, 2023; Emezaiwakpor, Idiodi, & Urhiewhu, 2023).

Globally, developed countries have made substantial progress in integrating AI into academic library systems. In the United States, universities such as Harvard University and the Massachusetts Institute of

Technology (MIT) employ AI-powered discovery systems, virtual assistants, and predictive analytics to improve information retrieval and user experience (Cox, Pinfield, & Rutter, 2019). Libraries in the United Kingdom utilize AI-driven chatbots and intelligent search systems to provide real-time support services (Panda & Kaur, 2022). In China, smart libraries employ robotics, facial recognition systems, and machine learning technologies to improve operational efficiency and user interaction (Li, 2021). Similarly, South Korean academic libraries integrate AI-based systems for digital learning support and automated library operations aimed at enhancing research productivity (Kim & Lee, 2022).

The global adoption of AI in academic libraries is driven by increasing demand for faster, personalized, and technology-driven services. The rapid growth of information resources and changing user expectations have compelled libraries to adopt innovative technologies capable of improving efficiency and service quality. Consequently, AI-powered systems now facilitate real-time information access, intelligent cataloguing, automated user support, and personalized recommendations tailored to users' information needs (Adewojo, Amzat, & Abiola, 2024; Huang & Rust, 2021).

In developing countries, particularly Nigeria, the adoption of artificial intelligence in academic libraries is gradually gaining attention due to the need for technological modernization and improved information service delivery. Nigerian academic libraries are beginning to implement AI-related technologies such as intelligent search engines, machine learning tools, robotics, and automated circulation systems to improve library operations and user experiences. However, the implementation of AI in many Nigerian academic libraries remains limited by inadequate infrastructure, poor funding, shortage of technical expertise, irregular power supply, and resistance to technological change (Emezaiwakpor et al., 2023; Nduka, Tella, & Okiki, 2023).

Beyond technological efficiency, the successful integration of AI in academic libraries is strongly linked to user psychology. User psychology refers to the cognitive, emotional, and behavioural responses of individuals toward technological systems and services. Variables such as trust, perception, satisfaction, technology acceptance, and attitudes toward innovation significantly influence users' willingness to adopt and utilize AI-based library services. Users who perceive AI technologies as useful, reliable, and easy to use are more likely to embrace such systems effectively. Conversely, fear of

technological complexity, privacy concerns, and digital anxiety may reduce acceptance and usage of AI systems (Odelami, Ebhonu, Oradugba, & Usman, 2026; Oluwayemi & Adeyinka, 2024). Studies have shown that psychological perceptions significantly determine the effectiveness of technological innovations in educational environments (Venkatesh, Morris, Davis, & Davis, 2003).

The Technology Acceptance Model (TAM) developed by Davis (1989) explains that perceived usefulness and perceived ease of use are major determinants of technology acceptance. Similarly, the Theory of Planned Behaviour proposed by Ajzen (1991) emphasizes that attitudes, subjective norms, and behavioural intentions influence technology adoption and utilization. These theories suggest that user psychology plays a crucial role in determining the effectiveness of AI-driven service delivery in academic libraries.

The integration of artificial intelligence into academic library systems has important implications for service delivery efficiency, accessibility, responsiveness, and quality. AI technologies can improve information organization, reduce response time, enhance digital reference services, and strengthen user engagement. However, the effectiveness of these technologies depends largely on users' readiness and psychological acceptance. Therefore, there is a need for empirical investigation into the relationship among artificial intelligence, user psychology, and service delivery in academic libraries in Nigerian universities.

1.1 Statement of the Problem

The emergence of artificial intelligence (AI) has transformed information management and service delivery across educational institutions and academic libraries worldwide. Modern academic libraries are increasingly expected to provide fast, efficient, user-centered, and technology-driven services that meet the growing information needs of students, lecturers, researchers, and other users. Consequently, many libraries now integrate AI technologies such as chatbots, automated cataloguing systems, machine learning applications, virtual assistants, and intelligent information retrieval systems to improve accessibility, efficiency, and user satisfaction.

Despite these global developments, many academic libraries in Nigerian universities still experience challenges related to effective service delivery. These challenges include delays in information retrieval, limited access to digital resources, inadequate personalization of services, poor responsiveness to

users' needs, and weak user support systems. Although some Nigerian universities have introduced AI-driven technologies into library operations, the level of implementation remains relatively low due to inadequate funding, poor technological infrastructure, shortage of skilled personnel, unstable power supply, and limited institutional support.

In addition to infrastructural constraints, the effectiveness of AI in academic libraries is strongly influenced by users' psychological responses toward such technologies. Factors such as perception, trust, satisfaction, anxiety, motivation, and technology acceptance determine whether users will effectively adopt and utilize AI-based library services. Some users perceive AI systems as difficult to use, impersonal, or unreliable, while some librarians express concerns about job displacement, insufficient technical competence, and the changing role of librarians in automated environments. These concerns may hinder the successful implementation and utilization of AI technologies in academic libraries.

Existing studies on AI in Nigerian academic libraries have focused mainly on awareness, adoption, benefits, and implementation challenges. However, limited empirical attention has been given to the psychological factors influencing users' interaction with AI systems and how these factors affect service delivery outcomes. Furthermore, few studies have examined the combined relationship among artificial intelligence, user psychology, and service delivery within Nigerian university libraries.

Therefore, this study seeks to investigate the relationship between artificial intelligence, user psychology, and service delivery in academic libraries in Nigerian universities. Specifically, the study examines whether AI adoption significantly influences users' psychological responses and whether these psychological factors contribute to improved library service delivery.

1.2 Research Questions

The following research questions were formulated to guide the study:

- What relationship exists between artificial intelligence adoption and service delivery in academic libraries in Nigerian universities?
- To what extent does artificial intelligence usage influence users' psychological responses such as satisfaction, trust, and technology acceptance in academic libraries in Nigerian universities?

- What difference exists in the perception of artificial intelligence-based library services among students, lecturers, and library staff in Nigerian universities?
- To what extent does user psychology predict the effectiveness of service delivery in academic libraries in Nigerian universities?

1.3 Research Hypotheses

- There is no significant relationship between artificial intelligence adoption and service delivery in academic libraries in Nigerian universities.
- Artificial intelligence usage does not significantly influence users' psychological responses (such as satisfaction, trust, and technology acceptance) in academic libraries in Nigerian universities.
- There is no significant difference in the perception of artificial intelligence-based library services among students, lecturers, and library staff in Nigerian universities.
- User psychology does not significantly predict the effectiveness of service delivery in academic libraries in Nigerian universities.

2. Empirical Review

AI and Library Service Delivery: Empirical studies have shown that artificial intelligence significantly improves service delivery in academic libraries through automation, efficient information management, and enhanced user support. Akinola (2023) reported that AI technologies such as machine learning, robotics, and natural language processing improve productivity, information retrieval, and virtual assistance in Nigerian academic libraries. Similarly, Emezaiwakpor, Idiodi, and Urhiewhu (2023) found that AI applications enhanced cataloguing, reference services, readers' services, and serial management, thereby improving efficiency and responsiveness in library operations.

Nduka, Tella, and Okiki (2023) further observed that AI technologies facilitate quick information retrieval, efficient service delivery, and improved operational performance in university libraries. Likewise, Wagwu, Okpala, Maxwell, and Oladokun (2024) revealed that AI-driven chatbots improved accessibility, communication, and user support services in Nigerian university libraries. Overall, the reviewed studies indicate that artificial intelligence positively enhances library service delivery by improving operational efficiency, accessibility, and user engagement.

AI Adoption and User Perception: Studies have also examined users' awareness, perceptions, and adoption of AI technologies in academic libraries. Oyekale and Zubairu (2023) found that librarians in university libraries in Osun State demonstrated high awareness and positive perceptions of AI technologies. However, adoption remained relatively low due to inadequate funding and infrastructural challenges. Similarly, Efevberha-Ogodo and Ivwighrehgweta (2023) reported substantial awareness of AI systems among librarians in Northern Nigeria, although actual utilization remained limited.

Research further shows that users' perceptions significantly influence AI adoption and utilization. Positive perceptions regarding usefulness, accessibility, and efficiency encourage technology acceptance, whereas concerns about complexity, reliability, and privacy discourage utilization (Venkatesh, Morris, Davis, & Davis, 2003). These studies suggest that awareness alone cannot guarantee effective AI implementation without adequate infrastructure, institutional support, and users' readiness to adopt technological innovations.

Psychological Factors and Technology Acceptance: Psychological factors are important determinants of AI adoption in academic libraries. Odelami, Ebhonu, Oradugba, and Usman (2026), using the Technology Acceptance Model (TAM), found that perceived usefulness and perceived ease of use significantly influenced librarians' intention to adopt AI technologies for knowledge sharing. This supports Davis' (1989) assertion that users are more likely to accept technologies they perceive as beneficial and easy to operate.

Similarly, Wagwu et al. (2024) reported that AI-driven chatbot systems improved user satisfaction and engagement when users perceived them as reliable and user-friendly. Conversely, anxiety, low digital literacy, and fear of technological complexity negatively affect users' willingness to utilize AI-based services (Oluwayemi & Adeyinka, 2024). The reviewed literature therefore indicates that trust, satisfaction, motivation, and behavioural intentions significantly determine the effectiveness of AI-driven library services.

Challenges of AI in Libraries: Despite the benefits of AI technologies, several challenges hinder their implementation in academic libraries, especially in developing countries. Emezaiwakpor et al. (2023) identified inadequate funding, poor governmental support, and shortage of technical expertise as major barriers to AI adoption in Nigerian academic libraries.

Similarly, Nduka et al. (2023) reported that resistance to technological change, inadequate ICT infrastructure, and fear of job displacement negatively affect successful AI integration.

Wagwu et al. (2024) also identified inadequate awareness and lack of skilled personnel as barriers to effective implementation of AI-driven chatbots in Nigerian university libraries. In addition, concerns relating to privacy, data security, digital inequality, and algorithmic bias continue to shape users' perceptions and acceptance of AI technologies (Oton & Kolawole, 2025). These findings suggest that infrastructure, training, funding, and ethical safeguards are necessary for sustainable AI implementation in academic libraries.

Summary of Empirical Review and Gap in Literature: The reviewed studies demonstrate that artificial intelligence improves academic library operations, information accessibility, and service delivery. However, most existing studies focused primarily on awareness, adoption, and technological infrastructure, with limited attention to the psychological factors influencing users' interaction with AI systems and their effects on service delivery outcomes.

Furthermore, few studies have examined the combined relationship among artificial intelligence, user psychology, and service delivery within Nigerian universities. This study therefore seeks to bridge this gap by investigating the interaction between artificial intelligence, user psychology, and service delivery in academic libraries in Nigerian universities.

3. Theoretical Framework

This study is anchored on the Technology Acceptance Model (TAM) and the Theory of Planned Behaviour (TPB). These theories explain how users perceive, accept, and utilize artificial intelligence technologies in academic libraries and how such perceptions influence service delivery in Nigerian universities.

Technology Acceptance Model (TAM): The Technology Acceptance Model (TAM), developed by Davis (1989), explains users' acceptance of technological innovations. The model identifies two major determinants of technology adoption: perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which users believe a technology improves performance, while perceived ease of use concerns the degree to which the technology is free from difficulty or complexity. TAM assumes that users are more likely to adopt technologies they perceive as useful, efficient, and

easy to operate (Venkatesh & Davis, 2000). In academic libraries, users are more likely to accept AI technologies when such systems improve information retrieval, accessibility, responsiveness, and overall library experiences.

The relevance of TAM to this study lies in its explanation of users' psychological responses toward AI technologies. Variables such as trust, satisfaction, perception, acceptance, and information-seeking behaviour are linked to perceived usefulness and perceived ease of use. In this study, artificial intelligence represents the independent variable, user psychology serves as the intervening variable, and service delivery constitutes the dependent variable. TAM therefore explains how AI adoption influences users' psychological acceptance and library service effectiveness.

Theory of Planned Behaviour (TPB): The Theory of Planned Behaviour (TPB), proposed by Ajzen (1991), explains that behaviour is influenced by behavioural intentions, which are shaped by attitude toward behaviour, subjective norms, and perceived behavioural control.

Attitude refers to an individual's positive or negative evaluation of a behaviour, subjective norms involve social influence, while perceived behavioural control concerns individuals' perception of their ability to perform a behaviour successfully. TPB assumes that individuals are more likely to adopt technologies when they possess positive attitudes, receive social support, and believe they have the required skills and resources.

The theory is relevant to this study because it explains how attitudes, social influence, and digital competence affect users' willingness to utilize AI-based library systems. Students, lecturers, and librarians are more likely to adopt AI technologies when they perceive them as beneficial and easy to use.

The linkage between TPB and this study is reflected in the relationship between user psychology and service delivery. Psychological factors such as trust, motivation, behavioural intention, and technology acceptance significantly influence users' interaction with AI systems. Positive attitudes toward AI technologies are likely to enhance users' engagement with library services and improve service delivery outcomes.

Theoretical Linkage to the Study: The integration of TAM and TPB provides a comprehensive framework for understanding AI adoption in academic libraries. TAM explains technology acceptance through perceived usefulness and ease of use, while TPB

explains how attitudes, social influence, and behavioural control shape technology utilization.

Together, the theories establish that successful AI implementation depends not only on technological availability but also on users' psychological readiness, trust, and behavioural intentions. The theories therefore support the assumption that positive psychological acceptance of AI technologies enhances effective service delivery in academic libraries.

4. Conceptual Framework

The conceptual framework explains the relationship among artificial intelligence, user psychology, and service delivery in academic libraries in Nigerian universities. The framework assumes that AI technologies influence users' psychological experiences, which subsequently affect the quality and effectiveness of library service delivery. It also recognizes the moderating influence of infrastructure, training, and institutional support.

Artificial Intelligence (Independent Variable):

Artificial intelligence is the independent variable in the study. It includes technologies such as chatbots, machine learning systems, robotics, expert systems, automated circulation systems, digital indexing tools, and virtual reference services. These technologies are expected to improve efficiency, accessibility, speed, and responsiveness in library operations.

User Psychology (Intervening Variable):

User psychology represents the intervening variable and includes perception, trust, satisfaction, motivation, behavioural intention, technology acceptance, perceived usefulness, and perceived ease of use. Users who perceive AI technologies as useful and reliable are more likely to utilize AI-enabled library services effectively. Conversely, anxiety, low digital literacy, and privacy concerns may reduce acceptance and usage.

Service Delivery (Dependent Variable):

Service delivery is the dependent variable and refers to the efficiency, accessibility, responsiveness, and quality of library services. Effective service delivery is reflected in timely information dissemination, improved access to resources, enhanced user satisfaction, and efficient support for teaching, learning, and research.

