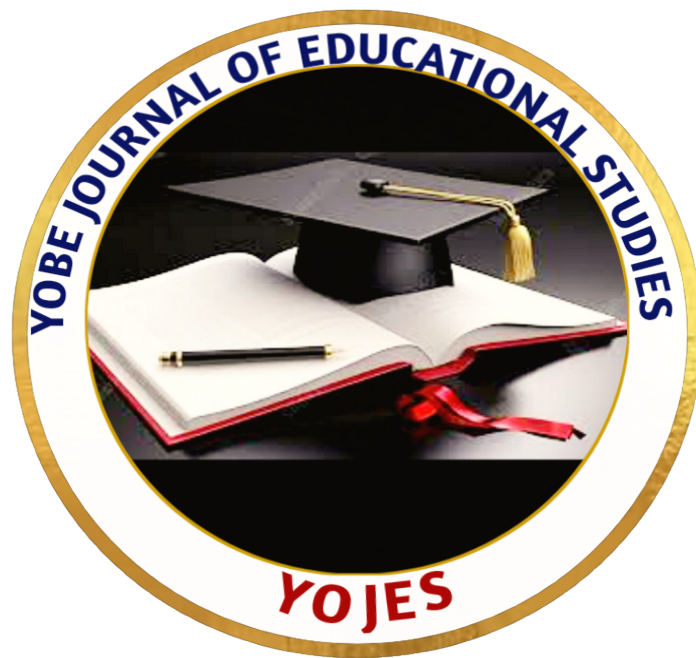


YOBE JOURNAL OF EDUCATIONAL STUDIES (YOJES)

Volume 2 number 2 February, 2025

ISSN: 1595-5338



A PUBLICATION OF THE FACULTY OF EDUCATION, YOBE STATE UNIVERSITY, DAMATURU

@ YOBE JOURNAL OF EDUCATIONAL STUDIES (YOJES)

February, 2025

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ISSN No.: 1595-5338

Printed and published by
GOODLUCK EBELE JONATHAN LIBRARY
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6. Manuscript must be original not published or accepted by another journal
7. No paper should exceed 15 pages including references
8. Manuscript/Article can be submitted for vetting electronically via yobejournalofeducation11@gmail.com

TABLE OF CONTENTS

ASSESSMENT OF SCHOOL-BASED MANAGEMENT COMMITTEES' (SBMCS) INVOLVEMENT IN MANAGING PUBLIC SENIOR SECONDARY SCHOOLS IN NORTH-EAST ZONE, NIGERIA <i>Maryam Sani, Prof. Kadiri Dugje, & Dr. Baba Babo</i>	1
COMPARATIVE ANALYSIS OF GOVERNMENT AND PRIVATE SECONDARY SCHOOLS' ACADEMIC ACHIEVEMENT IN MATHEMATICS IN KANO METROPOLIS, KANO STATE <i>Dr. Sadi Mohammed Sirajo</i>	15
AVAILABILITY AND ACCESSIBILITY OF SCHOOL HEALTH SERVICES IN THE UNIVERSAL BASIC EDUCATION PROGRAMMES IN GWALE LOCAL GOVERNMENT AREA, KANO STATE <i>Adeyanju, E. S. (PhD), Shuaibu, A. A. (PhD) & Mrs. M. I. Adeyanju-Ogbodo. (MSC)</i>	28
PARENTAL EDUCATION AND CREATIVITY: AN EXPLORATORY STUDY OF UNIVERSITY UNDERGRADUATES IN KWARA STATE, NIGERIA <i>Masud Ibrahim O., Aminat Ozohu A., Abiodun Jubril O., Yunus A. & Oludare David O</i>	43
ASSESSMENT OF SAFETY PRACTICES TOWARD OCCUPATIONAL HAZARDS AMONG HEALTHCARE WORKERS OF TEACHING HOSPITAL IN NIGERIA <i>Yusuf Muhammed, Prof. V. Dashe, Prof. M. A. Suleimann & Dr A. U. Ningi</i>	57
CLASSROOM MANAGEMENT TECHNIQUES: TOOLS FOR EFFECTIVE TEACHING IN NIGERIAN SECONDARY SCHOOLS <i>Yusuf Suleiman, Ahmed-Zakariyyah Rahmat Bukola & Ibrahim Musa Akanbi</i>	66
IMPACT OF DIGITAL TOOLS AND TECHNOLOGICAL ADVANCEMENTS ON THE QUALITY OF SCIENCE EDUCATION IN NIGERIAN SCHOOLS <i>Dr. Chilee C. Onwukwe Onyimonyi</i>	83
CURRICULUM AND PROGRAMME OFFERINGS IN NIGERIAN UNIVERSITIES FOR SUSTAINABLE NATIONAL DEVELOPMENT IN THE 21 ST CENTURY <i>Igben, O. M. PhD, Idaka, E. I. PhD, Iseyechinbo, A. G. PhD & Uzomba O. C.</i>	100
ASSESSMENT OF TECHNO-PEDAGOGICAL COMPETENCY SKILLS OF PRE-SERVICE TEACHERS IN ONDO STATE, NIGERIA <i>Abidoje James .Aalabi (PhD)</i>	118
AI-DRIVEN APPLICATIONS FOR PROMOTING ETHICAL EXCELLENCE AND INTEGRITY AMONG WORKERS IN HIGHER EDUCATION SYSTEM IN NIGERIA <i>Mrs. Mary I. Adeyanju-Ogbodo (M.Sc)</i>	128

EFFECTS OF PEER TUTORING TECHNIQUES ON PERFORMANCE AND ATTITUDE OF
LOW ABILITY SECONDARY SCHOOL BIOLOGY STUDENTS IN KATAGUM
EDUCATIONAL ZONE, BAUCHI STATE

Dr. Nazifi Wada Salisu, Uanzekin Daniel Ohiorenuan & Usman Sabo Baba139

PERCEPTION AND ATTITUDE OF PRE-SERVICE TEACHERS' ON USE OF WHATSAPP
MICROBLOG IN LEARNING SOCIAL STUDIES IN UMAR SULEIMAN COLLEGE OF
EDUCATION GASHUWA YOBE STATE, NIGERIA

Hassan M., Ibrahim U. H., Yakubu S., Adamu A. D. & Madu K. Z. B. 147

REVIEW OF EMPIRICAL STUDIES ON INFLUENCE OF SCHOOL ENVIRONMENT ON
STUDENTS' ACADEMIC PERFORMANCE

Fwangle, Ishaya Istifanus & Jings, Dogara Jingina 157

**ASSESSMENT OF SCHOOL-BASED MANAGEMENT COMMITTEES' (SBMCS)
INVOLVEMENT IN MANAGING PUBLIC SENIOR SECONDARY SCHOOLS IN
NORTH-EAST ZONE, NIGERIA**

BY

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ABSTRACT

This study examined the involvement of School-Based Management Committees (SBMCs) in managing public senior secondary schools in Nigeria's North-East Zone, Nigeria. It aimed to assess SBMCs' roles in provision of instructional resources and maintaining discipline. Two research questions and two null hypotheses were addressed using a descriptive survey design. The population included 1,155 principals and 13,632 SBMC members, with a sample of 31 principals and 347 SBMC members from Borno, Gombe, and Taraba States selected through purposive and random sampling. Data were collected using a validated questionnaire with a reliability coefficient of 0.8. Mean and standard deviation addressed research questions, while chi-square tested hypotheses at a 0.05 significance level. Findings showed SBMCs had moderate involvement in resource provision and high involvement in maintenance of discipline, with no significant differences in perceptions of principals and SBMC members. It is recommended that principals should collaborate closely with SBMCs to promote a supportive environment that reduces disciplinary challenges and promotes cooperation among students, staff, and SBMC members.

Keywords: *Assessment, Management, SBMC, Involvement, Instructional Resources, Discipline.*

Introduction

Secondary education in Nigeria was introduced by missionaries in the late 1850s. It serves as the foundation for higher education and is a necessary pathway for primary school graduates to develop the skills and knowledge required to contribute meaningfully to themselves and society. According to the National Policy on Education in Nigeria, the aims of secondary education include preparing students for productive living within the society and equipping them for

further education. Achieving the vision of education as a cornerstone of national development requires transformative measures within the school system, leading to the establishment of School-Based Management Committees (SBMCs). School-Based Management (SBM) is an institutional approach that delegates responsibility and authority to the school level to enhance performance (Elmelegy, 2015). It involves empowering key stakeholders with authority for effective administration, monitoring, evaluation, and policy review in education. This decentralized system promotes democratic principles, community involvement, equity, and responsiveness to local needs, ensuring quality teaching, learning, and the achievement of educational standards. According to the Federal Ministry of Education, SBMCs are statutory, non-political committees composed of members committed to actively supporting schools and their host communities. Their primary objective is to identify challenges, evaluate their effects on learners, and address issues that hinder school administrators from performing effectively. Additionally, SBMCs facilitate good governance aligned with government plans and policies while promoting strong relationships between schools and their communities.

The origins of School-Based Management (SBM) can be traced back to 1909 in the United States, where it began as the Teacher Council Movement (TCM). During this period, teacher-led councils were created to offer policy recommendations for individual school administration. Over time, these councils evolved, and by the mid-1990s, the SBM concept gained significant momentum, spreading globally and taking on various forms in different countries (Boonmee, 2002; Eurydice, 2007). In Nigeria, the roots of SBM can be linked to the colonial era, during which School Management Committees (SMCs) oversaw school management and fundraising. However, their influence declined in the 1980s when the Federal Government centralized control of all schools. The global education reform movements of the 1990s and 2000s spurred Nigeria to formalize the SBM system. In 2005, during its 52nd session, the National Council on Education (NCE) approved the establishment of SBMCs in all schools across the country. The NCE also provided guidelines for their establishment and recommended a structure designed to enhance active community participation in the planning and management of schools.

The researcher observed that public senior secondary schools in the North-East Zone of Nigeria are facing a decline in student achievement, influenced by several factors. These challenges include poor system management, indiscipline, and inadequate provision of instructional

resources. While effective administration plays a pivotal role in the educational process, it is evident that, despite government efforts to address these issues, a significant gap remains in fully meeting the needs of the education system in the region. Additionally, there appears to be insufficient involvement from parents, communities, philanthropists, and alumni in managing public senior secondary education in the North-East Zone. Their support, whether in cash or kind, remains limited. To bridge this gap, the involvement of SBMCs is essential, both through financial and non-financial contributions.

Review of Related Literature

School-Based Management (SBM) represents a significant educational reform aimed at enhancing the quality and adequacy of education for students (Mulyasa, 2007). By promoting participatory decision-making within the framework of national education policies, SBM introduces structural changes in school administration through decentralization, positioning the school as the primary unit of improvement and redistributing decision-making authority (Mulyasa, 2007). Complementing this, SBMCs provide a practical approach to addressing the prevailing management challenges in secondary schools. As highlighted by Kiragu, King, and Migosi (2013), SBMCs foster accountability and commitment among teachers, ensuring efficient resource utilization, timely syllabus coverage, quality education delivery, improved operational efficiency, and reduced need for supervision.

Effective school management is crucial for achieving organizational goals amidst dynamic environments. Management entails balancing efficiency, effectiveness, and equity to maximize limited resources while working collaboratively with others (Naylor, 2004). A key component of successful school management is the provision of instructional materials, which play a pivotal role in facilitating learning and improving outcomes. Obi (2010) and Olawale (2013) describe these materials as tools specifically designed to enhance learning, including textbooks, charts, maps, and audio-visual aids like radios, televisions, and tape recorders. Such resources contribute significantly to making the learning process more engaging and effective (Atkinson, 2000). Geoffrey (2015) observed minimal involvement by school committees in mobilizing school resources in Rufiji District, Coast Region Tanzania. Aguba and Etikuo (2023) also reported a low level of SBMC performance in the funding of secondary schools as regards to the provision of instructional materials. However, their study also found no significant difference between the

mean ratings of principals and SBMC Chairmen on the extent to which the SBMC has performed in the funding of secondary schools in fostering the provision of instructional materials in Enugu State. However, Sanusi (2018) demonstrated that School-Based Management Committees influenced the provision of instructional materials in secondary schools in Funtua Senatorial Zone, Katsina State.

Discipline, another critical factor in educational success, serves as the foundation for maintaining order and achieving organizational objectives, without discipline, no institution can function effectively (Ouma, Simatwa, & Serem, 2013). Ige (2013) defines discipline as the respect students show towards school authorities by adhering to laws and regulations to uphold established behavioral standards. Moreover, Masitsa (2008) highlights the importance of discipline in creating a positive school climate conducive to academic success. Onyilibe's (2020) reported a low extent of SBMC participation in maintaining discipline within secondary school administration in Enugu State, with no significant difference between the mean scores of urban and rural SBMCs regarding the extent of their participation in maintaining discipline in Enugu State secondary schools.

Statement of the Problem

It seems that the decline in students' achievement in public senior secondary schools in Nigeria's North-East Zone is a critical concern, exacerbated by poor system management, indiscipline, and inadequate instructional resources. Rossouw (2003) attributes the decline in discipline in most schools as originating from the communities rather than from schools. This community dynamic adds to the challenges of maintaining discipline in secondary schools. Agabi (2010) highlighted that the resources provided by the government for executing education projects in Nigeria are both inadequate and irregular. Supporting this view, Osarenren-Osaghae and Irabor (2012) emphasized that the unavailability of authentic resources, often influenced by environmental factors, poses a significant barrier to the availability and effective utilization of instructional materials. Together, these perspectives stress the critical challenges faced. Despite government interventions, there remains a significant gap in meeting the educational needs of the region. It appears that the limited involvement of key stakeholders further hampers the effective management of these schools. This lack of involvement undermines the potential of SBMCs to address challenges and enhance school administration. Consequently, a deeper exploration of

SBMCs' roles and contributions is necessary to improve educational outcomes and ensure sustainable development. Therefore, this research assessed the involvement of School-Based Management Committees (SBMCs) in managing public senior secondary schools in the North-East Zone of Nigeria.

Objectives of the study

This study determined:

1. School Based Management Committees' involvement in provision of instructional resources in public senior secondary schools in North-East Zone Nigeria;
2. School Based Management Committees' involvement in maintenance of discipline in public senior secondary schools in North-East Zone Nigeria.

Research Questions

In line with the research objectives these research questions were answered:

1. What is the level of school based management committees' involvement in provision of instructional resources in public senior secondary schools in North-East Zone Nigeria?
2. What is the level of school based management committees' involvement in maintenance of discipline in public senior secondary schools in North-East Zone Nigeria?

Research Hypotheses

The following hypotheses guided the study:

H₀: There is no significant difference in the opinions of principals and SBMC members on school based management committees' involvement in provision of instructional resources in public senior secondary schools in North-East Zone Nigeria;

H₂: There is no significant difference in the opinions of principals and SBMC members on school based management committees' involvement in maintenance of discipline in public senior secondary schools in North-East Zone Nigeria.

Methodology

Descriptive survey research design was used for the study and the targeted population comprised of 1,155 principals and 13,632 SBMC members making a total of 14,787 from 1,155 public senior secondary schools across the six states of Nigeria's North-East Zone (Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe). A sample of 378 respondents, including 31 principals and 347 SBMC members, were selected for the study. The sampling process employed a multistage

sampling technique, with three states Borno, Gombe, and Taraba purposively chosen from the zone. The sample size was then proportionally allocated among these states, and respondents were chosen through a simple random sampling technique. To collect data, the researcher developed a closed-ended, structured questionnaire titled "Assessment of School-Based Management Committees' (SBMCs) Involvement in Managing Public Senior Secondary Schools Questionnaire" (ASBMCIMPSSSQ). The instrument was validated by the researcher's supervisors and experts in test and measurement as well as educational administration and planning. Its reliability was confirmed with a Cronbach alpha coefficient of 0.8. Mean and standard deviation were employed to address the research questions. The mean value of 3.0 set indicated high level. Chi-square was used to test the hypotheses at a 0.05 significance level. Data analyses were conducted using the Statistical Package for Social Science (SPSS) version 23.

Results

Research Questions 1: What is the level of school based management committees' involvement in provision of instructional resources in public senior secondary schools in North-East Zone Nigeria? Table 1 provided the results for research question 1:

Table 1: Mean Responses of Principals and SBMC Members on the Level of Involvement of SBMCs in Provision of Instructional Resources

S/N	Items	Principals = 31			SBMCs = 347		
		Mean	SD	Decision	Mean	SD	Decision
The level at which SBMC plays a role in:							
1	Ensuring the provision of visual aids such as charts, diagrams, maps, graphs and posters in the school is	3.52	1.12	High Level	2.66	1.12	Moderate Level
2	Ensuring the provision of multimedia resources such as DVDs and audio in the school is	2.35	1.28	Moderate Level	2.49	1.02	Moderate Level
3	Provision of laboratory equipment such as microscopes, beakers, test tubes, and measuring instruments in the school is	2.74	1.13	Moderate Level	2.69	0.99	Moderate Level
4	Providing books for the school library is	2.97	1.25	Moderate Level	3.55	1.18	High Level
5	Provision of textbooks to the school is	3.26	1.06	High Level	3.19	1.14	High Level
6	Provision of E-book to the school is	1.74	1.06	Low Level	1.77	1.07	Low Level
7	Providing instructional aids/ICT resources to the school is	2.26	1.00	Moderate Level	2.65	1.19	Moderate Level
Grand Mean		2.69	1.13	Moderate Level	2.71	1.10	Moderate Level

Source: Field Work, 2025.

Table 1 showed that the provision of visual aids, principals rated SBMCs' involvement as high, with a mean of 3.52, while SBMC members rated it at a moderate level, with a mean of 2.66. Both groups rated the provision of multimedia resources, such as DVDs and audio, at a moderate level, with mean of 2.35 and 2.49 for principals and SBMCs, respectively. In terms of laboratory equipment provision, both principals and SBMCs rated involvement as moderate, with mean of 2.74 and 2.69. For providing books for school libraries, principals rated SBMCs' involvement at a moderate level, with a mean of 2.97, while SBMC members rated it higher, at 3.55. Both groups agreed on a high level of involvement in the provision of textbooks, with mean of 3.26

and 3.19 for principals and SBMCs, respectively. However, the provision of E-books was rated low by both groups, with mean of 1.74 for principals and 1.77 for SBMCs. Regarding instructional aids and ICT resources, principals rated involvement at a moderate level, with a mean of 2.26, while SBMC members provided a slightly higher moderate rating of 2.65. The grand mean scores of 2.69 and 2.71 for principals and SBMC members, respectively.

Research Question 2: What is the level of school based management committees' involvement in maintenance of discipline in public senior secondary schools in North-East Zone Nigeria?

Table 2 answered research question 2:

Table 2: Mean Responses of Principals and SBMC Members on the Level of Involvement of SBMCs in Maintenance of Discipline

S/N	Items	Principals = 31			SBMCs = 347		
		Mean	SD	Decision	Mean	SD	Decision
The level at which SBMCs:							
8	Monitors staff/students to maintain peaceful atmosphere during school's hours is	3.58	1.18	High Level	3.56	1.15	High Level
9	Ensure the punctuality of staff and students in attending school is	3.16	1.00	High Level	3.25	0.95	High Level
10	Formed counselling committee to address and mitigate instances of immorality among staff/students is	3.87	1.06	High Level	2.99	0.93	Moderate Level
11	Consider the suspension of staff/students as a disciplinary strategy is	2.65	1.25	Moderate Level	2.56	1.19	Moderate Level
12	Considers expelling staff/students as a severe disciplinary action is	1.81	0.98	Low Level	1.64	1.02	Low Level
13	Ensures that staff/students abide by the rules and regulation governing the school is	3.94	1.00	High Level	3.48	0.98	High Level
14	Ensures that conflicts are managed effectively within the school community is	3.19	1.30	High Level	3.54	0.98	High Level
Grand Mean		3.17	1.11	High Level	3.00	1.03	High Level

Source: Field Work, 2025.

Table 2 presented the item on monitoring staff and students to maintain a peaceful atmosphere during school hours, principals and SBMC members recorded mean scores of 3.58 and 3.56, respectively, indicated a high level of involvement. Regarding ensuring punctuality among staff and students, the mean scores were 3.16 for principals and 3.25 for SBMC members, also reflected a high level of involvement. The formation of counselling committees to address and mitigate immorality among staff and students was rated at a high level by principals with a mean 3.87, but a moderate level by SBMC members with mean of 2.99. Considering suspension as a disciplinary strategy was assessed as a moderate level of involvement, with mean scores of 2.65 and 2.56 for principals and SBMC members, respectively. Expelling staff or students as a severe disciplinary action was rated at a low level, with mean scores of 1.81 and 1.64. For ensuring that staff and students abide by school rules and regulations, principals gave a high level rating with a mean of 3.94, while SBMC members rated it at 3.48, also indicated a high level of involvement. Managing conflicts effectively within the school community was rated as high by both groups, with mean scores of 3.19 and 3.54 for principals and SBMC members, respectively. The grand mean scores were 3.17 for principals and 3.00 for SBMC members, both indicated a high level of SBMC involvement in the maintenance of discipline.

Research Hypotheses

The following hypotheses guided this study:

H₁: There is no significant difference in the opinions of principals and SBMC members on school based management committees' involvement in provision of instructional resources in public senior secondary schools in North-East Zone Nigeria. Hypothesis 1 results were summarized in table 3:

Table 3: Summary of Chi-Square Analysis on the Difference between the Opinions of Principals and SBMC Members on SBMCs Involvement in Provision of Instructional Resources

Status	Opinions	Observed N	Expected N	Level of Sig	df	χ^2 Calculated	P-value	Decision
Principals	VH	3	6	0.05	4	6.850	0.319	Retain
	H	5	6					
	M	9	6					
	L	7	6					
	VL	7	6					
	Total	31						
SBMC Members	VH	31	69					
	H	63	69					
	M	93	69					
	L	95	69					
	VL	65	69					
	Total	347						
	Grand Total	378						

Source: Field Work, 2025.

Table 3 yielded a chi-square value of 6.850 with 4 degrees of freedom and a p-value of 0.319. At a significance level of 0.05, the p-value was greater than 0.05 level of the threshold, lead to the retention of the null hypothesis. This indicated that there was no significant difference between the opinions of principals and SBMC members regarding SBMCs' involvement in the provision of instructional resources in public senior secondary schools in North-East Zone Nigeria.

H₂: There is no significant difference in the opinions of principals and SBMC members on school based management committees' involvement in maintenance of discipline in public senior secondary schools in North-East Zone Nigeria. Table 4 provided hypothesis 2 testing results:

Table 4: Summary of Chi-Square Analysis on the Difference between the Opinions of Principals and SBMC Members on SBMCs Involvement in Maintenance of Discipline

Status	Opinions	Observed N	Expected N	Level of Sig	df	χ^2 Calculated	P-value	Decision
Principals	VH	6	6	0.05	4	17.919	0.291	Retain
	H	7	6					
	M	7	6					
	L	7	6					
	VL	4	6					
	Total	31						
SBMC Members	VH	37	69	0.05	4	17.919	0.291	Retain
	H	94	69					
	M	104	69					
	L	58	69					
	VL	54	69					
	Total	347						
Grand Total	378							

Source: Field Work, 2025.

Table 4 produced a chi-square value of 17.919 with 4 degrees of freedom and a p-value of 0.291. At the 0.05 level of significance, the p-value exceeded the threshold, lead to the retention of the null hypothesis. This indicated that there was no significant difference between the opinions of principals and SBMC members on SBMCs' involvement in maintenance of discipline in public senior secondary schools in North-East Zone Nigeria.

Discussion

The findings revealed a moderate level of involvement of SBMCs in the provision of instructional resources. SBMCs demonstrated higher engagement in areas like providing textbooks and books for the library, while their involvement in ensuring the provision of E-books and multimedia resources is comparatively lower. The grand mean were 2.69 for principals and 2.71 for SBMC members. Additionally, the p-value of 0.319, which exceeded 0.05, indicated no significant difference in the opinions of principals and SBMC members. This finding contrasted with Geoffrey's (2015) research, which reported minimal involvement of school committees in mobilizing school resources in Rufiji District, Coast Region, Tanzania. Similarly, Aguba and Etikuo (2023) highlighted a low level of SBMC performance in funding secondary schools,

particularly in the provision of instructional materials. However, their study also revealed no significant difference between the mean ratings of principals and SBMC chairmen regarding SBMC performance in fostering the funding and provision of instructional materials in Enugu State, aligned with the present study. Supporting the current findings, Sanusi (2018) demonstrated that School-Based Management Committees significantly influenced the provision of instructional materials in secondary schools within the Funtua Senatorial Zone, Katsina State. The findings indicated that SBMCs were actively involved in maintenance of discipline. Their efforts included monitoring staff and students to ensure a peaceful school environment, promoting punctuality, forming counselling committees to address behavioural issues, and ensuring adherence to school regulations. However, their involvement in implementing severe disciplinary actions, such as suspension and expulsion, was at a lower level. With grand mean of 3.17 for principals and 3.00 for SBMC members, and a p-value of 0.291 greater than 0.05, indicated no significant difference in the opinions of principals and SBMC members. These results contrasted with Onyilibe's (2020) study, which reported a low level of SBMC participation in maintaining discipline within secondary school administration in Enugu State. However, Onyilibe's further research revealed no significant difference between the mean scores of urban and rural SBMCs regarding their level of participation in maintaining discipline, which is consistent with the findings of the present study.

Conclusion

This study concluded that SBMCs demonstrated moderate involvement in provision of instructional resources and significant involvement in maintenance of discipline in public senior secondary schools in North-East Zone Nigeria, though their role in severe disciplinary actions and advanced instructional materials remains limited. Additionally, there is no significant difference in the perceptions of principals and SBMC members on these roles.

Recommendations

The following recommendations were made:

1. The government should prioritize the acquisition of ICT resources, digital learning materials, and visual aids as part of their instructional resource provision. This can be achieved by promoting partnerships with technology firms and non-governmental organizations. Moreover, efforts should focus on ensuring a balanced supply of both

traditional and modern instructional resources to effectively address diverse learning needs.

2. Principals should collaborate closely with SBMCs to promote a supportive environment that reduces disciplinary challenges and promotes cooperation among students, staff, and SBMC members.

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COMPARATIVE ANALYSIS OF GOVERNMENT AND PRIVATE SECONDARY SCHOOLS' ACADEMIC ACHIEVEMENT IN MATHEMATICS IN KANO METROPOLIS, KANO STATE

BY

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ABSTRACT

Mathematics plays a critical role in national development, hence, this study comparatively analyzed mathematics students' performance in government and private secondary schools in Kano Metropolis. Using the West African Senior Secondary Certificate Examination (WASSCE) results from 2016 to 2018 as the source of data and quantitative research survey, the study examined potential differences in academic achievement between these two educational sectors. From the population of government and private schools (N=469; Gov=229, Prv=240), the stratified sampling was used to select schools (47) and simple random sampling technique was used to select samples (N=260; (Gov=110; Prv=150) respectively using table of random numbers. The instrument used was a carefully designed, vetted and validated questionnaire ($r=0.74$); on underlying causes of low performance and methods used in teaching mathematics on secondary schools. Based on WASSCE Chief Examiner's Report, results of 2016 – 2018 mathematics results were also used as instrument for the study. Data generated from the two instruments were analysed with the descriptive statistics (frequencies, means and standard deviation) and inferential statistics (chi square and t-test analyses) in line with the hypotheses raised for the study. The findings revealed significant differences in observed and expected frequencies in the listed underlying causes; and methods teachers used in teaching mathematics. Analyses of WASSCE results in mathematics performance showed variations between government and private schools in 2016 and 2018 as difference in performance score was significant ($p > 0.05$) with private school students demonstrating consistently superior academic outcomes. These results underscore the importance of educational resources, teaching quality, and institutional infrastructure in mathematics education. It was recommended that there should be upgrade in school infrastructures and entrenchment of periodic supervision to enhance improvement in teaching and learning.