Moderating Variables

The framework identifies the following moderating variables:

Infrastructure: Availability of internet connectivity, electricity, and ICT facilities.

Training: Digital literacy, AI competence, and professional development for librarians and users.

Institutional Support: Administrative commitment, funding, and policy support for technological innovation.

These factors may strengthen or weaken the relationship among AI, user psychology, and service delivery.

Visual Conceptual Model

Plain text

Moderating Variables

- Infrastructure
- Training
- Institutional Support



Artificial Intelligence→User Psychology→Service Delivery

- Chatbots
- Machine Learning
- Robotics
- Expert Systems
- Automation
- Trust
- Satisfaction
- Perception
- Acceptance
- Motivation
- Accessibility
- Efficiency
- Responsiveness
- User Satisfaction
- Quality Services
- Behavioural Intention

The model illustrates that artificial intelligence technologies influence users' psychological responses, which subsequently affect service delivery outcomes. Positive psychological outcomes such as trust, satisfaction, and acceptance improve users' engagement with AI-enabled library services, thereby enhancing efficiency, accessibility, and quality of service delivery. The effectiveness of this relationship depends on infrastructure, training, and institutional support.

5. Methodology

Research Design: This study adopted a descriptive survey research design to examine the relationship among artificial intelligence, user psychology, and service delivery in academic libraries in Nigerian universities. The design was considered appropriate because it enables the collection of data from a large population and facilitates the examination of existing perceptions, attitudes, and relationships among variables without manipulation.

Population of the Study: The population comprised undergraduate students, postgraduate students, academic staff, and library personnel in selected

federal, state, and private universities in Nigeria. These groups were selected because they are the primary users and providers of academic library services and are directly affected by the integration of artificial intelligence technologies in library operations.

Sample and Sampling Techniques: A sample of 600 respondents was drawn from six universities across the six geopolitical zones of Nigeria. The sample included students, lecturers, and library staff to ensure adequate representation of library users and service providers. A multistage sampling technique was employed. Purposive sampling was first used to select universities with evidence of AI-related applications in their library systems. Stratified sampling was then used to group respondents into undergraduate students, postgraduate students, lecturers, and library staff, after which simple random sampling was used to select participants proportionately from each stratum.

Instrumentation: Data were collected using a structured questionnaire titled Artificial Intelligence, User Psychology, and Library Service Delivery Questionnaire (AIUPLSDQ) developed by the researcher. The instrument consisted of four sections: Section A contained demographic information; Section B assessed AI utilization in academic libraries; Section C measured user psychology variables such as trust, satisfaction, perceived usefulness, and technology acceptance; while Section D focused on service delivery variables including accessibility, efficiency, responsiveness, and quality of services. The questionnaire was structured on a modified four-point Likert scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD).

Validity and Reliability of the Instrument: Face and content validity were established through expert review by specialists in educational psychology, library and information science, and measurement and evaluation. Their observations and recommendations were incorporated into the final version of the instrument. A pilot study involving 40 respondents from a university outside the sampled institutions was conducted. Cronbach's alpha reliability coefficients obtained were 0.81 for artificial intelligence utilization, 0.84 for user psychology, and 0.88 for service delivery, with an overall reliability coefficient of 0.86, indicating adequate internal consistency.

Method of Data Collection: Data were collected through direct administration of questionnaires with the assistance of trained research assistants. Approval was obtained from the selected universities and library management before data collection. Questionnaires

were distributed physically and electronically where necessary, and completed copies were retrieved immediately or within an agreed period.

Ethical Considerations: Ethical standards were strictly observed throughout the study. Institutional approval was obtained from the relevant university authorities before data collection commenced. Participants were informed about the objectives of the study, and informed consent was obtained prior to participation. Participation was voluntary, and respondents were free to withdraw at any stage without penalty. Confidentiality and anonymity were ensured by excluding personal identifiers from the

questionnaire. Information provided by respondents was treated strictly for academic and research purposes.

Method of Data Analysis: Data collected were coded and analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics such as frequency counts, percentages, mean, and standard deviation were used to answer the research questions. Inferential statistics including Pearson Product Moment Correlation (PPMC), independent sample t-test, one-way Analysis of Variance (ANOVA), and multiple regression analysis were used to test the hypotheses at 0.05 level of significance.

6. Results

Hypothesis 1: There is no significant relationship between artificial intelligence adoption and service delivery in academic libraries in Nigerian universities.

Table 1: Person Product Moment Correlation Analysis Showing the Relationship Between Artificial Intelligence Adoption and Service Delivery

Variables	N	Mean	SD	r	p-value	Decision
Artificial Intelligence Adoption	600	32.45	5.21	.684**	.000	Rejected
Service Delivery	600	31.18	4.87			

Note p < .05

The result presented in Table 1 revealed a significant positive relationship between artificial intelligence adoption and service delivery in academic libraries, $r(598) = .684$, $p < .05$. Therefore, the null hypothesis was rejected. This finding suggests that increased adoption of artificial intelligence technologies significantly improves the efficiency, accessibility, responsiveness, and overall quality of service delivery in academic libraries. The result further implies that AI-driven systems such as chatbots, intelligent cataloguing, and automated circulation services contribute positively to users' experiences and operational effectiveness within university libraries.

Hypothesis 2: Artificial intelligence usage does not significantly influence users' psychological responses (such as satisfaction, trust, and technology acceptance) in academic libraries in Nigerian universities.

Table 2: Multiple Regression Analysis Showing the Influence of Artificial Intelligence Usage on Users' Psychological Responses

Model Summary

Model	R	R ²	Adjusted R ²	F
1	.712	.507	.503	153.284

Regression Coefficients					
Predictor variable	B	Std. Error	Beta (β)	t	p-value
Artificial Intelligence Usage	.621	.050	.712	12.381	.000

Note $p < .5$

The findings in Table 2 indicated that artificial intelligence usage significantly influenced users' psychological responses, $\beta = .712$, $t(598) = 12.381$, $p < .05$. Hence, the null hypothesis was rejected. The result implies that increased utilization of artificial intelligence technologies positively affects users' perceptions, trust, satisfaction, and acceptance of academic library services. This suggests that users are more likely to develop positive attitudes toward library services when AI technologies are perceived as useful, reliable, and easy to use.

Hypothesis 3: There is no significant difference in the perception of artificial intelligence-based library services among students, lecturers, and library staff in Nigerian universities.

Table 3: One-Way ANOVA Showing Difference in Perception of AI-Based Library Services Among Respondents

Source of Variation	Sum of Squares	df	Mean Square	F	p-value	Decision
Between Groups	524.316	2	262.158	6.427	.002	Rejected
Within Groups	24341.227	597	40.773			
Total	24865.543	599				

Note $p < .05$

The result in Table 3 showed a significant difference in the perception of artificial intelligence-based library services among students, lecturers, and library staff, $F(2, 597) = 6.427$, $p < .05$. Therefore, the null hypothesis was rejected. This finding suggests that different categories of library users perceive AI technologies differently based on their experiences, technological competence, and level of exposure to digital systems. The result indicates that while some users may view AI technologies as innovative and beneficial, others may still have concerns regarding technological complexity, privacy, and reliability.

Hypothesis 4: User psychology does not significantly predict the effectiveness of service delivery in academic libraries in Nigerian universities.

Table 4: Simple Regression Analysis Showing the Predictive Influence of User Psychology on Service Delivery

Model Summary

Model	R	R ²	Adjusted R ²	F
1	.653	.426	.423	121.563

Regression Coefficient

Predictor variable	B	Std. Error	Beta (β)	t	p-value
User Psychology	.587	.053	.653	11.025	.000

$P < .05$

The result in Table 4 indicated that user psychology significantly predicted service delivery in academic libraries, $\beta = .653$, $t(598) = 11.025$, $p < .05$. Consequently, the null hypothesis was rejected. This finding implies that psychological factors such as trust, satisfaction, motivation, perception, and technology acceptance play a major role in determining the effectiveness of service delivery in academic libraries. The result further suggests that positive psychological responses toward artificial intelligence technologies enhance users' engagement with library services and improve overall service quality.

7. Discussion of Findings

The findings of this study were discussed based on the four hypotheses formulated to examine the relationship among artificial intelligence, user psychology, and service delivery in academic libraries in Nigerian universities.

Relationship Between Artificial Intelligence Adoption and Service Delivery: The study revealed a significant positive relationship between artificial intelligence adoption and service delivery in academic libraries. This suggests that increased AI integration improves efficiency, accessibility, responsiveness, and quality of library services. The finding may be attributed to AI-driven systems that support faster information retrieval, automated cataloguing, real-time assistance, and personalized services. The result agrees with Akinola (2023), Emezaiwakpor et al. (2023), Isiaka (2023), and Fagbola and Egbebi (2025), who reported that AI technologies improve information retrieval, operational efficiency, and user-centered services in academic libraries.

Beyond supporting previous studies, the finding reflects the realities of Nigerian universities where overcrowded libraries, inadequate staffing, and increasing student populations place pressure on traditional library systems. In such contexts, AI technologies provide practical solutions for improving efficiency and reducing service delays. The finding also suggests that AI can help bridge information access gaps in developing countries where educational resources remain unevenly distributed.

Contrary to earlier concerns that infrastructural limitations may reduce the effectiveness of AI in African institutions, the present study indicates that even moderate AI implementation can positively improve library performance when supported by institutional commitment and user readiness. The

implication is that AI adoption has become essential for modern academic libraries seeking to improve research productivity, learning support, and institutional competitiveness in the digital age.

Influence of Artificial Intelligence Usage on Users' Psychological Responses: The study further revealed that artificial intelligence usage significantly influenced users' psychological responses such as trust, satisfaction, perception, and technology acceptance. This may be because AI systems simplify information access, improve responsiveness, and create more interactive user experiences.

The finding supports the Technology Acceptance Model (TAM), which explains that perceived usefulness and ease of use influence technology acceptance (Davis, 1989). The result aligns with Odelami et al. (2026), Lulu-Pokubo and Okwu (2025), and Kayode et al. (2026), who reported positive attitudes toward AI technologies in Nigerian libraries. Similarly, Akpan et al. (2024) emphasized that conversational AI systems improve engagement and accessibility in educational environments.

From a sociocultural perspective, the finding is important in Nigeria where students and lecturers increasingly rely on digital technologies for learning and research. Younger users with greater digital exposure may adapt more easily to AI-enabled services, whereas some older users and library staff may experience anxiety, fear of automation, or concerns about job displacement.

The finding also highlights challenges common in developing countries where digital literacy, socioeconomic conditions, and trust in technology influence users' willingness to adopt innovations. Consequently, successful AI implementation requires not only infrastructure but also user orientation, digital literacy training, and trust-building initiatives.

Difference in Perception of AI-Based Library Services Among Respondents: The study revealed significant differences in the perception of AI-based library services among students, lecturers, and library staff. This indicates that technological competence, professional roles, and prior digital exposure shape users' attitudes toward AI technologies.

The finding agrees with Edom-Agbor et al. (2025) and D'Souza (2024), who found variations in AI awareness and adoption among library professionals. Students were more likely to appreciate AI systems because of their preference for speed, convenience,

and accessibility, while some lecturers and librarians expressed concerns about reliability, ethics, privacy, and automation.

In the Nigerian context, disparities in digital literacy and ICT infrastructure also contribute to variations in perception. Users in technologically advanced universities may demonstrate more positive attitudes than those in under-resourced institutions. This reflects broader realities in developing countries where technological adoption remains uneven across institutions and social groups.

Unlike previous studies that reported generally positive attitudes toward AI, this study demonstrates that acceptance differs across user categories. This suggests that successful AI integration depends not only on technological availability but also on users' social experiences and psychological readiness. The implication is that academic libraries should adopt inclusive and user-sensitive implementation strategies through workshops, awareness programs, and targeted training for different user groups.

Predictive Influence of User Psychology on Service Delivery: The study further showed that user psychology significantly predicted service delivery effectiveness in academic libraries. Psychological variables such as trust, satisfaction, acceptance, motivation, and behavioural intention were found to influence the success of AI-driven services.

The finding aligns with Aguiar-Costa et al. (2022) and Ajani et al. (2022), who reported that psychological readiness and user satisfaction significantly influence technology utilization and service outcomes. The result also supports the Theory of Planned Behaviour (TPB), which emphasizes that attitudes, subjective norms, and perceived behavioural control influence technology acceptance (Ajzen, 1991).

The finding suggests that technological systems may remain ineffective when users lack confidence in or willingness to engage with them. In Nigeria and many developing countries, psychological readiness often determines whether technological innovations succeed or fail.

From a sociocultural perspective, the finding highlights the continued importance of human interaction in African service environments. Users may resist AI systems if they perceive them as replacing rather than supporting human-centered services. Therefore, AI technologies should complement human interaction rather than eliminate it entirely. The implication is that university

administrators and library managers should prioritize users' psychological preparedness through digital literacy training, ethical safeguards, awareness programs, and trust-building measures to enhance sustainable AI-driven service delivery.

8. Implications of the Study

Educational Implications: The findings indicate that AI technologies can improve access to academic resources, strengthen independent learning, and enhance research productivity in universities. AI-driven systems such as intelligent cataloguing and virtual reference services support faster access to scholarly information and improve teaching, learning, and research activities. The study also suggests that universities should integrate digital and AI literacy into academic programs while ensuring continuous professional training for librarians to remain relevant in evolving digital environments.

Psychological Implications: The study demonstrates that users' trust, perception, satisfaction, and acceptance significantly influence the effectiveness of AI-driven services. This implies that technological innovation alone cannot guarantee improved service delivery without positive psychological readiness among users. Consequently, libraries should address users' emotional and cognitive concerns through orientation programs, awareness campaigns, and user-friendly systems that reduce anxiety and improve confidence in AI technologies.

Technological Implications: The findings confirm that AI technologies have become essential tools for improving efficiency, information retrieval, and user engagement in academic libraries. However, inadequate infrastructure, unstable electricity, weak internet connectivity, and shortage of technical expertise remain major barriers to effective implementation in Nigeria. The study therefore emphasizes the need for sustained investment in digital infrastructure, technical support systems, and user-centered AI technologies that are accessible and responsive to diverse users.

Policy Implications: The study highlights the need for comprehensive policies promoting AI integration in academic libraries through sustainable funding, ICT development, staff training, and AI literacy programs. Policymakers should also address ethical concerns relating to privacy, cybersecurity, data protection, and algorithmic bias to strengthen users' trust in AI systems. Furthermore, policies should promote equitable access to digital technologies across universities to reduce technological inequalities

between urban and rural institutions. Effective AI policies must combine technological advancement with users' psychological readiness and continuous institutional support.