Keywords: *Academic, Achievement, Examination, Mathematics, Performance*

Introduction

Mathematics is often considered one of the most challenging subjects in school, but whether students enjoy the subject or not, it is a fundamental part of our everyday lives, and it is the language of science, technology, and engineering. In fact, mathematics is integral to many

aspects of modern society (Okpala & Anene, 2009). However, its influence extends beyond just practical applications. Mathematics can also help us understand the deeper complexities of the world, such as patterns in nature, social dynamics, and economic systems. Thus, concept formation, abstraction, generalization, theory-building and problem solving, which are basic mathematical activities are also integral part of the problem-solving process which mathematics encompasses.

Mathematics is being used to help man understand global dynamics such as the phenomenal climate change by analysing global warming, economic projections and speed estimation in space travels (Gowers, 2002). It is mathematics that has brought order to communities across this planet and prevented chaos and catastrophes. Many of our inherited human qualities are nurtured and developed by mathematics theories, like spatial awareness, problem-solving skills, power to reason (which involves calculated thinking) and even human creativity and communication (Obioma, 2011).

Furthermore, the advancement of any nation is intrinsically linked to its scientific and technological capabilities, with mathematics serving as a fundamental pillar of such progress (Nosakhare, 2007). As Nigeria aspires to become one of the world's top twenty economies, the critical role of mathematical knowledge becomes paramount. Mathematics, a human invention borne from the resolve to solve complex problems, transcends mere numerical manipulation and represents a sophisticated mode of logical reasoning and problem-solving (Odili, 2005). In order to reap bountiful gains from this vast area of endeavour, mathematics has to be taught from the cradle into advancing years because as one of the related sciences that deals with the logic of quantity, shape and arrangement, its several components from simple arithmetic, geometry, algebra and the development of algorithms, have propelled many nations from obscurity to global recognition (Adeniyi, 2000).

In the past, mathematics was often considered abstract and disconnected from use. Fast forward to today, the viewpoint has changed to understanding that it is deeply connected to experiences and solving real-world problems. It's an area that keeps expanding and evolving, welcoming new concepts and methods (Agwagah, 2001). The student is likely to hear a great deal about its importance in science, technology, engineering and mathematics (STEM) fields. It navigates from analysing data to driving progress that serves behind many of the everyday innovations we

encounter in the area of: a) Data analysis: Scientists use mathematical tools to analyze data and identify patterns and trends. This is crucial for making accurate predictions and understanding complex systems, b) Modelling: Mathematical models allow scientists to simulate real-world phenomena, such as climate change or the spread of disease. These models can help us understand the impact of different variables and predict how the system will behave in the future, c) Quantitative reasoning: Math helps scientists think logically and systematically, making it easier to design experiments, interpret results, and draw conclusions, d) probability: helping to grasp randomness and uncertainty within datasets and enabling us to make informed decisions (Bookings, 2018).

The teaching of mathematics to young people in secondary schools can be very tiring, cumbersome and uninteresting because of the methods used to impart such exquisite knowledge. Traditionally, the lecture method was the dominating approach that has been used over the years to teach mathematics to school children. Thus, Okpala and Anene (2009) observed that this has been highly traditional and teacher-centered; while Odili (2005) sees it as a major problem that militates against students understanding of mathematics and mathematical concepts in schools, thereby contributing to poor performance output in internal and external examinations. The traditional lecture method, which had hitherto been used over decades, is concerned with the teacher being the controller of the learning environment. And today, it still takes precedence in teaching mathematics in our secondary schools in Kano state because, according to Inah (2014), the lecture method allows the teacher to deliver large amount of information in a short time with the capacity for routine repeatability for new groups of students. Research has shown that low performance in mathematics is often attributed to a combination of factors including inadequate teaching methods, lack of student motivation, insufficient resources and low teacher quality to mention just a few (Brown, & Roger, 2017). Ability to downplay the effects of these factors will go a long way to increasing the learners' interest and consequently improved performance output in all examinations. Consequent upon the relevant role of mathematics in our society and the need to ingrain interest in mathematics on a solid foundation, this study carried out a comparative analysis of government and private secondary schools' academic achievement in mathematics in Kano metropolis, Kano state

Statement of the Problem

Despite the importance of mathematics in everyday life and its role as a fundamental subject in secondary education, many students in secondary schools continue to perform poorly in mathematics. This low performance in mathematics is a persistent problem that affects not only individual students but also the overall quality of education and Nigeria's competitiveness in the global economy (Kolawole, 2005).

In recent years, a concerning trend of declining mathematics performance among secondary school students has emerged, posing significant challenges to educational stakeholders. Most secondary school graduates struggle to pursue science and social science courses due to inadequate mathematics performance at the credit level in the West African Senior Secondary Certificate Examination (WASSCE). This study intends to determine whether school type or in combination with their factors are responsible for the students' low performance in mathematics.

It is public knowledge that secondary school students may not be too interested in mathematics as a subject, particularly when their love is focused on disciplines other than sciences. Although, this may not be a natural phenomenon, it is believed there are factors responsible for this mathematics apathy. This study intends to investigate the reasons behind this lack of zeal to study mathematics in both government and private secondary schools in order to rekindle students' interest in the subject for the greater benefit of the society.

Objectives of the study

The primary objectives of this study are to:

- i. Identify the underlying causes of low performance in mathematics among secondary school students in Kano metropolis
- ii. Investigate the effectiveness of different teaching methods used in improving students' performance in mathematics in Kano metropolis
- iii. To compare the differences in mathematics performance in government and private secondary schools in Kano metropolis

Research Questions

- i. What are the underlying causes of low performance in mathematics among government and private secondary school students in Kano metropolis?

- ii. What are the teaching methods employed to improve students' performance in mathematics in government and private secondary school students in Kano metropolis?
- iii. Is there difference in mathematics performance by students in government and private secondary schools in Kano metropolis?

Hypotheses:

- H₀₁. There is no significant difference in underlying causes of low performance in mathematics among secondary school students in government and private schools in kano metropolis.
- H₀₂. There is no significant difference in mathematics performance between students taught with different methods in government and private secondary school in Kano metropolis?
- H₀₃. There is no significant difference in mathematics performance by students in government and private secondary schools in Kano metropolis

Methodology

This study employed the quantitative-comparative, survey research design (Creswell, 2014; Johnson & Christensen, 2014); by using mixed method and utilizing secondary data from Senior Secondary Certificate Examination (SSCE) results as the basis for comparison of mathematics performance. Also, using a carefully designed and vetted questionnaire ($r=0.74$), the study elicited information from the mathematics teachers, selected parents and school authorities on relevant variables of the study. This mixed design helped to combine the strengths of two or approaches in order to increase the validity, reliability and generalizability of the findings (Leedy & Ormrod, 2015).

From the population of government and private schools (N=469; Gov=229, Prv=240), the stratified sampling was used to select schools (47) and simple random sampling technique was used to select samples (N=260; (Gov=110; Prv=150) respectively using table of random numbers (Research Adviser, 2006). The self-designed and vetted questionnaire which centered on underlying causes of low performance of students; and methods teachers use in teaching mathematics were administered to teachers, school administrators and selected parents using their children as questionnaire administrators. Secondary data were collected from school examination officers after official permissions were granted by the various school managements, results of mathematics performance in WASSCE for the years 2016, 2017 and 2018 were

collected in government and private secondary schools in the study area. The reason for the limited scope is borne of the poor results recorded in mathematics in the years preceding years based on WASSCE Chief Examiner's Report. Responses assisted in the drawing conclusion of difference in performance of students in the two types of schools. Data collected were analyzed using the descriptive statistics (frequencies, means and standard deviation) and inferential statistics (Chi square and t-test) based on the hypotheses raised for the study. The hypotheses were deemed significant at $p \leq 0.05$.

Results

The data collected from the questionnaire administered and WASSCE mathematics results were analysed using descriptive statistics (frequency, mean and standard deviation) and inferential statistics (Chi square and t-test) were used to test the null hypotheses raised for the study. All hypotheses are deemed significant at 0.05 alpha level.

Research Question 1: What are the underlying causes of low performance in mathematics among government and private secondary school students in Kano metropolis?

Table 1: Summary of responses on underlying causes of low performance in mathematics among government and private secondary school students in Kano metropolis.

Option	Responses	SA	A	D	SD	Total
a	Inadequate teaching method	20	19	10	02	51
b	Lack of student motivation	41	12	13	09	75
c	School location/environment	30	19	08	06	63
d	School proprietorship	44	22	01	04	71
	Total	135	72	32	21	260

Source: Field work, 2025

A careful study of Table 1 reveals the key underlying causes of low performance in mathematics among the target respondents in government and private secondary schools. Comparison between the agreed and disagreed columns showed most of the respondents believed the type of proprietor (66), poor student motivation (53), school location (42) and inadequate teaching method (39) are top reasons student perform poorly in subjects like mathematics. Although there may be other reasons of no consequence, hence the responses were not considered. However, in order to find out whether any significant difference exist among the top four responses, the stated null hypothesis was tested as presented in table two.

H₀₁. There is no significant difference in underlying causes of low performance in mathematics among secondary school students in government and private schools in kano metropolis.

Table 2: Inferential statistical analysis of observed and expected frequencies of underlying causes of low performance in mathematics among students in government and private schools

Options	SA	A	D	SD	Df	X ² cal	X ² crit	Remark
a. Fe	26.48	14.12	6.28	4.12	9	22.893	16.919	Significant
b. Fe	38.94	20.77	9.23	6.08				
c. Fe	32.71	17.45	7.75	5.09				
d. Fe	36.86	19.66	8.74	5.73				
Total	135	72	32	21				

$X^2_{(9)} = P < 0.05$ *Significant

Examination of Table 2 revealed expected frequencies of the observed values presented in Table 1 obtained by using standard formular (CT/GT x RT) where: CT = Column Total; GT = Grand Total and RT = Row Total. The final computation of chi square is obtained using the formular: $\sum (O - E)^2/E$. By adding up values obtained in all the cells, the final chi square calculated (X²cal) is obtained. Thus, at df of 9, differences in the expected frequencies were significant (X²₍₉₎ = P < 0.05) and the null hypothesis was not retained.

Research Question 2: What are the teaching methods and strategies employed to improve students’ performance in mathematics in government and private secondary school students in Kano metropolis?

Table 3: Summary of observed frequency of teaching methods employed by teachers to improve students’ performance in Kano metropolitan schools

Options	Responses	SA	A	D	SD	Total
a.	Traditional Method (Lecture)	120	79	06	00	205
b.	Student-centered Methods	28	09	05	01	43
c.	Collaborative Methods	03	01	01	02	07
d.	Technology-enhanced Method	01	01	02	01	05
Total		152	90	14	04	260

Source: Field work, 2025

A careful observation of Table 3 showed the total number of responses on the different teaching methods employed such that low performance in mathematics could be remedied in government and private secondary schools in Kano metropolis. The traditional lecture method had the highest observed frequency (N=199; SA=120, A=79) that strongly (agreed and agreed while student-

centered method recorded observed frequency of N=43; SA=28, A=09. Although several other methods listed (collaborative and technology enhanced methods) recorded low frequencies (N=07; 05) respectively. However, in order to find out whether these observed differences are significant, the inferential statistics of chi square was used to test the corresponding hypothesis.

H₀₂. There is no significant difference in mathematics performance between students taught with different methods in government and private secondary school in Kano metropolis

Table 4: Inferential statistical analysis of observed and expected frequencies of methods of teaching mathematics in government and private schools in Kano metropolis

Options	SA	A	D	SD	Df	X ² cal	X ² crit	Remark
a. Fe	119.85	70.96	11.04	3.15	9	73.976	16.919	Significant
b. Fe	25.14	14.88	2.32	0.66				
c. Fe	1.75	2.42	0.38	0.11				
d. Fe	2.93	1.73	0.70	0.08				
Total	152	90	14	04				

X²₍₉₎ = P < 0.05 *Significant.

Examination of Table 4 revealed expected frequencies of the observed values presented in Table 3 obtained by using standard formular (CT/GT x RT) where: CT = Column Total; GT = Grand Total and RT = Row Total. The final computation of chi square was obtained using the formular: $\sum (O - E)^2/E$. By adding up values obtained in all the cells, the final chi square calculated (X²cal) was obtained. Thus, at df of 9, differences in the expected frequencies were significant (X²₍₉₎ = P < 0.05) and the null hypothesis was not retained. The implication is that lecture method was the predominant teaching strategy lecturers use in teaching mathematics.

Research Question 3: Is there difference in mathematics performance by students in government and private secondary schools in Kano metropolis?

Table 5: Descriptive statistics of differences in mathematics performance by students in government and private secondary schools in Kano metropolis

Year	School Type	
	Government (N=110)	Private (N=150)
	Mean ± SD	Mean ± SD
2016	21.64 ± 0.23	25.16 ± 3.02
2017	31.22 ± 1.19	36.83 ± 2.44
2018	37.61 ± 0.31	42.99 ± 1.23

Source: Field work, 2025

A careful study of Table 5 reveals the descriptive statistics of mean and standard deviation performance values of both government and private schools in WAEC from 2016 to 2018. While the government schools recorded mean and standard deviation values of 21.64 ± 0.23 , 31.22 ± 1.19 and 37.61 ± 0.31 in 2016, 2017 and 2018 respectively; the private schools recorded means and standard deviation values of 25.16 ± 3.02 , 36.83 ± 2.44 and 42.99 ± 1.23 respectively within the same period. In order to find out if these mean differences are significant, the t-test inferential statistics was employed.

H₀₃. There is no significant difference in mathematics performance by students in government and private secondary schools in Kano metropolis

Table 6: Results of inferential statistical analysis of t-test on differences in performance between government and private schools in Kano metropolis

Year	School Type		Analysis			
	Government (N=110) Mean \pm SD	Private (N=150) Mean \pm SD	df	tcal	tcrit	Rmks
2016	21.64 ± 0.23	25.16 ± 3.02	1	-23.02	12.7	$p > 0.05^*$
2017	31.22 ± 1.19	36.83 ± 2.44	1	-0.25	12.7	$p < 0.05$
2018	37.61 ± 0.31	42.99 ± 1.23	1	-13.50	12.7	$p > 0.05^*$

$t_{(1)} = 12.706$; $p > 0.05$ *Significant

A careful examination of Table 6 shows the result of t-test analysis on performance of government and private schools' students in WAEC mathematics examination from 2016 to 2018. The outcome of the analysis revealed significant performance differences in years 2016 and 2018 ($p > 0.05$) but not in year 2017 ($p < 0.05$). The Scheffe post hoc analysis employed to indicate the direction of significant difference favoured the private schools. This implies that school type has a role to play in the performance of students in mathematics examinations.

Discussion

Performance in all life's endeavors has its challenges, and this is applicable to academic achievements at all levels of education. In other words, students are unable to excel in their academic pursuits because of isolated or entwined factors which cannot be waived aside. For instance, the student-related factors like prior knowledge and skills, motivation and interest, learning style and cognitive abilities nor the teacher-related factors in respect of their qualifications and experience in teaching mathematics, teaching methods and strategies, and the quality of the teacher-student relationship can influence students' motivation and engagement in learning mathematics (NCTM, 2014). The school cannot be exonerated from students' poor

performance in mathematics because the school has to make resources and facilities available, develop a culture and climate that support mathematics education and ensure the parents are involved in schools' activities (Kilpatrick, et al. 2001). These factors and many others related to the learning environment interact with each other in diverse ways to influence students' mathematics performance in secondary schools.

The outcome of this study on underlying causes of low performance in mathematics and the methods used in lecture delivery are significant ($p > 0.05$) to the fact that mathematics teachers dwell more on the traditional lecture method in their lecture delivery (Brown & Roger, 2017) making it very uninteresting. According to Bookings (2018), student centered approaches to teaching mathematics have gone a long way to encouraging teacher-student interaction in class and encouraging students to assist each other when they are confronted with mathematical problems. Rather than laying emphasis on teaching methods alone, the school environment, parents' involvement in what goes on the school should be an area of focus for improved student-teacher performance (Kilpatrick, et al. 2001) These can help to improve performance in the long run.

The conclusions drawn from the WASSCE 2016 to 2018 results obtained from this study was significant and the null hypotheses was not accepted in respect of years 2016 and 2018 ($p > 0.05$) while the null hypothesis was retained for the result obtained in 2017 ($p < 0.05$) because it was not significant. These results are consistent with those obtained in earlier studies (Ibrahim, 2004, Nosakhare, 2007) in which private secondary schools have consistently demonstrated superior mathematics performance against government schools. The reason behind this can be attributable to: a) enhanced educational infrastructure; b) more conducive learning environments; c) higher quality teaching resources; and d) quality supervision of teachers output. However, the anomalous results obtained in 2017 that showed no significant difference, might be due to external factors such as examination cancellations or administrative irregularities and even factors that may be intrinsic in nature.

Conclusion

Mathematics is one of the most challenging subjects taught in secondary schools and a fundamental part of our everyday lives. In fact, mathematics is integral to many aspects of

modern-day society and to that, it must be taught from the cradle till advanced age if Nigeria is to live up to the 21st century technological advancement.

As Nigeria aspires to become one of the world's top twenty economies, the critical role of mathematical knowledge becomes paramount. As a human invention borne from the resolve to solving complex problems, it transcends mere numerical manipulation and represents a sophisticated mode of logical reasoning and problem-solving.

However, students do not seem to love this subject due factor in the learning environment which tend to interact with each other in diverse ways to influence students' mathematics performance in secondary schools including, but not limited to teaching methods, school type, school environment, parental involvement and even teacher-learner interaction. Based on the aforementioned, this study carried out a comparative analysis of government and private secondary schools' academic achievement in mathematics in Kano metropolis, Kano state.

Results obtained were significant in respect of underlying causes of poor performance, method of teaching mathematics which greatly favoured the traditional lecture method, and school type which favoured the private schools against the government schools. These findings emphasize the critical role of institutional support, resource allocation, and teaching quality in mathematics education.

Recommendations

In order to improve of the fortunes in their mathematics performance, the following recommendations were proffered:

- i. The state Ministry of Education (MOE) should begin to implement the mandatory professional development programs for mathematics teachers as recommended by the Mathematical Association of Nigeria (MAN)
- ii. The Kano Educational Resource Development Council (KERDC) should liaise with the Educational Trust Fund to enhance government schools' infrastructure
- iii. The Inspectorate Division of the KERDC should commence regular supervision of schools to ensure compliance with curriculum demands
- iv. The state MOE should establish robust guidance and counseling services to guide the students in their career choices

- v. The state government should consider incentives for mathematics teachers to encourage their output in the performance of their duties.

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**AVAILABILITY AND ACCESSIBILITY OF SCHOOL HEALTH SERVICES IN THE
UNIVERSAL BASIC EDUCATION PROGRAMMES IN GWALE LOCAL
GOVERNMENT AREA, KANO STATE**

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ABSTRACT

This study evaluated the performance of school health service programme in the Universal Basic Education (UBE) schools in Gwale local government area (LGA), Kano state. Using the survey research design, this study ascertained conditions that are prevalent within the school population without manipulating variables. The population comprised all UBE schools in the LGA (N=399) and the teachers (N=2969). The stratified and simple random sampling techniques were used to select a representative sample of three hundred and fifty (350) respondents using the Research Advisors guide. A self-constructed and validated questionnaire was administered for data collection. Summarised data was analysed using the descriptive statistics (%) and inferential statistics (X^2). Results obtained were not significant ($p < 0.05$) in all the hypotheses raised; and it was concluded that school health service programme was only available as policy statement, it's not both popular and accessible. It was recommended that there is need to send statutory provisions on school health service to schools by the Universal Basic Education Commission, establish an efficient school health supervisory unit in the health ministry; and reinvigorate collaborative efforts of the health and education ministries, NGOs and the PTA to ensures optimum health of school children in the local government area.

Key Words: Basic Education, Collaboration, Environment, Health services, Nutrition,

Introduction

The school is a maelstrom of conflicting values deliberately bringing together young people from different backgrounds and socioeconomic status, for the purpose of disseminating knowledge. During the process of passing knowledge across to young minds, acculturation and enculturation processes are bound to result in conflict (Nieri, 2012). This process has health implication on the learner, their teachers and the community. The resultant implication, therefore, brings to the fore why there is the need that a comprehensive school health programme should encompass

activities of indoor and outdoor nature that caters for a gathering of young people in a learning centre; with the provision of school health services atop the priority list. Therefore, the school health service is an important part of the school health programme designed to appraise, protect and promote that health and welfare of pupils and all others who come in contact with them within the school environment (United Nations Education, Scientific and Cultural Organization (UNESCO, 2012).

According to Ajala (2008), health is a condition which renders an individual able to live most and to serve best; is an invaluable asset of healthy living that transcends age, sex, race, religious and social barriers. As good health is desired from the cradle to the geriatric years, health of the school child and the health of all school personnel can be catered for by the provisions in the school health services (SHS), an important component of the school health programme as enshrined in the Nigerian School Health Policy (NSHP). This is in recognition that when a group of people conglomerate within an enclosed environment, there is bound to be negative impacts, no matter how miniature it is; hence the need for the provision of school health services to cater for members of the school population.

School health programme is a key for achieving good and healthy lifestyle for children and a sure way of nurturing them for future challenges in any nation. Daniel & Miina (2022) posited that one of the reasons for establishing comprehensive school health programmes was to improve learners' academic performance and therefore improve their employability and productivity as our future adult citizens. To do this, the need for an organised school health programme has become inevitable; with the school health service as requisite and indispensable, where the services will reach several persons who will contribute their respective skills to improving pupils' health (Nieri, 2012).

In the past, only a percentage of children of school age are actually able to attend school because of little attraction the school system offers to parents of school age children. However, with the introduction of the Universal Primary Education (UPE) in 1976, there was an astronomic increase in enrolment of pupils in primary schools without a concomitant increase in facilities that will fully cater for this unprecedented enrolment. This situation, though a positive development, has physical, social, economic and health implications on the school child, their parents, government, school authorities and the society in general. Hence, from inception, the

UPE system advocated for better health services for children in school; as it was in pursuance of the general objective of primary education (National Policy on Education, 2014).

The establishment of the school health service programme in any area where school children abound, is a practical expression of the community's acceptance that health is an asset. This important health programme is expected to be provided for by legislation and staffed by professionally qualified people (WHO, 2020). The most important way to start a health work, according to Adekoya and Okueso (2018) include the following:

- ✓ Environmental hygiene – whereby every school is supposed to pay attention to its water supply, disposal of excreta and rubbish, prevention of insects breeding and the condition of its buildings with regards to overcrowding condition, ventilation and lighting.
- ✓ School feeding – this programme provides an opportunity for school children to get what might be missing in the diet especially proteins and vitamins; so, care should be taken in the selection of food handlers.
- ✓ The school day – this should be so planned as to contribute to the health of the child with reference to the hours of work, periods of play and feelings of happiness in the classroom that influences the growing child.
- ✓ Physical activities in the school – Although this is meant to improve strength, endurance, agility and give the child an opportunity to learn to work with others as a team, it should be age and sex-appropriate.

In this present age, there is no gainsaying the fact that different ailments of different types can be easily spread in areas where there is conglomeration of learners. This is probably because of their apparent heterogeneity and seeming lack of caution that is peculiar to that age bracket. Despite this unexpected exposure of school children to communicable diseases, the school has a duty to the child singly and in collaboration with others, in the following areas:

- Ensuring effective teaching of health education is a priority
- Promotion of mental health through provision of congenial emotional atmosphere
- Adequate and regular supervision of teachers' health
- Well-designed and supervised safety and accident prevention programme in school
- Regular immunization against poliomyelitis, tuberculosis, small pox and measles

- Enhanced programme for the prevention of common epidemic diseases like scabies, ringworm and pediculosis (louse infestation) (Ajala, 2008).

Despite overwhelming concerns and efforts to keep school children safe and healthy, lack of physical activity, diet, parents, pupils (peers) and school environment are factors that can still affect the health of school children. Therefore, factors that contribute to the health of school child is not limited to the school alone, nutrition at home and peer influence have substantial impacts on how they imbibe the cultures of healthy living. This is because the need to consider school health is borne out of the fact that the school is not only a factor but a force, an active contributor to the health of the citizenry (Umar, et al., 2007). However, to sustain this effort, the school is expected to modify its procedures to increase its effectiveness by increasing collaborative strategies in encouraging the ultimate health changes desired. It is against this background that this study evaluated availability and accessibility to school health services in the Universal Basic Education programmes in Gwale local government area, Kano state

Statement of the Research Problem

The environment is full of security hazards ranging from kidnappings, rapes, ritual killings and child molestations. Absence of a functional school health service will resort to throwing the school child out of school in search for medical assistance that will expose them to these security hazards (Aldous-Mycock, 2011). This study will enlighten the authorities on the need to ensuring the SHS is made efficient and functional.

It is a known fact that personal prejudices related to social status, religious and political leanings can present stiff opposition and hinder full utilisation of available health services in the school. However, with public enlightenment using radio jingles and positive intervention by religious organisations, apathy towards school health services is bound to change for the better (Chidiebere, 2016).

Recently, however, the school child's health has become a concern to everyone in the education system due to the preponderance of ailments that permeate our biological environment today. Scientists have attributed some of these illnesses to climate change, human negative impacts on the environment and the like (Daniel & Miina, 2022). The school child is more exposed to these ailments because of the number of contacts they make in a school day, hence the need for a

school health team that will be proactive in ensuring health monitoring and assessment in every typical school day.

Objectives of the study

Specifically, the objectives of this study are to:

- i. assess the awareness of statutory provisions for school health services at the UBEC schools in Gwale LGA, Kano state
- ii. evaluate if the school health programmes are accommodated by the comprehensive school health services at the UBEC schools in Gwale LGA, Kano state
- iii. evaluate collaborations in the organizational set-up of school health services in UBEC schools in Gwale LGA, Kano state
- iv. assess the impact of the school health services on the school community in Gwale LGA, Kano state

Research Questions

- i. What is the awareness level of statutory provisions for school health services at the UBEC schools in Gwale LGA, Kano state?
- ii. Are the school health programmes accommodated by the comprehensive school health services at the UBEC schools in Gwale LGA, Kano state?
- iii. What are the collaborations in the school health services' organizational set up in UBEC in Gwale LGA, Kano state?
- iv. What are the impacts of the school health services on the entire UBEC school community in Gwale LGA of Kano state?

Hypotheses

This research work tested the following hypotheses at $p \leq 0.05$ alpha level.

- i. There is no significant awareness of statutory provisions for school health services at the UBEC schools in Gwale LGA, Kano state
- ii. School health programmes are not significantly accommodated by the comprehensive school health services in UBEC schools in Gwale LGA, Kano state
- iii. There are significant collaborations in the school health services' organizational set up in UBEC schools in Gwale LGA, Kano state

- iv. There are no significant impacts of school health services on the entire UBEC school community in Gwale LGA of Kano state

Methodology

The purpose of this study was to evaluate the availability and accessibility of school health service in the universal basic education programmes in Gwale Local Government Area of Kano State. To achieve the stated objectives of this study, the survey research design was used. This design is suitable because it sought to ascertain conditions that are prevalent within a population. This design does not involve the manipulation of variables in the study; rather it obtained quantitative description of the general characteristics of the group under study.