9. Conclusion

This study examined the relationship among artificial intelligence (AI), user psychology, and service delivery in academic libraries in Nigerian universities. The findings revealed that AI significantly improves library service delivery through enhanced information access, faster response systems, automated operations, and personalized user support. AI-driven tools such as chatbots, intelligent cataloguing systems, and virtual reference services were found to improve efficiency, accessibility, and responsiveness in academic libraries.

The study also established that AI usage significantly influences users' psychological responses, including trust, satisfaction, perception, and technology acceptance. Users who perceived AI systems as useful and user-friendly demonstrated more positive attitudes toward AI-enabled library services. This indicates that the effectiveness of AI in academic libraries depends not only on technological availability but also on users' psychological readiness and acceptance.

Furthermore, significant differences were found in the perception of AI-based library services among students, lecturers, and library staff, suggesting that technological exposure, professional roles, and digital competence shape users' attitudes toward AI technologies. The study additionally revealed that user psychology significantly predicts service delivery effectiveness, implying that trust, motivation, and acceptance are essential for successful AI implementation.

The study therefore concludes that AI has strong potential to transform academic library operations and service delivery in Nigerian universities when supported by adequate infrastructure, trained personnel, institutional support, and positive user orientation. It further demonstrates that technological advancement alone cannot guarantee effective service delivery without considering users' psychological acceptance and engagement. Consequently, sustainable AI integration in Nigerian academic libraries requires both technological investment and deliberate efforts to strengthen users' digital confidence and readiness.

10. Recommendations

Based on the findings of this study, the following recommendations are made:

University administrators and library management should invest in AI-driven technologies such as chatbots, intelligent cataloguing systems, automated circulation services, and virtual reference platforms to improve efficiency and user satisfaction in academic libraries.

Government agencies and university authorities should provide adequate funding for digital infrastructure, including stable internet connectivity, reliable electricity supply, and modern ICT facilities necessary for effective AI implementation.

Continuous training and capacity-building programmes should be organized for librarians and library personnel to improve AI literacy, technical competence, and readiness for technology-driven service delivery.

Academic libraries should implement user orientation and digital literacy programmes to improve students', lecturers', and researchers' trust, acceptance, and effective utilization of AI-based services.

Universities and policymakers should develop ethical guidelines and institutional policies addressing privacy, data protection, cybersecurity, and responsible use of AI technologies in academic libraries.

Collaboration among universities, professional library associations, ICT experts, and policymakers should be encouraged to facilitate knowledge sharing, technical support, and sustainable AI development in Nigerian academic libraries.

Future studies should examine additional psychological variables such as digital anxiety, self-efficacy, and behavioural intention, while comparative and longitudinal studies should also be conducted to expand knowledge on AI and academic library service delivery in developing countries.

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Learner Behavior, Student Engagement and Academic Performance: A Mixed-Methods Case Study of Cavendish University Uganda

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Abstract. Performance in higher education institutions (HEIs) and organizations is crucial as it enhances productivity, engagement, continuous improvement, and goal attainment. Despite these benefits, student performance in private universities remains a persistent concern. This mixed-method study examined the association between learner behavior, student engagement, and academic performance at Cavendish University Uganda (CUU). Quantitative data were collected from 196 undergraduate students using structured questionnaires, while qualitative data were obtained from 10 key informant interviews with deans, heads of department, academic staff, and students. Quantitative analysis revealed that learner behavior ($r = .353, p < .001$) and student engagement ($r = .439, p < .001$) had significant positive associations with academic performance. Together, they explained 20.6% of the variation in academic performance ($R^2 = .206, F(2, 193) = 25.044, p = .001$). However, regression results showed that student engagement demonstrated a strong unique association ($\beta = .355, p = .001$), while learner behavior was not statistically significant ($\beta = .142, p = .076$). Qualitative findings supported these results by providing contextual explanations. Participants emphasized that collaboration, active participation, regular attendance, and time management enhance students' understanding, motivation, and confidence. The study concludes that student engagement demonstrated a stronger unique association with academic performance than learner behavior when both variables were considered simultaneously. Therefore, higher education institutions should strengthen student engagement strategies while promoting positive learner behaviors to improve academic performance.

Keywords: (Learner behavior, Student engagement, Academic performance, Higher education, Private universities, Uganda).

1. Introduction

Performance is vital in higher education institutions (HEIs) and other organizations as it enhances productivity, engagement, talent retention, and goal setting; supports training needs; and fosters continuous improvement (Tao, 2025). In HEIs, academic performance reflects students' acquired knowledge, skills, and attitudes that influence future career prospects (Tan et al., 2025). It substantially affects individual success, institutional reputation, and societal advancement by producing competent graduates (Wang & Chen, 2025). Elger (2007) defined performance as the capacity to produce desired outcomes, highlighting the performer's active involvement in attaining them. Different scholars have viewed academic performance as a multidimensional concept. Yusuf and Adejoh (2016) define it as measurable student behavior over time, reflected in tests and assignments. Similarly, Kumar et al. (2021) relate it to achievement quantified by test scores, grades, and participation. Key attributes include previous academic records, accommodations, family support, gender, and environmental conditions like lighting and classroom layout (Angula et al., 2022; Alani et al., 2021; Wang & Chen, 2025).

1.1 Statement of the Problem

Higher education student performance is vital since it affects future career trajectories, adds to student academic achievement, and reflects on the quality of the institution itself (Bakar et al., 2023). But at Cavendish University Uganda (CUU), performance declined between 2019 and 2023, with 45% receiving poor grades and low instructional supervision scores of 2.41 (Emara et al., 2024). The shortage of PhD-qualified professors and unmotivated part-time staff undermines instructional quality (Alemiga & Kibukamusoke, 2019). A lack of sufficient IT systems to support online instruction for both staff and students, despite claims of a strong record

in innovative teaching modes, has resulted in inadequate monitoring of its implementation. Consequently, students have faced challenges that impede their ability to complete assessments efficiently (Kusasira et al., 2023; Omona et al., 2024). Technical difficulties, such as system outages and poor connectivity, have disrupted online services, leading students to perceive institutions as unsupportive (Kusasira et al., 2023). Therefore, this present study examined how learner behavior, students' engagement was associated with academic performance at Cavendish University Uganda.

1.2 General Objective

The study aimed to examine the association between learner behavior, student engagement and academic performance among students at Cavendish University Uganda. The following were the specific objectives:

- To examine the association of learner behavior on academic performance among students at Cavendish University Uganda.
- To examine the association student engagement on academic performance among students at Cavendish University Uganda.
- To examine the combined association of learner behavior and student engagement on academic performance among students at Cavendish University Uganda.

1.3 Research Questions

- How does learner behavior contribute to academic performance among students at Cavendish University Uganda?
- How does student engagement contribute to academic performance among students at Cavendish University Uganda?
- How do students and academic staff describe their experiences and views regarding learner behavior, student engagement, and academic performance at Cavendish University Uganda?

2. Literature Review

2.1 Theoretical review

The study was anchored in Constructivist Learning Theory, drawing on the work of Piaget and Vygotsky (1980) and Kuh's Student Engagement Theory (2001). Constructivism recognises learning as an active process in which learners construct new knowledge by integrating prior knowledge through interplay, inquiry, and reflection (Piaget, 1980). Vygotsky highlighted social and cultural contexts, affirming that learning occurs within the Zone of Proximal Development through scaffolding and support (Vygotsky, 1978). Language accelerates knowledge construction and cognitive growth (Piaget, 1980). Constructivism in higher education strengthens student engagement,

cooperation, critical thinking, and problem-solving through active, inquiry-based learning (Piaget, 1980).

Kuh's Student Engagement theory stresses that student achievement depends on the time and effort dedicated to learning and organisational support for engagement (Kuh, 2001; 2009). Academic engagement in terms of emotional, behavioral, and cognitive aspects promotes learning, perseverance, and cultivating reflection, motivation, and lifelong learning, which are vital for better academic performance (Kuh, 2001; 2009). Together, both theories champion student-centered learning that increases motivation, comprehension, and the development of lifelong learning skills fundamental for graduates.

2.2 Learner Behavior and Academic Performance

Learner behavior refers to the observable academic and classroom-related actions of students that reflect their engagement and motivation in the learning process (Saxena et al., 2024). It includes students' participation in learning activities, interaction in class, and their effort toward completing academic tasks. Learner behavior is influenced by motivational and socio-emotional factors that shape how students respond to learning demands and classroom environments (Skinner et al., 2016). With respect to the association of learner behavior with academic performance, Adrian Chin et al. (2022) investigated whether undergraduate learning behavior is a correlate of academic performance using Austin's model of student involvement and revealed a positive correlation. However, Adrian Chin et al.'s study was conducted outside Uganda and used student involvement, raising contextual and theoretical discrepancies. Qiu et al. (2022) employed a behavior classification model to examine the effect of learning behavior on the e-learning academic performance of students, and the findings revealed a significant effect. Nonetheless, the study created methodological and theoretical gaps. Swargiary (2023) conducted a comparative study regarding the relationship between the behavior of learners and academic performance and found that visionary learning behaviors are strongly related to the academic excellence of learners. However, Swargiary's study was quantitative, raising methodological gaps that call for the present study. Therefore, there remains a need to examine the relationship between learner behavior and academic performance in the present context.

2.3 Students' Engagement and Academic Performance

Student engagement has been defined in different but related ways in the literature. Kuh (2009) describes it as the time and effort students put into activities that contribute to learning outcomes, as well as the efforts by institutions to encourage such participation. Trowler (2010) adds that engagement is not one-dimensional but

includes behavioral, emotional, and cognitive aspects that together influence how students learn and perform.

Several studies have examined how engagement relates to performance, though in different settings and using different approaches. For example, Nachonga et al. (2021) studied engagement among academic staff at Makerere University and found a significant relationship with job performance, drawing on Herzberg's Two-Factor Theory. However, the study focused on staff rather than students, which limits how far the findings can be applied to learner engagement.

Anokye Effah and Nkwantabisa (2022), working within involvement theory, found that academic engagement has a strong positive association with student academic performance. Their study was, however, purely quantitative, which means it did not explore in depth how students actually experience engagement in learning. Opiyo et al. (2025) also reported that classroom engagement has a positive association with academic performance among secondary school students in Kenya, although the association was only moderate. This suggests that engagement may not have the same level of impact across different contexts. On the other hand, Bordbar et al. (2025) found that learning behaviors had a positive but not statistically significant relationship with academic performance, showing that the relationship is not always strong or consistent across studies.

Conclusively, the studies generally agree that student engagement is linked to academic performance, but they differ in context, theory, and strength of findings. This makes it important to further examine how engagement works in specific learning environments.

2.4 Combined association between Learner Behavior, Students engagement, and Academic performance

Previous studies indicate that learner behavior and student engagement are associated with academic performance. Li and Xue (2023), through a meta-analysis, recognized learning behavior as a critical factor influencing student engagement and academic performance. Wang et al. (2025) employed correlation and multiple regression analyses to show significant associations between online learning behavioral engagement and university students' academic performance. Though these findings align with student engagement theory, which conceptualizes engagement as students' behavioral, emotional, and cognitive involvement in learning, they mainly studied learner behavior and student engagement independently in relation to academic performance, with insufficient evidence examining their combined association, particularly in private university settings in Uganda. The current study addresses this discrepancy by examining the combined association between learner behavior, student engagement, and students' academic

performance at Cavendish University Uganda using a pragmatic paradigm.

3. Methodology

The study investigated the association between learner behavior, students' engagement, and academic performance at Cavendish University using a convergent parallel design. The design entails collecting quantitative and qualitative data simultaneously, analyzing data independently, and interpreting them together to give a comprehensive understanding of the association, and triangulating both data sets (Creswell, 2023). In particular, the qualitative component employed a case study design to gain an in-depth understanding of learner behavior, student engagement, and academic performance within the setting of Cavendish University Uganda (CUU). The qualitative participants comprised 10 key informants, including deans, heads of departments, academic staff, and students. Participants were selected purposively based on their roles and experiences critical to teaching, learning, student engagement, and academic performance. The integration of quantitative and qualitative results enabled the study to establish statistical associations while giving contextual interpretations of the observed patterns.

3.1 Sample/Study Group

A quantitative approach employed a stratified sampling technique in which the population was divided into faculties within the university. The Faculty of Science and Technology and the Faculty of Business and Management were selected because they contained the target population, specifically students from the Bachelor of Public Health and Bachelor of Business Administration programmes, while other faculties were excluded due to smaller populations that were not suitable for reliable analysis. Thereafter, simple random sampling was used to select respondents from the identified strata, giving all eligible students an equal chance of participation. A sample size of 205 was determined from a population of 440 using the Krejcie and Morgan (1970) table, and 205 questionnaires were distributed. Of these, 198 were returned, but 2 were excluded for incompleteness, resulting in 196 valid responses for analysis. Data were collected at a single point in time using a self-administered questionnaire administered to eligible students from the selected programmes and year of study.

So:

$$F(2,193) = 25.044$$

is consistent with $N = 196$.

3.2 Data Collection

Data Collection Methods / Tools. Quantitative data were collected from respondents using a questionnaire survey. The study employed self-administered questionnaires to collect quantitative data on the hypotheses at one point

in time. The researcher reached out to participants for first-hand data collected through semi-structured key informant interviews. The interviews explored participants' experiences and views regarding learner behavior, student engagement, and academic performance. Interviews were conducted individually, with participants encouraged to give detailed insights into their experiences. The interviews were documented and prepared for analysis while preserving participants' confidentiality and anonymity.

3.3 Measurement Tool

This study investigated the association between learner behavior, students' engagement (explanatory variables), and students' academic performance (outcome variable). Academic performance was assessed using three dimensions: diagnostic, formative, and summative assessment. The measures were adapted from the Assessment Practices Inventory developed by Zhang and Burry-Stock (2003) and the Assessment for Learning framework of Black and Wiliam (1998).

Diagnostic assessment was studied in terms of pre-assessment, formal assessment, and non-formal assessment, using a questionnaire survey (Kraus & Minstrell, 2002). Formative assessments were examined in four aspects, namely: classroom discussions, brief quizzes, peer and self-assessment, and observation (Kulasegaram et al., 2018). Summative evaluation was examined in terms of final examinations and, end of course, grades (Brownlie et al., 2024). The development of the instrument entailed examining existing approved tools to choose applicable measures for the study. The survey used a five-point Likert scale, ranging from 'strongly disagree' (1) to 'strongly agree' (5), to gauge the attributes and test the relationship between learner behavior, engagement (predictors), and academic performance (outcome). The quantitative data were first coded and then analyzed using SPSS, with both descriptive and inferential statistics applied to investigate

the effect of learner behavior and students' engagement on academic performance. Trustworthiness of qualitative data was ensured by developing an interview guide with the guidance of experts in the subject with respect to the research questions.