The population of this study comprises all the UBEC schools in the Local Government Education Authority (LGEA) (N=399) and teachers (N=2,969); and using the stratified and simple random sampling techniques, the Research Adviser (2006) method of determining sample from a given population was used to select a representative sample of three hundred and fifty (350) for the study. With a population of two thousand, nine hundred and sixty-nine (M=1714, F=1255) UBEC teachers in Gwale LGA (Finelib.com, 2016; KERDC, 2024), the samples were representatives of each stratum (districts=05, school=08, teachers: M=195, F=145, school administrators=05, and school health providers=05 in the population. Letters that sought official permission to conduct this research work were submitted for authorisation after which the research work commenced.

A self-constructed questionnaire, titled Availability and Accessibility of School Health Service Programmes (EPSHSP) in the Universal Basic Education Programmes in Gwale LGA of Kano state was designed, validated by three professionals in the field, and administered to the sampled subjects. The questionnaire was framed to elicit responses on evaluation of SHS performance in schools on a modified Likert scale options from strongly agreed (SA), Agreed (A), disagreed (D) and strongly disagreed (SD) that best answers the raised question for the study. For collation purposes, these responses were allocated 4, 3, 2, 1 point respectively. Summarised data was analysed using both the descriptive statistics of percentages (%) for the demographic information, and inferential statistics of Chi square (χ^2) goodness of fit statistics to answer the research questions raised for the study. Results obtained will be tested in line with the stated hypotheses; and shall be considered significant at 0.05 alpha level.

Results

Data collected for this study are presented in line with the research questions and appropriately described; while the inferential statistics of Chi square was used to test the null hypotheses at 0.05 alpha level and presented in tables below.

Research Question 1: What is the awareness level of statutory provisions for school health services at the UBEC schools in Gwale LGA, Kano state?

Table 1a: Summaries of descriptive of level of awareness of the statutory provisions for school health services at the UBEC schools in Gwale LGA, Kano

Options	SA (%)	A (%)	D (%)	SD (%)	Total
a.	5 (16.13)	3 (20)	110 (82.09)	120(70.59)	238
b.	1 (3.23)	00 (0)	04 (2.98)	16 (9.41)	21
c.	1 (3.23)	2 (13.33)	12 (8.96)	30 (17.65)	45
d.	24 (77.42)	10 (66.67)	08 (5.97)	04 (2.35)	46
Total	31 (100)	15 (100)	134 (100)	170 (100)	350

Source: Field Survey (2024)

On Table 1a is the detailed summary of data generated from public health centres and local government education authority (LGEA) schools in Gwale LGA of Kano state. The observed frequencies and percentages were highest among the respondents that disagreed (110; 82.09%) and strongly disagreed (120; 70.59%) on their awareness of the statutory provisions of the school health service (SHS) program for the UBEC schools; while the respondents who strongly agreed (24; 77.42%) and agreed (10; 66.67%) opined that teaching health education assisted in disseminating health information to the school community, and by extension, the homes. Very low frequencies and percentages were recorded for options on regular health visit to schools (SA=01, 3.23%; A=00, 0%) and use of sports for health promotion (SA=01, 3.23%; A=02, 13.22%). These low responses may be related to few situational health visits due to health crises and the very low sports patronage due to the day-school system respectively. In order to find out whether these variable responses are significant, inferential statistics of chi square (X^2) was employed and the result is presented in Table 1b.

Ho₁: There is no significant awareness of statutory provisions for school health services at the UBEC schools in Gwale LGA, Kano state

Table 1b: Inferential statistics of chi square analysis of level of awareness of the statutory provisions for school health services at the UBEC schools in Gwale LGA, Kano

Analysis $(F_o - F_e)^2$				
Fe				
N	df	X ² cal	X ² crit	Remarks
350	9	11.77	16.92	Not Significant

$$X^2_{(9)} = 11.77 < 0.05 \text{ Not Significant}$$

A careful study of Table 1b showed result of chi square analysis of the level of awareness of the statutory provisions for school health services at the UBEC schools in Gwale LGA, Kano. Result of the analysis was not significant ($X^2_{(9)} = 11.77 < 0.05$); hence the null hypothesis was retained. This result may be due to poor dissemination of the school health policy provisions and their implementation across all UBEC schools in the area of study.

Research Question 2: Is the content of the school health programmes accommodated by the comprehensive school health services at the UBEC schools in Gwale LGA, Kano state?

Table 2a: Summaries of descriptive statistics of content of the school health programmes accommodated by the comprehensive school health services at the UBEC schools in Gwale LGA, Kano state.

Options	SA (%)	A (%)	D (%)	SD (%)	Total
a.	15 (100)	10 (90.91)	11 (14.29)	20 (8.09)	56
b.	00 (0)	00 (0)	08 (10.39)	125 (50.61)	133
c.	00 (0)	01 (9.09)	58 (75.32)	102 (41.30)	161
d.	00 (0)	00 (0)	00 (0)	00 (0)	00
Total	15 (100)	11 (100)	77 (100)	247 (100)	350

Source: Field Survey (2024)

Table 2a showed summaries of descriptive and inferential statistics of chi square analysis of responses in respect of the content of SHP accommodated at the UBEC schools in the study area. Results revealed extremely low frequencies in respect of periodic health checks on staff and supply of facilities games and sports (See Table 2; options b, c) and zero (00) in all response options on SHP officials having direct link with PTA members. The periodic checks on pupils which recorded very low response across all options indicated poor accommodation of school health programs in the comprehensive school health services. In order to find out whether these low responses are significant, the summarized data was analysed with inferential statistics of chi square was used to test the hypothesis and results presented in Table 2b.

H₀₂: School health programmes are not significantly accommodated by the comprehensive school health services in UBEC schools in Gwale LGA, Kano state

Table 2b: Inferential statistics of chi square analysis of content of the school health programmes accommodated by the comprehensive school health services at the UBEC schools in the study area

Analysis $(F_o - F_e)^2$				
		Fe		
N	df	X ² cal	X ² crit	Remarks
350	9	7.09	16.92	Not Significant

$$X^2_{(9)} = 7.09 < 0.05 \quad \text{Not Significant}$$

Presented in Table 2b is result of chi square analysis of content of the school health programmes accommodated by the comprehensive school health services at the UBEC schools in the study area. Result of the analysis was not significant ($X^2_{(9)} = 7.09 < 0.05$); hence the null hypothesis was retained. This implies there exists a lacuna between health policy formulation and implementation in the local government area of study.

Research Question 3: What are the collaborations in the school health services’ organizational set up in UBEC schools in Gwale LGA, Kano state?

Table 3a: Summaries of descriptive on areas of collaborations in the school health services’ organizational set up in UBEC schools in Gwale LGA, Kano state

Options	SA (%)	A (%)	D (%)	SD (%)	Total
a.	08 (22.86)	03 (6.38)	13 (16.46)	14 (7.41)	38
b.	00 (0)	00 (0)	35 (44.30)	135 (71.43)	170
c.	27 (77.14)	44 (93.62)	31 (39.24)	40 (21.16)	142
d.	00 (0)	00 (0)	00 (0)	00 (0)	00
Total	35 (100)	47 (100)	79 (100)	189 (100)	350

Source: Field Survey (2024)

A careful examination of Table 3a showed the summaries of descriptive statistics on areas of collaborations in the school health services’ organizational set up in UBEC schools in Gwale LGA, Kano state. Results showed that 44/47 representing 93.62% agreed that the health master acts as school health coordinator while 41/189 strongly disagree that any collaboration exists. Furthermore, results have shown that parents are not carried along regarding health of school children as zero frequencies were recorded. In order to find out whether these variable responses

are significant, the summarized data was analysed with inferential statistics of chi square to test the hypothesis and results presented in Table 3b.

H₀₃: There are significant collaborations in the school health services’ organizational set up in UBEC schools in Gwale LGA, Kano state.

Table 3b: Inferential statistics of chi square analysis on areas of collaborations in the school health services’ organizational set up in UBEC schools in Gwale LGA, Kano state

Analysis $(F_o - F_e)^2$				
Fe				
N	df	X ² cal	X ² crit	Remarks
350	9	9.72	16.92	Not Significant

$$X^2_{(9)} = 9.72 < 0.05 \quad \text{Not Significant}$$

On Table 3b is the inferential statistics of chi square analysis on areas of collaborations in the school health services’ organizational set up in UBEC schools in Gwale LGA, Kano state. Result of X² analysis was not significant ($X^2_{(9)} = 9.72 < 0.05$); and the null hypothesis was accepted. The implication of this outcome is that the organization setup of SHS need to collaborate and meet regularly so that school communities can enjoy health benefits entrenched in the programme.

Research Question 4: What are the impacts of the school health services on the entire UBEC school community in Gwale LGA of Kano state?

Table 4a: Summaries of descriptive statistics on impact of the SHS on the entire UBEC school community in Gwale LGA of Kano state

Options	SA (%)	A (%)	D (%)	SD (%)	Total
a.	62 (62.63)	44 (51.77)	10 (16.95)	12 (11.21)	128
b.	02 (2.02)	06 (7.06)	38 (64.41)	90 (84.12)	136
c.	13 (13.13)	19 (22.35)	11 (18.64)	05 (4.67)	48
d.	22 (22.22)	16 (18.82)	00 (0)	00 (0)	38
Total	99 (100)	85 (100)	59 (100)	107 (100)	350

Source: Field Survey (2024)

A cursory look at Table 4a revealed the summaries of descriptive statistics on impact of the SHS on the entire UBEC school community in Gwale LGA of Kano state. The respondents who strongly agreed (62) and agreed (44) are of the opinion the impact of SHS is not being felt, while others disagreed (38) and strongly disagreed (90) that the PHC team ever carried out periodic visits. From the table, it could also be observed that health talk was not regular (05) and neither

did the school children enjoy free health services in the school (00). To ascertain whether SHS has had any significant impact on the UBEC school community, the inferential statistics of chi square (X^2) was employed. The result is presented in Table 4b.

Table 4b: Inferential statistics of chi square analysis on impact of the SHS on the entire UBEC school community in Gwale LGA of Kano state.

N	df	Analysis $(F_o - F_e)^2$		Remarks
		X^2_{cal}	X^2_{crit}	
350	9	13.56	16.92	Not Significant

$$X^2_{(9)} = 13.56 < 0.05 \quad \text{Not Significant}$$

A careful study of Table 4b showed result of chi square analysis on impact of the SHS on the entire UBEC school community in Gwale LGA of Kano state. Results obtained was not significant ($X^2_{(9)} = 13.56 < 0.05$). This implies that all the attributes contained in the SHS document are not being implemented on the UBEC schools and consequently its impact is not felt in the entire school communities in Gwale LGA, Kano state.

Discussion

As good health is the desire of all humans, the school child and personnel who care for them are also considered in the school health services policy. Thus, the provision of health education as described by the findings of this study is in line with the WHO's (2020) on school health guidelines, which state that school-going children can benefit from health education teaching. Similarly, Chidiebere, (2016) emphasised that health education gives learners the opportunity to understand the implications of not caring for their health. Although, the result was not significant, this is a policy requirement that should not be waived aside because it is a coordinated system that ensures a continuum of care from school to home to community health care provider and back again (Small, et al., 1995). All stakeholders should be familiar with these provisions using mass media and other channels to disseminate the awareness policy.

Another feature of school health services, and one that is often overlooked, is its potential for expanding the knowledge base. School health services can be a rich source of data for studying the relation between health status and learning capacity, and for assessing unmet needs and monitoring the health status of children, adolescents (Haider, et. al, 2018) and the school personnel. This is reflected in the results presented on Table 2 in which responses on

accommodation of SHS by the CSH programmes was not significant ($P < 0.05$). This can be explained because of the extremely low frequencies in respect of periodic health checks on staff and supply of facilities games and sports (See Table 2; options b, c) and zero (00) in all response options on SHP officials having direct link with PTA members.

Results of chi square analysis presented in Table 3 on areas of collaborations in the school health services' organizational set up was not significant ($X^2_{(9)} = 9.72 < 0.05$). This outcome reflects the higher frequency of disagreed compared to agreed responses on options (a) and (b) on the questionnaire. The PTA members seem not involved in health matters in the UBEC schools; as revealed by frequency (00). It can be concluded that there is no collaboration with stakeholders in the SHS organizational setup. And finally, on impacts of SHS on the entire UBEC school community, result of chi square analysis was not significant ($X^2_{(9)} = 13.56 < 0.05$). This was as a result of frequency of respondents, (eighty-six, 86) that strongly agreed (62) and disagreed (44) who opined the impact of SHS is not being felt, while others disagreed (38) and strongly disagreed (90) that the PHC team neither carried out periodic visits nor school children enjoy free health services in the school. So, that all the indices presented negative frequencies, caused the non-significance. The strength of this study revealed there was a gap in the organizational setup with stakeholders (Daniel & Miina (2022) and found that this gap also influenced in policy implementation (WHO, 2020).

The outcome of the summary of results presented in Table 4 was not significant as majority of the respondents did not feel the impact of SHS programmes in the UBEC schools. This might be related to policy implementation (Shasha, et al., 2011). If the impact is not felt, it means the school children are not benefitting from health teaching (UNESCO, 2012), have neither access to sports and games (Ajala, 2008) nor primary health care; hence at greatest risk of academic failure (Federal Ministry of Education, Nigeria, 2006). This is why there is need to institutionalize SHS by integrating the health programme components into our educational system as part of its regular task (Oseji & Okolo, 2014) of the day-to-day administration of our school system.

Conclusion

From the foregoing, it can be concluded that the school public health centers and local education authorities are probably not aware of the statutory provisions of the CSH programme or failed in their implementation. Of importance is the role teaching of health education in disseminating

health information to local communities; and using sports and games to ward off sedentary living and promote healthy lifestyle. They are entrenched in the SHS statutory provisions that should be made available to stakeholders for health promotion.

This study further revealed that the content of SHP was not fully accommodated at the UBEC schools' system in the study area. Results revealed extremely low frequencies in areas of periodic health checks on learners and staff; availability of facilities games and sports and even relationship with strong stakeholders like the Parents-Teachers Association (PTA). This signify there is a lacuna between health policy formulation and implementation in the area of study.

On collaborations in the SHS organizational setup, it was concluded that it never existed as officers listed in the programme performed their normal duties of health master, no health visits except there was communal emergencies and parents were not involved in the school health administration. The only collaboration was in the SHS organization chart placed in LGEA and PHC offices.

Finally, finding of this study revealed the impact of SHS is not being felt; while some disagreed (38), many strongly disagreed (90) that the PHC team ever carried out periodic visits. From the result, it could also be observed that health talk was not regular (05) and neither did the school children enjoy free health services in the school (00). There is need for a complete overhaul of the school health service programme if our educational system is to be free from diseases and ailments that can be prevented.

Recommendations

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

- i. The school health supervisory unit of the Kano state Ministry of Health (MOH) should be revamped to ensure implementation of the statutory provisions of Comprehensive School Health Programme
- ii. There is need to reinvigorate the Parents/Teachers Association (PTA) in schools. They will be partners with government and other relevant agencies in health promotion among school children
- iii. Collaboration between the MOH and others, such as the Ministry of Education, the private sector and nongovernmental organisations, needs to be strengthened in order to establish a united effort for promoting the delivery and utilisation of school health services.

- iv. Written instructions based on the SHP guidelines should be made compulsory in all schools, and every school should develop its own health-related policies to enhance the quality and continuity of school health services.
- v. Community members should be incorporated into school health committees, which can be utilised to increase school health awareness and identify health problems that are affecting the learners in their communities.

Acknowledgements

The authors appreciate the Tertiary Education Trust Fund (**TETFUND**) for providing funds to carry out this research work; the Gwale LGA Education Secretary and Public Health Centers for consenting to data collection in their domains and all the field workers led by Mall. Sadiq Aliyu, for administering and retrieving questionnaire used for the study.

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**PARENTAL EDUCATION AND CREATIVITY: AN EXPLORATORY STUDY OF
UNIVERSITY UNDERGRADUATES IN KWARA STATE, NIGERIA**

BY

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ABSTRACT

This study investigated parental education and creativity among undergraduates of universities in Kwara state, Nigeria. The study specifically examined the creativity level of the respondents and how they have differed on the bases of demographic factors. Using the descriptive survey design, proportionate sampling technique was used to select the respondents from the two Universities. A self-designed creativity scale was used to collect data and the data were analysed with descriptive statistics and a 2-way and 3-way Analysis of Variance (ANOVA). The results of the study showed that Undergraduates of Universities in Kwara State have an average level of creativity and the respondents were similar in their level of creativity based on demographic variables (gender, residence, level of study and course of study); while they have differed on the basis of parents' educational attainment. It was recommended among others that stakeholders in the Nigerian education system should equip universities with resources that can nurture innate potentials of students (irrespective of the demographic factors) to enable them

Keywords: Parental Education, Creativity, Undergraduates, Kwara State.

Introduction

Technological advancement has made the whole world in Diasporas become one. There is an easy flow of information and exchange of ideas across board with less or no hindrances. This is made possible through people's creative thinking and innovative ideas that had brought about rapid growth and development in all facets of life. This has necessitated the inculcation of creativity in the methodology of teaching and learning processes so that the hidden or innate creative ideas, talents and potentials in students can be identified, nurtured and harnessed for innovative development of the overall educational system and other spheres of life. This suggests that teachers in training must be equipped and conversant with different instructional interventions that can motivate students to learn and achieve the overall goals and objectives of education; of producing integrated citizens who can contribute positively and immensely to the development of the nation. This is why (Wu et al., 2010) asserted that "creativity is the basis of a nation's competitive advantage and the university is a major core for fostering such talent". (Shan, 2000), creativity contributes towards the mental health, education, vocational success and many other important areas in life. Therefore, pre-service teachers are expected to be practically creative during and after their course of study so that they can eventually be able to thoroughly nurture creative ideas or talent within pupils or students.

Every individual is born with one innate potential or the other and this varies from one person to the other. However, different socio-economic indicators may determine the identification and exploitation of such potentials in human being. In support of this, (Feldman, 1999) described creativity as a multi-dimensional construct that involves a cognition process, social or emotional process, family and clan, formal and informal education, characteristics of domain and discipline, social-cultural context and history; meaning that creativity is subject or susceptible to some influential socio-demographic factors. This may be likened to the concepts of "nature" and "nurture"; that is, an individual may be born with creative gene or potential, but such child is trained or nurtured in an unfavourable environment, the creative potentials in that person may become difficult to identify not to talk of exploiting such talents for positive achievement. In the other way round, a dull child but nurtured in a conducive and comfortable environment may become creative and exploit such for meaningful purpose in life. In view of the above, this study

aims at examining the influence of some selected demographic indicators on creativity among undergraduates of universities in Kwara State.

In line with Maslow's humanistic theory, it is believed that human needs form a hierarchy, from basic physiological demands to the need for self-actualization. Needs at the lower levels must be reasonably well satisfied before the individual will turn his or her attention to those at the higher levels. This is where the demographic background of students comes in when indicators of creativity are being discussed. For example, a child who comes from lower socioeconomic status is not likely to develop much intellectual curiosity than one from higher socioeconomic status. Maslow acknowledged the likelihood that the different levels of motivation (personal and environmental factors) could occur at any time in the human mind but he focused on identifying the basic types of motivation and the order which they should be met.

Several studies have revealed varying findings on the influence of socio-economic factors on individuals' creativity. For example, (Zhou & George, 2001); (Zhou & George, 2003) have shown in their studies that family background, schools, classes, or organizational cultures in the workplace affect the creativity of people. According to (Dodds et al., 2002), parents, peers, parents, space and time impacted students' level of creativity.

It has been observed by (Battle & Lewis, 2002) that many variables like family size, family child-rearing practices, birth order and socio-economic status of the parents affects the creativity level of the individual child in the school. Considine and Zappala, (2002) stated that families where the parents are advantaged socially, educationally and economically foster a high level of creativity and achievement in their children. The researcher agreed with ⁸ that students from high social-economic backgrounds are well exposed to scholastic materials which aid their intelligence and enhance their creativity level. (Runco et al., 2017] found that students are more creative when outside the school environment.

In terms of gender, in Nigeria, (Oyyundoyin & Olatoye, 2007) reported that there was no difference between male and female students on general creativity tests. There was also no significant difference between male and female students on each component of creativity namely fluency, originality, flexibility and creativity motivation. (Mefoh et al., 2017) indicated that males are better at problem-solving than females. In contrast, (Naderi et al., 2008) found that

there was no gender difference in creativity as the whole. According to this result, females' score higher than males in the initiative factor, while males' score higher than females in the environmental sensitivity factor.

Reddy et al., (2015) findings revealed that there is a significant impact of gender, locality of residence and class of study on nonverbal creativity among high school students. (Hamed et al., 2016) showed statistically significant differences in creative-teaching for teachers at IPS's, based on gender, age, academic qualification, teaching experience and subject taught. According to (Mali & Kumar, 2017) findings, demographic variables of gender, parents' education, residential location and academic area of study are good predictors of creative thinking. (Alizamar et al., 2019) discovered that students' creativity is high enough (55.56%) and no significant difference was found in their creativity level on the bases of the field of study, gender, parents' education and year of entry.

Statement of the Problem

Creativity is presumed significant to the achievement of educational goals and objectives, and the overall development of the nation. However, the Nigerian education system has not recorded huge success in the creativity realm among University students. Many Nigerian graduates are regarded as unemployable and far behind in contributing to the development of their society compared to other youths in the developed world. This might have resulted from the fact that many of them lack critical thinking and innovative abilities or ideas that can translate to new inventions in the education system and towards sustainable growth and development of the nation. In proffering solution to this, several educational policies had been introduced but had not yielded any positive change in the targeted problem. Perhaps, less or no attention has been given to the demographic factors of individuals as it relates to their creativity level. Also, empirical studies are scarce in this area of study, particularly, among University preservice teachers in Kwara State; hence, the need for examining the demographic indicators of creativity among undergraduates of Universities in Kwara State, Nigeria.

Objectives of the Study

This study is designed to achieve the following specific objectives:

1. To determine the level of creativity among undergraduates of Universities in Kwara State.

2. If there will be difference in the creativity level of undergraduates of Universities in Kwara State on the bases of gender, residence and parental educational attainment.
3. If there will be difference in the creativity level of undergraduates of Universities in Kwara state on the bases of level of study and course of study.

Research Question

In view of the above the following research question was addressed:

1. What is the level of creativity among undergraduates of Universities in Kwara State?

Hypotheses

1. There is no significant difference in the creativity level of undergraduates of Universities in Kwara State on the bases of gender, residence and parental educational attainment
2. There is no significant difference in the creativity level of undergraduates of Universities in Kwara state on the bases of level of study and course of study

Methodology

The quantitative approach is employed for this study. This is because it aims at examining the relationship that exists among some variables and involves the test of relevant hypotheses. In view of this, the descriptive survey design is considered appropriate for this study because it demands the use of questionnaire for data collection on the variables under study. The population for the study comprises all 52,623 undergraduates of Universities in Kwara State. Only the State and Federal universities' undergraduates were the target population for this study and their population include:

Table 1: Population Size

S/N	Institutions	Target Population	Sample size
1	University of Ilorin, Ilorin	36,312	$36,312/52,623 * 382 = 264$
2	Kwara State University	16,211	$16,211/52,623 * 382 = 118$
	Total	52,623	382

Based on this population, a sample size of 382 is required (Krejcie & Morgan, 2006) for a population within 75,000 at 95% confidence level and under 0.05 margin of error. Thus, 382 undergraduates from the Universities participated in the study. The sampling technique used to select the respondents is the proportionate sampling technique. This is because of the wide gap in the population sizes of the two universities. Hence, the sample was distributed based on the population size contributed by each university. Having done that, the questionnaire was distributed randomly to students found in various faculties in the Universities. However, during the questionnaire administration 382 copies of the questionnaire were administered, 366 were retrieved; while 357 copies were adequate for data analysis.

The research instrument used in the conduct of this research was developed by the researcher which was tagged “Creativity Scale”, with a Cronbach Alpha reliability coefficient of 0.82 which is within the acceptable region of strong consistency of an instrument. It consists of the demographic section and 20 creativity items in the second part, with Five-point scale of; SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; and SD = Strongly Disagree. Percentage was used to describe the demographic profiles of the respondents; while 3-way and 2-way Analysis of Variance (ANOVA) were employed to test the hypotheses formulated at 0.05 alpha level.

Results

The demographic characteristics of the respondents shows that out of 357 respondents that took part in the study, 143 (40.1%) were males; while 214 (59.9%) were females. In terms of residence, 183 (51.3%) of the respondents were living on-campus; while 174 (48.7%) were offcampus. As regards, parental education, 41 (11.5%) have nonformal education, 90 (25.2%) were primary school certificate holders, 65 (18.2%) have ND/NCE certificate, 51 (14.3%) have HND/1st Degree certificates, 20 (5.6%) were Master’s Degree holders; while 3 (0.8%) were Ph.D holders. On the basis of level of study, 95 (26.6%) of the respondents were in 100 level, 118 (33.1%) were in 200 level, 74 (20.7%) were in 300 level; while 70 (19.6%) were 400 level students. With respect to their course of study, 38 (10.6%) were from Arts Education, 48 (13.4%) were in Science Education, 57 (16.0%) were in Guidance and Counselling, 41 (11.5%) were in Educational technology, 35 (9.8%) were Educational Management students, 84 (23.5%) were

from the Department of Human Kinetic; while 54 (15.1%) were students from the Department of Health Promotion and Environmental Health.

Research Question One: What is the level of creativity among undergraduates of Universities in Kwara State?

Table 2: Percentage Distribution of Creativity Level of Undergraduates of Universities in Kwara State

Score Range	Frequency	Percentage	Remark	Decision
61-100	148	41.0	High	
41-60	207	58.0	Average	Average Level of Creativity
1-40	2	1.0	Low	
Total	357	100.0		

In order to establish creativity levels of Undergraduates of Universities in Kwara State, scores obtained on creativity scale administered were categorized into three levels (i.e low, average and high). The instrument is patterned on five-point scale, so, the highest possible scores on any of the positive response was $5 * 20 = 100$, and the lowest possible score was $1 * 20 = 20$, while the average falls within $3 * 20 = 60$. In this regard, scores between 1-40 on the "Creativity Scale" is considered low level of creativity, scores between 41-60 is remarked average level of creativity; while scores between 61-100 on the scale are rated high level of creativity. Table 2 thus indicated that majority, 207 (58.0%) of the respondents fall within average continuum, 148 (41.0%) were within high level of creativity; while 2 (1.0%) have low level of creativity. It is therefore inferred that Undergraduates of Universities in Kwara State have average level of creativity.

H₀₂: There is no significant difference in the creativity level of undergraduates of Universities in Kwara State on the bases of gender, residence and parental educational attainment.

Table 3: 3-Way ANOVA Comparing Creativity Level of Undergraduates of Universities Based on Gender, Residence and Parental Educational Attainment

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1587.661 ^a	26	61.064	1.628	.029
Intercept	378674.594	1	378674.594	10096.595	.000
Gender	6.352	1	6.352	.169	.681
Residence	75.301	1	75.301	2.008	.157
Parents' Education	551.934	6	91.989	2.453	.025
Gender * Residence	.789	1	.789	.021	.885
Gender * Parents' Education	304.039	6	50.673	1.351	.234
Residence * Parents' Education	176.157	6	29.359	.783	.584
Gender * Residence * Parents' Education	217.428	5	43.486	1.159	.329
Error	12376.709	330	37.505		
Total	1340532.000	357			
Corrected Total	13964.370	356			

a. R Squared = .114 (Adjusted R Squared = .044)

Table 3 shows that the main effect for gender, residence and parents' educational attainment yielded F ratios of $F(1, 330) = .169$, $F(1, 330) = 2.008$ and $F(6, 330) = 2.453$, at $p = .681$, $.157$ and $.025$ respectively. This indicates that gender and residence of the respondents have no influence on their level of creativity; while parents' level of educational attainment influences the students' level of creativity; hence, the hypothesis was retained based on gender and residence but was rejected on the basis of parents' level of educational attainment. The interaction effect was also not significant, $F(5, 330) = 1.159$, $p > .005$.

This effect means that overall, irrespective of the demographic variables of respondents, are not different in their level of creativity. A post-hoc of Duncan Multiple Range Test (DMRT) was conducted to determine the group of respondents that contribute to the difference with regards to their parental educational attainment.

Table 4: DMRT Showing the Educational Category of Parents that Contributes to the Difference in Respondents' Level of Creativity

Parents' Education	N	Subset1
HND/1st Degree	51	59.14
Non-formal	41	59.56
Secondary	65	60.11
Ph.D	3	60.33
Master	20	61.10
Primary	90	61.26
ND/NCE	87	63.00
Sig.		.140

Table 4 shows that the mean scores of 59.14 and 59.56 for students whose parents were HND/1st Degree certificate and non-formal education slightly different from each other. Also, the mean scores of 60.11 and 60.33 for students whose parents were secondary school and Ph.D certificates holders were in the same group. Furthermore, 61.10 and 61.26 were mean scores for those respondents whose parents have Master's Degree and primary education respectively. However, students with parents that have ND/NCE certificate have the highest mean value of 63.00 which is significantly greater than those in other groups; hence, undergraduates of Universities whose parents have average level of education contribute more to the difference observed in their level of creativity. This suggests that undergraduates with parents of moderate level of education are more creative than those in another higher or lower level of education.

H₀₂: There is no significant difference in the creativity level of undergraduates of Universities in Kwara state on the bases of level of study and course of study.

Table 5: 2-Way ANOVA Comparing Creativity Level of Undergraduates of Universities Based on Gender, Residence and Parental Educational Attainment

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	975.164 ^a	27	36.117	.915	.591
Intercept	1040453.904	1	1040453.904	26353.370	.000
Level of Study	95.689	3	31.896	.808	.490
Course of Study	277.446	6	46.241	1.171	.321
Level of Study * Course of Study	674.725	18	37.485	.949	.519
Error	12989.205	329	39.481		
Total	1340532.000	357			
Corrected Total	13964.370	356			

a. R Squared = .070 (Adjusted R Squared = -.007)

Table 5 shows that the main effect for level of study and course of study yielded F ratios of $F(3, 329) = .808$ and $F(6, 329) = 1.17$, at $p = .490$ and $.321 > 0.05$) respectively. This indicates that both level of study and course of study of the respondents have no influence on their level of creativity; hence, the hypothesis was retained based on level of study and course of study. The interaction effect was also not significant, $F(18, 329) = .949$, $p > .005$. This effect means that overall, irrespective of the demographic variables of respondents; they are not different in their level of creativity.

Discussion

The first finding of this study revealed that Undergraduates of Universities in Kwara State have average level of creativity. This finding disagrees with the study of (Alizamar et al., 2019) whose finding showed high level of creativity (55.56%) among the students of tertiary institutions. Also, this finding is against the findings of (Aminullahi et al., 2019) whose finding indicated that secondary school students in Nigeria have high level of creativity. This might be because this study focused on tertiary institution students, while that of (Aminullahi et al., 2019) was on secondary school students whose majority are adolescents and that of ¹⁶ was not conducted in Nigeria. However, (Aminullahi et al., 2019) noted that his finding is in contrast with the reality of Nigerian students as far as creativity is concerned. This finding is an indication and supporting the fact that there is much to be done in improving the Nigeria education system in such a way

that creativity and innate abilities or potentials of students can be nurtured adequately so that they can independently come up with new inventions or ideas that will contribute positively and enormously to the development of the nation. Despite this, this finding has brought into limelight that many Nigerian students are embedded with potentials and innovative ideas that can be translated to greater achievement if adequately nurtured with a functional educational system and responsible political leadership.

Secondly, the finding of this study showed that there is no significant difference in the level of creativity of undergraduates of universities in Kwara State on the bases on gender and residence; while they were differed in their creativity level on the basis of parents' level of educational attainment. This means that both male and female undergraduates, as well as those living both on/off-campus, were similar or the same in their level of creativity. Similar finding had been reported by (Mefoh et al., 2017). In Nigeria, (Oyundoyin & Olatoye, 2007); (Naderi et al., 2008); while (Reddy et al., 2015); (Mali & Kumar, 2017) showed that there is significant difference in students' level of creativity with regards to gender and residence. This finding suggests that other factors other the respondents personal or socio-demographic factors are more influential on their level of creativity. This implies that undergraduates of Universities in Kwara State can easily reach the higher level of creative and move the nation to a greater height if an enabling environment is provided for them to explore their potentials to the fullest. On the other hand, parents' level of educational attainment has been proven to be influential on undergraduates' level of creativity in Kwara State. The DMRT result indicated that undergraduates with parents at average level of education are more at average level of creativity than those in other higher or lower level of education. This finding supports the findings of (Dodds et al., 2002); (Mali & Kumar, 2017) who noted that parents' educational background can determine creativity level of students. This finding suggests that students whose parents are at a middle or low level of educational status are more likely to receive less support that can contribute to the students' high creativity level.

Finally, the finding revealed that both level of study and course of study of the respondents have no influence on their level of creativity. This means that the course in which an individual has chosen and their level of study are not determinants of their creativity level. The implication of this is that anybody can become creative in their field and level of studies, depending on the

tasks or activities involved in such profession. The finding of this study corroborates the finding of ¹⁶, while it contradicts the findings of (Zhou & George, 2001); (Zhou & George, 2003)]; (Reddy et al., 2015); (Mali & Kumar, 20017) that established that level of study and course of study impact creativity level of students. This finding deviates from some of the previous studies because of perhaps, difference in locality of study and peculiarity of the students under study.

Conclusion

The study on demographic indicators of creativity among undergraduates in Kwara State, Nigeria, reveals critical insights into the creative potential of university students. The research discovered that university students in the region demonstrate an average level of creativity, suggesting significant room for educational improvement. Notably, the study found that while most demographic factors like gender, residence, level of study, and course of study do not significantly impact creativity, parental educational attainment emerges as a crucial influencing factor.

The findings highlight that students whose parents have a moderate level of education tend to exhibit slightly higher creativity levels compared to those with parents at extremely high or low educational levels. This suggests that balanced parental educational backgrounds might provide a more conducive environment for nurturing creative thinking.

Recommendations

1. Stakeholders in the Nigerian education system should invest in comprehensive university resources, including advanced learning technologies, creative workshops, and innovative teaching methodologies to systematically nurture students' inherent creative potentials.
2. Nigerian educational policy makers should provide undergraduates of universities (irrespective of their demographic variation) with adequate facilities that can help improve their creativity level for better performance and positive contribution to the development of the society.

3. Parents should be enlightened on the need to be educated and be exposed to contemporary development in the globe, so that can be able to nurture their children innate potentials and creative ideas for development of the society at large.
4. Universities should redesign curricula to incorporate more interactive, problem-solving, and creativity-stimulating learning approaches that encourage students to think beyond traditional academic boundaries. Establish ongoing research mechanisms to monitor and assess creativity levels among students, allowing for dynamic and responsive educational interventions. Develop interdisciplinary platforms and programs that encourage students from various academic backgrounds to collaborate, share ideas, and stimulate creative thinking.

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**ASSESSMENT OF SAFETY PRACTICES TOWARD OCCUPATIONAL HAZARDS AMONG
HEALTHCARE WORKERS OF TEACHING HOSPITAL IN NIGERIA**

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ABSTRACT

The study investigated safety practices toward occupational hazards among healthcare workers of teaching hospital in Nigeria. guided the study. The population of the study consisted of twenty-five thousand, five hundred and fifty (25,550) healthcare workers of Teaching Hospitals in Nigeria. The sample size for this study was three hundred and forty-eight (348), which was selected among healthcare workers in teaching hospitals in Nigeria. Multi-stage sampling techniques was used to draw the sample size of the study. A researcher designed structured questionnaire titled "Occupational Hazards and Safety Practices among Healthcare Workers Questionnaire" (OHSPHWQ) was used to obtain data from the selected respondents. An inferential statistic of one sample t-test was used to test the hypothesis at 0.05 level of significance. Findings revealed that there were positive significant safety practices towards occupational hazard among healthcare workers in teaching hospitals in Nigeria ($t = 121.745$, $df = 339$; $P < 0.05$) and there is no significant difference in safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria based on their cadre ($F = .590$, $df = 6,333$; $P > 0.05$). It was concluded that healthcare workers at a teaching hospital in Nigeria have positive safety practices toward occupational hazards and because the hypotheses tested was significant. However, there was no difference in safety practices toward occupational hazards among healthcare workers in teaching hospitals in Nigeria based on their cadre, because the difference was not insignificant. It was recommended among others that the teaching hospitals should implement and enforce strict regulations to cultivate a conscientious safety practice towards occupational hazards and protocols among healthcare workers across Nigeria. Such proactive measures will foster and elevate a positive mindset regarding occupational safety and best practices.

Key words: Safety practices, Occupational hazards, Healthcare workers and Teaching hospitals.

Introduction

Safety in the workplace in general is the protection of the health and safety of the entire staff (Aluko, Adebayo, Adebisi, Ewegbemi, Abidoye, & Popoola, 2016). Moreover, occupational safety is a multidisciplinary field concerned with the safety, health, and welfare of people at their workplace. It is a discipline that is concerned with preserving and protecting human resources in the workplace. In other words, occupational safety is a discipline with a broad scope involving many specialised fields that encompasses the social, mental, and physical well-being of people in their working environment (Viragi, Ankola, & Hebbal, 2020).

In its broadest sense, occupational safety aims at the promotion and maintenance of the highest degree of physical, mental, and social well-being of workers in all occupations; the prevention of adverse effects on health caused by working conditions; the protection of workers from risk-associated adverse health effects of one's employer; the placing and maintenance of workers in an occupational environment adapted to physical and mental needs; and the adaptation of work to humans (Efstathiou, Spiegel, & Shipley, 2021). Furthermore, occupational safety deals with all aspects of health and safety in the workplace and has a strong focus on the primary prevention of hazards. The health of the workers has several determinants, including risk factors at the workplace leading to cancer, accidents, musculoskeletal diseases, respiratory diseases, hearing loss, circulatory diseases, stress-related disorders, communicable diseases, and others (Aluko et al., 2016).

Successful occupational safety practice requires the collaboration and participation of both employers and workers in health and safety programmes, and it involves the consideration of issues relating to occupational medicine, industrial hygiene, toxicology, health education, engineering safety, ergonomics, and psychology (Omar & Mohd-Nordin, 2021). Compliance with occupational safety is the standard of meeting all the required legal standards stipulated by the Occupational Health and Safety Act in Nigeria. The legal standards stipulated are meant to safeguard and protect employees in the workplace from any hazards, risks, incidents, or fatalities. It also stipulates the safe use of machinery and equipment to prevent injury. However, safety compliance refers to those fundamental activities that need to be performed by employees

according to their occupational safety and health requirements to ensure a safe working environment (Neal & Griffin, 2021). It also entails engaging in required behaviours that maintain workplace safety, such as following safety procedures and wearing personal protective safety equipment (Daniel, Utuh, & Nwaichi, 2020; Neal & Griffin, 2021). It is on these premises that the researcher intended to establish safety practices towards occupational hazards among healthcare workers in a teaching hospital in Nigeria.

Research Questions

The following research question was raised to guide the study:

1. What are the safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria?
2. What is the difference in safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria based on their cadre?

Hypotheses

1.1 HO₁ There is no significant safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria

HO₂ There is no significant difference in safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria based on their cadre

Methodology

A descriptive research design of survey type was employed in this study. Descriptive research is a type of research that describes a population, situation, or phenomenon that is being studied. It focuses on answering the how, what, when, and where questions. a research problem rather than the why (McCombes, 2020). This design was chosen to allow the researcher to describe the safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria in order to make generalisations in the study area. The population of this study consists of twenty-five thousand, five hundred and fifty (25,550) healthcare workers of Teaching Hospitals in Nigeria (Federal Ministry of Health [FMOH], 2023). The sample size for this study is three hundred and forty-eight (348), which was selected among healthcare workers in teaching hospitals in Nigeria. The sampling techniques for this study consist of multi-stage sampling techniques. Gupta (2011) described multi-stage sampling as a sampling technique that

is carried out in various stages. Similarly, multi-stage sampling techniques are procedures that are carried out in phases and usually involve more than one sampling method (Njodi & Bwala, 2004; Alchemer, 2021). Therefore, the stages for sampling in this study were as follows:

Step I: Teaching hospitals in Nigeria are clustered in six (6) geopolitical zones in Nigeria, namely: North-Central, North-East, North-West, South-East, South-South, and South-West.

Step II: A simple random sampling technique was used to select one (1) teaching hospital each from six (6) geopolitical zones in Nigeria, making up a total of six (6) teaching hospitals for the study. This was done by involving all the names of the teaching hospitals in the six (6) geopolitical zones in Nigeria being written down on a piece of paper, put into a container, and mixed vigorously. Then chits are picked out of the container to select the sample group.

Step III: A simple random sampling technique was also used to select five (5) Departments from each selected teaching hospital; these include: Medicine, Surgery, Anaesthesia, Nursing, Laboratory, Physiotherapy, and Pharmacy.

Stage IV: The proportionate sampling technique was used to select ten percent (10%) of the respondents as the sample size from each of the five (5) most hazardous Departments in the randomly selected teaching hospitals. Bullen (2021) stated that a good maximum sample size is usually around 10% of the population, as long as this does not exceed 1000. The formula is given as: $N/_{100} \times 10$, where N=population.

Stage V: The respondents in each healthcare worker's department were selected using the availability sampling technique. The availability sampling technique (also known as convenience sampling) is a specific type of non-probability sampling method that relies on data collection from population members who are conveniently available to participate in the study (Boxill, Chambers, & Wint, 2014).

A researcher designed structured questionnaire titled "Attitudes towards Occupational Hazards and Safety Practices among Healthcare Workers Questionnaire" (AOHSPHWQ) was used to obtain qualitative data from the selected respondents. The questionnaire consists of two sections (sections A & B); section A consists of 10-items on attitude of occupational hazards among healthcare workers of teaching hospitals in Nigeria; and section B consists of 10-items on

attitude on safety practices among healthcare workers of teaching hospitals in Nigeria. A four-point modified Likert scale was scored as follows: strongly Agreed, 4 points. Agreed 3 points, disagreed 2 points, and strongly disagreed 1 point at a decision mean of 2.50. Therefore, any response with a mean score of 2.5 and above was regarded as having aware of whereas any response with a mean score of less than 2.5 is viewed as not having aware of occupational hazards and safety practices in teaching hospitals in Nigeria

Seven hundred and eighty-seven (348) copies of the questionnaire were administered to the healthcare workers of a teaching hospital in Nigeria, with the help of four (4) research assistants, who were fully briefed on how to administer and collect the questionnaire from the respondents. Questionnaire forms were administered to healthcare workers in their respective departments. Moreover, the research assistant helps by reading and interpreting the questions in the questionnaire so that their responses tick appropriately. The instrument was collected back through the research assistants, and the exercise lasted for three (3) weeks. An inferential statistic of one sample t-test to test the null-hypotheses of the study.

Results

An Inferential statistic of one sample t-test and Analysis of Variance (ANOVA), were used to test the postulated null hypotheses for the study. An alpha level of 0.05 was used as a criterion for either retaining or rejecting the null hypotheses.

Testing of Research Hypotheses

Hypothesis One: There is no significant safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria

Table 1: Summary of One Sample t-test on safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria

Variable	N	Mean	SD	SE	df	T	P
Safety practices	340	32.66	4.95	0.26	339	121.745	.000
Test mean	340	2.50					

t=121.745, df: 339; P<0.05

Table 1 revealed the summary of one sample t-test on the safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria. The table showed the calculated mean of 32.94, which is greater than the decision mean of 2.50. This means that healthcare workers in teaching hospitals in Nigeria have a positive practices safety occupational hazard in the hospitals. The statistical computation of the sample t-test also indicated that there were significant safety practices of occupational hazard among healthcare workers in teaching hospitals in Nigeria ($t = 121.745$, $df = 339$; $P < 0.05$). Therefore, the hypothesis tested is rejected, because the p-value of .000 is less than the alpha-value of 0.05.

Hypothesis Two: There is no significant difference in safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria based on their cadre.

Table 2: Summary of One-Way ANOVA on difference in safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria based on their cadre

	Sum of Squares	Df	Mean Square	F	P
Between Group	13.278	6	2.213	.590	.738
Within Group	1249.475	333	3.752		
Total	1262.753	339			

The result in Table 2 indicated no difference in safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria based on their cadre. Therefore, the statistical computation of a one-way ANOVA shows that there is no significant difference in safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria based on their cadre ($F = .590$, $df = 6,333$; $P = .738$). The hypothesis stated that there was no significant difference in safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria based on their cadre is therefore retained, because the p-value of .738 is greater than the alpha-value of 0.05.

Discussion of findings

The finding of this study shows that there were significant safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria ($t = 121.745$, $df = 339$; $P < 0.05$). This finding agrees with the study conducted by Aluko, Adebayo, Adebisi, and Egbemi (2018), which carried out a study on knowledge, attitudes, and perceptions of occupational hazards and safety practices among Nigerian healthcare workers. The results showed that over half of the respondents identified recapping used needles as a risky practice (70%) and recognised that effective hand washing prior to and after every clinical procedure prevents cross-infection (100%). Also, most respondents (96.2%) believed they were at risk of occupational hazards, while about two-thirds perceived the risk as high. Only 52.1% "always" complied with standard procedures, and most (93.8%) practice safe disposal of sharps, while those that did not (40%) generally implicated a lack of basic safety equipment. This finding is also in line with the study conducted by Gebreyessus (2022) to determine knowledge, attitude, and practices on occupational health and safety principles among cleaners: the case of Tikur Anbassa Specialised Referral Hospital, Addis Ababa, Ethiopia. The result of the study showed that all cleaners had a favourable attitude towards safety principles. However, the knowledge of cleaners on occupational safety was so poor to the point that all of them did not even know the meaning of nosocomial infection. Almost all of the cleaners, 69 (98.6%), had not taken any reemployment training by the time of the interview. All of the cleaners' practices were not fully compliant with the universal precaution principles, and the major proportion, 37 (53%), of them had instances of needle-stick injuries ranging from one to four times. Furthermore, the waste in the hospital was located indiscriminately and in an uncovered container.

The outcome of this study revealed that there is no significant difference in safety practices toward occupational hazard among healthcare workers in teaching hospital in Nigeria based on their cadre ($F = .590$, $df = 6,333$; $P > 0.05$). This finding agrees with the study carried out by Naresh, Bhat, Chavan, Bhat, and Vira (2018) on staff perceptions, awareness, and compliance with safety: a survey of occupational hazards in a cancer centre. The results indicated that responses were obtained from 66 participants (18 men and 48 women). Most respondents were nurses (57.57%) and technologists (28.79%). Common injuries encountered were musculoskeletal (62.12%), sharps (12.12%), and allergies (36.36%). Compliance with safe work

practices, including personal protective equipment and waste disposal, ranged from 92% to 98% based on their cadre. Employee perceptions and awareness with respect to occupational hazards and safety measures were generally $\geq 90\%$ based on their cadre.

Conclusion

Based on the findings, the study concluded that healthcare workers at a teaching hospital in Nigeria have positive safety practices toward occupational hazards and because the hypotheses tested was significant. However, there was no difference in safety practices toward occupational hazards among healthcare workers in teaching hospitals in Nigeria based on their cadre, because the difference was not insignificant.

Recommendations

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

1. Teaching hospitals should implement and enforce strict regulations to cultivate a conscientious safety practices towards occupational hazards and protocols among healthcare workers across Nigeria. Such proactive measures will foster and elevate a positive mindset regarding occupational safety and best practices.
2. Teaching hospitals in Nigeria should organise periodic refresher courses and workshops to reinforce safety practices, irrespective of the cadre. This will help in updating knowledge and addressing any gaps that might arise over time.

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**CLASSROOM MANAGEMENT TECHNIQUES: TOOLS FOR EFFECTIVE
TEACHING IN NIGERIAN SECONDARY SCHOOLS
BY**

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ABSTRACT

It is an indisputable fact that Nigerian educators in general and secondary school teachers in particular are faced with problems of classroom management and this has direct effect on its products. It is on this basis that this study examined the concept of classroom management, purpose of classroom management techniques, concept of classroom management techniques and concept of effective teaching. Furthermore, this study discusses how classroom management techniques serve as a tool for effective teaching in Nigerian secondary schools and challenges of classroom management techniques. The challenges include resource constraints, diverse student needs, curriculum misalignment, limited time for planning, limited access to technology, inadequate teacher training, teacher motivation, technology gaps, classroom size and overcrowding among others. The study concludes that classroom management techniques serve as a tool for effective teaching and learning, enhance teachers' classroom instruction, their professional growth as teachers, and create a positive learning atmosphere. Therefore, it is suggested that classroom management techniques should ideally align with the curriculum to ensure relevance and effectiveness, teachers should be given access to digital instructional aides and adequate training on how to effectively use those instructional aides, teachers should be motivated in other for them to be able to motivate their students as well. It is also suggested that a conducive learning environment should be provided by both teachers and the educational financier for effective classroom management.

Keywords: Classroom Management, Effective Teaching, Secondary Schools, Nigerian Education, Teaching Techniques

Introduction

As the educational system evolves, teachers face challenges in adopting appropriate techniques to meet students' dynamic needs. Effective classroom management extends beyond maintaining

discipline; it involves strategies that create an engaging learning environment. Classroom management includes planning, supervising, controlling, and coordinating students' activities to achieve instructional objectives while safeguarding their well-being (Grieser, 2017). In Nigerian secondary schools, classroom management is crucial due to student diversity, overcrowded classrooms, and resource constraints (UNESCO, 2019). Poor management can hinder teaching and learning, making it essential for student engagement and academic success. Babad (2020) emphasized its influence on behavior and achievement, setting the tone for the learning experience. Technology is also transforming classroom management, with Smith and Jones (2021) highlighting digital tools' role in enhancing communication, organization, and engagement. Classroom management techniques refer to strategies teachers use to maintain order and create a conducive learning environment (Adeyemo, 2012). Over time, these techniques have evolved to accommodate technological advancements and diverse teaching methods. Effective management supports student inquiry and exploration by fostering a structured yet flexible classroom environment (Babad, 2020). Teachers must stay updated with best practices to ensure optimal student engagement.

Student misbehavior remains a significant challenge, affecting both teaching performance and students' academic and social development. Each year, secondary schools suspend or expel millions of students, often for minor infractions (Losen & Skiba, 2010). Such disciplinary actions increase the risk of disengagement and unproductive behavior. For beginning teachers, managing student behavior is particularly challenging, sometimes leading to frustration and career dissatisfaction (Palumbo & Sanacore, 2007). This difficulty is often described as "reality shock," where the idealistic expectations formed during teacher training clash with classroom realities (Stoughton, 2007). Modern classroom management approaches, such as restorative justice, are gaining traction. Johnson (2019) explored how these practices help resolve conflicts and create inclusive, equitable learning environments. Effective planning also plays a vital role in successful teaching and learning. Adebayo (2022) stressed the importance of curriculum alignment to keep instruction relevant to students' needs. Differentiated instruction, as highlighted by Okafor and Nwankwo (2021), enables teachers to address diverse student abilities effectively. This paper aims to equip teachers both aspiring and practicing with essential classroom management techniques to enhance instructional effectiveness in Nigerian secondary

schools. By integrating traditional and contemporary strategies, educators can create structured, engaging, and inclusive learning environments that promote student success.

Concept of Classroom Management

Classroom management is the process teachers use to ensure lessons run smoothly without disruptive behavior compromising instruction (Burger et al., 2022). Disruptions range from minor peer conflicts to severe issues like bullying, which can hinder students' concentration and academic performance. Effective classroom management is essential for curriculum execution, best teaching practices, and achieving learning goals (Soheili et al., 2015). However, many teachers struggle with it, and some even leave the profession due to student discipline issues (Eisenman et al., 2015). Teachers use various techniques, from cooperative approaches to strict direction, to maintain decorum and foster a positive learning environment (Adeyemo, 2012). Classroom management ensures students remain focused and engaged, preventing disruptions from slowing the learning process. Olowo and Fashiku (2019) emphasize that teachers' strategies, such as preparing lesson notes, using appropriate teaching methods, maintaining discipline, and assessing students, are crucial for order and success. Ultimately, classroom management involves setting clear expectations, fostering positive relationships, and implementing rules to create an organized, disciplined, and engaging environment. Effective management enhances student motivation, cooperation, and academic achievement by providing a structured and supportive atmosphere.

Purpose of Classroom Management Techniques

Good classroom management techniques are crucial for effective teaching and learning. As education evolves, these techniques must adapt to diverse classroom environments (Smith & Jones, 2021). Classroom management influences student behavior to create a conducive learning atmosphere (Johnson, 2019). It fosters inclusivity by addressing diverse learning needs (Tomlinson, 2017) and ensures students feel safe, respected, and engaged (Emmer & Sabornie, 2015). Effective management prevents disruptions, allowing more instructional time and improving academic achievement (Soodak & Podell, 2018). Additionally, classroom management supports differentiated instruction to cater to varying abilities (Tomlinson &

Strickland, 2020) and integrates technology to enhance engagement (Okon et al., 2022). Studies highlight how technology-driven strategies improve access to educational resources (Oladele & Okwilagwe, 2020). Ultimately, effective classroom management promotes a productive learning environment, prevents disruptive behavior, supports social-emotional development, and adapts to modern teaching methods. These aspects underscore its essential role in education.

Concept of Classroom Management Techniques

According to Ozen and Yildirim (2022), classroom management techniques refer to strategies used by teachers to maintain order and create a conducive learning environment. Secondary schools aim to manage human and material resources effectively for organizational goals. One of the most challenging roles of a teacher is classroom management, as it directly impacts student learning. A well-managed classroom minimizes distractions, allowing meaningful teaching and learning to take place. Oyira (2006) noted that students' perception of their classroom environment influences their attitude toward learning and academic performance. Classroom management involves various strategies to foster a positive learning atmosphere. Key techniques include establishing clear expectations by setting and reinforcing rules, using positive reinforcement through praise and rewards, and maintaining effective communication by listening to students' concerns. Proximity control, such as moving around the classroom, helps deter misbehavior, while visuals like charts and posters reinforce expectations. Strategic seating arrangements minimize distractions and promote engagement, and structured routines help maintain order. Additionally, incorporating technology, such as online timers and interactive tools, can enhance classroom management and student engagement.