3.4 Data Processing

The quantitative data were first coded and then analyzed using SPSS, with both descriptive and inferential statistics applied to examine the results. The qualitative data were transcribed and analyzed using thematic analysis to find patterns.

3.5 Data Analysis

The analysis of quantitative data at the univariate level used descriptive statistics. The Pearson correlation coefficient was used to establish the association between learner behavior and students' engagement and the dependent variable (DV), academic performance. A multiple linear regression was then conducted to examine the combined association of learner behavior and student engagement with academic performance and the unique association of each explanatory variable with the dependent variable. The qualitative data were analyzed thematically. The analysis involved familiarization with the interview data, identification of meaningful statements, generation of initial codes, grouping of related codes into subthemes, and development and refinement of overarching themes. The themes were then interpreted in relation to the study objectives and the quantitative findings. Both quantitative and qualitative findings were incorporated at the interpretation stage following independent analysis of the two data strands. The results from the two strands were compared to establish areas of convergence, complementarity, and divergence, thereby giving a fused interpretation of learner behavior, student engagement, and academic performance.

4. Findings

4.1 Demographic Characteristics

Table 1: Descriptive Results for Bio data

Item	Categories	Frequency	Percent
A1 Age of the respondents	19-23	48	24.5
	24-29	72	36.7
	30 and above	76	38.8
	Total	196	100.0
A2 Gender	Male	70	35.7
	Female	126	64.3
	Total	196	100.0
A3 Year of study	Year Two	100	51.0
	Year three	96	49.0
	Total	196	100.0
A4 Type of Faculty	Business and management	72	36.7

	Sciences and Information Technology	124	63.3
	Total	196	100.0
A5 What is your program?	ICT/Computer Science	64	32.7
	Business Administration	32	16.3
	Software Engineering	54	27.6
	Environmental Health/ Public Health	46	23.5
	Total	196	100.0
A6 How do you perform? Excellent		16	8.2
	Very good	12	6.1
	Good	82	41.8
	Average	58	29.6
	Not good	28	14.3
	Total	196	100.0

Table 1 Table 1 presents the demographic characteristics of the 196 respondents included in the study. The study comprised 196 respondents. The biggest proportion of respondents were aged 30 years and above (38.8%), followed by those aged 24–29 years (36.7%) and 19–23 years (24.5%). Females composed the majority of respondents (64.3%), compared with males (35.7%). Concerning year of study, 51.0% were in Year Two, and 49.0% were in Year Three. The majority of respondents belonged to the Sciences and Information Technology faculty (63.3%), while 36.7% were from Business and Management. ICT/Computer Science had the biggest proportion of respondents (32.7%), followed by Software Engineering (27.6%), Environmental Health/Public Health (23.5%), and Business Administration (16.3%). Concerning self-reported academic performance, the largest proportion rated their performance as good (41.8%), followed by average (29.6%), not good (14.3%), excellent (8.2%), and very good (6.1%).

Academic Performance

The academic performance of students was studied in three constructs, i.e., diagnostic, formative, and summative assessments. The results are shown in Table 2:

Table 2: Mean and Standard Deviation of Academic performance items

Constructs	Mean	Standard Deviation
Diagnostic assessment	4.0327	.93707
Formative Assessment	4.0367	.98308
Summative Assessment	4.2380	.69275

The findings reveal that summative assessment was the most highly ranked assessment practice ($M = 4.2380$, $SD = 0.69275$), followed by formative assessment ($M = 4.0367$, $SD = 0.98308$) and diagnostic assessment ($M = 4.0327$, $SD = 0.93707$). The high mean scores indicate that respondents mostly perceived the three forms of assessment as highly practiced at Cavendish University Uganda. The relatively low standard deviation for summative assessment suggests higher consistence in respondents' perceptions of its implementation.

The qualitative results confirmed these quantitative findings by demonstrating the practical application of formative and summative assessment. One participant reported that the *CUU CLaned platform provides weekly essays and quizzes, which require continuous study, while end-of-semester examinations account for 70% of the final grade (K11-2)*. The regular essays and quizzes give evidence of continuous formative assessment and help expound its high ranking ($M = 4.0367$). Likewise, the considerable weighting of end-of-semester examinations gives qualitative support for the higher ranking acquired for summative assessment ($M = 4.2380$). Therefore, the qualitative evidence complements the quantitative results by proving that students experience assessment through both continuous exercises and end-of-semester examinations. Never the less, the available qualitative evidence gives limited insight into diagnostic assessment, given its relatively high quantitative rating ($M = 4.0327$). Generally, the confluence of the findings indicates that academic performance at the university is well entrenched, with summative assessment occupying a specifically leading position in the assessment process.

Table 3: Mean and Standard Deviation of Learners' behaviour (LB) and Students Engagement items

Constructs	Mean	Standard Deviation
Learner Behavior	4.0327	.93707
Students' Engagement	4.0367	.98308

The results in the table indicate that student engagement had the highest mean score ($M = 4.0367$, $SD = 0.98308$), while learner behavior had a slightly lower mean score ($M = 4.0327$, $SD = 0.93707$). The high mean scores suggest that

respondents mostly perceived both learner behavior and student engagement positively. The close mean scores indicate that the two constructs were ranked at almost the same level among students. The standard deviations suggest moderate variation in respondents' opinions, with student engagement exhibiting slightly greater variability than learner behavior. Altogether, the findings indicate that students showed positive learner behavior and were actively involved in the learning process.

The qualitative findings confirmed these findings by emphasizing the university and learning practices that support positive learner behavior and student engagement. One participant clarified that "good learner behavior at CUU is encouraged through participation, positive study habits, motivation, and institutional support, including mentorship and collaborative learning" (KII-1). This result confirms the relatively high mean score for learner behavior ($M = 4.0327$) by suggesting that positive behaviors are reinforced through both individual practices and university support practices. Likewise, another participant reported that "learners are engaged through active participation in learning, utilization of resources, development of skills, motivation, and commitment" (KII-5). This account reinforces the high mean score for student engagement ($M = 4.0367$) by explaining how active participation, access to learning resources, motivation, and commitment are associated with students' engagement in the learning process. Both the quantitative and qualitative findings convey that positive learner behavior and student engagement at CUU are supported by collaborative learning, mentorship, motivation, active involvement, and opportunities for skill development. The merge of the two strands of evidence thus indicates that the university's learning environment provides conditions that promote both appropriate learner behavior and active engagement in learning.

4.2 Testing hypotheses

4.2.1 Pearson correlation of learner behavior and academic performance

The study went further and examined the association between learner behavior and students' academic performance. Inferentially, the researcher conjectured to carry out correlations:

H_1 : Learner behavior has a significant association with academic performance at Cavendish University, Uganda.

H_0 : Learner behavior has no significant association with academic performance at Cavendish University, Uganda.

A Pearson correlation coefficient was run to test the association. The findings of Pearson's correlation coefficient for learner behavior and students' academic performance at Cavendish University, Uganda, are in Table 5.

Table 5: Pearson's correlation coefficient index between Learner Behavior and students' academic performance

		Learner Behavior	Students' academic performance
Learner Behavior	Pearson Correlation	1	.353**
	Sig. (2-tailed)		.001
	N	196	196
Students' academic performance	Pearson Correlation	.353**	1
	Sig. (2-tailed)	.001	
	N	196	196

Results of Pearson's correlation coefficient revealed a significant positive association between learner behavior and academic performance ($r = .353$, $n = 196$, $p < .001$). The finding suggests that students who showed more positive learner behaviors are *inclined* to report higher academic performance. Hence, the hypothesis that learner behavior is significantly associated with academic performance was supported.

The qualitative perspective aimed to answer research question one: To explore students' experiences of how learner behavior contributes to their academic performance at Cavendish University Uganda.

The qualitative findings provided further insight into how respondents were asked to share their experiences of how learner behavior may contribute to academic performance. When participants were asked how learner behavior contributes to students' academic performance, one participant noted:

"In my opinion, as a student, learner behavior enhances class participation, while pedagogical quality, career significance, institutional support, and peer engagement promote academic performance" (KII-6).

This qualitative account confirms the quantitative results by clarifying the possible mechanisms through which learner behavior is associated with academic performance. In particular, class participation conveys an observable learner behavior

that may boost students' engagement in learning tasks, while peer engagement and university support may create conditions that promote such behavior. Thus, qualitative evidence helps clarify the positive association identified quantitatively, although it also indicates that academic performance is shaped by factors beyond learner behavior, including pedagogical quality and university support. Generally, the convergence of the two strands of evidence indicates that positive learner behaviors, especially active participation and engagement with peers, are associated with better academic performance at Cavendish University Uganda.

4.2.2 Student engagement and academic performance

The researcher also went ahead to test the hypothesis with the postulate that:

H₂: Students' engagement has a significant association with academic performance at Cavendish University Uganda, using the Pearson Correlation coefficient.

H₀₂: Students' engagement has no significant association with academic performance at Cavendish University Uganda.

Table 5: Pearson's correlation coefficient index between students' engagement and students' academic performance

		Students' Engagement	Academic performance
Students' Engagement	Pearson Correlation	1	.439**
	Sig. (2-tailed)		.001
	N	196	196
Academic performance	Pearson Correlation	.439**	1
	Sig. (2-tailed)	.001	
	N	196	196

The Pearson correlation analysis results indicated a moderate, positive, and statistically significant relationship between students' engagement and academic performance, $r = .439$, $p = .001$, $N = 196$. This finding suggests that higher levels of student engagement were associated with better academic performance. Since the p -value was below the 0.05 significance level, the null hypothesis of no significant association between students' engagement and academic performance was rejected. The finding therefore provides empirical support for the hypothesis that students' engagement is significantly related to academic performance.

The qualitative strand aimed to answer the research question: To explore students' experiences of how student engagement contributes to their academic performance at Cavendish University Uganda.

Participants shared their experiences that supported the quantitative results by emphasizing the significance of active participation, motivation, skill development, resource utilization, and seeking feedback in advancing students' engagement and academic performance. One key informant alluded to:

"In this department, students demonstrate engagement through active participation, resource utilization, motivation, skill development, and seeking feedback on their assignments." (KII-3)

The results confirm the quantitative evidence by emphasizing how student engagement is displayed in the university context. Active participation in learning activities, motivation to learn, development of academic skills, effective utilization of available learning resources, and seeking feedback may give students opportunities to reinforce their learning and improve their academic performance. Therefore, the pragmatic interpretation of the findings suggests that reinforcing students' engagement may enhance academic performance at Cavendish University Uganda.

4.2.3 Learner behavior, students' engagement and academic performance

Additionally, multiple linear regression analysis was conducted to determine the combined association between learner behavior, students' engagement to academic performance. The following hypotheses were tested, and the results are presented in Table 6.

H₃: Learner behavior and student engagement have a combined significant relationship with academic performance at Cavendish University Uganda.

H₀₃: Learner behavior and student engagement have no combined significant relationship with academic performance at Cavendish University Uganda.

Table 6: Regression Analysis Learner Behavior, students' engagement, and Students' Academic Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.454a	.206	.196	.62046

The results suggest a moderate positive multiple association between learner behavior, student engagement, and academic performance ($R = .454$). The model explained 20.6% of the variance in students' academic performance, while the adjusted R^2 was .196, showing that about 19.6% of the variance was explained after adjustment for the number of indicators.

These findings indicate that learner behavior, encompassing growth mindset, active learning, accountability, and knowledge sharing, together with student engagement, including cognitive, emotional, social, and collaborative engagement, are important factors associated with students' academic performance.

The quantitative results were further backed by the qualitative evidence. The results were based on the research question: How do students and academic staff describe their experiences and views regarding learner behavior, student engagement, and academic performance at Cavendish University Uganda? Participants were asked to narrate their experiences of academic engagement and clarify how class attendance and participation influenced their academic performance.

For example, KII-9 stated:

"As a student, regular revision and active class participation enhance my understanding, confidence, and overall academic performance." (KII-9)

The responses highlighted the relevance of regular revision, regular class attendance, and active participation in classroom activities. Participants expounded that these behaviors improved students' understanding of course content, reinforced their confidence, and contributed to improved academic performance. This qualitative voice commends the regression results by clarifying how active engagement in learning activities may be mirrored in students' academic experiences. Regular revision and involvement give students opportunities to reinforce their understanding, build esteem, and strengthen their learning, thereby enhancing the observed relationship between learner behavior, student engagement, and academic performance.

Table 7: ANOVA on LB and SET on Academic Performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.282	2	9.641	25.044	.001
	Residual	74.299	193	.385		
	Total	93.581	195			

The results presented in Table 8 show that the overall multiple regression model was statistically significant, $F(2, 193) = 25.044$, $p = .001$. This finding suggests that learner behavior and student engagement, when combined together, were significantly associated with students' academic performance. The two explanatory variables jointly accounted for a statistically significant proportion of the variation in academic performance. Therefore, the research hypothesis that learner behavior and student engagement have a combined significant association with academic performance at CUU was supported, while the null hypothesis was rejected.

The quantitative findings were further supported by the qualitative evidence. Participants were asked to describe their level of engagement in classroom activities and explain how such engagement contributes to their academic performance. They were also asked how time management contributes to their academic performance. Regarding classroom engagement, KII-10 alluded:

"As a learner in this faculty, I try my best at all times to attend all my lectures and engage in class discussions, but occasionally when I miss lectures, I observe it impacts my performance." (KII-10)

This response clarifies the relevance of regular attendance and active involvement in supporting students' academic performance. It indicates that engagement extends beyond mere attendance to comprise of active involvement in classroom discussions and learning activities. In contrast, missing lectures may restrict students' exposure to subject matter and opportunities for engagement, which may negatively affect their academic performance.

Concerning time management, KII-7 observed:

"Balancing my classwork and personal duties is vital. When I do not observe time management, I submit my coursework after deadlines, which lowers grades." (KII-7)

The response emphasizes time management as a crucial aspect of students' learning behavior. Effective management of academic and personal duties allows students to finish coursework within the mandatory deadlines, while time procrastination may lead to late submission of assignments, resulting in lower academic grades.

Similarly, one participant noted that:

“As a student, I ensure that consistent attendance, active participation, and effective time management are essential for achieving good performance, as missing lectures or poor time management can negatively impact grades.”

The integration of the quantitative and qualitative findings provides a consistent account of the relationship between learner behavior, student engagement, and academic performance. While the regression analysis established that learner behavior and student engagement jointly had a statistically significant association with academic performance, the qualitative findings provided contextual explanations of how these factors are experienced in students’ daily academic lives. Specifically, students identified regular class attendance, active participation, consistent engagement, and effective time management as important practices that support their academic work. The qualitative evidence therefore complements and enriches the quantitative findings, providing a more comprehensive understanding of the relationship between learner behavior, student engagement, and academic performance at Cavendish University Uganda.