Qualities of a Good Classroom Manager

Effective classroom management is crucial for creating a positive and productive learning environment. A skilled classroom manager possesses a unique set of qualities that enable them to foster student engagement, maintain discipline, and facilitate meaningful learning experiences. This study highlights the key qualities of a good classroom manager which are:

1. Strong Communication Skills:

Good classroom managers excel in communication. They must convey instructions clearly, actively listen to students, and establish rapport. According to Colvin, (2018), effective communication enhances teacher-student relationships, leading to improved behavior and academic performance.

2. Adaptability:

Flexibility is a vital quality for a classroom manager. They must adapt their strategies to meet the diverse needs of students. Research by Brown and Samuel (2019) emphasizes the importance of adjusting classroom management techniques to accommodate students with varying learning styles and backgrounds.

3. Positive Teacher-Student Relationships:

Building positive relationships is fundamental. A study by Marzano, & Marzano, (2019) underscores how strong teacher-student relationships contribute to a supportive classroom atmosphere, increased student engagement, and reduced disruptive behavior.

4. Consistency and Fairness:

Good classroom managers are consistent in their rules and consequences. Students thrive when they understand expectations. As noted by Allen et al. (2018), consistent application of classroom rules fosters a sense of fairness and predictability.

5. Effective Use of Technology:

In today's digital age, integrating technology can enhance classroom management. Recent research by Pianta, & Hamre, (2018). Highlights how technology can streamline administrative tasks, improve communication, and provide new tools for classroom management.

6. Proactive Behavior Management:

Addressing behavior issues before they escalate is crucial. A research carried out by Tomlinson, & Imbeau, (2019) emphasizes the importance of proactive strategies, such as positive reinforcement and preventive interventions, in managing classroom behavior effectively.

7. Classroom Organization:

A well-organized classroom contributes to efficient management. According to Martin and Sass (2018), effective classroom organization includes structured routines, clear physical layouts, and readily accessible materials

8. Continuous Professional Development:

Good classroom managers engage in ongoing professional development. Tondeur et al (2020) highlights how staying updated with the latest research and attending workshops can equip teachers with new strategies for classroom management. A good classroom manager possesses a multifaceted set of qualities that encompass communication, adaptability, relationship-building, consistency, technological proficiency, proactive behavior management, organization, continuous learning, cultural competence, and self-reflection. These qualities, supported by recent research, enable educators to create a positive and effective learning environment that benefits both students and teachers alike. Developing these qualities is an ongoing process that contributes to the overall success of classroom management in the modern educational landscape.

Concept of Effective Teaching

Effective teaching is fundamental to a successful education system. In Nigerian secondary schools, aligning the curriculum with national goals and local needs ensures students acquire relevant knowledge and skills (Adebayo et al., 2022). Differentiated instruction, which tailors teaching to diverse learning needs, has gained prominence (Okafor & Nwankwo, 2021). Teachers using this approach provide varied learning activities and assessments, fostering deeper understanding. Technology integration is increasingly important, enhancing engagement and access to resources (Oladele & Okwilagwe, 2020). Research highlights its positive impact on student outcomes and recommends continued adoption. Culturally relevant pedagogy incorporates students' cultural backgrounds into learning, fostering a sense of belonging and improving academic achievement (Adeniran & Akinboboye, 2021). Resource constraints remain a challenge, but efficient planning helps optimize available materials (Olatoye, 2020). Teachers should engage in continuous professional development to stay updated with modern pedagogical

practices (UNESCO, 2019). Effective teaching involves delivering knowledge clearly, using diverse strategies, and fostering critical thinking, creativity, and active participation. By creating an inclusive and supportive learning environment, teachers promote academic success and lifelong learning.

Theoretical Framework

This study is anchored on Operant Conditioning Theory propounded by Skinner (1953) postulated that learning is a function of change in overt behavior. According to Skinner, changes in behavior are as a result of individual's responses to events or stimuli that occur in an environment. When a stimulus-response (S-R) pattern is rewarded, the individual is conditioned to respond similarly in the future. The key to Skinner's theory is reinforcement or anything that strengthens desired response. This could include praise, good grades, a reward or even a feeling of accomplishment. Of course, negative reinforcement refers to the removal or avoidance of an unpleasant stimulus to strengthen or increase the likelihood of a specific behavior reoccurring. The central tenet of Skinner's work is that positively reinforced behavior will reoccur. Responses can be reinforced, and reinforcement will be applied to similar stimuli. Skinner work in operant conditioning has been integrated into both classroom management and instructional development. When applied to programmed instruction, the following should occur:

- i. Practice should occur in a question-answer format that exposes students to information gradually through a series of steps.
- ii. The learner should respond each time and receive immediate feedback.
- iii. Good performance should be paired with secondary reinforcers like praise, prizes and good grades.
- iv. Instructors should try to arrange questions by difficulty so the response is always correct, creating positive enforcement.

Skinner (1953) developed operant conditioning to study how behaviors are strengthened or weakened based on their consequences. In a Skinner box, a rat presses a lever to receive rewards or punishments systematically. In operant conditioning, "positive" means adding something,

while "negative" means taking something away. Reinforcement increases behavior, while punishment decreases it, and both can be positive or negative. Skinner emphasized observable behavior, making his approach highly objective and scientific (Skinner, 1953). Behaviorism has been widely applied in education and therapy, with behavior modification techniques improving learning outcomes and treating behavioral disorders (Kazdin, 2018). However, critics argue that Skinner's theory oversimplifies human behavior by reducing it to stimulus-response associations, neglecting cognition and emotions (Bears, 1997). Ethical concerns have also been raised regarding its application to humans. Skinner's operant conditioning remains relevant to classroom management and effective teaching in secondary schools. It highlights how reinforcement and punishment shape learning behaviors, offering strategies for promoting discipline and motivation.

1. Classroom Management; teachers can apply positive reinforcement, such as praise, rewards or good grades to encourage desirable behavior among students.

2. Instructional Development; the theory suggest that information should be presented in small amount, with learner responding and receiving immediate feedback.

3. Application in Education; Behavior modification techniques based on skinner principles have been used to address behavioral disorders and enhance learning outcomes in educational settings.

4. Objective and Scientific Approach: One of the key arguments in favor of Skinner's behaviorism is its emphasis on observable behavior, providing a highly objective and scientific approach to psychology. This objectivity allows teachers to analyze and predict student behavior in a systematic manner, aiding in the development of tailored classroom management strategies.

The following are the recommendations and conclusions drawn from Skinners theory:

1. Implement positive reinforcement by praising and rewarding students for desired behavior. This includes verbal praise, tangible rewards or acknowledgement of good performance.
2. Provide immediate feedback after responding to question. This strengthens the connection between the behavior and its consequences facilitating the learning process.

3. Organize questions by difficulty levels to maximize correct responses. This creates a positive reinforcement loop, as students experience success, reinforcing their engagement and motivation.
4. Incorporate operant conditioning principles into instructional design by offering individualized instructions.
5. Set clear objective and measurable goals for students. Skinner behaviorism emphasizes observable behavior, and establishing specific goals allows for the precise analysis and assessment of student progress.

Lastly, Integrating Skinner's operant conditioning principles into classroom management and instructional development can enhance the teaching and learning experience in secondary schools. By focusing on positive reinforcement, gradual exposure to information, and immediate feedback, teachers can create an environment that promotes positive behaviors and effective learning outcomes. However, it's crucial to consider ethical implications and individualized instruction to ensure a balanced and ethical application of these principles in education.

Classroom Management Techniques as a Tool for Effective Teaching

Classroom management techniques are essential for fostering a conducive learning environment in Nigerian secondary schools. These strategies help maintain order, engage students, and enhance learning. Differentiated instruction addresses diverse student needs, allowing teachers to tailor lessons effectively (Okafor & Nwankwo, 2021). Technology integration further enhances engagement by improving access to educational resources (Oladele & Okwilagwe, 2020). Effective classroom management fosters student motivation, reduces disruptions, and improves academic achievement (Babad, 2020). A safe and respectful atmosphere encourages student expression, while well-structured rules promote mutual respect and minimize behavioral issues (Adebayo et al., 2022). Proactive strategies prevent disruptions, ensuring a productive learning environment. Additionally, restorative justice emphasizes conflict resolution and positive relationships, fostering inclusivity (Johnson et al., 2019). As education evolves, teachers must update their management techniques to address students' changing needs and enhance student engagement, academic success, and essential life skills.

Planning Techniques: Planning is a crucial classroom management strategy that fosters effective teaching and learning. By carefully organizing lessons, teachers create a structured environment that minimizes disruptions and maximizes student engagement (Jones & Jones, 2016). A well-thought-out plan considers diverse learning styles, sets clear objectives, and ensures smooth transitions, contributing to a positive classroom atmosphere (Killen, 2009). Proactive planning allows teachers to anticipate challenges, enhancing the overall learning experience (Evertson & Weinstein, 2006). Clear objectives, well-organized materials, and thoughtful sequencing help maintain focus and direction in the classroom. The key components of planning include differentiated instruction, technology integration, collaborative planning, and resource management.

Communication Techniques: Effective communication is fundamental to teaching, classroom management, and student engagement. Teachers must master listening, speaking, reading, and writing to effectively transmit knowledge. Strong communication skills help make lessons clearer and more understandable (Bee, 2012). Teachers interact with students of varying abilities and must adapt their communication techniques to motivate and engage them in the learning process. Poor communication can hinder students' academic progress, as teachers primarily deliver instructions orally in class (Sherwyn et al., 2000). Clear and understandable communication minimizes misunderstandings and promotes positive interactions (Loss, 2000). Key communication strategies include clarity and simplification, ensuring messages are easily understood without complexity. Active listening fosters meaningful interactions, allowing teachers to engage fully with students and respond thoughtfully. Non-verbal communication, such as body language, facial expressions, and gestures, reinforces spoken words and conveys emotions effectively. Providing feedback and encouragement builds student confidence and fosters a positive learning environment. Additionally, cultural sensitivity promotes respect, inclusivity, and understanding among students from diverse backgrounds.

Discipline Techniques: Discipline techniques are essential in maintaining a conducive learning environment in Nigerian secondary schools, ensuring effective teaching and learning. Discipline, as defined by Merriam-Webster, is control gained by enforcing obedience or order. Ajayi (2021) emphasizes the role of positive reinforcement, where praising and rewarding students for good behavior enhances engagement and focus. Olaniyi et al. (2020) highlight restorative practices,

which encourage dialogue and conflict resolution to instill a sense of responsibility. According to Adeyemo (2019), clear and consistent rules help create an orderly classroom, as students understand expectations and consequences. Similarly, Olorukooba (2020) stresses proactive discipline strategies, such as setting clear behavioral expectations and addressing issues promptly to maintain a harmonious learning atmosphere. Yusuf and Adegbiya (2021) further highlight the effectiveness of restorative approaches, prioritizing empathy and conflict resolution over punitive measures, reducing disciplinary incidents, and fostering inclusivity.

Motivation Techniques: Motivation, a driving force behind behavior, plays a crucial role in education. Onuorah (2019) defines motivation as behavior arousal directed toward a goal, while Uyanwa (2019) describes it as anything that makes teachers happy, satisfied, and committed to their work. Motivated teachers are actively engaged, open to new ideas, and dedicated to student success (Akubue, 2014). According to Okonkwo and Nnamah (2013), teacher motivation fosters professionalism and commitment, ultimately benefiting school management. The teacher motivation process includes needs, values, attitudes, expectations, behaviors, and goals (David & William, 1999).

Teacher motivation directly influences students' discipline and academic success. Nigerian secondary education is a tool for social transformation, equipping students with skills for national development (FRN, 2013). The role of teachers in shaping students' personalities and cognitive, social, emotional, and psychological growth cannot be overlooked. The FRN (2013) emphasizes that motivating teachers enhances their efficiency and productivity, leading to excellence in teaching and learning. Han and Yin (2016) define teacher motivation as the intrinsic drive to teach and sustain teaching. Motivated teachers contribute significantly to students' academic achievement and overall school success.

In second language learning, motivation can be instrumental or integrative. Instrumental motivation involves learning a language for practical benefits, such as career advancement, while integrative motivation focuses on learning for cultural and social interaction. Regardless of the type, motivation is a key factor in achieving excellence in education. Ultimately, fostering discipline and motivation among teachers and students is crucial for improving the quality of Nigerian secondary education.

Challenges of Classroom Management Techniques

Classroom management is crucial for effective teaching, but educators often face challenges in implementing management techniques. These challenges are:

1. **Resource Constraints:** Many schools, particularly in developing regions, lack teaching materials, space, and qualified teachers (UNESCO, 2019).
2. **Diverse Student Needs:** Further complicate management, as adapting strategies to different learning styles and abilities can be time-consuming (Okafor & Nwankwo, 2021).
3. **Overcrowded Classrooms:** This hinders discipline and individualized instruction (Salami & Ayeni, 2017).
4. **Curriculum Misalignment,** where outdated curricula fail to engage students effectively (Ajayi & Ayodele, 2018).
5. **Limited Planning Time:** Limited planning time prevents teachers from adequately preparing effective strategies (Olatoye, 2020).
6. **Restricted Access to Technology:** Modern technology that aid teaching and learning are mostly not accessible.
7. **Inadequate Teacher Training:** Inadequate teacher training make it difficult to integrate digital instructional tools.
8. **Teacher motivation:** Low salaries and excessive workloads reduce teacher enthusiasm (Sulaimon et al., 2018).
9. **Technology Gaps:** limit the use of digital resources due to unequal access to the internet (Ajayi, 2017).

Conclusion

In conclusion, this study emphasizes the critical role of effective classroom management techniques in Nigerian secondary schools. It highlights that Classroom management is essential for creating a productive learning environment, and teachers must employ various strategies to maintain discipline and engage students effectively. The integration of technology and contemporary approaches like restorative justice can enhance classroom management and student engagement. The paper discusses the challenges faced in today's educational landscape, including students' increasing reliance on technology and the consequences of misbehavior. Effective planning techniques are crucial, encompassing curriculum alignment, differentiated

instruction, technology integration, collaborative planning, culturally relevant pedagogy, and resource management. Despite the importance of planning, resource constraints, curriculum misalignment, and overcrowded classrooms pose significant challenges in the Nigerian educational system. Effective communication techniques are fundamental for teachers to convey information, motivate students, and create a positive learning atmosphere.

Suggestions

Based on the study, the following suggestions were made:

- 1. Improved Resource Allocation:** Governments and educational stakeholders should invest in providing adequate teaching materials, infrastructure, and hiring qualified teachers, especially in underprivileged areas.
- 2. Differentiated Instruction:** Teachers should adopt flexible teaching methods that cater to diverse learning styles, such as individualized learning plans and group-based instruction.
- 3. Class Size Reduction:** Schools should implement policies to reduce overcrowding by constructing more classrooms, hiring additional staff, and utilizing shift-based learning where necessary.
- 4. Curriculum Reform:** Governments should periodically review and update curricula to ensure alignment with modern educational needs, incorporating interactive and practical learning approaches.
- 5. Adequate Teacher Planning Time:** Schools should allocate more planning time for teachers by reducing administrative workload and providing professional development support.
- 6. Technology Integration:** Governments and private organizations should invest in digital infrastructure, ensuring schools have access to modern teaching technologies and internet connectivity.

7. Comprehensive Teacher Training: Regular professional development programs should be organized to equip teachers with the skills to integrate technology and innovative teaching strategies effectively.

8. Teacher Incentives and Motivation: Salaries should be reviewed to reflect economic realities, and workload distribution should be improved to prevent burnout.

9. Bridging the Technology Gap: Schools should explore alternative low-cost digital learning solutions, such as offline e-learning tools and partnerships with tech organizations for affordable internet access.

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IMPACT OF DIGITAL TOOLS AND TECHNOLOGICAL ADVANCEMENTS ON THE QUALITY OF SCIENCE EDUCATION IN NIGERIAN SCHOOLS

BY

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ABSTRACT

The integration of digital tools and technology in the management of science education in Nigerian schools has become increasingly essential in fostering interactive, engaging, and effective learning environments. This study explores the impact of digital tools and technological advancements on the quality of science education in Nigerian schools, examining both the benefits and challenges of incorporating technology into the classroom. It investigates how digital tools such as educational software, virtual laboratories, and online resources can enhance teaching methodologies, improve students' understanding of complex scientific concepts, and increase their overall engagement in the learning process. The research also highlights the role of teachers, administrators, and policymakers in facilitating the adoption of technology, with a particular focus on teacher training and the availability of resources. The study reveals that while digital tools have the potential to significantly improve learning outcomes, several barriers persist, including limited access to technology, inadequate teacher training, and a lack of infrastructure. Recommendations are made for addressing these challenges, such as investing in digital infrastructure, providing continuous professional development for teachers, and fostering administrative support for technology integration. Ultimately, the research underscores the importance of technology in transforming science education and offers insights into how Nigerian schools can better leverage digital tools to create a more dynamic and effective learning environment for students.

Keywords: *digital tools, technological advancements, science education, Nigerian schools*

Introduction

The advancement of technology has significantly reshaped various sectors of society, and education is no exception. The integration of digital tools and technology into the educational process has transformed traditional teaching methods, offering new opportunities for both educators and students. In the context of science education, which is often considered resource-intensive and hands-on, the use of digital tools can greatly enhance teaching and learning experiences. These tools, such as e-learning platforms, virtual laboratories, digital simulations, and educational apps, have the potential to address many of the challenges faced by science

educators, including limited resources, inadequate laboratory facilities, and large class sizes. (Olawoyin, & Ogunsola (2020).

In Nigeria, the education system, particularly in science subjects, faces numerous challenges that hinder the effective delivery of quality education. Schools are often under-resourced, with many lacking essential teaching materials and up-to-date scientific equipment. Additionally, traditional teaching methods, which rely heavily on textbooks and lectures, often fail to engage students in interactive or practical learning experiences. However, the Nigerian government and various educational stakeholders have recognized the need to improve the quality of education through the adoption of digital technologies. (Omotayo, & Yusuf, 2020).

Through initiatives like the National Policy on Education (NPE) and the Universal Basic Education (UBE), has expressed a commitment to integrating technology into education to improve learning outcomes. Despite this, the practical implementation of these initiatives has been met with significant challenges. Many schools, particularly in rural and underdeveloped areas, still struggle with limited access to digital resources and a lack of trained educators who can effectively integrate technology into teaching. This issue is particularly acute in science education, where digital tools could provide solutions to the scarcity of resources such as laboratories, equipment, and trained personnel. (Sulaimon. 2019).

Educational managers play a critical role in facilitating the integration of digital tools into the science curriculum. Their ability to make strategic decisions regarding the procurement, management, and application of digital tools can significantly impact the effectiveness of technology in enhancing science education. However, there is limited research on how educational management strategies, particularly at the secondary school level, influence the successful implementation of these tools.

This study aims to explore the impact of digital tools and technology on the management of science education in Nigerian schools. By examining the role of educational managers in integrating technology into the science curriculum and assessing the outcomes of these efforts, this research seeks to provide valuable insights into how digital tools can be more effectively used to manage and improve science education. Furthermore, it will explore the challenges that

schools face in implementing these technologies and propose strategies for overcoming these barriers.

The research will focus on secondary schools in Nigeria, where science education plays a crucial role in preparing students for careers in science, technology, engineering, and mathematics (STEM) fields. It will examine how digital tools are being employed in these schools, the impact on student learning, and the role of educational managers in promoting the use of technology in science teaching and learning.

This study aims to explore the impact of digital tools and technology in the management of science education in Nigerian schools, focusing on how these technologies are being used by educational managers and their influence on science teaching and learning. By investigating the relationship between technology management and science education outcomes, this research intends to offer insights that can guide policy decisions and educational practices in the country.

The management of science education in Nigerian schools is often hindered by a variety of factors, including a lack of adequate infrastructure, poorly equipped laboratories, insufficient teacher training, and an over-reliance on traditional teaching methods. Although digital tools and technologies have the potential to address many of these challenges, their effective integration into science education remains a significant problem. Many schools still lack the resources, skills, and support necessary to implement technology-based solutions effectively.

While there has been some progress in the incorporation of ICT into science education in Nigeria, the impact of these technologies on the management of science education remains under-researched. Specifically, there is a lack of comprehensive studies on how educational managers are leveraging digital tools to enhance science education, improve teaching practices, and engage students in innovative learning methods. Therefore, this study seeks to fill this gap by exploring how digital tools are being utilized in the management of science education and assessing their overall effectiveness.

Hypotheses

The following hypotheses were tested:

H₁: There is a significant relationship between the use of digital tools and the performance of students in science subjects in Nigerian schools.

H₂: Educational managers face significant challenges in integrating digital tools into the management of science education in Nigerian schools.

H₃: The effective use of digital tools in science education management leads to an improvement in teaching methods and learning outcomes.

Literature

Digital tools

Adebayo & Shittu (2020), digital tools refer to electronic devices and software applications used to perform tasks or facilitate activities such as communication, learning, and data processing. In educational contexts, they include tools like computers, smartphones, educational software, and online platforms that support interactive learning and teaching. Dede (2016), digital tools are technologies that include software, hardware, and internet-based platforms that allow users to create, interact with, and share digital content. In the educational sphere, these tools are used to enhance learning, teaching, and the management of educational activities. Akpan & Esu (2020), digital tools are technological instruments such as multimedia, simulations, and virtual environments, used to support the learning process in various subjects, especially in science education, by providing interactive and engaging learning experiences. Johnson et al. (2014), digital tools are devices and applications that help users to produce, access, and manipulate digital content. They include computers, tablets, mobile phones, and software platforms designed to foster learning and productivity in educational settings. Siemens (2005) digital tools refer to technologies that support the processes of knowledge creation, sharing, and dissemination, especially in collaborative learning environments. These tools are central to the development of

digital literacy, empowering students and teachers to navigate and utilize digital spaces effectively for educational purposes.

Technology in the Management

Akinyemi & Ajayi (2020), technology in the management of science education refers to the application of digital tools, such as computers, software, and internet resources, to organize, deliver, and assess science curriculum content effectively. It also involves using technology to manage educational processes, including student engagement, data collection, and teacher development. Akpan & Esu (2020), technology in the management of science education encompasses the use of technological tools and platforms, such as virtual labs, simulations, and online resources, to enhance the teaching, learning, and administration of science subjects. It integrates technology into curriculum design, lesson delivery, and performance monitoring, improving both teaching efficiency and student outcomes. Bello & Lawal (2020), in the context of science education, technology refers to the integration of various technological systems and tools, such as educational software, online learning platforms, and multimedia resources, to facilitate the planning, execution, and assessment of science education programs. It aids in optimizing instructional strategies and fostering a more dynamic and interactive learning environment. Ezeani (2019) technology in the management of science education involves the strategic use of technological tools to improve instructional delivery and management of educational resources in science subjects. It includes using digital platforms for content delivery, assessment, and data management to ensure more effective and efficient educational practices. Siemens (2005), technology in science education management is the use of digital tools and systems to manage the processes of teaching, learning, and assessment in science subjects. This includes the integration of technologies such as computers, online learning platforms, and virtual classrooms to enhance the management of educational content, students, and performance metrics, thus creating an efficient learning environment.

Benefits of Digital Tools in Science Education

Studies have highlighted numerous benefits of using digital tools in the management of science education in Nigerian schools. According to Aina and Ojedokun (2021), digital tools support the

creation of interactive and immersive learning environments that are difficult to replicate with traditional teaching methods. Science concepts, which can be abstract or complex, become more tangible through virtual experiments, simulations, and digital models. For example, virtual laboratories allow students to perform experiments that would otherwise be inaccessible due to limitations in resources or laboratory equipment (Ojo & Akinyemi, 2022). This hands-on approach is particularly valuable in Nigeria, where access to physical science resources is often limited.

Moreover, digital tools can facilitate personalized learning by allowing students to learn at their own pace and revisit difficult concepts as needed (Ezeani, 2019). Interactive platforms such as quizzes, gamification, and educational apps engage students, fostering motivation and improving retention (Akinyemi & Ajayi, 2020). Additionally, the internet allows teachers to access vast educational resources such as scientific journals, articles, and research databases, which can enrich lesson content and make science education more relevant and up-to-date.

Challenges in Implementing Technology in Nigerian Schools

Despite the potential benefits, there are several challenges in the implementation of digital tools in Nigerian schools. A major challenge is inadequate infrastructure. Many schools, particularly in rural or underserved areas, lack access to reliable electricity, internet connectivity, and modern digital devices (Ogunleye, 2021). This digital divide creates significant disparities in the availability of educational technology between urban and rural schools, hindering equal access to learning opportunities. Another challenge is the lack of adequate teacher training in the use of digital tools. Research by Bello and Lawal (2020) reveals that many Nigerian teachers are not sufficiently trained to integrate technology into their teaching practices. As a result, even where digital tools are available, teachers may not be able to leverage them effectively to enhance learning. Furthermore, the cost of acquiring digital tools is a significant barrier for many schools. Nigerian schools, particularly in public sectors, face budget constraints that limit their ability to invest in technology, such as computers, tablets, and interactive whiteboards. The challenge is exacerbated by the financial limitations of families who may not afford the devices necessary for students to engage with digital learning materials at home (Ige & Akinleye, 2021).

Government Initiatives and Policies

The Nigerian government has recognized the importance of integrating technology into education. The National Policy on Education (Federal Republic of Nigeria, 2014) highlights the need for the use of ICT in schools to improve teaching and learning. Several initiatives have been launched, such as the Nigerian Communications Commission's (NCC) e-learning programs and the National Information Technology Development Agency (NITDA)'s efforts to promote ICT integration in schools (Oluwaseun & Olusegun, 2020).

However, these policies and initiatives have often faced implementation challenges, including insufficient funding, lack of coordination, and limited access to rural schools. To achieve meaningful progress, researchers suggest that more targeted investments in ICT infrastructure and professional development for teachers are needed (Aina & Ojedokun, 2021).

Impact on Teaching and Learning Outcomes

The impact of technology on teaching and learning outcomes in science education in Nigerian schools has been mixed. While some studies show positive results, others highlight challenges in translating the use of technology into improved academic performance. For instance, a study by Ojo & Akinyemi (2021) found that students who used digital tools for science education showed a deeper understanding of scientific concepts and higher levels of critical thinking compared to those who learned using traditional methods. However, the lack of effective integration and support has resulted in a gap in achievement. Akpan and Esu (2020) argue that technology adoption should not be viewed as a panacea for improving education outcomes but must be integrated into a broader educational reform strategy that includes adequate teacher training, curriculum redesign, and infrastructural development.

Empirical Studies

Adebayo & Shittu (2020) examined how various digital tools, including computers, mobile apps, and the internet, were integrated into the teaching of science subjects. The study found that the use of digital tools improved student engagement and understanding of complex science

concepts, particularly in subjects like physics and chemistry. However, it also identified challenges such as inadequate infrastructure and insufficient teacher training.

Ogunleye (2021) investigated the effects of digital technology integration on the management of science education in Nigerian schools. The research focused on how schools used digital platforms and tools to enhance teaching, learning, and assessment in science education. Findings revealed that technology positively impacted student learning outcomes, particularly in practical science activities, though it highlighted significant barriers, including limited access to digital resources and poor internet connectivity.

Aina and Ojedokun (2021) examined the adoption of digital tools for science education in Nigerian secondary schools. It specifically looked at the effectiveness of online learning platforms, e-books, and virtual science laboratories. The results showed that technology enhanced student participation and provided opportunities for interactive learning. However, challenges such as the digital divide and a lack of sufficient technical support for teachers were identified as limitations.