Table 8: Correlation coefficient of LB, SET, and overall SAP

	Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Tolerance	Statistics VIF
1	(Constant)	2.805	.214		13.099	.001		
	Learner Behavior	.105	.059	.142	1.783	.076	.647	1.546
	Students' Engagement	.250	.056	.355	4.450	.001	.647	1.546

The coefficients presented in Table 9 indicate that learner behavior was a positive but statistically non-significant unique predictor of academic performance ($B = .105$, $\beta = .142$, $p = .076$). In contrast, student engagement was a positive and statistically significant unique predictor of academic performance ($B = .250$, $\beta = .355$, $p = .001$). Therefore, when the two predictors were considered concurrently, student engagement proved a stronger and statistically significant unique association with academic performance than learner behavior.

The regression equation was stated as:

$$\text{Academic Performance} = 2.805 + 0.105(\text{Learner Behavior}) + 0.250(\text{Student Engagement})$$

The results thus indicate that student engagement has a stronger unique statistical association with academic performance than learner behavior in the joint model. Though learner behavior was positively associated with academic performance, its unique contribution was not statistically significant after accounting for student engagement.

Additionally, the collinearity statistics suggested that there was no evidence of problematic multicollinearity between the predictors. Both students’ engagement and learner behavior registered a tolerance value of .647 and a variance inflation factor (VIF) of 1.546, suggesting that the predictors were adequately separate for inclusion in the regression model.

The qualitative findings gave contextual support for the quantitative findings. Participants stressed regular revision, class attendance, active participation, and seeking feedback as practices linked to positive academic performance. For instance, KII-9 described regular revision and active class participation as practices that supported understanding, confidence, and academic performance. These narrative accounts provide contextual insight into the quantitative results that student engagement made the stronger unique contribution to academic performance.

Table 9: Qualitative themes and subthemes

Themes	Subthemes	Main illustrative evidence
Promotion of Positive Learner Behaviour	Collaboration; Accountability; Mentorship	Participants explained that positive learner behavior is promoted through mentorship, collaborative learning, class participation, and responsible study habits, which encourage supportive peer interaction and academic responsibility (KII-1, KII-6).
Student Engagement in Learning Activities	Participation; Peer Collaboration; Interactive Pedagogy	Respondents emphasized that active participation in class discussions, teamwork, utilization of learning resources, and interactive teaching approaches strengthen student engagement and improve learning experiences (KII-3, KII-4, KII-5).
Factors Enhancing Academic Performance	Attendance; Time Management; Balance	Participants noted that regular class attendance, revision practices, balancing coursework with personal responsibilities, and effective time management contribute positively to academic performance (KII-7, KII-9, KII-10).

Institutional and Pedagogical Support	Guidance; Growth Mindset; Interactive Learning	Interviewees highlighted that continuous academic guidance, mentorship, interactive learning methods, and encouragement from lecturers support student motivation, confidence, and academic achievement (KII-4, KII-6).
Interconnectedness of Behaviour, Engagement & Performance	Behaviour; Engagement; Engagement; Performance; Support; Effort	Participants described learner behavior, engagement, institutional support, and personal effort as interconnected factors that collectively influence students' academic performance and overall learning outcomes (KII-4, KII-6, KII-10).

Positive behaviour, active engagement, effective support systems, and disciplined practices are key drivers of student academic performance.

Table 10: Joint display table of Quantitative and qualitative findings

Construct	Quantitative Findings	Qualitative Themes	Integrated Interpretation
Learner Behavior	Learner behavior was positively and significantly associated with academic performance ($r = .532, p < .001$). However, when together with student engagement, it was not a statistically significant unique predictor of academic performance ($B = .105, \beta = .142, p = .076$).	Discipline, collaboration, mentorship, and positive classroom behavior (KII-1, KII-4, KII-6).	Learner behavior is positively associated with academic performance, with qualitative findings emphasizing discipline, collaboration, mentorship, and positive classroom behavior. However, its unique association becomes weaker when considered simultaneously with student engagement.
Student Engagement	Student engagement was positively and significantly associated with academic performance ($r = .568, p < .001$) and was also a statistically significant unique predictor when considered together with learner behavior ($B = .250, \beta = .355, p = .001$).	Active participation, feedback seeking, motivation, time management, and class involvement (KII-3, KII-7, KII-9).	Student engagement established a stronger unique association with academic performance, congruent with qualitative results highlighting participation, feedback seeking, motivation, time management, and class involvement.
Combined Model (LB & SET)	The overall multiple regression model was statistically significant, $F(2, 193) = 25.044, p = .001$, with the two constructs jointly accounting for 20.6% of the variation in academic performance ($R^2 = .206$; adjusted $R^2 = .196$) variation in performance	Students emphasize attendance, revision habits, and structured learning routines	Both constructs were jointly associated with academic performance, though student engagement demonstrated the stronger unique association within the combined model.

5. Discussion

The findings emphasize that learner behavior and student engagement are significantly associated with academic performance at Cavendish University Uganda (CUU). However, the findings also indicate a crucial distinction between the bivariate relationships and the joint regression model. Whereas both learner behavior and student engagement were positively and significantly associated with academic performance at the bivariate level, student engagement surfaced as the only statistically significant unique predictor when both variables were entered concurrently into the regression model. The combined model was statistically significant

and accounted for 20.6% of the variance in students' academic performance. These results give a subtler understanding of the separate contributions of learner behavior and student engagement to academic performance.

5.1 Learner Behavior and Academic Performance

The first objective examined the association between learner behavior and students' academic performance. The findings indicated a positive and statistically significant relationship between learner behavior and academic performance. This shows that students who exhibit positive learning behaviors, including active

participation, accountability, collaboration, regular revision, and constructive relationships with peers, tend to report better academic performance. The qualitative results reinforce this interpretation, with participants underscoring discipline, collaboration, mentorship, class participation, and positive classroom behavior as critical features of students' academic performance. The qualitative evidence thus gives contextual insight into the positive association noted in the quantitative findings. The finding is consistent with the constructivist perspective, which underscores active participation, interaction, and the learner's active role in constructing knowledge. From this viewpoint, students who actively participate in learning activities and relate with peers and lecturers may have greater opportunities to engage with course content and consolidate their comprehension.

The findings align with Constructivist Theory (1936), which emphasizes active learning and interaction in knowledge construction, and are supported by Swargiary (2023), who found that positive learner behaviors are significantly associated with academic performance. Importantly, the multiple regression analysis gives a more distinct interpretation. When learner behavior and student engagement were considered concurrently, learner behavior had a positive but statistically non-significant unique association with academic performance ($B = .105, \beta = .142, p = .076$). This suggests that though learner behavior was significantly associated with academic performance at the bivariate level, its unique contribution was not statistically significant after student engagement was considered. This distinction is crucial because the bivariate association captures the general association between learner behavior and academic performance, while the regression coefficient represents the unique contribution of learner behavior whilst controlling for student engagement. This finding is supported by Bordbar et al. (2025), who found that learning behaviors are positively associated with performance but may not always be statistically significant when other academic factors are considered.

5.2 Student Engagement and Academic Performance

The second objective examined the association between student engagement and academic performance. The Pearson correlation analysis suggested a moderate, positive, and statistically significant association between student engagement and academic performance ($r = .439, p = .001, N = 196$). Therefore, higher levels of student engagement were associated with better academic performance. The null hypothesis asserting that there was no significant association between student engagement and academic performance was therefore rejected.

The qualitative results give further contextual support for this result. Participants depicted student engagement in terms of active involvement, motivation, development of academic skills, effective utilization of learning resources, and seeking feedback. These experiences

indicate that engagement is expressed through students' active participation in academic activities and their efforts to get and utilize learning support.

The finding concurs with Kuh's Student Engagement Theory, which highlight the critical role of students' participation in educationally tenacious activities. Students who participate actively in learning, seek feedback, utilize available resources, and consistently participate in academic activities are most likely to get opportunities for learning and academic development. The finding also aligns with Çali et al. (2024), cited in the study, who reported that behavioral engagement was a relevant predictor of academic performance.

The regression analysis further reinforces the relevance of student engagement in the current study. When learner behavior and student engagement were integrated into the model concurrently, student engagement remained a statistically significant unique predictor of academic performance ($B = .250, \beta = .355, p = .001$). Its standardized coefficient was greater than that of learner behavior ($\beta = .142$), suggesting that student engagement made the stronger unique association with academic performance in the joint model. This finding indicate that active student engagement may be specifically crucial in the CUU context. Engagement gives students with opportunities to interact with course content, involve in learning activities, and receive feedback, which may help explain its stronger unique contribution to academic performance. This finding align with Opiyo et al. (2025) also reported that classroom engagement has a moderate positive association on academic performance among secondary school students.

5.3 Combined Association of Learner Behavior and Student Engagement with Academic Performance

The third objective examined the combined association between learner behavior, student engagement, and academic performance. The multiple regression model was statistically significant, $F(2, 193) = 25.044, p = .001$, with $R = .454, R^2 = .206$, and adjusted $R^2 = .196$. The model therefore explained 20.6% of the variance in students' academic performance. This finding shows that learner behavior and student engagement, combined, provide a statistically significant explanation of variation in academic performance. This finding agrees with Wang et al. (2025), who found a significant association between students' online learning behavioral engagement and academic performance, highlighting the importance of students' active learning behaviours in achieving positive academic performance.

6. Conclusion

The study findings revealed that learner behavior and students' engagement had a significant positive association with the academic performance of students at CUU, with students' engagement emerging as the

strongest unique predictor, driven by active involvement, motivation, and seeking guidance.

Multiple regression analysis indicated that student engagement continued to be a significant and stronger unique predictor of academic performance, while learner behavior was no longer statistically significant when both variables were included together. Though learner behavior was significantly associated with academic performance at the bivariate level, its unique contribution was not significant after accounting for student engagement.

Moreover, it was found that learner behavior and student engagement, examined together, significantly affect students' academic performance at CUU, which may explain about 20.6% of the variation in students' academic performance. Collinearity diagnostics did not demonstrate any collinearity issue (multicollinearity problem is not significant).

In general, higher student engagement was associated with better academic performance, whilst positive learner behavior remained significant.

7. Recommendations

The study reveals that student engagement had a significant unique association with academic performance, whereas learner behavior did not have a statistically significant unique association when both variables were examined simultaneously. The study recommends that higher education institutions (HEIs) strengthen programs that inspire positive behaviors, including regular class attendance, discipline, and promptness, through guidance initiatives and acknowledgement of commendable conduct. HEIs' teaching staff should adopt and implement rewarding and interactive teaching methods, such as group discussions and regular feedback, to keep students actively engaged and motivated, thereby enhancing their academic performance. HEIs should strengthen institutional support systems to enhance student engagement.

8. Limitations

This study was limited to examining the association between learner behavior, student engagement, and students' academic performance, while other potential factors associated with academic performance such as teaching quality, learning resources, motivation, and institutional support were not included. Furthermore, the correlational design prevented time-related changes from being observed, and, finally, the use of self-report data could be subject to response bias. The study was conducted in only one institution (CUU), limiting generalizability.

9. Future Research

Future research should assess the role of learner behavior and engagement across multiple universities, considering additional factors and using advanced methods to understand their association with academic performance.

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Peer Influence as Correlate of Juvenile Delinquency among In-School Adolescents in Oredo Local Government Area of Edo State, Nigeria

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Abstract. The study investigated peer influence as correlate of juvenile delinquency among senior school adolescents in Oredo Local Government Area of Edo State. The study was guided by two hypotheses, tested at 0.05 level of significance. The survey research design using the correlational approach was adopted for the study. A sample size of 350 students (256 males and 94 females) was drawn from five public senior secondary school using the multistage sampling technique. The researchers used two instruments for the study. Self-structured questionnaire was used for peer group influence while Juvenile Delinquency Scale was adapted from Brown *et al* (1986). The instruments were validated by test experts in the Faculty of Education, University of Benin, and the reliability coefficients of 0.80 and 0.86 were obtained for the peer influence and juvenile delinquency respectively. Pearson Product Moment Correlation statistic was used to test hypothesis one while the Fisher-Z statistic was used to test hypothesis. The findings showed that there is no significant relationship between peer influence and juvenile delinquency among senior secondary school students in Oredo Local Government Area. The relationship between peer influence and delinquency is not influenced by sex of senior secondary school students in the study area. It was recommended that guidance counsellors and school administrators should provide opportunities for positive peer interaction, such as clubs, sports, mentoring programmes, leadership activities. This recommendation is appropriate even though the study found no significant relationship between peer group influence and delinquency, because peer environments may still provide constructive developmental opportunities; delinquency-prevention programmes should be made available for both male and female in-school adolescents since the study found no significant

difference by sex in the relationship between peer group influence and juvenile delinquency also further research should examine other variables that may explain juvenile delinquency, especially variables that were not included in the present study. They may also employ qualitative or mixed-method approaches to provide deeper understanding of the phenomenon.

Keywords: Peer Influence, Juvenile Delinquency, Adolescents, In-school.

1. Introduction

Adolescence is a critical development period characterized by substantial physical, emotional, cognitive and social change. During this period, young people increasingly seek independence from parents and attach greater importance to relationships with friends and age-mates. Peer groups therefore become important sources of socialization, providing adolescents with companionship, emotional support, social identity and behaviour models. Although, peer relationships can promote positive developments, they may also expose adolescents to behaviour that conflicts with accepted social and legal norms. Through interaction with peers, adolescents may adopt attitudes, values and behaviour that influence their decisions and patterns of conducts. One behavioural problem that attracts considerable attention during adolescence is juvenile delinquency.

Juvenile delinquency could be referred to as unlawful, anti-social or norm-violating behaviour committed by individuals who are below the legally recognized age of adulthood in a particular society. Adebowale et al (2020) defined juvenile as behaviour exhibited by adolescents that contravenes social rules and disrupts social harmony. Frazier and Rogers (2024) defined

juvenile delinquency as youth offending involving actions or behaviour by juveniles that may warrant intervention by juvenile's justice system. They further explained that the concept may include criminal offence as well as behaviour that are considered unlawful, specifically because of the young person's age. Delinquent behaviours are not limited to legal infractions alone, but also includes behavioural patterns that undermine social order and personal development. According to Alufohai and Osagie-Obazee (2016), some of the antisocial behaviours often associated with delinquency include vandalism, drug abuse, stealing, sexual promiscuity, truancy, thugery, rape, verbal abuse, and cultism. The development of juvenile delinquency is multidimensional and may be influenced by some factors such as the family, school, peer influence and the individual. Among these social factors, peer influence is considered in this study because adolescent spend quality time with their peers and are motivated to obtain acceptance and approval within their peer group.

1.1 Statement of the Problem

Juvenile delinquency seems to be on the increase among the in-school adolescents in this contemporary period, largely due to imported values arising from information explosion and access, as a result of information technology advancement. Behaviours such as truancy, bullying, fights, gangsterism, vandalism, theft, substance abuse and other antisocial behaviours are common among them (Adeyemi, 2020). These behaviours not only disrupt the teaching-learning process but could also threaten students' psychological well-being and academic achievement. Several efforts had been made by parents, teachers, counselors, government and other stakeholders to address the problems of juvenile delinquency, but unfortunately, it seems to still persists among school attending adolescents. Numerous studies have explored peer influence and as an important factor associated with juvenile delinquency (Lasisis et al., 2021, Rudy et al, 2023), findings on the relationship between peer influence and delinquency remain inconsistent. Limited research work has examined their combined correlation among senior school attending adolescent in Oredo Local Government Area in Benin City, Edo State. Empirical evidence generally revealed that peer group influence is positively associated with juvenile delinquency, indicating that adolescents who associate with delinquent peers are more likely to engage in delinquent behaviours. Therefore, the problem of this study is: could there be relationship between juvenile delinquency and peer

influence among in-school adolescents in Oredo Local Government Area, being a metropolitan Geo-entity?

1.2 Hypotheses

The following hypotheses were raised and tested in this study:

- There is no significant relationship between peer influence and juvenile delinquent behaviour among in-school adolescents in Oredo Local Government Area.
- There is no significant difference in the relationship between peer influence and juvenile delinquent behaviour among in-school adolescents in Oredo Local Government Area based on sex.

2. Literature Review

Peer influence refers to the process through which individuals of similar age affect one another's attitudes, behaviours and ways of thinking over time. Peer influence is often used to describe instances where an individual feel indirectly pressured into changing his/her behaviour to match a particular peer group which may have social and psychological impact on an individual's attitude, beliefs, values and behaviours. Osagie-Obazee and Ataha (2024) opined that peer influence is a compulsion to do or obtain the same things as others in one's peer group. Among adolescents, peer influence may be positive or negative and may occur through modelling, social interaction, reinforcement, and the desire to become more similar to friends or members of the peer group. Adeyemi & Egbochuku (2020), posited that young adolescents may be very concerned about their acceptability by their peers, and if not controlled, such desire to belong can serve as negative influence on many of them to engage in risky and delinquent behaviours. Laursen and Veenstra (2021) explains that peer influence occurs when an individual acts or thinks in ways that may differ from how they would otherwise act or think as a result of other peer affiliates. In the context of present studies, peer influence refers to the extent to which adolescents' friends and age-mates influence their attitudes, decisions, and behaviours, including behaviours that may contribute to juvenile delinquency. Peer influence may be positive, such as encouraging academic achievements and prosocial behaviour, or negative, such as encouraging truancy, substance use, fighting, stealing, or other delinquent behaviours.

Olowo (2020) stated that peer influence is one of the determinant factors of juvenile delinquency among

senior secondary school students. He was of the view, that in-school adolescents who belong to peer groups that approve of antisocial behaviours are more likely to imitate and adopt such behaviours to gain acceptance and social identity. In this context of juvenile delinquency, peer group influence can be seen as the extent to which association with delinquent or antisocial peers encourages school attending adolescent to engage in antisocial behaviours and other forms of delinquency in respect of their sex.

Sex differences may exist in the level of juvenile delinquency and in pathways through which individual, peer, family, and psychological factors are associated with delinquent behaviours. However, these differences are not uniform across studies, with males generally reporting higher levels of involvement than female in delinquent acts (Fehintola et al. (2025)). These differences are evident during secondary school period (adolescence period) a critical stage of identity formation.

The concepts of peer group influence is connected to Albert Bandura's social Learning Theory (1977) which posits that behaviour is learned through observation, imitation, modelling and reinforcement. Bandura opined that adolescents acquire behaviours by observing significant others, particularly their peers and are more likely to imitate behaviours that are rewarded and socially accepted. The theory explains that peer groups play a vital role in shaping adolescent behaviour. This is the group where most school attending adolescent belong. Adolescent who associates with delinquent peers may observe and imitate behaviours such as theft, vandalism, drug trafficking, armed robbery, burglary, assault, fighting and substance abuse, especially when such behaviours are reinforced by peer approval. Conversely, association with positive peers encourages socially accepted behaviours.

Fehintola et al (2025) studied the triad of influence: peer pressure, community factors and gender as determinant of delinquent behaviour among in-school adolescents in Ibadan in a descriptive survey with a sample size of 300 adolescents. Her finding revealed that gender had a significant relationship with juvenile delinquent behaviour. Male adolescents reported higher levels of delinquency than the females peer pressure was revealed to be the strongest predictor of delinquency in the study.

Lasisi et al (2024) in their study, titled correlational study of peer influence and juvenile delinquency among secondary school adolescents in Ibadan metropolis. They used a sample size of 1200

adolescents, with the purpose to investigate the relationship between peer influence and juvenile delinquency. The finding of the study revealed that peer influence had a significant positive relationship with juvenile delinquency.

Njoku and Ugoji (2024) investigated the relationship between parenting styles, family structure, peer pressure and delinquent behaviour among 960 secondary school adolescents in Delta North Senatorial District, Nigeria using a correlational survey design and multiple regression analysis. The findings of the study revealed that peer pressure had no significant relationship with delinquent behaviour, therefore it is not a significant predictor of delinquent behaviour in the study area.

Farrell et al. (2017) employed a quantitative survey design among one thousand seven hundred and eighty-seven urban middle school students in the United States to examine dimensions of peer influence and their relationship with adolescents' aggression, problem behaviours and prosocial behaviour. The findings of the study revealed that peer influence was associated with adolescent problem behaviour importantly the pattern of findings was generally consistent across gender.

James et al (2026) examined the relationship between peer influence and delinquency in a study titled juvenile delinquent behaviour among school adolescent: becoming the roles of peer influence and gender in Edo state with a sample size of 218 in a cross-sectional survey. The finding revealed that peer influence significantly predicts juvenile delinquency, and males reportedly significantly higher delinquent behaviour than females. Furthermore, Yeung (2023) examined the relationship between peer influence and delinquent behaviours in a cross-sectional survey study titled: a multi-system approach to investigate different forms of delinquency in female adolescents at risk: Family, School and Peers in Hong Kong China. A sample size of 236 female adolescents receiving services from front-line social workers. Findings revealed that deviant peer influence was a significant positive predator of destructive delinquent behaviours. Rudy et al (2023) examined south Korean adolescents' delinquency, disclosure, parental knowledge, parent child closeness and delinquent peer associations in a longitudinal study. Findings revealed that involvement with delinquent peers was a significant predictor of delinquency.

Juvenile delinquency is a multifaceted issue that affects individuals, families and communities. Despite efforts to prevent and intervene, the problem still persists, with peer influence emerging as

significantly contributing factors. It is against this background that this study examined peer influence as correlate of juvenile delinquency among in-school adolescent in Oredo Local government area of Edo State, with a view of providing empirical evidence that will guide counselling practice and school-based interventions aimed at reducing juvenile delinquency.

3. Methodology

The design for this study is a survey research design which adopted a correlational approach. The population of this study consisted of 2,384 adolescents in senior secondary (SS2) in public schools in Oredo Local Government Area of Edo State (State Universal Basic Education Board (SUBEB) Edo State, 2026). The sample size for the study was 350 in-school adolescents. The multistage sampling technique was used in selecting respondents for the study. Firstly, five public mixed schools were purposefully sampled. Secondly, with the aid of proportionate stratified sampling, 50% of population of SS2 in-school adolescents in each of the five schools were sampled which gave a total of 699 students. Thirdly, the simple

random sampling technique was used to select 256 males and 94 females.

The instrument for this study was a questionnaire, titled "Peer influence and Juvenile Delinquency Scale (PIJD)", made of two sections. Section A solicited demographic information from the respondents. Section B contained items on peer influence, adapted from "Peer Pressure Inventory. (PIP)", developed by Brown et al. (1986). The original response format was modified from a 7 point Scale to a four 4 point Likert scale, based on: Strongly agree 4 points, Agree 3 points, Disagree 2 points, and Strongly disagree 1 point, in response to positive worded questions on the scale, while negatively worded questions were reversed to be Strongly agree 1, Agree 2, Disagree 3, and Strongly Disagree 4. The instruments were validated while the Cronbach Alpha Statistic was used to establish the reliability of the instruments with r values of 0.80 and 0.86 for peer influence and juvenile delinquency respectively. The Pearson Product Moment Correlation Statistic was used to test hypotheses 1 while Fishers z was used to test hypothesis 2.

4. Results

Hypothesis one: There is no significant relationship between peer influence and juvenile delinquency among the in-school adolescents in Oredo Local Government Area of Edo State.

Table 1: Pearson's Product Moment Correlation of peer influence and juvenile delinquency

Variable	N	"r"	2(sig-tailed)
Peer Influence and delinquency	350	-.313	0.14

Table one shows r-value of -.313 and a p-value of 0.14, testing at an alpha level of 0.05. Since the p-value is higher than the alpha level, therefore the null hypothesis which states that "there is no relationship between peer influence and juvenile delinquent behavior among school attending adolescent" is accepted. Consequently, there is no relationship between peer influence and juvenile delinquency among in- school adolescents in Oredo Local Government Area.

Hypothesis two: There is no significant difference in the relationship between peer influence and juvenile delinquency among in-school adolescents in Oredo Local Government Area of Edo State by sex.

Table 2: Fisher-Z statistics of peer influence and juvenile delinquency by sex.

Sex	N	'r'	Zr	Zcal	Zcrit
Male	256	229	0.234	0.847	±1.96
Female	94	128	0.131		

Table 2 shows a calculated z of 0.847 and Z-critical of ±1.96, testing at an alpha level of 0.05. Since the calculated z is less than Z-critical therefore, the null hypothesis which states that "there is no relationship between peer influence and juvenile delinquency among senior secondary school students based on sex" is retained. Consequently, there is no significant difference in relationship between peer influence and juvenile delinquency in- school adolescents in Oredo Local Government Area by sex.

5. Discussion

The findings from hypothesis one revealed that there is no significant relationship between peer influence and juvenile delinquency among in-school adolescents of Oredo Local Government Area of Edo State. In other words, the way in-school students in Oredo local Government Area interact with peers has no statistically significant correlation with delinquent behaviours. The findings of this study is in line with the findings of Njoku and Ugoji (2024) who found that peer pressure had no significant relationship with delinquent behaviour. These findings could be attributed to several contextual factors such as effective parental supervision, positive school climate, strong moral values and individual resilience against negative peer influence by in-school adolescents in Oredo Local Government Area. Although it is also possible that peer influence affects delinquent behaviour indirectly through other psychological variables rather than exerting a direct influence.

The finding on hypothesis 2 revealed that there is no significant difference in the relationship between peer influence and juvenile delinquency among in-school adolescents in Oredo Local government Area of Edo State based on sex. This implies that the relationship between peer influence and juvenile delinquency is consistent across both male and female in-school adolescents in Oredo Local Government Area of Edo State. The findings of this study are partially in line with the study of Farrell et al. (2017) which found that the relationship between dimensions of peer influence and delinquent behaviour are generally consistent across gender. Sex may not be a significant factor in determining the relationship between peer influence and delinquency, rather factors such as the nature of peer relationships, the behaviour of the peer group and peer pressure and the level of acceptance of delinquent behaviour within the group may be more important. The findings of this study, however, contradicts that of Fehintola et al. (2025) which revealed that gender has significant relationship with delinquency. The study further showed that adolescents generally have a strong need for belonging and acceptance making them susceptible to the attitude and behaviour of their peers irrespective of sex.

6. Conclusion

The researchers concluded that peer influence have no relationship with juvenile delinquent behaviour among in-school adolescents in Oredo Local Government Area of Edo State. Furthermore, sex has no bearing with peer influence relationship with juvenile

delinquency among in-school adolescents in the study area.

7. Recommendations

The following are recommended based on the findings and the conclusion:

Guidance counsellors and school administrators should provide opportunities for positive peer interaction, such as clubs, sports, mentoring programmes, leadership activities. This recommendation is appropriate even though the study found no significant relationship between peer group influence and delinquency, because peer environments may still provide constructive developmental opportunities.

Delinquency-prevention programmes should be made available for both male and female in-school adolescents since the study found no significant difference by sex in the relationship between peer group influence and juvenile delinquency.

Further research should examine other variables that may explain juvenile delinquency, especially variables that were not included in the present study. They may also employ qualitative or mixed-method approaches to provide deeper understanding of the phenomenon.

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School Discipline Management Strategies as Predictors of Learner Engagement in Private Secondary Schools in Wobulenzi Town Council, Luwero District, Uganda

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Abstract. This study examined school discipline management strategies as predictors of learner engagement in private secondary schools in Wobulenzi Town Council, Luwero District, Uganda. Guided by B. F. Skinner's Operant Conditioning Theory, the study adopted a descriptive cross-sectional survey design. Data were collected from 100 respondents using structured questionnaires and analysed using descriptive statistics, Pearson correlation, and multiple linear regression. The study examined three discipline management strategies: positive reinforcement, guidance and counselling, and school rules and regulations. The findings revealed a moderate, positive, and statistically significant relationship between positive reinforcement and learner engagement ($r = 0.477$, $p < 0.001$). In contrast, guidance and counselling ($r = 0.068$, $p = 0.505$) and school rules and regulations ($r = 0.073$, $p = 0.473$) had weak, positive, and statistically insignificant relationships with learner engagement. The overall regression model was statistically significant, $F(3, 95) = 13.780$, $p < 0.001$, explaining 30.3% of the variation in learner engagement ($R^2 = 0.303$). However, positive reinforcement was the only statistically significant individual predictor ($\beta = 0.548$, $p < 0.001$). The study concludes that positive reinforcement is an important predictor of learner engagement, while guidance and counselling and school rules and regulations did not independently demonstrate significant predictive relationships. The study recommends that teachers strengthen the use of praise, encouragement, rewards, and recognition to promote learner participation and engagement in classroom activities.

Keywords: School discipline management, positive reinforcement, guidance and counselling, school rules and regulations, learner engagement.

1. Introduction

Recent research show learner engagement as a critical concern in educational research because its strong relationship learner engagement, achievement in classroom learning, and retention and positive behaviors that lead to learners' achievement (Reschly and Christenson, 2022).

Lerner engagement could be understood as multidimensional constructs which students engage with cognitive, emotional, and behavioral involvement to learn more. Skinner and Pitzer (2012) conceptualized student engagement as a dynamic process involving students' behavioural participation, emotional involvement, and cognitive investment in learning. Worldwide, learner engagement has received substantial attention as education systems endeavour to enhance learning outcomes and equip learners with the skills required in the twenty-first century.