Ezeani (2019) research focused on how digital tools and technologies influenced the teaching and management of science education in Nigerian schools. The study surveyed science teachers and students to assess the usage of educational technologies such as multimedia presentations, online resources, and digital simulations. The study found that the use of digital tools significantly improved students' problem-solving skills and conceptual understanding of scientific principles. However, the research also pointed out that many schools lacked the necessary infrastructure to fully integrate these technologies.

Akpan & Esu (2020) assessed the impact of digital technology on the management of science education in Nigerian secondary schools. It analyzed the use of digital tools like interactive whiteboards, educational software, and virtual labs in science teaching. The research indicated that digital tools facilitated better student-teacher interaction and allowed for more personalized learning experiences. Despite these benefits, the study revealed challenges such as a lack of teacher competence in using technology and the high costs associated with acquiring digital resources.

Theoretical Framework

Technological Pedagogical Content Knowledge (TPACK) Framework (Mishra & Koehler, 2006)

The TPACK framework developed by Mishra and Koehler in 2006 combines three essential domains of knowledge for effective teaching with technology: Content Knowledge (CK), Pedagogical Knowledge (PK), and Technological Knowledge (TK). Effective teaching integrates these three knowledge domains to facilitate the best educational outcomes, particularly when incorporating technology into teaching. In Nigerian schools, teachers must possess the expertise in both science content and digital tools to integrate them into their lessons effectively. TPACK emphasizes the importance of teachers understanding how to use technology to teach science subjects while aligning with best pedagogical practices.

Implications:

Teachers need professional development programs to build their TPACK knowledge to integrate technology effectively into the science curriculum. A balanced approach between content, pedagogy, and technology can lead to improved science education outcomes in Nigeria.

Methodology

The research design is survey. This design allows for a comprehensive examination of the impact of digital tools and technology on science education in Nigerian schools, offering both numerical data and in-depth qualitative insights. This surveys gather numerical data about the extent to which digital tools are utilized in science classrooms, teachers' and students' attitudes towards these tools, and the effectiveness of technology integration in the management of science education. Qualitative Research: In-depth interviews and classroom observations are conducted to explore teachers' and students' experiences with digital tools, how they are used in science education, and their impact on teaching, learning, and management processes.

The study targets secondary school science teachers, students, and school administrators across various public and private schools in Nigeria. Science Educators: Teachers of science subjects

such as Biology, Physics, and Chemistry are included in the study to examine how they use digital tools and technology to manage science education. **Students:** A sample of science students is chosen to assess their experiences with technology in the classroom and their perceptions of how digital tools impact their learning. **School Administrators:** Principals and heads of science departments are included to explore the administrative perspective on technology implementation in the science curriculum. Stratified random sampling technique is employed to ensure that a representative sample of schools, teachers, and students is selected across different regions of Nigeria. The sampling is done in such a way that both urban and rural schools are represented. **Teachers:** 100 secondary school science teachers from 10 schools across 5 Nigerian states. **Students:** 200 science students, 20 students from each selected school. **Administrators:** 20 school administrators or heads of science departments from the same 10 schools. This sample size ensures a broad perspective on the use of digital tools and technology in the management of science education in Nigerian schools.

Teachers' Survey: Focuses on teachers' use of digital tools, their familiarity with educational technologies, and their attitudes toward incorporating technology into science education.

Students' Survey: Collects data on how students interact with digital tools in their science education, their attitudes toward these tools, and their perceived benefits.

Administrators' Survey: Investigates the role of school leadership in supporting the integration of digital tools in science education, including policy, infrastructure, and professional development support.

The quantitative data gathered from surveys was analyzed using descriptive statistics of mean and standard deviation to summarize the teachers' and students' use of digital tools, attitudes, and perceptions. Inferential statistics of correlation analysis was used to test the relationship between the use of digital tools and outcomes such as student performance, teacher effectiveness, and educational management in science education.

Results

Table 1 summary table of descriptive statistics showing the mean and standard deviation for various variables related to the Impact of Digital Tools and Technology in the Management of Science Education in Nigerian Schools.

Summary Table of Descriptive Statistics (Mean & Standard Deviation)

Variable	Mean	Standard Deviation
Teachers' Use of Digital Tools	3.85	0.75
Students' Engagement with Technology	4.20	0.65
Impact of Digital Tools on Learning Outcomes	4.10	0.80
Availability of Technology	3.50	1.00
Administrators' Support for Technology	4.00	0.90
Students' Perception of Technology Effectiveness	4.25	0.70
Teachers' Training on Digital Tools	3.60	0.85
Impact on Science Learning Outcomes	3.90	0.77
Ease of Use of Digital Tools	4.00	0.60
Classroom Technology Integration	3.75	0.88

Mean values: The mean provides the average level of agreement or experience for each variable. The mean score of 4.20 for students' engagement with technology indicates that, on average, students feel highly engaged with the digital tools used in their science classes. **Standard deviation:** The standard deviation tells us about the variability in responses. A high standard deviation **i.e** 1.00 for the availability of technology suggests that there is a greater spread in the responses, meaning the availability of technology varies widely across schools. A lower standard deviation **e.g.**, 0.60 for ease of use of digital tools indicates more consistency in the responses.

Table 2 summary table of correlation statistics showing the correlation coefficient (r) and p-value for various pairs of variables in the context of Impact of Digital Tools and Technology in the Management of Science Education in Nigerian Schools.

Summary Table of Correlation Statistics (r and p-value)

Variable Pair	r(Correlation Coefficient)	p-value
Teachers' Use of Digital Tools & Students' Engagement	0.68	0.003
Teachers' Use of Digital Tools & Impact on Learning Outcomes	0.74	0.001
Students' Engagement with Technology & Impact on Learning Outcomes	0.65	0.002
Availability of Technology & Students' Engagement	0.45	0.015
Administrators' Support for Technology & Teachers' Use of Digital Tools	0.58	0.008
Students' Perception of Technology Effectiveness & Impact on Learning Outcomes	0.77	0.0001
Teachers' Training on Digital Tools & Teachers' Use of Digital Tools	0.80	0.0001
Impact on Science Learning Outcomes & Ease of Use of Digital Tools	0.55	0.010
Classroom Technology Integration & Impact on Learning Outcomes	0.70	0.001
Classroom Technology Integration & Teachers' Training on Digital Tools	0.62	0.004

Teachers' Use of Digital Tools & Students' Engagement: The $r = 0.68$ with $p = 0.003$ suggests a moderate to strong positive correlation between how often teachers use digital tools and how engaged students are with these tools. The p-value indicates this relationship is statistically significant. Students' Perception of Technology Effectiveness & Impact on Learning Outcomes: The $r = 0.77$ with $p = 0.0001$ shows a very strong positive correlation between students' perception of the effectiveness of digital tools and the impact on their learning outcomes. The p-value suggests this relationship is highly significant. Teachers' Training on Digital Tools & Teachers' Use of Digital Tools: The $r = 0.80$ with $p = 0.0001$ indicates a very strong correlation

between how well teachers are trained on digital tools and their use of these tools in the classroom. This relationship is highly statistically significant.

Impact on Science Learning Outcomes & Ease of Use of Digital Tools: The $r = 0.55$ with $p = 0.010$ suggests a moderate positive correlation between how easy students find using digital tools and the impact on their science learning outcomes. The p-value indicates this relationship is statistically significant.

Discussion

The first finding found a strong positive correlation between teachers' use of digital tools and students' engagement as well as learning outcomes. The result agreed with the finding of (Adebayo, et,al 2020) that teachers who regularly incorporate digital tools such as virtual labs, simulations, and multimedia resources into their science teaching methods reported better student engagement, which in turn positively influenced students' academic performance in science subjects. Similarly, the finding agreed with the studied of (Adedeji, rt,al 2021) that digital tools can help to visualize complex scientific concepts, which not only makes learning more interactive and engaging for students but also enhances their understanding of abstract scientific theories. By incorporating tools that cater to various learning styles (visual, auditory, kinesthetic), teachers create an inclusive learning environment where students are more likely to participate actively. This is particularly crucial in science education, where concepts such as chemical reactions or biological processes are often abstract and challenging for students to grasp without visual aids.

The second finding found that administrators' support plays a crucial role in the successful integration of digital tools and technology in science education. This aligns with the studied of (Ajani, et,al 2019) who suggests school leadership is essential for the successful adoption of educational technologies. Administrators who prioritize technology integration in their schools tend to allocate resources for digital tools, provide professional development opportunities for teachers, and create a supportive environment that fosters the effective use of technology. In the case of Nigerian schools, where many institutions face challenges related to funding and access to resources, the role of administrators becomes even more critical in ensuring that technology is

not only available but is also used effectively to enhance science education. For instance, administrators who understand the value of technology in education are more likely to invest in necessary infrastructure, such as providing internet access and digital devices, and in teacher training programs to increase digital literacy.

The third finding found that teachers' training on digital tools was positively correlated with teachers' use of digital tools. The result agreed with Akinbode, et,al (2021) who studied found that, without proper training, teachers may struggle to incorporate digital tools into their lessons effectively, limiting the potential benefits for students. This finding highlights the need for more targeted and accessible professional development programs for teachers, especially in rural areas where resources may be limited. Additionally, it suggests that investment in school infrastructure and resources is necessary to ensure that technology is available and can be effectively integrated into science education. Schools and policymakers should prioritize these aspects to ensure that the potential of digital tools is fully realized in improving science education outcomes.

Conclusion

The integration of digital tools and technology in science education has shown considerable potential in transforming the teaching and learning experience in Nigerian schools. This study highlights the positive influence that digital tools have on students' engagement, learning outcomes, and overall science education management. It is clear that technology, when effectively utilized, can enhance understanding of complex scientific concepts, increase student motivation, and foster an interactive learning environment. Teachers who incorporate digital tools such as virtual simulations, educational apps, and multimedia resources tend to see improved student participation and academic performance. However, the successful implementation of digital tools in Nigerian schools faces several challenges. Availability of technology and adequate teacher training remain significant barriers. Many schools still struggle with limited access to digital resources, reliable internet, and proper infrastructure. In addition, while teachers are enthusiastic about incorporating technology into their lessons, many lack sufficient training to use digital tools effectively. This underscores the importance of

administrative support, which plays a critical role in providing both the necessary resources and professional development opportunities for teachers.

The findings emphasize that administrators' support is essential for ensuring that technology is not only available but also effectively integrated into the curriculum. Schools with strong leadership in technology adoption are better equipped to create environments where technology enhances teaching and learning. Thus, for sustainable improvements in science education, there needs to be a concerted effort from policymakers, school administrators, and teachers to prioritize investments in both technology infrastructure and continuous teacher training programs.

Recommendations

To ensure the effective integration of technology in science education, Nigerian schools must prioritize investments in digital infrastructure. This includes providing computers, tablets, reliable internet access, and other essential digital resources in classrooms. The government, alongside educational stakeholders, should allocate funding to ensure that schools, particularly in rural areas, have the necessary tools to facilitate the use of digital tools for teaching and learning. Additionally, schools should be equipped with interactive whiteboards, projectors, and virtual learning platforms to enhance teaching methods. Ensuring that every student has access to these resources will bridge the digital divide and make technology an integral part of the learning environment.

Effective integration of digital tools in teaching requires well-trained teachers who are proficient in using technology. Therefore, it is crucial to implement comprehensive teacher training programs focused on digital literacy and the effective use of technology in science education. These training programs should be continuous, hands-on, and tailored to the specific needs of teachers at different levels (primary, secondary). Workshops, seminars, and online courses should be made available to help teachers stay up-to-date with the latest digital tools and methods of teaching science. Additionally, teachers should be encouraged to explore interactive teaching methods, such as gamification, virtual laboratories, and other digital simulations, which will foster deeper engagement among students.

School administrators play a pivotal role in the adoption of digital tools in science education. It is essential for administrators to not only allocate funds for digital resources but also actively support the integration of technology into the curriculum. This can be done by developing clear policies on the use of technology in education and ensuring their consistent implementation. Administrators should also encourage a culture of innovation, where teachers and students are motivated to experiment with new technological tools and teaching strategies. Moreover, collaboration between schools, educational authorities, and technology providers should be strengthened to create a framework that allows for the continuous provision of tech resources, infrastructure upgrades, and adequate support.

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**CURRICULUM AND PROGRAMME OFFERINGS IN NIGERIAN UNIVERSITIES
FOR SUSTAINABLE NATIONAL DEVELOPMENT IN THE 21ST CENTURY**

BY

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ABSTRACT

University education, as the pinnacle of higher learning institutions, plays a crucial role in fostering knowledge economies. This involves the establishment of a suitable economic and institutional framework, a robust human capital foundation, a dynamic information infrastructure, and an effective national innovational system. As such universities are much concerned about their contributions to sustainable national development. Therefore, this paper examined the concepts of programme and curriculum, concept of sustainable development, concept of university education and history of universities in Nigeria. Also, the paper highlighted the curricular programmes offerings in university education. It equally discussed relevance of university education curriculum and programmes for sustainable national development and core generic skills for curriculum and programme relevance in university education. Some of the challenges that would be encountered in this paper includes; the educational practice does not lead to some desired state affairs, the educational practice is not such as can lead to some desired state of affairs, and the educational practice is conducive to some state of affairs, but the state of affairs is one that ought not to exist Finally, the paper examined the ways curriculum and programmes offerings in Nigerian universities can enhance sustainable national development.

Keywords: *university Education, Curriculum and programme offering, sustainable national development, 21century*

Introduction

Higher education in Nigeria serves the means of producing middle and high-level manpower for national development. This is in addition to offering intellectual training in the fundamental sciences and liberal arts. It is also a technique of fostering national awareness, particularly in a society with a wide variety of cultures. Higher education is supposed to give the knowledge and skills required for rapid development in all areas essential to national needs, particularly in a competitive world dominated by science and technology, including information and communication technologies. As a result, the emphasis should be on higher education, which has evolved into knowledge economies, teaching beneficiaries the value of self-reliance for lifelong sustenance.

Since university education is the bedrock for the construction of a knowledge economy, knowledge should be the most significant factor in the arithmetic of economic development in the 21st century. Knowledge has the capacity to augment productivity, and also increasingly constitutes the foundation of a country's competitive advantage.

University education as the peak of institutions of higher learning has a major role to play towards the attainment of knowledge economies that encompasses an appropriate economic and institutional regime, a strong human capital base, a dynamic information infrastructure and an efficient national innovative system. Besides, national governments are looking up to universities to provide the much needed highly skilled human resource to meet national needs and in contributing to an efficient innovative system. Furthermore, for Nigeria and Nigerians according to Jimol in Mukoro (2023) to be able to function in the 21st century world of global knowledge and economy, her universities must be responsive to change and innovations going on in the approaches to the provision and delivery of university education. He stressed that new universities are increasingly required to provide education that fosters global knowledge, skills and languages in order to perform professionally and socially in an international and multicultural environment. As such universities are much concerned about their contributions to sustainable national development. One sure way of achieving this may be through relevance curriculum and programme offerings in university education. It is in this light that this paper examine ways curriculum and programme offerings can enhance sustainable National Development in Nigeria in the 21 Century.

Concepts of Programme and Curriculum

Programme is a structured curriculum designed to provide a comprehensive education in a specific field of study (<https://www.41cu.org>). It typically includes a series of subjects, practical experiences and assessment leading to a recognized qualification or degree. From above definition on programme, the following ideas emerged:

- i. A plan of things that will be done or included in the development of something; a research programme/training programme.
- ii. Method of study in which a subject is divided into very small part;
- iii. Instruction to do a particular thing/carry out a task;
- iv. A set of structured activities/method of doing things.

Based on the explanation on programme above, it seems that the main role of the university education institutions would be to put all structure in place to ensure its philosophy and objective are fulfilled through content selection, development, implementation and evaluation. Therefore, programme is a designed instruction arranged in sequence to ensure learners attain specific objectives as specified by university education. University programmes conducted in various fields of study according to Anukaehyi et al. (2015) fall under the following:

1. Certificate programmes;
2. Diploma programmes;
3. Undergraduate programmes (bachelor's degree);
4. Postgraduate programmes- masters and doctoral degrees;
5. Postgraduate programmes; and
6. Research fellowships.

A variety of modes of programmes including full-time, part-time, block-release, day-release, sandwich, among others are available in Nigeria universities.

On the other hand, curriculum means the sequence of potential experiences designed by the institution for students to be disciplined in group ways of thinking and acting. (Eye, in Ominyi, Ogba & Igu, 2019). Ezeani (2015) presented curriculum as a continuous process of a conscious insight into the life of the society, by the institution with a view to bringing about improvement. This suggests that curriculum is a programme of instruction use by an institution as a means of accomplishing its purpose. In this respect, Philip (2019) declared curriculum as a schedule of

proposed instruction embodying the preferred direction of students' development; it rests upon and manifests a certain system of values. According to him, these values constitute the aims, objectives or purpose of education- (secondary education) and the curriculum is the means by which the aims are achieved, the objectives realized and the purpose fulfilled. The National Policy on Education has guided the achievement of such values through institutional curriculum at the education level.

Concept of Sustainable Development

The concept of sustainable development can be viewed from different angles depending on the issue on which an author seeks to address, but its overall intention is to create balance in nature so that approaches to actualizing human needs do not result in far-reaching environmental consequences. The term, sustainable development, was first used by the World Conservation Strategy in 1980 and its most popular definition was given by the Brundtland Report, *Our Common Future*, under the auspices of the World Commission on Environment and Development (Jhingan, 2019). According to the Brundtland Report, sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Scott & Marshall, 2015). They further stated that economic growth and modernization have been pursued vehemently by countries as a means not only of satisfying basic material needs, but also of providing the resources necessary to improve quality of life more generally". Succinctly put, sustainable development focuses on creating awareness for safe environmental, social and economic activities. To sustain according to Chamber's twentieth century Dictionary to 'hold up; to prolong, to keep-going; Development means progressive change. National development refers to progressive change or movement in, and of a Nation from certain conditions considered to be of sub-standard and undesirable to other conditions considered to be desirable. Sustainable National Development therefore can be defined as prolonged and continued movement of a Nation towards social justice, economic growth, religious tolerance, political dynamism and technological advancement. Hence, Umaru (2015), opined that "the ultimate objective must be to bring about sustained improvement in the well-being of the individual and the society.

The global community under the umbrella of United Nations' General Assembly at its 64th session reiterated that sustainable development in its economic, social and environmental aspects

is a key element of the overarching framework for United Nations activities, and that there is the need to ensure a balance among economic development, social development and environmental protection as interdependent and mutually reinforcing pillars of sustainable development, it further states that sustainable development is an indispensable requirement for eradication of poverty especially in developing countries, including Nigeria, and that concerted efforts are required at all levels of government to achieve sustainable development.

Naturally, development is driven by one particular need, without fully considering the wider or future impacts. We are already experiencing the damage this kind of approach can cause, from large-scale environmental pollution crises caused by irresponsible industrialization, to changes in global climate. The longer we pursue unsustainable development, the more frequent and severe its consequences are likely to become, which is why we need to reeducate the society. It is necessary for us to focus on sustainable development because of its broad advantages of meeting the diverse needs of all people in communities, promoting personal well-being, social cohesion and creating equal opportunities. Sustainable development provides an approach to making better decisions on the issues that affect all of our lives.

Concept of University Education

University education, as the pinnacle of higher learning institutions. The university has been characterized as a place where inquiry is pushed forward and discoveries are verified and perfected and rashness and inoffensive nor capable of causing harm, while error is exposed by the collision of mind with mind and knowledge with knowledge (discourse IX as cited in Mafiana, 2017). In essence universities all over the world are accepted as citadel of learning and development of human resources. The entire intellectual and professional life of a country depends on sound university education that provides quality products (graduates) of international standard (Adeogun et al., 2019). The centrality of university in national development is incontrovertible (Ogbodo et al., 2013) According to them, the primary strategic mission of the university is to promote knowledge, provide vision and translate that vision into a reality via policies and actions (practices) which are purely quality –oriented. Ogbodo (2016) posited that university education was meant to explore solutions to the country’s problems and assist the larger society in achieving its objectives in the areas of human, social and economic development.

In particular, university education is geared towards production of skilled manpower, required for national development. University education is meant for technological and scientific advancement, skill development of quality entrepreneurial graduates and strategic researchers for development (Abdulkareem & Oyeniran, 2021). In other words, the university education is meant to drive a knowledge-based economy. The responsibilities of propounding, preserving, promoting and propagating knowledge fall squarely on the university education system (Babalola, 2018b)

In Nigeria, the university education is a veritable tool for the realization of national development, the development of cultured citizens and the promotion of basic research. University education is therefore the most powerful and critical success factors for individuals and the society (Aina as cited in Ogbogu, 2021). (FRN, 2018: 41-42) stipulated that university education shall make optimum contribution to national development by:

- a. intensifying and diversifying its programmes for the development of high-level manpower within the context of the needs of the nation;
- b. making professional course contents reflect our national requirements;
- c. making all students parts of general programmes of all-round improvement in university education to offer general study courses such as history of ideas, philosophy of knowledge, nationalism and information technology (IT) and
- d. making entrepreneurial skills acquisition a requirement for all Nigerian universities.

As such, the fundamental mission of university education is to promote the life of the mind through intellectual inquiry and to generate, store and transmit specialized knowledge and supplicated expertise, university forms of culture and ethnical basis of conduct (Federal Ministry of Education, 2016). Given credence to the Federal Ministry of Education position, Ivowi (2016) stated that universities exist to generate, disseminate and apply knowledge through teaching, research and extension service.

Moreover, every university in the world is competing for a scholarly space on the global map of world-institutions (Babalola, 2019). Babalola and Atinma (2019) maintained that each university and its sub-systems are expected to quickly fashion out practical strategic to empower their people to move the institution towards becoming a world-class university. They noted that the world class university is characterized by having a world view of teaching, research and

community services. The world class university is expected to explore windows of opportunities, nature learning and research culture, which is driven by collegiality and aspiration to housing lead scholars, academics and students through the use of face-to-face, open and distance models. World Class Universities are those that are better equipped, execute their responsibilities better and obtain better results in comparison with others, as judged by the global community in a ranked ordered manner (Briggs, 2020). He stressed that World Class Universities are those that come top of the list in any reliable and credible positioning of universities, based in certain criteria. Continuing, Briggs (2020) clearly stated that:

Ranking of universities has become the medium through which the outside world confers the elite status of “World Class Universities” on some institutions on the basis of international recognition, irrespective of their locations and proprietorship. ‘

“This elite upper-class standing underscore the crave for such institutions as it is believed that, outside the issues of prestige and international recognition, such institutions are better able to contribute at the development, growth and global competitiveness of their respective countries, in an exponential manner since development issues are now largely knowledge – driven.”

Levin, et al (2006) in Ahmed (2015) declared that: In general, there is wide agreement that great universities have three major roles: (1) excellence in education of their students; (2) research, development and dissemination of knowledge; and (3) activities contributing to the cultural, scientific and civic life of society. Excellence in education means the resources and organization of undergraduate, graduate, and professional instruction and educational opportunities for students. Clearly, this goal requires outstanding faculty, high quality teaching and other instructional activities, and availability of good libraries, laboratories, and other pertinent facilities as well as highly prepared and motivated students who serve to educate through their peer influence. Research, development, and dissemination of knowledge refer to the embryonic identification, growth, and extension of concepts and ideas as well as their transformation into applications, goods, and services that enhance understanding of welfare. Activities contributing to the cultural, scientific and civic life society are many and varied, but include conferences, publications, artistic events and forums as well as provision of services (e.g. medical clinics and hospitals or museums) that engage and contribute to the larger community including the regional, national and international communities. p. 126.

Curricular and Programmes Offerings in University Education

There are numerous and diverse courses and programmes available in the university educational institutions of learning in Nigeria, as shown in the Unified Tertiary Matriculation Examination (UTME) brochure released every year by the Joint Admissions and Matriculation Board (JAMB), as evidence of bold attempts to ensure that the curriculum of university education is, indeed, responsive to the socio-cultural, economic, political, scientific and technological needs and aspiration of the Nigerian society, as well as, to the need of the individual student (Ivowi, 2021). The current (2015/2016) UTME Brochure, for example, indicated that there are as many as 30 programmes in the Faculty of Administration alone, 20 in Agriculture, 75 in Arts, 39 in General Education, 26 Education Arts, 35 Education Science and Tech, 13 Education Social Science, 10 in Engineering/Technology, 8 in Law, 17 in Medical/Pharmaceutical Sciences, 151 in sciences, and 79 in Social Sciences. The diversity of the programmes is quite impressive, and there is no doubt about their relevance to the needs of the country.

Relevance of University Education Curriculum and Programmes for Sustainable National Development

The continued question on the relevance of Nigeria university education curriculum and programmes responsiveness to the needs of the society has led to continuing debate among scholars and employers of labour. In the observation of Akinpelu in Nguda (2015), the divergent nature of the needs of individuals is reflected in such instances as: a student considers educational pursuit as relevant if it guarantees a meal ticket or could readily be converted into a job. To parents, education would only be relevant if it guarantees employment, enhances earning power and earns their wards high position on the jobs. In the case of government, education would only be relevant if it ensures a perfect match between acquired skills and economic manpower requirements, between education and job, and between schooling and productive - labour. Consideration of employers of labour often centres on the graduate's effectiveness or performance on the job. This is because it is believed that university education curriculum and programmes supposed to be responsive to the needs of the society it ought to serve. Once these needs are identified the curriculum and programmes are then fashioned to train and impact the required skills, attitudes, values and competences for realization of such societal needs (Jaja, 2019). In this respect, Okebukola in Osagie and Okafor (2012) averred that university education

curriculum and programmes are relevance to societal needs (in the development of the economy) through:

1. **Research:** University education, especially in core areas of science and technology, are centred on research. These research efforts are translated into inventions, which are used to increase production processes which boost the economy.
2. **Promotion of creativity:** University education stimulations creativity. Creativity, through an innate quality, can blossom in the fact of high-quality university education. Development of sellable skills and knowledge: Skills and knowledge development are the best gifts of higher education to the nation. This is what the economy needs for improvement and upward movement to be part of the top twenty economies of the world. When armed with sellable skills and knowledge, and attitudes and values developed through university education, the individual is able to foster economic growth.
3. **University education trains students in different fields.** University education as a worthwhile and sound education should not only meet the challenges of today, but meet future challenges and contribute to creating a future society and its culture. University education is very important in that it is through it that learners are taught through their various disciplines the knowledge and skills needed for production of goods and services. That is why Ivowi (2016) noted that knowledge and skills acquired through exposure to relevant programmes in university education manifest in their innovative use to increase the tempo, quantity and quality of goods and services. Consequently, Ivowi (2016) remarked that when individuals specifically use some knowledge and skills to generate goods and services to create wealth, the entire community is likely to gain from such innovations. This means that university education with numerous programmes should enable individuals to face challenges and bring out in them their creativity that would lead to job creation. This means that when jobs are created, there will be sustainable development. Ivowi (2016) further appreciated that university education not only creates jobs for wealth acquisition through improved productivity but it equally provides opportunities for her programmes to provide and stimulate activities which will lead to innovative discoveries and excellence in the production of goods and services for the improvement of mankind and the entire society. When this is done, national development will occur and be sustained. To that end,

Abdulkareem (2021) earlier noted that university education all over the world are accepted as the citadel of knowledge, education and human resource development. On that note, Nigerian university education system sprang out of the need for the development of high-level manpower to take the challenge of - nation building. That is why every university education in Nigeria is striving to produce the right type of manpower in sufficient quantity and quality. This is another way of creating job opportunities, because when human beings are developed through university education, they will open industries and companies, and work in them and employ other people to work with them. Production of individuals who are capable of employing others is good step in sustenance of national development. Abdulkareem (2021) therefore appreciated that when university education creates individuals who are capable of creating job opportunities, they are transforming the nation from a developing country to a developed country.

Challenges

Opinions on university education curriculum and programmes indicated that our present curriculum and programmes in university institutions of learning are inadequate and not very relevance in content. Thus, Akinpelu in Akpochafo (2016) is of the opinion that the state of irrelevance in Nigeria university education curriculum and programmes may has arise because:

- i. the educational practice does not lead to some desired state affairs;
- ii. the educational practice is not such as can lead to some desired state of affairs;
- iii. the educational practice is conducive to some state of affairs, but the state of affairs is one that ought not exist.

The question now is that are the curriculum and programmes in university education in Nigeria leading to the desire state of affair? The answer may be no because, Nigeria university education curriculum programmes according to Ofoha, Uchegbu, Anyikwa and Nkemdirim (2019) lack effective implementation and does not adequately prepare students for the demands of a competitive, talented workforce. As indicated by Ivowi in Ivowi (2012) an effective curriculum needs also to be relevant and adequate. Relevance demands that we take into consideration the needs of the society; and since society is dynamic, such needs are ever changing, hence programme must affect this for their relevance to be maintained. Other sources of checks in curriculum and programme relevance are research and development, world of work productivity,

and wealth creation (Ivowi, 2016). In this way, education what affect the relevance of a programme may not totally be the unavailability of qualified academics but its market value. As such a curriculum programme that cannot build in student the relevant generic skills cannot be considered relevant to societal needs.

Ways Curriculum and Programmes Offerings in Nigeria Univerisities can enhance Sustainable National Development

Curriculum: This is perhaps where the greatest challenge lies. University education in Nigeria will have to start from now on to apply the global vision on university education curricula and programmes with its emphasis on the inculcation of generic skills, the aim of which is to prepare students both for the world of work and the demands of the learning society of the 21st century. In this connection, our university institutions would do well to consider the implementation of the following:

1. Institutionalization of a foundation year during which all students are exposed to ways of learning and of knowing and in the course of which they are screened for lapses in their earlier educational exposure so that the necessary remedial teaching and counseling can be undertaken.
2. Eliminating narrow specialization in bachelor's degree programmes as much as possible.
3. Using the bachelor's degree as the sole entry qualification of professional degree programmes.
4. The involvement of a wide variety of stakeholders in regular curriculum review dialogues.
5. ICT (Information Communication Technology) as a tool subject, in addition to its being a discipline in its own right.

Internationalized Curriculum: The Internationalized curriculum has been defined as: “a curriculum with an international orientation in content and/or form aimed at preparing students for performing (professionally/socially) in an international and multicultural context and designed for domestic and/or foreign students.” (Organisation for Economic Co-operation and Development (OECD), 2016). Such a curriculum would encourage the integration of a global perspective in teaching; enhance knowledge of international development and cooperation concerns; inculcate an understanding of global interdependence and a country's responsibilities as a member of the global village; foster a sense of global citizenship and increase awareness of

the impact that individual and collective actions can make on matters of global importance (Canadian International Development Agency (CIDA)/Global Classroom Initiative(cited in David Gamble, 2015). In addition, a globalized curriculum is expected to, in some way; address the United Nations Millennium Development Goals (MDGs), namely:

- Goal 1 - Eradicate extreme poverty and hunger
- Goal 2 - Achieve universal primary education
- Goal 3 - Promote gender equality and empower women
- Goal 4 - Reduce child mortality
- Goal 5 - Improve maternal health
- Goal 6 - Combat HIV/AIDS, malaria and other diseases
- Goal 7 - Ensure environmental sustainability
- Goal 8 - Develop a global partnership for development.

The rationale for the choice of the goals is that universities should be among the major drivers for the attainment of the millennium development goals, not by policy promulgation, of course, but by serving as the incubator and the fertilizer of the “hard skills” (knowledge of subject matter) and “soft skills” (character).

Work Integrated Learning: Work-Integrated Learning describes educational activities “that integrate theoretical learning on campus with its application in the workplace” (Flinders University, 2012). In other words, a curriculum that reflects work integrated learning provides authentic learning that tries to create a match between classroom experiences and real occupational characteristics. The aim is to ensure that there is no dissonance between theory and practice. It makes graduates fit neatly into the workplace. It might make learning real, relevant and contextualized. “Work-integrated learning is a process where students develop their skills, behavior and self-awareness.” (Cooper & Maidment, 2021).

Teaching and Learning Methods: Constitute an area of university education that should no longer be a case of business as usual. Today’s university education learner lives in a different world and has a different pre-tertiary experience from students of a generation ago. His or her aspirations and expectations of university education are also different from those of earlier

generations. Above all, the goals of university education have changes from selectivity to optimizing the cultivation of talents. These factors call for:

1. Improved teacher-student interaction;
2. Paying greater attention to the needs of individual learner;
3. Student assessment procedures that eliminate memorization and regurgitation in favour of logical reasoning, analysis, problem solving, and creativity; and
4. All manners of creative teaching on the part of lecturers. The websites of FAWE and ADEA and
5. Training in pedagogy should, therefore, be built into all forms of staff development for universities, as should be student and peer evaluation of the classroom performance of lecturers.

Research: This is an important area of activity of university that must be demystified. This is in order to make sure that research benefits the researcher, the student, the society. For this to happen, concerted action would be necessary in the following areas, according to Obanya (2019).

1. Both Government and the organized private sector must create research challenges for university education;
2. Every university education (as well as its constituent units) must develop research agenda on issues related to the nation's developmental challenges.
3. A conscious move towards cooperative, large-scale, long-term research (this does not cancel out other approaches to research for other purposes).
4. Research as a method of teaching and learning, to improve the learning- to-learn skills of students.
5. Research capacity building as a continuous process in university education.

Conclusion

This paper attempted to discuss the concepts of programme and curriculum, concept of sustainable development, concept of university education and history of universities in Nigeria. Furthermore, the paper looks at the curricular programmes' offerings in university education. It equally discussed relevance of university education curriculum and programmes for sustainable national development and core generic skills for curriculum and programme relevance in

university education. Moreover, the paper dwell on the ways curriculum and programmes offerings in Nigeria universities can enhance sustainable national development.

Recommendations

Based on the conclusion of this study, the following recommendations were made

1. Universities should deliberately design all curriculum and programmes to prepare students for work whether as an employee or an entrepreneur. This would help address the dissonance between Nigeria universities and sustainable national development.
2. Nigeria universities should generally continue to explore internationalized curriculum in order to expand the frontiers of research and sustainable national development.

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ASSESSMENT OF TECHNO-PEDAGOGICAL COMPETENCY SKILLS OF PRE-SERVICE TEACHERS IN ONDO STATE, NIGERIA

BY

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ABSTRACT

The study assesses the techno-pedagogical skills acquired by pre-service teachers in Ondo State. A descriptive survey research design was adopted in the study. The population of the study consisted of all university students in the state. While the sample size consisted of 351 (200 Level) pre-service teachers randomly selected from the two public universities running education courses in the state. Two research questions and one null hypotheses guided the study. A self developed questionnaire titled Assessment of Techno-pedagogical Competency Skills of Pre-service Teachers Questionnaire (ATCSPTQ) was used. The instrument was validated by two experts from the department of Educational Technology Adeyemi Federal University of Education, Ondo. The instrument was validated with the use of cronbach Alpha and the reliability coefficient of 0.76 was obtained. Descriptive statistics (mean and standard deviation) were used to answer the research questions, while inferential statistics (t-test) was employed to test the hypotheses. The findings of the study revealed that pre-service teachers possessed basic techno-pedagogical skills, as well as the necessary techno-pedagogical skills for instructional delivery. The findings further revealed no significant differences between male and female pre-service teachers in basic technological skills. Based on these findings, it was recommended that facilities supporting the use of technological tools for teaching and learning should be made available in schools. This would ensure that the skills already acquired by pre-service teachers are effectively utilized when they finally become qualified classroom teachers.

Key words: *Techno-pedagogy, skill, pre-service teachers, instructional delivery*

Introduction

The rapid growth in technology in the 21st century has made societies and institutions more dependent upon technologies to get information and stay connected worldwide. Umeh et al. (2015) claimed that emerging technological trends have made students digitally literate and created more learning opportunities to explore. The integration of Information and Communication Technology (ICT) tools in education allows students to apply computer and technology skills to learning and develop problem-solving approaches.

Today, technology competency is essential for teachers in the teaching and learning process, as it facilitates effective teaching and learning. This competence centres on the ability of teachers to make use of technology in a techno-pedagogical good way for effective teaching (Absari et al.,

2020). Techno-pedagogy according to Koehler et al. (2013) is the hybrid method of teaching in which ICT resources are utilised in the classroom interaction process. Vanajhaa, (2017) also refers to techno-pedagogy as electronically mediated courses that integrate sound pedagogic principles of teaching/learning. It is the art and craft of incorporating technology in effectively tailoring teaching-learning experiences. Techno pedagogical skills are instrumental in making the teaching-learning process a joyful experience as it brings about notable changes in the interaction pattern of teachers. However, teachers will have to commit to upgrade skills and integrate technology into the educational environment successfully.

Application of technological skills to the teaching and learning process helps to improve professional development. Vanajhaa & Pachaiyappan, (2017) posit that demonstration of techno-pedagogy competency skills in the classroom requires the teachers to integrate technological affordances with pedagogical approaches for the specific subject matter to be taught. Thakur (2014) opines that the techno-pedagogical competency needs to be improved to equip teachers to face the students belonging to the digital era and the challenges in the modern classroom. Acquiring techno-pedagogical proficiencies will make teaching and learning a pleasurable experience as it would lessen the pressure on the teachers and enable the students to delve deeper into domain of knowledge. The presence of techno-pedagogical competency in teachers can be examined from various techno-pedagogical skills viz. Proficiency in linguistic abilities; Aptitude to develop teaching learning process; Ability to improve multimedia based Study materials; Capacity to design multi grade instruction; Talent to plan Specific Pedagogy; Development of e-learning module etc.

The pre-service teacher is the student enrolled in a teacher preparation program who must complete degree requirements, including course work and field experience, before being awarded a teaching license. Buabeng-Andoh (2022).defined a pre-service teacher as a student in a tertiary institution involved in learning the art of teaching and acquires mandatory teaching practice programme experienced by practicing teaching profession under the supervision of an experienced teacher by gradually taking on more classroom management and instructional responsibilities. The purpose of pre-service experiences is to allow students to practice the strategies and concepts they have learned in their tertiary education courses. Pre-service teaching is one of the most beneficial components of preparing teachers for the

classroom. During student teaching, participants can observe their assigned host/cooperating teachers as they model best practices, assess students readiness, design and implement effective lesson plans and activities, and develop rich, rewarding experiences. Upon completion of their programs, pre-service teachers are then expected to demonstrate pedagogical content knowledge, meet the diverse learning needs of their students academically, developmentally, and socially, and adhere to the ethical and professional responsibilities of being an educator. Within these expectations, pre-service teachers are also responsible for effectively managing classroom behavior, collaborating and communicating with parents, colleagues, and stakeholders, administrative tasks and technological skills for instructional delivery.

Gender has been identified as one of the factors that influences students' academic performance. The issue of gender on students' performance has been controversial. Most Africans believe that young female are less useful than males and this is one of the factors that militate against women education and full participation in social, political, economic and technology activities (Goswami & Dutta, 2016). However, Abidoye & Abidoye, (2022) findings revealed that there is no significant difference in the mean achievement scores of male and female students in mathematics. That is, gender does not significantly affect the achievement of students in mathematics. In the context of adopting technological innovation, females are more induced to adopt technological innovation through social influence rather than by a personal decision whereas in case of males the personal decision to adopt innovation is much stronger than social influence (Aderole & Abidoye 2022).

Competence according to Shittu, (2017) are the skills and knowledge that enable a teacher to succeed. Therefore, to maximize students' learning, teachers must have expertise in a wide-ranging array of competencies in basic technological skills, planning and preparing lesson plans, technical skills in instructional delivery, and specialized skills for evaluating learning and providing feedback.

Over the years, significant emphasis has been on Pedagogy and Content knowledge, thereby giving rise to the need for Technology Knowledge. This knowledge can be transferred through ICT development programs if aligned with the curriculum of the Colleges of Education and universities where pre-service teachers are trained (Abidoye & Abidoye 2022). Training pre-service teachers in this 21st century should be with recent technological gadgets to ensure their

exposure and awareness of these device(s). Pre-service teachers are expected to implement the use of technology in teaching to support the digital native students. Furthermore, many pre-service teachers cannot still think about teaching and learning as a process requiring technology in this new dispensation. Therefore, it could be due to a lack of proper knowledge of Techno-pedagogical skills. Hence, the need to assess the techno-pedagogical competence of pre-service teachers in tertiary institutions in Ondo State, Nigeria.

Objectives of the Study

The study aims at achieving the following objectives

- i. Determine basic technological skills possessed by pre-service teachers in Ondo State.
- ii. Determine the technological skills for instructional delivery possessed by pre-service teachers in Ondo State
- iii. Observe whether differences exist in the basic technological skills possessed by pre-service teachers based on gender in Ondo State.

Research Questions

The following research questions guided the study:

1. What are the basic technological skills possessed by pre-service teachers in Ondo state, Nigeria?
2. Do pre-service teachers possess technology skills for instructional delivery in Ondo State, Nigeria?

Research Hypothesis

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

H₀₁: There is no significant difference between the basic techno-pedagogical skills possessed by male and female pre-service teachers in Ondo State.

Methodology

Descriptive survey research design was adopted in this study. The sample population consisted of 270 pre service teachers proportionately selected from the two public universities running education courses in Ondo State. The instrument for this study was the researcher's self-developed questionnaire titled Assessment of Techno-pedagogical Competency Skills of Pre-service Teachers Questionnaire (ATCSPTQ). The instrument was divided into two sections A-B. Section A focuses on demographic information covering the participants' gender, school and

level. Section B consisted of ten question items eliciting information on pre-service teacher techno-pedagogical competency skills. A 4-point Likert Scale response modes: Strongly Agree (SA = 4), Agree (A = 3), Disagree (D = 2) and Strongly Disagree (SD = 1) was used. Face and content validation of the instrument was carried out by an expert in test measurement and evaluation from the Department of Educational Foundation and Counseling Adeyemi Federal University of Education Ondo. To ensure that the instrument has the accuracy, appropriateness and completeness for the study. Cronbach Alpha technique was used to determine the level of reliability of the instrument. The reliability coefficient obtained was 0.76 and this was considered to be high enough to justify the use of the instrument. The researcher subjected the data generated for this study to mean score and standard deviation for answering the research questions while Pearson product moment correlation was used in testing the hypothesis. The test for significance was done at 0.05 alpha levels.

Results

The following are the findings of the study;

Research question 1: What are the basic technological skills possessed by pre-service teachers in Ondo state, Nigeria?

Table1: Mean and Standard Deviation of Pre-service Teachers' Response on Basic Technological Skills Possessed in Teaching

S/N	STATEMENT	Mean	S.D	Remark
1	I can connect a projector to the system.	2.99	0.97	Agree
2	Save and retrieve information on the system.	2.91	0.84	Agree
3	Can create and name folders for a different purpose.	3.18	0.76	Agree
4	Interact with the system in the absence of a mouse.	2.96	0.81	Agree
5	Type and produce document with computers.	2.98	0.80	Agree
6	Draw and edit image with computer.	1.79	1.04	Disagree
7	Play multimedia application with a computer.	2.72	0.89	Agree
8	Print with a computer.	3.21	0.90	Agree
9	Develop and run a programme package with a computer.	1.48	0.73	Disagree
10	Capture image with a computer webcam.	2.78	0.85	Agree
Grand Mean		2.70		Agree

Decision Value: 0.00- 2.49= Agree, 2.50- 4.00 = Disagree

The results in Table 1 show that pre-service teachers in Ondo State generally possess basic technological skills in teaching, as indicated by a grand mean of 2.70, which is above the decision mean of 2.50. Pre-service teachers agreed they could perform tasks such as connecting projectors to systems (M = 2.99), saving and retrieving information on a computer (M = 2.91), creating folders for different purposes (M = 3.18), and typing and producing documents with computers (M = 2.98). However, the respondents disagreed on possessing more advanced skills such as drawing and editing images with computers (M = 1.79) and developing and running program packages (M = 1.48). These findings indicate that while pre-service teachers have basic technological competencies, they lack advanced technical skills needed for more complex tasks.

Research Question 2: Do pre-service teachers possess technology skills for instructional delivery?

Table 2: Mean Response of Pre-service Teachers Technological Skills for Instructional Delivery

S/N	Statement	Mean	Std. Dev.	Remark
1.	I can use PowerPoint to present lessons in the classroom	2.53	.80	Agree
2.	I can hyperlink videos to my PowerPoint presentation to enhance learning	2.70	.92	Agree
3	I can convert Instruction to various software packages	2.52	.07	Agree
4	I can use social media platforms to deliver instructions	2.58	1.03	Agree
5	I can record delivered instructions and send an online platform for students to access at their convenience	2.94	1.10	Agree
6	I can use the net to deliver instruction asynchronously at an agreed time	2.79	1.04	Agree
7	I can manipulate instruction using diagrams, thereby putting into consideration the individual differences of the students	2.52	.89	Agree
8	I can use an image to present a lesson to the student through the net	2.56	.90	Agree
9	I can use power point to present a summary and conclusion within a short time	2.84	1.10	Agree
10	I can prepare user-friendly instructional packages using an online platform	2.89	.85	Agree
Grand Mean		2.82		Agree

Decision Value: 0.00- 2.49= Agree, 2.50- 4.00 = Disagree

The results in Table 2 show that pre-service teachers in Ondo State possess the necessary techno-pedagogical skills for instructional delivery, as reflected by a grand mean of 2.82, which is above the decision value of 2.50. Respondents agreed that they could use PowerPoint to present lessons in class ($M = 2.53$), hyperlink videos to PowerPoint presentations ($M = 2.70$), and convert instructions into various software packages ($M = 2.52$). Additionally, they expressed confidence in using social media platforms for instruction delivery ($M = 2.58$), recording and sharing lessons via online platforms ($M = 2.94$), and delivering asynchronous instructions using the internet ($M = 2.79$). The ability to manipulate instructional diagrams considering individual differences ($M = 2.52$), use images for online lessons ($M = 2.56$), and prepare user-friendly instructional packages ($M = 2.89$) further demonstrates their technological proficiency for effective instructional delivery.

H₀₁: There is no significant difference between the basic techno-pedagogical skills possessed by male and female pre-service teachers in Ondo State.

Table 3: Summary of t-test Analysis of the Cumulative Mean Response of Male and Female Pre-Service Teachers' Basic Techno-pedagogical Skills

Grouping Variable (Group)	N	Mean	Std. D	Df	T	Sig.	Remark
Male	138	72.54	9.91	349	-.592	.536	Not Significant
Female	213	73.26	10.96				

Table 3 showed the t-test analyses of mean response of male and female pre-service teachers' basic techno-pedagogical skills for teaching in Ondo State. The result indicated the mean score of the male and females are 72.54 and 73.26, respectively. The values of the mean scores do not reveal an appreciable difference. Therefore, there is no significant difference between the basic technological skills possessed by male and female pre-service teachers ($df = 349$; $t = -.592$; $p > 0.05$). Hence, hypothesis 1 is not rejected.

Discussion

The finding of this study revealed that pre-service teachers in Ondo State generally possess basic techno-pedagogical skills in teaching. This indicated that pre-service teachers possess adequate technological skills for planning and preparing a lesson plan. This finding is in line with the earlier results of Shittu, (2017) and Yurdakul (2018), found out that pre-service teachers possessed the needed techno-pedagogical skills for planning and preparing a lesson plan. However, the study is not in line with the earlier finding of Aduwa-Ogiegbaen. (2021), found out that pre-service teachers' do not possess the needed technological skills for planning and preparing a lesson plan.

This study further revealed that pre-service teachers' possessed techno-pedagogical skills for instructional delivery. This indicated that pre-service teachers possess adequate techno-pedagogical skills for instructional delivery in the teaching and learning process. This finding is in line with the earlier results of Valtonen et al., (2015) and Yorulmaz et al., (2017), who found out that pre-service teachers' level of techno pedagogical competencies was high. However, this study is not in line with the earlier finding of Almerich et al., (2011) who found that pre-service teachers' level of techno pedagogical competencies was low

This study also revealed that gender has no influence on pre-service teachers' basic technological skills for teaching. This finding is in line with the earlier discovery of Bala,

(2018), who found out that pre-service teachers' basic technological skills for education vary based on the variables of gender. The clear implication of these findings is that although ICT is not currently used at the highest levels, pre-service teachers recognize the benefits of the ICT components incorporated in the teaching and learning process. The present study was related to the previous research of Valtonen et al. (2015), Yurkadul (2011), Almerich et al., (2011) and Bala (2018) who find out no significant gender difference in terms of students possession of techno-pedagogical skills.

Conclusion

Based on the findings of this study, it can be concluded that pre-service teachers in Ondo State generally possess basic techno-pedagogical skills in teaching. It was also concluded that gender differences did not have any significant effect on techno-pedagogical competency skills of pre-service teachers in Ondo State.

Recommendations

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

1. Integration of emerging technologies in to educational settings to create the motivation and skills needed by pre-service teachers should be included explicitly in teacher education curricula.
2. Pre-services should be taught on the use of emerging technologies in other to improve the learning outcomes of the learners.
3. Management of tertiary institutions should provide continuous training, workshops, and seminars in emerging technologies for pre-service teachers. It will further develop their techno-pedagogical skills for instructional delivery and learning outcomes.

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AI-DRIVEN APPLICATIONS FOR PROMOTING ETHICAL EXCELLENCE AND INTEGRITY AMONG WORKERS IN HIGHER EDUCATION SYSTEM IN NIGERIA BY

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ABSTRACT

Ethical excellence is the quality of doing what is right and avoiding what is wrong. It is closely related to goodness or admirableness. Aristotle, the great philosopher, describes it as a character or trait, acquired by practice that disposes a person to adopt the right course of action in morally charged situations. These virtues are life-skills that enable a person to realize his/her potential for living the good life as a rational, social animal. Artificial intelligence (AI), is the simulation of human intelligence in machines that are programmed to think and act like humans, encompasses tasks such as learning, problem-solving, understanding natural language, and perception; can be adapted and improved over time to accommodate human experience and behaviour. Therefore, this paper describes a complex method for using AI applications to promote ethical excellence and integrity among workers in higher educational system. This approach integrates machine learning algorithms to analyze academic data for identifying potential instances of plagiarism, misconduct, or unethical behavior among members of staff and students. Furthermore, AI-powered educational tools can be utilized to provide personalized ethics training and resources to staff. By leveraging AI technologies in these ways, higher education institutions can proactively promote ethical conduct, maintain academic integrity, and uphold professional standards within their academic communities in Nigeria.

Key Words: Artificial Intelligence, Ethics, Integrity, Morality, Workforce

Introduction

Artificial Intelligence (AI) has an history spanning over seven decades, beginning in the mid-20th century. Its conceptual roots can be traced to the 1940s when British mathematician Alan Turing proposed the idea of machines capable of performing computations that imitate human thought. In 1950, Turing introduced the "Turing Test," a benchmark to assess machine intelligence (Turing, 1950). The formal birth of AI as a field came in 1956 during the Dartmouth Conference, where pioneers like John McCarthy, Marvin Minsky, and Claude Shannon laid the foundations of AI research. McCarthy coined the term "artificial intelligence" and introduced the idea of creating machines capable of simulating every aspect of learning and intelligence (McCarthy *et al.*, 1956). Early AI research focused on symbolic reasoning and rule-based

systems, leading to notable achievements in game-playing programs like IBM's Deep Blue, which defeated chess champion Garry Kasparov in 1997. The rise of machine learning (ML) in the 1980s and 1990s, particularly through neural networks, marked a significant evolution in AI's capabilities.

The 21st century saw rapid AI advancements due to increased computational power, big data, and breakthroughs in deep learning. In 2012, the success of deep neural networks in image recognition, demonstrated by AlexNet, propelled AI into mainstream applications like speech recognition, autonomous vehicles, and personalized recommendations (LeCun, Bengio, & Hinton, 2015). Today, AI continues to grow across numerous sectors, shaping the future of technology and society. This paper intends to expose the salient activities of tertiary institutions in the area of ethics and integrity in work performance and output. This is because ethical excellence is vital in higher education, fostering integrity and responsible behavior. Aristotle's virtues emphasize character traits for adopting right actions (Aristotle, 1985; Kristjánsson, 2015). Artificial intelligence (AI) promotes ethical excellence by simulating human intelligence. In Nigeria's higher education, AI addresses plagiarism and misconduct. In order to curb these acts, the applications of AI for ethical conduct among staff and students will go a long way in promoting all-round quality in the system.

Artificial intelligence (AI) represents one of the most transformative innovations of the 21st century, reshaping industries, economies and daily life. AI refers to the development of computer systems capable of performing tasks typically requiring human intelligence, such as visual perception, speech recognition, decision-making, and language translation. Its rise is driven by advancements in machine learning (ML), where algorithms are trained on vast datasets to improve over time explicit programming. The innovation of AI is rooted in its ability to process and analyze enormous volumes of data at unprecedented speeds, offering insights and automation that were previously impossible. AI is at the core of technologies like autonomous vehicles, personalized medical treatments, smart assistants (e.g., Siri, Alexa), and advanced robotics, fostering new opportunities across healthcare, finance, manufacturing, and retail (Kaplan & Haenlein, 2019).

AI's capacity for innovation is particularly evident in its role in augmenting human capabilities, such as diagnosing diseases earlier or optimizing supply chains for greater efficiency.

Additionally, the advent of AI tools in creative industries—writing, art, and music—demonstrates its versatility in both technical and imaginative applications (Brynjolfsson & McAfee, 2017). Despite these advances, AI presents challenges, including concerns over ethical use, job displacement, and decision transparency. Thus, ongoing innovation must balance the benefits with responsible deployment to maximize AI's societal potential.

Ethical Excellence and Integrity

Ethical excellence today is often discussed in the context of leadership and organizational ethics. Scholars such as Paine (2003) emphasize that ethical excellence in organizations requires a culture of integrity, responsibility, and accountability. She argues that ethical excellence involves embedding moral values into the fabric of decision-making and corporate governance. This means leaders should not only comply with laws and regulations but also promote fairness, honesty and respect for all stakeholders. Sandel (2009) expands on the idea of ethical excellence by challenging society to think about the moral dimensions of justice and fairness; and stresses that ethical excellence involves engaging with deep moral questions, including equality, community, and the common good, to foster societies that reflect collective moral values.

Contemporary scholars view integrity as more than individual honesty, framing it as a systemic quality crucial for leadership and public trust. Bazerman (2011) explores how good people can unintentionally engage in unethical behavior, arguing that integrity in the modern world requires awareness of cognitive biases and ethical blind spots. He posits that true integrity involves recognizing these biases, holding oneself accountable, and creating mechanisms that encourage ethical decision-making. In the same vein, Bok (2010) emphasizes that integrity is about the alignment of actions with moral values, but also extends to one's transparency and honesty with others. Bok argues that in today's interconnected world, integrity is crucial for maintaining public trust and ensuring transparency in personal and professional life.