Reschly and Christenson (2022) suggested that 'learner engagement has multiple dimensions comprising behavioral dimension of students engaged with school, emotional dimension of students engaged with classroom learning and cognitive dimension of student's engaged in classroom learning. Evidence from different regions of the world show that learners' engagement depends on school and contexts factors too. Van den Broeck et al. (2023) found that social economic status (SES), behavioral and emotional engagement positively predicted students' educational expectations in European city high schools, emphasizing the importance of learner engagement in enhancing educational outcomes.

According to Jimerson and Chen (2022), positive learning environment within schools and relationships between learners and teachers boost learners'

engagement in both varied cultures. Learner engagement has been a significant subject in education in the African continent. Bekker et al. (2024) indicated that engagement with school was associated with psychological well-being and decreased learner burnout for South African learners. On the other hand, Ahmed (2025) found insufficient learner support and weak school management to be reasons for learner disengagement in South African secondary schools. Makramalla (2021) observed that learner who actively participated learning experiences increased their interest and participation in classroom practices in Egyptian secondary schools. In Nigeria, Adeyemi et al. (2025) found hybrid learning strategies enhance learners' engagement and academic performance. According to Anierobi et al. (2023) and Ikegbusi and Ogamba (2026), engaging in learning at school and home, academic resilience and high self-esteem were among significant correlates of engagement with school among learners in Nigeria.

In Sub-Saharan Africa, various scholars reported similar predictors of learner engagement. Migwambo et al. (2024) found that teachers' digital content evaluation skills significantly predicted secondary school learners' engagement in English lessons. However, Amoadu et al. (2025) found that academic resilience and learner motivation contribute to improved learner engagement for Ghanaian secondary students.

Learner engagement in Uganda is a topical issue as many of the secondary schools still encounter challenges of low participation of learners in the class, absenteeism, lack of motivation among learners, and poor performance in school subjects (Arinaitwe & Reddy, 2025). In their study, Kipuru and Kitembo (2025) asserted that learners' behavioral engagement and emotional engagement significantly predict learners' academic success at secondary school level. Joseph and Charles (2026) reported that decline of interest in learning among students was a contributing factor of learner disengagement in secondary schools in Uganda. In their study, Twesigye et al. (2023) highlighted that parental supervision helped to strengthen learners' engagement during schools' disturbances. In their respective studies, Julius and Audrey (2025) and Kaazara and Audrey (2025) revealed that inquiry-based learning method was very vital to enhanced learner engagement by involving learners actively in the lesson.

Prior studies indicate various factors predicting learner engagement; namely; instructional practices, learner motivation, parental influence, and enquiry-based approach have been established as significant factors

influencing learner engagement, while insufficient attention has been placed on school discipline management techniques (Ruiz et al., 2024; Saziwa, 2026). There is little research on the predictor role of positive reinforcement, rules and regulations of a school, and guidance and counseling in determining learner engagement in private secondary schools. Therefore, this study examined the extent to which school discipline management strategies predict learner engagement in private secondary schools in Wobulenzi Town Council, Luwero District.

1.1 Statement of the Problem

Despite effort by secondary schools to enhance learner engagement, concerns about declining learner engagement in Luwero district has remained disappointingly alarming (Luwero District Education Office, 2021). This low level of learner engagement is caused by the high rates of teachers' absenteeism (35-40%) per day, parental nonchalant behaviour, insufficient learning and teaching resources, insufficient school facilities, insufficient academic resources and under-use of information and communication technologies in education (Nassaazi & Okee, 2024). According to Kagiri (2021), about 15% of students in secondary schools in Luwero lack important scholastic materials and some teachers were reported to use inappropriate teaching methods; most students lack sufficient food leading to poor concentrations in the classroom. Nassaazi and Okee (2024) further discovered that up to 27% of the teachers in public secondary schools in Luwero District do not show up for duty. Lack of effective internal monitoring of teachers, weak teacher effectiveness, limited interaction in the classroom, low learner participation and low levels of students' engagement are consequences of inadequate supervision of teachers in Luwero District (Ludigo et al., 2025).

Nansamba et al. (2024) reported that inadequate teacher support undermines students' academic resilience in Universal Secondary Education schools in Luwero. Also, Rukundo and Magara (2025) noted that even prevalence of local languages over English as a subject of instruction in the secondary school classrooms creates interference on learner's abilities to listen, understand and participate fully in the classroom discourse.

If these situations remain unchecked, there is a possibility that learner's engagement in classroom activities would decline thereby contributing to the low performance in private secondary schools in Wobulenzi Town Council. Therefore, the present

study examined the extent to which discipline management strategies predicted student's engagement in private secondary schools in Wobulenzi Town Council of Luwero District.

1.2 Objectives of the Study

The examined the extent to which discipline management strategies predicted student's engagement in private secondary schools in Wobulenzi Town Council of Luwero District. The following specific objectives were formulated:

- To determine the extent to which positive reinforcement predicts learner engagement in private secondary schools in Wobulenzi Town Council, Luwero District.
- To determine the extent to which guidance and counselling predicts learner engagement in private secondary schools in Wobulenzi Town Council, Luwero District.
- To determine the extent to which school rules and regulations predict learner engagement in private secondary schools in Wobulenzi Town Council, Luwero District.
- To determine the extent to which positive reinforcement, guidance and counselling, and school rules and regulations collectively predict learner engagement in private secondary schools in Wobulenzi Town Council, Luwero District.

1.3 Hypotheses

H01: Positive reinforcement does not significantly predict learner engagement in private secondary schools in Wobulenzi Town Council, Luwero District.

H02: Guidance and counselling does not significantly predict learner engagement in private secondary schools in Wobulenzi Town Council, Luwero District.

H03: School rules and regulations do not significantly predict learner engagement in private secondary schools in Wobulenzi Town Council, Luwero District.

H04: Positive reinforcement, guidance and counselling, and school rules and regulations do not significantly predict learner engagement when considered jointly in private secondary schools in Wobulenzi Town Council, Luwero District.

2. Literature review

2.1 Theoretical Review

Informed by B.F. Skinner's (1948) Operant Conditioning Theory, the theory suggests that behaviour is determined by its consequences; a behaviour is strengthened if it is followed by reward

(positive reinforcement) and weakened if it is followed by punishment (Skinner, 1948; Staddon & Cerutti, 2003).

Thus, the theory underlines how a favourable behaviour can be strengthened by reward. Schools are one context in which teachers apply reward strategies like praise, rewards, encouragement, and recognition which reinforce behaviour such as participation, regularity, compliance with rules. (Skinner, 1948; Sundel & Sundel, 2018). When a student has been rewarded for participation, regular attendance, completing assignments, and maintaining discipline, and will be motivated to maintain this behaviour, hence this will result in greater engagement.

Although Skinner did elaborate on how negative reinforcement and punishment also play a part in behaviour reinforcement, this study focused solely at how positive reinforcement can predict learner behaviour, as proposed by the theory, this can also increase their levels of motivation, engagement and motivation in academic pursuits.

2.2 Discipline Management Strategies

Globally, school discipline in school contexts is conceived both as a management of behaviour as well as mechanisms to sustain learners' engagement. However, Ijaz et al (2024) stated that while negative reinforcement mechanisms such as suspension and warning help to instill learner's compliance it has adverse effect on learners' social and psychological well-being and engagement (Zondo et al., 2023), while positive mechanisms stimulate responsibility and learners' engagement (Firman et al., 2025).

When viewed from an organisational standpoint, strategies of managing discipline entail mechanisms of enforcement, uniformity, and justice in managing behavior(s) (Nwinyokpugi & Robinson, 2019). In education, discipline management strategies refer to institutional mechanisms that are put in place to guide behavior and promote learner engagement (Krskova et al., 2020).

School discipline in Ugandan secondary schools stem from the post-corporal punishment era, focus more on building disciplinary structure of guide, corrections and supported by the school leadership to ensure that teachers can handle student discipline and behavioral results in school environment (Santo et al., 2025). Similarly, Kaweesi et al. (2023) note that consistent use of discipline management practices promotes student behaviour in private secondary schools, however inconsistencies limit their effectiveness.

Ludigo, Buet al. (2025) observed effective internal school supervision and implementation of school policies enhances to improved educational outcomes.

Despite these improvements, scanty evidence exists on how particular discipline management strategies predict learner engagement in private secondary schools in Wobulenzi Town Council, Luwero District, creating a contextual and empirical gap for this study.

2.3 Positive Reinforcement and Learner Engagement

Positive reinforcement is a behavioral learning principle involving the provision of a desirable outcome after the desired behavior happens to reinforce the likeliness that it happens again (Barata, 2022). It includes praise, acknowledgements, compliments, tangible rewards and others which can promote getting and keeping the target behaviour, both in academic and behavior terms (Gunaretnam, 2021). The impact of positive reinforcement includes the interaction of student and teacher which does not limit to tangible rewards only (Nikishyna et al., 2023).

Studies from Western and European contexts have consistently reported that positive reinforcers lead to learner engagement and involvement. For instance, Nikishyna et al. (2023) identified that positive verbal reinforcers (e.g. Praising words, encouragement) used constantly lead to improvement in the students' participation and reactivity towards the teaching instructions. The findings from Mondol et al. (2026) also suggested that learners' engagement toward learning are stronger when supported in a positive school climate that involved consistent positive reinforcement. However, these studies were conducted within well-resourced and structured learner supportive systems, hence, it is not confirmed whether same result can be obtained in a school within a low resource setting.

Evidence from Asian countries also support how positive reinforcement practices predicts learner engagement. For instance, the consistent use of reinforcements to influence the learner engagement enhanced learning (Khanum et al., 2025). Nevertheless, most Asian studies have concentrated on primary education, leaving limited evidence on how positive reinforcement predict learner engagement among secondary school students.

Studies carried out across Africa like in Nigeria shows that the use of positive reinforcement decreases the absenteeism of the students and also increases learners' interest in school. However, a large number of studies in Africa continued to measure students'

attendance, discipline and school achievement instead of their learners' engagement (Abdulrazak et al., 2025).

In Uganda, research on positive reinforcement remains scanty. Ismail (2023), as well Ahmed (2026), indicates that teachers who continually used positive reinforcement noted elevated rates of classroom participation and attentiveness of learners. However, limited empirical evidence studies have investigated positive reinforcement to predict learner engagement in private secondary schools particularly in semi-urban like Wobulenzi Town Council in Luwero District

2.4 Guidance and Counselling and Learner Engagement

Guidance and counselling are also becoming more accepted as a school-based service aiming to assist students to face academic, social and emotional problems and enhance school attendance. Counselling assistance with students developing coping skills, with making choices and adapting to school (Akdemir, 2023).

In most studies, learner engagement is not measured directly. Instead, it is often reflected through related outcomes such as self-efficacy or academic adjustment. This creates a limitation because engagement is usually assumed rather than clearly measured in its behavioural, emotional, and cognitive dimensions. Counselling is usually described with theories such as the Social Cognitive Theory, Humanistic Theory but often research papers do not clarify the connection between the theory and continuous engagement for learners at school. The terms 'guidance' and 'counselling' usually means services that provides organised school services that assists children in dealing with the learning situation and related social, behavioural, emotional and academic tasks (Canzittu, 2024). Such a service aims to assist children in becoming more effective to improve their active participation in teaching and learning at school.

Evidence from Europe has shown that counselling improves learner retention as well as reducing dropout rate by managing various problems leading to lack of engagement (Psifidou et al., 2021). According to Steen et al (2022) school counselling service also enhances learner engagement. However, most of these studies are based on well-developed counselling systems, which may not reflect the situation in schools where counselling services are still developing or less structured.

In African, the most prevalent perception of counseling tends to be associated with better academic performance, discipline and behaviour. Counselling was identified as contributing to student success, especially within resource poor schools, and assisting learners to resolve academic, social and behavioural issues which prevent school participation (Muluvhu-Malanga, 2024; Dianovi et al., 2022). Nevertheless, most studies tend to emphasize academic and behavioural results over learner engagement per se.

In Uganda, guidance and counselling is slowly gaining ground in secondary schools, although implementation is still uneven. Counseling services in schools currently revolve largely around career counseling and discipline management. Counselling services over time as in how they help the students make career choices and adjust have been addressed by Otwine et al., (2025), while Mugalu and Muhammed (2023), and Otwine et al. (2025) demonstrate how counselling has positively impact students' academic performance in secondary schools in Uganda. Still, little has been studied concerning how guidance and counseling predicts learner engagement in private secondary schools.

2.5 School Rules and Regulations and Learner Engagement

School rules are formal guidelines that prescribe the standards for good conduct, set out the rights and responsibilities of each member of the school community, and define how order should be preserved in schools. They provide a basis on which order, responsibility, fairness, consistency, and discipline are maintained in school to create an environment that facilitate the processes of teaching and learning (Koop & Lodge, 2017). A school that streamlines school rules can make peaceful learning environment, orderly and supportive for the effective learner engagement. Conceptually school rules are supposed to create an environment within which learners are willing to engage, assume responsibility for their learning and invest in learning. In most studies of school rules however, evaluation has tended to be on terms other than learner engagement and typically focuses on student behaviour, achievement, compliance with rules, school atmosphere etc. Thus, the impact on learner engagement has often been implicitly inferred rather than assessed. There has been little discussion in existing studies as to school rules leads learners to develop engaged attitudes predicts learner engagement.

In Africa, studies consistently associate school rules and regulations with improved discipline, learner

behaviour, and educational outcomes. In Kenya, Akech et al. (2022) reported that involving learners in the development of school rules enhanced discipline management by strengthening learners' ownership and commitment to school regulations. Similarly, Idris (2023) found that effective implementation of school rules was positively associated with students' academic performance in Nigeria, while Nduwayezu and John (2025) observed that internal school rules strengthened learner accountability and improved academic outcomes in Rwanda. Despite these positive findings, most African studies have examined school rules through discipline, behaviour management, and academic performance rather than learner engagement as a specific outcome. Consequently, limited evidence exists on whether school rules and regulations independently predict learners' behavioural, emotional, and cognitive engagement in secondary school settings.

In Uganda, schools' rules and policies still have significant impacts on school management and learners' management. For example, school policies aiming to ensure welfare of both staff and learners can lead to positive learning environment in public secondary schools, according to Nabirye et al (2022). Furthermore, effective supervision and application of internal policies were positively associated with learning outcomes in government aided secondary schools of Luwero District (Ludigo et al., 2025). However, most research focused on public schools, discipline and welfare of learners as well as learning outcomes, but with not much regard for learner engagement.

3. Methodology

3.1 Sample / Study Group

This study adopted a descriptive cross-sectional survey design. The design was appropriate because it enabled the collection of data at a single point in time to describe discipline management strategies and learner engagement, and to examine the extent to which positive reinforcement, guidance and counselling, and school rules and regulations predict learner engagement in private secondary schools.

The study was conducted in Wobulenzi Town Council, Luwero District, located in Central Uganda along the Kampala–Gulu Highway. The area was selected because of persistent concerns about low learner engagement in private secondary schools and the presence of diverse discipline management practices, making it suitable for examining the

relationship between discipline management strategies and learner engagement.

The target population comprised students, teachers, head teachers, and district education officials from four selected private secondary schools in Wobulenzi Town Council. The total population was 145 respondents distributed across Mulusa Academy Wobulenzi (35), Wobulenzi High School (35), Focus Secondary School (35), and Katikamu SDA Secondary School (40). Using Krejcie and Morgan's (1970) sample size determination table, a quantitative sample of 103 student respondents was selected.

The study employed Stratified sampling and simple random sampling. Stratified sampling was first used to group student respondents into relevant strata (such as class level or gender, depending on the study context) to ensure proper representation of key subgroups within the population. Simple random sampling was then used within each stratum to select student respondents, ensuring that every individual had an equal chance of participation and reducing selection bias (Cohen, Manion, & Morrison, 2018; Creswell & Creswell, 2018).

3.2 Data Collection Methods

Data were collected using structured self-administered questionnaires. The questionnaires enabled the researcher to obtain quantifiable data from a large number of respondents, enhancing the generalisability of findings (Creswell & Creswell, 2018).

3.3 Measurement Tool

The study used self-administered questionnaires and semi-structured interview guides as the principal data collection instruments. The questionnaires were administered to student respondents and consisted mainly of close-ended items measured on a five-point

Likert scale to facilitate standardised responses and quantitative analysis (Creswell & Creswell, 2018; Kothari, 2004). The questionnaire first captured demographic information such as age, gender, and class level, which helped describe the characteristics of the respondents and support comparative analysis.

Student engagement was measured as the dependent variable and was operationalised through indicators reflecting social, cognitive, behavioural, collaborative, and emotional engagement (Fredricks, Filsecker, & Lawson, 2016; Bond & Bedenlier, 2019). The independent variables focused on discipline management strategies, which included positive reinforcement, guidance and counselling, and school rules and regulations. These dimensions examined how disciplinary practices predicted learner engagement.

3.4 Data Processing

Data were collected through questionnaires were edited, coded, and entered into the Statistical Package for Social Sciences (SPSS) for analysis. Data cleaning procedures were conducted to identify and correct errors, omissions, and inconsistencies before analysis. Data Analysis

Quantitative data were analysed using both descriptive and inferential statistics. Descriptive statistics such as frequencies and percentages were used to summarize respondents' characteristics and study variables. At the bivariate level, Pearson correlation analysis was used to establish how discipline management strategies predicted learner engagement. At the multivariate level, multiple linear regression analysis was employed to determine the extent to which positive reinforcement, guidance and counselling, and school rules and regulations collectively predict learner engagement.

4. Results

The results of the various findings on this study are presented in the tables 1-7 below.

Table 1: Descriptive Results for Demographic Characteristics

Characteristic	Category with Highest Representation	Frequency	Percent (%)
School attended	Mulusa Wobulenzi Academy	36	36.0
Age of respondents	22 years and above	49	39.2
Gender	Female	57	65.7
Type of class	Senior Three (S.3)	52	51.0
Duration in school	Three years and above	39	40.2
Learning frequency per week	Five times and above	61	58.8
	English/Literature	34	32.4

From Table 1, the data indicated that the majority of respondents were from Mulusa Wobulenzi Academy (36.0%), aged 22 years and above (39.2%), and were female (65.7%). Most respondents were in Senior Three (51.0%), had studied in their schools for three years and above (40.2%), and attended lessons five times or more per week (58.8%). The preferred subject to all groups of students was English/ Literature (32.4%). The findings show that respondents represented varied school and academic backgrounds.

Table 2: Mean Scores and Standard Deviation of the Engagement constructs

Constructs	Mean (M)	Standard deviation (SD)
Cognitive Engagement	3.62	1.24
Social Engagement	3.37	1.31
Collaborative Engagement	3.02	1.35
Behavioral Engagement	3.22	1.22
Emotional Engagement	3.22	1.25

Results from table 2 suggest that learner's engagement with the five dimensions were at moderate-high level. The respondents who participated in this study perceived they are high engaged both for the aspect of cognitive engagement (M = 3.62, SD = 1.24), which means they are engaging to understand the material being delivered. They showed a relatively high-level engagement in both social engagement (M = 3.37, SD = 1.31), behavioral, and emotional engagement (M=3.22) as student responded positively to teacher and classroom rules. The least score was received by collaborative engagement (M = 3.02, SD = 1.35), which seems a little low to measure teamwork and co-activity within groups of learners. The overall results indicated that student did very well in cognitive aspect compared to the collaborative aspect, which needs improvement.

Table 3: Mean Scores and Standard Deviation of the Variables

Constructs	Mean (M)	Standard Deviation (SD)
Positive Reinforcement PRF	3.10	1.34
Guidance and Counseling	4.20	0.79
School Rules and Regulations	3.97	0.99

The data revealed an overall perception by the students that discipline management practices were present in schools. Guidance and counseling achieved the top mean rank score (M= 4.20, SD= .79) implying that there were high perceived levels of teacher concern over students emotionally, academically, career as well as for personal growth. High mean rank scores for the presence of school rules and regulations (M= 3.97, SD= .99) suggested students' perceptions of this practice as clear, fair and understandable to all students. The use of positive reinforcement ranked the lowest (M= 3.10, SD= 1.34) thus implying that while teachers had a high perception use of praise, reward and recognition, these practices differ among the students. Essentially, teachers have strengths related to guidance/counseling and excellent rule enforcement, but they need to standardize effective use of reinforcement.

4.1 Hypotheses testing

Inferred from the research, the researcher hypothesized a correlation: H₀₁: Positive reinforcement, H₀₂: guidance and counselling, and H₀₃: school rules and regulations do not significantly predict learner engagement in private secondary schools in Wobulenzi Town Council, Luwero District.

A Pearson correlation coefficient was run to test the significance predictability, respectively. The findings of findings are presented in Table4.

Table 4: Pearson Correlation of PRFM, GDC, SRR, and Learner engagement

Discipline Management Practices	Pearson Correlation (r)	Sig. (2-tailed) (p)	N
Positive Reinforcement (PRFM)	0.477**	0.000	100
Guidance and Counseling (GDC)	0.068	0.505	100
School Rules and Regulations (SRR)	0.073	0.473	100

The results in Table 4 indicate that positive reinforcement had a moderate positive and statistically significant relationship with learner engagement (r = 0.477, p < 0.01), implying that students who receive praise, recognition, and rewards tend to display higher engagement levels. Since the significance value was below the 0.01 threshold, the null hypothesis (H₀₁) that positive reinforcement has no statistically significant relationship with learner engagement was rejected. However, guidance and counseling (r = 0.068, p = 0.505) and school rules and regulations (r = 0.073, p =

0.473) showed weak positive but statistically insignificant relationships with learner engagement. Since their p-values were greater than 0.01, the null hypotheses (H_{02} and H_{03}) were not rejected, indicating that guidance and counseling and school rules and regulations did not significantly predict learner engagement. This suggests that while these practices contribute to streamlining discipline, their direct prediction on learner engagement was not statistically significant in this study.

Table 5: Multiple Regression of Positive reinforcement, Guidance and Counselling, and Learner Engagement

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.551 ^a	.303	.281	.56963

The model summary in Table 5 indicates that positive reinforcement, guidance and counseling, and school rules and regulations collectively explain a significant proportion of variation in student engagement. The model showed a moderate positive correlation ($R = 0.551$) and an R^2 of 0.303, suggesting that the three discipline management practices account for 30.3% of the variation in student engagement. The adjusted R^2 (0.281) verify the stability of the model, while the remaining 69.7% of variation is explained by other factors outside the model. The standard error of the estimate (0.56963) indicates a relatively acceptable deviation of error.

Table 6: ANOVA on PRFM, GDCS, and SRRS and Students Engagement

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	13.414	3	4.471	13.780	.000 ^b
	Residual	30.825	95	.324		
	Total	44.239	98			

The ANOVA results as presented in Table 6 are used to determine the overall significance of the overall regression model that is predicting learner engagement from positive reinforcement, guidance and counseling, and school rules and regulations. The regression model as per the results obtained is significant; $F(3, 95) = 13.780$, $p = .000$. As $p < 0.01$ the regression model is significant at 1% level. This demonstrates that PRFM, GDCS and SRRS significantly predict learner engagement in private secondary schools of Wobulenzi Town Council, Luwero District.

Hence, the null hypothesis is rejected as the combined predictors do significantly explain variability in the learner engagement. Furthermore, the model is reliable for predictions on learner engagement using the three independent variables.

Table 7: Correlation coefficient of PRFM, GDC, and SRR and Student Engagement

	Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Tolerance	Statistics VIF
1	(Constant)	1.624	.587		2.765	.007		
	PRFM	.317	.050	.548	6.353	.000	.986	1.015
	GDC	.048	.138	.033	.351	.726	.847	1.181
	SRRS	.127	.096	.125	1.331	.186	.835	1.197

The multiple regression analysis indicated that positive reinforcement significantly predicted learner engagement ($\beta = .548$, $t = 6.353$, $p < .001$). In contrast, guidance and counselling ($\beta = .033$, $t = .351$, $p = .726$) and school rules and regulations ($\beta = .125$, $t = 1.331$, $p = .186$) did not significantly predict learner engagement. The findings reveal that positive reinforcement explained most of the variations in learner engagement among the examined school discipline management practices. The collinearity statistics showed acceptable levels of tolerance and variance inflation factor (VIF), suggesting that multicollinearity was not a concern.

5. Discussion

Result from the study reveal that positive reinforcement is the highest significant predictor of learner engagement, such that positive reinforcement is positively correlated with learner engagement. This result support Skinner's theory of operant conditionality (1948) which stated that the behavior will increase in probability if the behavior has a reinforcing stimulus for the learner. The finding also concurs with research by Nikishyna et al. (2023), and Khanum et al. (2025), which concluded that encouragement and the practice of reinforcement boost learner participation and motivation. In addition,

the findings are supported by Ismail (2023) in which found that positive reinforcement increased participation in classroom participation and attentiveness in learners of Uganda.

The study further found that guidance and counselling were weak and statistically insignificant predictors of learner engagement. Although literature suggests that counselling supports learners' emotional adjustment, behaviour, and academic development (Akdemir, 2023; Canzittu, 2024), the current findings indicate that counselling alone may not sufficiently predict learner engagement in private secondary schools. This finding may be explained by variations in the implementation and availability of counselling services, where counselling may focus more on discipline and career guidance than on directly promoting behavioural, emotional, and cognitive engagement.

In a similar vein, the school rules and regulations had a low and non-significant predictor of learner engagement. It has been established in several studies that the school rules enhance discipline, accountability and an organized learning environment (Koop & Lodge, 2017; Akech et al., 2022) however in this study, the results reveal that just having rules in place may not necessarily culminate in an engaged learner. The quality of delivery and implementation and perception of rules on the part of the learner are vital for effective participation.

The combined regression model revealed that positive reinforcement, guidance and counselling, and school rules and regulations significantly predicted learner engagement, explaining 30.3% of the variation in engagement. However, positive reinforcement remained the only significant individual predictor. The study corroborates Skinner's theory in showing that the more direct modes of reinforcement are more significant than general discipline regimes in influencing pupil participation and behaviour. In conclusion, though management regimes in discipline as a whole increase participation of learners in the learning activities, positive reinforcement remains the key strategy in determining the pupils' level of participation, commitment to their learning and motivation.

6. Conclusion

This study examined the extent to which positive reinforcement predicts learner engagement in private secondary schools in Wobulenzi Town Council, Luwero District. The findings show that positive reinforcement significantly learner engagement and

isthe strongest predictor among the variables studied. This indicates that the use of praise, rewards, and encouragement plays an important role in improving students' participation, interest, and involvement in learning activities.

The study findings reveal also that guidance and counselling, and school rules and regulations do not predict learners' engagement in the study area. This implies that in isolation the interventions, although crucial in ensuring the discipline of the learners, may not necessarily enhance their participation. In summation, the three factors accounted for a significant proportion of variability in learners' engagement, meaning that they contribute collectively to the behavioural aspect and participation of the learners.

The study concludes that learner engagement is more strongly predicted by classroom-based reinforcement practices than by broader institutional support systems such as guidance and counselling and school rules.

7. Recommendations

The recommendations arising from the study are as follows; Firstly, teachers should continually use the reinforcement positive techniques (such as rewards, praise, rewards and acknowledgement) in the classroom in order to motivate desired behavior among the learners so as to achieve greater class participation. Secondly, school administrators should improve the guidance and counseling system of the school; through proper organization, provision of well-trained teachers and integration with student's needs, both behavioral and academic. Thirdly, school management should assess how regulations/rules are applied in schools; they should ensure fairness, clarity and uniformity in their application. Sharing school rules with students, or asking for input from students could promote a better understanding of and compliance with school rules. Fourthly, the school should embrace a multi-pronged approach which integrates the reinforcement techniques, the guidance and counseling service, and well-thought-out school rules, rather than using only one intervention in trying to improve the learner's participation. Lastly, education authorities should promote on-going teacher in-service training programs on learner motivation, effective classroom management, and especially reinforcement as they tend to have a higher impact on student engagement.

8. Areas for Further Study

This study examined the extent to which school discipline management strategies predicted learner engagement in private secondary schools in Wobulenzi Town Council, Luwero District, Uganda. Given the study's findings, the following are proposed as future areas of inquiry: Future research could address the various other potential influencing variables like teacher-student relationships, school climate, instructional strategies, and peers. Other researchers could investigate the possible mediating roles that guidance and counseling, and school rules and regulations have on learner engagement; perhaps by school climate or learner motivation. Similar investigations could also be done on public schools and rural schools for purposes of comparisons with private schools and generalizability. Fourth, future studies should use longitudinal or mixed-method approaches in order to capture changes in student engagement over time and provide deeper explanations of the observed relationships. Finally, further research should consider analysing student engagement in its different dimensions, including behavioural, emotional, cognitive, and agentic engagement, to provide a more detailed understanding of how school practices influence each aspect.

9. Limitations of the Study

The study had several limitations. First, the cross-sectional design limited the ability to establish causal relationships between discipline management strategies and learner engagement. Secondly there might have been a response bias due to reliance on self-reported information, but this was addressed by anonymous and confidential responses, careful instructions to respondents and used established data collections instruments. Third, the study focused on private secondary schools in one district, limiting generalizability to other contexts. Finally, the study examined only three discipline management strategies, while other factors may also influence learner engagement. Future studies should consider broader settings and additional variables.

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