Use of Artificial Intelligence in Higher Institutions of learning.

The integration of Artificial Intelligence (AI) in education has garnered significant attention in recent years. Research has demonstrated AI's potential in enhancing academic integrity, particularly in plagiarism detection (Clough, 2014). Studies have shown that AI-powered tools can effectively identify plagiarized content, reducing the burden on educators (Foltynek, 2018). Moreover, AI-driven personalized learning approaches have been found to improve students'

engagement and academic performance (Kumar, 2020). AI-powered ethics training has also been explored, with promising results. Gynnild's (2019) study demonstrated the effectiveness of AI-facilitated workshops in promoting ethical awareness among students. Similarly, Li's (2019) research highlighted the potential of machine learning algorithms in detecting anomalous behavior. Today, higher education system in Nigeria is facing numerous challenges, including ethical concerns and integrity issues among workers. Artificial intelligence (AI) offers a promising solution to address these challenges. This review explores the potential of AI in promoting ethical excellence and integrity among workers in Nigerian higher education.

AI and Biological Insights for Promoting Ethical Integrity in Higher Education

In behavioral science, AI enhances the analysis of complex datasets, enabling researchers to identify patterns and correlations that inform interventions and strategies. For instance, machine learning algorithms like random forests and neural networks are utilized to predict behavioral outcomes, supplementing traditional methods. Natural language processing (NLP) tools assist in understanding human behavior by analyzing textual data, thereby improving social services (Robila & Robila, 2020).

Moreover, AI is integrated into Cognitive Behavioral Therapy (CBT) to personalize mental health interventions. By leveraging AI, clinicians can tailor treatments to individual needs, enhancing the effectiveness of therapy. It can be applied in various stages of the CBT process, including: Assessment, personalization and monitoring.

The combination of neuroscience and artificial intelligence (AI) presents significant ethical considerations, particularly as AI systems increasingly draw inspiration from neural processes. This intersection has led to the emergence of neuroethics, a field dedicated to addressing the ethical implications of advancements in neuroscience and related technologies. One primary concern is the potential for bias in AI systems. While algorithms are designed to process data logically, they can inadvertently perpetuate existing biases present in their training data, leading to unfair outcomes. This issue is particularly pertinent when AI is applied to neurological data, where biases could affect diagnoses or treatments (Resseguier, 2021; Queensland Brain Institute, 2024). Another significant ethical issue involves the integration of AI with neurotechnology, such as brain-computer interfaces. These technologies, which can record and influence brain activity, raise concerns about privacy, autonomy, and the potential for misuse. For example,

unauthorized access to neural data could lead to breaches of personal privacy, while the ability to influence brain activity could impact an individual's autonomy (Eke, 2024; UNESCO, 2024). To navigate these challenges, scholars advocate for a collaborative approach between neuroethics and AI ethics. By combining insights from both fields, it is possible to develop comprehensive frameworks that address the unique ethical dilemmas arising from the integration of AI and neuroscience. This collaboration can enhance theoretical understanding and inform governance strategies to manage ethical issues effectively (Salles & Farisco, 2024).

Research in Biology has shown that genetic and psychological factors play a role in moral decision-making (Ketelaar, 2015). AI could be used to analyze patterns of behavior within specific groups and suggest customized ethics training or behavioral interventions, tailored to the biological predispositions or psychological profiles of individuals. For instance, personalized learning systems for educators could help them overcome ethical challenges that might be influenced by unconscious biases. AI could also be employed to monitor biological markers of stress, burnout, or other health factors that might influence ethical behavior. For example, integrating AI with wearable devices could track physiological signs (heart rate, sleep patterns, etc.) to help workers manage stress better, reducing the likelihood of unethical actions being taken under pressure (Tao & Tan, 2005).

AI systems could also facilitate the teaching of biology-related ethics, like issues surrounding biotechnology, genetic engineering, or medical research, which are especially relevant in higher education. By using AI-driven simulations, faculty and students could engage with ethical dilemmas, with real-time analysis of their decisions guided by both biological principles and AI insights (Wallach, 2011). A great example is the use of artificial intelligence in Ecology and Environmental Biology, AI models help to predict climate change effects on biodiversity and ecosystems, tracking wildlife populations and species identification.

Ethical Challenges in Nigerian Higher Education

Nigerian higher education institutions face ethical dilemmas among which includes:

Corruption: Corruption is a pervasive ethical issue in Nigeria's higher education system, undermining the integrity and quality of education. According to Adeyemi and Adeyinka (2016) this unwholesome ethical issue is of utmost concern in the following areas:

- i. Admission irregularities: There are frequent reports of bribery, favoritism, and nepotism in students' admission. These acts undermine quality and fairness; and negates one of the sustainable development goals (SDG) which dwell on education for all. Nepotism and favoritism: AI-driven solutions can promote fairness and meritocracy in hiring and promotion processes, reducing nepotism and favoritism (Kumar, 2020). AI algorithms can analyze applicant data and identify top candidates.
- ii. Another critical area of concern is examination malpractice which usually comes in the form of cheating, impersonation, and leakage of examination questions; and grade inflation which might be induced by gratification of all manners.
- iii. Sexual harassment: This is a direct abuse of power and privileges of being a lecturer, leading to exploitation and intimidation of students placed under their tutelage and the result is wrong grading, and/or placement of students as a consequence. The application of AI tools will increase value for the academic outputs and confidence in the system
- iv. Plagiarism and academic dishonesty: AI-powered tools can detect plagiarism and academic dishonesty, promoting originality and integrity in research (Clough, 2014). These tools analyze text similarity and identify potential cases of plagiarism and reprimand culprits.
- v. Mismanagement of resources: These systems can optimize resource allocation, reducing waste and inefficiency in Nigerian higher education institutions (Li, 2019). AI algorithms can analyze resource utilization patterns and identify areas for improvement. This will go a long way in mopping up scarce resources and increase internally generated revenue (IGR)
- vi. Lack of transparency and accountability: AI-driven systems can promote transparency and accountability through blockchain technology and data analytics (Gynnild, 2019). AI algorithms can track financial transactions and identify potential irregularities, the solutions can help detect and prevent corrupt practices through predictive analytics and machine learning algorithms (Olanrewaju, 2020). Thus, sharp practices involving illegal collection of fees, boycott of legal payment routes and payment for grades can be tracked.
- vii. Corruption: In all climes, weak governments' stance against corruption will be exhibited in all Ministries, Departments and Agencies (MDAs) in any country. Weak institutional leadership, inadequate policies, lack of accountability and nepotism in appropriating rewards and punishment; economic pressures – including financial constraints, low wages

and limited resources; cultural norms with entrenched social values such as nepotism, favoritism, statism, regionalism and religious affiliations can singly or in association with another, cause corruption to flourish get entrench in the tertiary education system in Nigeria.

Ways Artificial Intelligence can check lapses

AI can help mitigate these ethical challenges by:

- i. Detecting and Preventing Plagiarism: AI-powered tools like ‘Turn it in’ and ‘Quetext’ can identify plagiarized content, promoting originality and academic integrity.
- ii. Enhancing Transparency and Accountability: AI systems can track financial transactions, reducing embezzlement and mismanagement. For example, SAP Concur, a financial management system used in tracking transactions and expenses.
- iii. Automating Recruitment and Promotion: Systems like ‘HireVue’ can minimize bias in hiring and promotion processes, promoting fairness and meritocracy.
- iv. Monitoring and Evaluating Performance: AI-powered evaluation tools can assess employee performance objectively, reducing favoritism.
- v. Providing Ethics Training and Support: Platforms in the likes of ‘EthicsPoint’, ‘Coursera’ and ‘Compliance Wave’ can offer personalized ethics training and resources.

Implementation and Benefits of AI

Effective implementation of the proposed AI-based system requires a multifaceted approach. Implementation strategies include:

- a. Institutional policy development: Clear policies and guidelines will be established to ensure seamless integration of AI-powered ethics training.
- b. Staff training and support: Educators will receive comprehensive training on AI-powered ethics training tools.
- c. Students’ engagement and awareness: Students will be actively engaged through workshops and awareness campaigns.

The benefits of this system, among others include:

- a. Enhanced academic integrity: AI-powered plagiarism detection and ethics training promote a culture of integrity.
- b. Reduced plagiarism: Advanced algorithms identify and prevent plagiarism.

- c. Improved ethics awareness: Personalized training and resources foster ethical awareness.

Its challenges and limitations

While AI offers significant potential, several challenges, as identified by specialists include:

- Infrastructure Constraints: It is an open secret that there is a major lacuna in the provision of critical infrastructures in Nigeria and the ICT related infrastructures are inclusive. If this gap is not bridged, limited internet connectivity and electricity will continue to hinder effective AI adoption in Nigeria tertiary institutions (ITU, 2020).
- Data Quality and Availability: Insufficient data undermines AI effectiveness in Nigerian higher education (UNESCO, 2019).
- Human Bias: AI systems can perpetuate existing biases, affecting fairness and equity (Barocas *et al.*, 2023)
- Regulatory Frameworks: Lack of clear guidelines hinders AI adoption in Nigerian higher education (OECD, 2019).
- Resistance to Change: As the saying goes, change Workers may resist AI-driven solutions due to fear of job loss or mistrust (Ford, 2015).

Conclusion

Artificial intelligence has the potential to promote ethical excellence and integrity among workers in Nigerian higher education. By addressing ethical challenges and leveraging AI-driven solutions, institutions can enhance transparency, accountability, and fairness. While challenges persist, careful planning, investment, and regulation can ensure successful implementation.

Recommendations

In order to overcome these challenges, the following recommendations are proffered:

- i. Strengthen institutional governance by establishing robust policies, procedures, and oversight mechanisms.
- ii. Enhance faculty and staff development by providing training, incentives and opportunities for professional growth
- iii. It is important to ensure data quality, availability and storage protocols are in place in all tertiary education system for ease of assessment and retrieval.
- iv. There should be regular audits to address human bias to ensure fairness.

- v. Collaborate with anti-corruption agencies, Civil Societies Organizations and international bodies for the promotion of ethics
- vi. Finally, clear guidelines should be developed for AI adoption in Nigerian higher education so that stakeholders will work toward its success.

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EFFECTS OF PEER TUTORING TECHNIQUES ON PERFORMANCE AND ATTITUDE OF LOW ABILITY SECONDARY SCHOOL BIOLOGY STUDENTS IN KATAGUM EDUCATIONAL ZONE, BAUCHI STATE

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ABSTRACT

The study determined the Effects of Peer Tutoring Techniques on Performance and Attitude of Low Ability Secondary School Biology Students in Katagum Educational Zone, Bauchi State. Three objectives, three research questions and three null hypotheses were raised. The objectives are to find out the difference in performance among students taught Biology concept using peer tutoring strategy, and those taught using lecture method, to examine the difference between the attitude of students taught Biology concept using peer tutoring instructional strategy and those taught using lecture method as well as to investigate the difference if any, among gender. Quasi experimental research design was adopted for the purpose of the study; employing two groups (experimental group and control group). 8, 131 formed the population of the study. Two intact classes were selected randomly to form the sample size which is made up of seventy seven (77) students for the experimental group and seventy four (74) students for the control group. The instruments used for data collection are Biology Performance Test (BPT) and Biology Attitude Test Questionnaire (BATQ). The sample of this study is comprised of four schools, two boys' schools and two girls' schools. The data was analyzed using t-test for testing the stated hypotheses at 0.05% level of significance. The result showed that Peer tutoring learning strategy improved students' academic performance and attitude in Biology. However, also no gender difference was shown in terms of student's performance and attitude, among the male and female students. It is therefore recommended that workshops, seminars and conferences should be organized for Biology teachers on the use of peer tutoring learning strategy in secondary schools in order to enhance academic performance.

Key words: Peer tutoring, Performance, Attitude and Gender

Introduction

Science is an essential tool for national development; and its study is based on analysis of facts. Modernization in every aspect of life is the greatest example of the implementation of scientific and technological knowledge (Ahmad, 2019). The role that science and technology have played in improving the life conditions across the globe is vivid, and the benefits have been harvested maximally around the globe. Scientific knowledge has made impacts in the advancement of medicine, education, communication, agriculture, industry etc. The basic science subjects taught in Nigerian secondary schools are Physics, Chemistry and Biology. These science subjects are very crucial in acquiring scientific knowledge and the development of a nation.

Biology provides the basis for learning several other disciplines in sciences, some of which include the Pharmaceutical Sciences, Nursing, Medicine, Biochemistry, Microbiology, Physiology, and Anatomy. It is concerned with the study of living organisms, their structure, function, growth, evolution, distribution and taxonomy. It helps in understanding the body system of every living organism, i.e. from genetics to physiology. It has also uncovered a lot in the modern healthcare, like Immunology which studies our immune system and how it reacts to all sorts of threats. Pathology as an aspect of Biological Science helps in the diagnoses of diseases, what causes them, as well as what they do to the body.

Peer tutoring technique is an instructional technique where high performing students are paired to weaker or low performing students in a common venue outside the usual classroom with a view to tutor the weaker ones, under the supervision of a teacher. The technique has proven well with a variety of learners. In peer tutoring, students are paired together to work on a specific academic task, master certain academic skills and course contents. It is possible and easy to handle a variety of students who need more individualized attention using the peer tutoring strategy. Like all other tutoring techniques, peer tutoring has its own benefits and challenges. Some of the benefits of peer tutoring include, improved performance, better retention, clearer understanding, develop more self-confidence, as well as improve social interaction among students. Generally in peer tutoring technique, all students benefit, not just the low performing students. However, it has its own challenges. For example, it is time consuming, and a student tutor may turn out to be a poor tutor.

Performance can be explained as a term, which is directly proportional to change in a learning context, input, or classroom process. Performance therefore, simply means the extent to which a student, a teacher, or an institution has achieved its educational goals. It is commonly measured by examinations or other means of evaluation of teaching and learning outcome. Sati (2014) described performance as a complex students' behavior that underlies several abilities. Examples include memory, previous knowledge or aptitude, as well as psychological factors like motivation, interest, temperaments or emotions. Deary, Whiteman, Star, Whaley and Fox (2004) stated that performance can either be low or high. Adamu (2008) explained that the causes of low performance are diverse and cannot be associated with a single factor. For instance, proponents of self-concept and its variables may be a paramount factor in academic failure. Yoloye (2009) reported that performance in any form of activity is based upon study interpretation and application and that study has a purpose. So it depends on the individual to decide why he or she wants to study. That is, either to gain new ideas or to find out relationship between two different things. In essence, what one learns as a result of study depends on the degree to which one succeeds. Nwagbo (2001) and Penil, Olorukooba, Usman and Lawal (2007) revealed that students perform poorly in science secondary schools and a number of factors were found to be responsible. Some isolated factors as deduced by some researchers like Nwagbo (2006) and Abdullahi (2005); these include inappropriate and uninspiring teaching approaches adopted by teachers, inadequate teaching and learning facilities and so on.

Literally, attitude is a way of thinking or how someone feels about a particular situation. In psychology, attitude denotes mental construct, or a mental and emotional entity that characterize a persons' behavior. Attitude can be classified into three components, i.e. cognitive, emotional, and behavioral. However, in a psychological point of view, attitude can be defined as the general personality of an individual, which can either be good or bad. One important thing that can change or determine the attitude of an individual is positive thinking. In the context of this research cognitive attitude is what we are trying to measure; as it deals with the knowledge we acquire and feel confident about the fact that we are educated and can present relevant information about a particular subject. In an educational setting confidence is a good attitude and one of the basic things in the lists of positive attitudes. Looking and facing things confidently and feeling that I am equal to the tasks, is enough to reflect on your performance.

Statement of the Problem

This research is motivated by the growing incidence of failure in Biology in the West African Examination Council (WAEC) which could be a clear manifestation of poor teaching and learning strategy. Students perform woefully in science subjects generally and Biology in particular (Bangbade, 2004). It is for this reason, that this research work is conducted to study the effect of peer tutoring on the performance, attitude and gender of Biology students in senior secondary schools of Katagum Educational Zone, Bauchi State

Objectives of the Study

The objectives of this study are to:

1. Find out the difference in performance of SS II students taught Biology concept using peer tutoring instruction and those taught using lecture method
2. Examine the difference between the attitude of SS II students taught Biology concept using peer tutoring instruction and those taught using lecture
3. Investigate the difference if any, in the level of Performance between male and female SS II students taught Biology concept using peer tutoring instructional teaching and those taught using lecture method

Research Hypotheses

The following research hypotheses were formulated

H₀₁: There is no significant difference in the performance of SS II students taught Biology concept using peer tutoring instructional strategy and that of students taught using lecture method

H₀₂: There is no significant difference in the attitude of SS II students taught Biology concept using peer tutoring instructional strategy and those taught using lecture method

H₀₃: There is no significant difference in the level of Performance between male and female SS II students taught Biology concept using peer tutoring instruction.

Methodology

Quasi experimental design was adopted for the purpose of this study. The main purpose of quasi-experimental design is to determine cause and effect. The research consists of two experimental

groups and two control groups. The two experimental groups received treatment using the peer group learning strategy while the control groups were taught using the usual classroom lecture method as the control groups. All the groups were pre-tested before treatment was given, and post-tested after treatment was given.

Results

The data was analyzed using t-test for testing the hypotheses stated below at 0.05% level of significance.

H₀₁ - There is no significant difference in the mean score of students taught Biology using peer tutoring learning strategy and those taught using conventional method of teaching in senior secondary schools of Katagum Educational Zone.

Table 4.1 Post-test result of Independent t-test statistics on Biology performance scores of students taught Biology using the peer tutoring strategy and those taught using the Lecture method

Variables	Groups	N	Mean	Std. dev	Std. Err	Df	t-cal	P-Value
CLS	Experimental	77	42.18	7.102	.809	150	3.537	0.001
LM	Control	74	38.37	6.149	.710			

***significant at $P=0.05$**

From table above the calculated P value is 0.001 lower than the level of significance which is 0.05 with df of 150. This shows that there is a significant difference in the Biology mean scores of students taught Biology using peer tutoring learning strategy and those taught using lecture method, as such, the hypothesis is therefore rejected.

H₀₂ There is no significant difference in the attitude of students taught biology using peer tutoring learning strategy and those taught using conventional method of teaching in senior secondary schools of Katagum Educational Zone

Table 4.2 Post-test statistics result of Independent t-test on Attitude of students taught Biology using the peer tutoring learning strategy and those taught using the Lecture method

Variables	Groups	N	Mean	Std. dev	Std. Err	Df	t-cal	P-value
Attitude	Experimental	77	56.57	6.352	.723	149	1.898	0.04
	Control	74	53.65	11.714	1.361			

**significant at P=0.05*

From table above the calculated P value is 0.04 lower than the level of significance which is 0.05 with df of 149. This shows that there is a significant difference in the attitude of students taught Biology using peer tutoring learning strategy and those taught using lecture method, and the hypothesis is therefore rejected.

H₀₃: There is no significant difference in the mean score of male and female students taught biology using peer tutoring learning strategy in senior secondary schools of Katagum Educational Zone

Table 4.3 Post-test result of Independent t-test on Biology achievement score of male and female students taught Biology using the peer tutoring learning strategy.

Variables	Groups	N	Mean	Std. dev	Std. Err	Df	t-cal	P-value
Gender	Male	47	44.08	6.21	.906	75	3.106	0.4
	Female	30	39.20	7.47	1.36			

**Not significant at P=0.05*

From the table above, the t-calculated is 3.106, the p value however is .4 which is greater than the level of significance at 0.05. The hypothesis is therefore retained, there is no significant difference in the mean scores of male and female students taught biology using peer tutoring learning strategy.

Discussion

The study investigated the Effects of Peer Tutoring Techniques on Performance and Attitude of Low Ability Secondary School Biology Students in Katagum Educational Zone, Bauchi State. The finding of the result indicated the following:

- a. Peer tutoring learning strategy improved students' academic achievement in Biology. This means that there is a significant influence in the effect of peer tutoring learning strategy on students' academic achievement in biology.
- b. There is significant influence in the effect of peer tutoring learning strategy on students' attitude towards Biology.
- c. There is no gender difference in the performance of male and female students when taught using peer tutoring learning strategy.
- d. There is no difference in attitudes of male and female students exposed to peer tutoring learning strategy

Conclusion

In conclusion, based on the finding of this study, the researcher concludes that the use of peer tutoring instructional strategy in teaching Biology enhances students' performance and has proven to be effective in the teaching of Biology concepts in senior secondary schools.

Recommendations

The recommendations are as follows:

1. Workshops, seminars and conferences should be organized for Biology teachers on the use of peer tutoring learning strategy in secondary schools, to enhance academic performance.
2. Biology teachers in senior secondary schools should endeavor to use peer tutoring learning strategy because of its positive effect of enhancing students achievement and attitude
3. Peer tutoring learning strategy is not gender bias, therefore it is use as a learning strategy will be appropriate in coeducational setting.
4. Peer tutoring learning strategy should be used by teachers to teach not only science subjects but art subjects as well.

Acknowledgement

The authors of this research work wish to sincerely acknowledge the efforts of the Tertiary Education Trust Fund (TETFUND) for funding this research, through the Institutional Based Research (IBR) to the staff of Federal College of Education Jama'are Bauchi State.

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**PERCEPTION AND ATTITUDE OF PRE-SERVICE TEACHERS' ON USE OF
WHATSAPP MICROBLOG IN LEARNING SOCIAL STUDIES IN UMAR SULEIMAN
COLLEGE OF EDUCATION GASHUWA YOBE STATE, NIGERIA**

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ABSTRACTS

This research titled perceptions and attitudes of pre-service teachers on the use of WhatsApp microblog in learning social studies in Umar Suleiman college of Education Gashua, Yobe State was guided by two objectives and two research questions. The research used descriptive survey research design in the study. The population of the study was 539 pre-service teachers. Simple size is 225, random sampling technique was employed. The instruments used for data collection is a questionnaire designed by the researcher. To answer research questions one and two descriptive statistics (mean and standard deviation) were used. The findings revealed that pre-service teachers have positive perception on the use WhatsApp microblog and they have good attitude to use such tools. It is recommended that the school authority should organize capacity building workshop to pre-service teachers on the existence and use of WhatsApp microblog in leaning social studies and tertiary institutions should support pre-service teachers with infrastructures and gadgets that will enable the pre-service teachers to utilize WhatsApp

microblog in learning social studies in other to make them more ready to use such tools in learning.

Keywords: *perception, Attitude, WhatsApp microblog and pre-service teachers.*

Introduction

The technologies of mobile phones have been of more disastrous to students learning than any other technology. Students become less focused during lecture because they engaged more with their mobile phone irrespective of location busy chatting with friend, participating in a group discussion and sharing media. The level at which student used this technological device in their day to day activities has attracted a great deal of attention from practitioners and researchers on how mobile technology can be innovatively integrated in teaching and learning. According to Song (2014), schools have started to adopt a trend called ‘Bring your own device’ (BYOD) that permits learners to bring their own mobile devices as a way to encourage learning. Such learning practices seem to be the perfect companion with the digital natives’ nature of learning who prefer activities that involved multi-tasking, virtual interactions and collaboration.

The use of social media has increased massively in recent years worldwide. Communication via these new media is called ‘computer-mediated communication,’ abbreviated to CMC. This has been defined as “the practice of using networked computers and alphabetic text to transmit messages between people or groups of people across space and time” (Jacobs 2008). A growing number of communication tools are now at our disposal on computers, mobile phones, and tablets and their users appear to get younger by the day.

The stage of enlightenment in which social media or innovative tools could be used in education is still low. Many lecturers do not access and utilize social media tools in teaching. It is observed that some vital social media tools are accessible to lecturers’ in most tertiary institutions in Nigeria. Beside, many lecturers have been unable to find effective ways to use technology tools in their content delivery or any other aspect of their teaching. The use of ICT resources in content delivery is still a mirage; Living in this era, teachers must spend additional time and efforts to understand technologies which will keep as an educational resource (Okik & Asiru, 2020).

A microblog is a type of online communication platform that allows users to post brief updates, often limited in character count, and share multimedia content like photos, videos, and links.

These posts, commonly referred to as "micro-posts," are generally shorter than traditional blog entries, enabling quick and frequent updates. Microblogging platforms often emphasize immediacy and real-time interaction, making them popular for sharing opinions, news, or updates with a broader audience or a specific community (Kaplan & Haenlein, 2011).

Pre-service teachers are individuals enrolled in teacher education programs who are undergoing training to become professional educators. These teachers are yet to be fully certified and are often completing coursework, internships, or teaching practicums designed to prepare them for the responsibilities of teaching. Pre-service teacher education focuses on equipping these future educators with theoretical knowledge, practical skills, and professional values to effectively teach in classrooms and adapt to diverse learning needs (Darling, 2006).

Attitude represents our evaluations, preferences or rejections based on the information received. It is a learned predisposition to respond in a consistently favorable or unfavorable manner concerning a given object. An important consequence of instruction is the students' attitude toward the subject. A student with low achievement might have developed a very positive attitude toward the subject matter while student with high achievement might have developed negative attitude toward the subject matter, vice-versa. Teachers need to be aware of the attitudinal characteristics of their students (Gano-Phillips, 2015). The likelihood of student putting his knowledge of social studies education to use (applicability) largely depends on the student's attitude for or against the subject because things disliked has a way of being forgotten easily.

Statement of the Problem

The integration of digital tools into teaching and learning has become increasingly essential in modern education. WhatsApp microblog, a widely used Learning Management System (LMS), offers features that support collaborative learning, streamline administrative tasks, and enhance teaching efficiency. Despite its global popularity and potential benefits, the successful adoption of WhatsApp microblog in educational institutions, especially in developing countries like Nigeria, remains inconsistent. The Umar Suleiman college Education gashua is no exception, as lecturers' perceptions play a significant role in determining the extent of its utilization in teaching and learning.

Research has shown that the adoption of educational technologies is heavily influenced by lecturers' perceptions, attitudes, and willingness to embrace change (Afolabi, 2021). Positive perceptions can lead to greater adoption and integration, while negative perceptions can result in resistance, underutilization, or outright rejection of such tools. Challenges such as limited ICT skills, inadequate training, unreliable internet connectivity, and insufficient institutional support further complicate the integration of WhatsApp microblog in teaching practices (Okiki & Asiru, 2020).

At the Umar Suleiman College Education Gashua there is limited empirical evidence on lecturers' perceptions of WhatsApp microblog and how these perceptions influence its use. Without understanding these perceptions, efforts to promote the adoption of WhatsApp microblog may fail, thereby depriving students of the potential benefits of technology-enhanced learning. Additionally, the lack of a clear policy framework and support for integrating digital tools may exacerbate this issue.

This study seeks to investigate lecturers' perceptions and attitude of pre-service teachers on use WhatsApp microblog at the Umar Suleiman college Education Gashua. It aims to explore factors influencing their attitudes toward its use and identify potential barriers to its effective implementation. The findings will provide valuable insights for policymakers and stakeholders to design strategies for promoting the adoption of WhatsApp microblog and enhancing teaching and learning outcomes in the institution.

Objectives of the Study

1. Ascertain the level of pre-service teacher's perception on the use of WhatsApp Microblog in learning social studies in Umar Suleiman College of education Gashua.
2. Assess the level of pre-service teacher's attitude towards the use of WhatsApp Microblog in learning social studies in Umar Suleiman College of education Gashua

Research Questions

1. What is pre-service teacher's perception on the use of WhatsApp Microblog in learning social studies in Umar Suleiman college of education Gashua?
2. What is pre-service teacher's attitude on the use of WhatsApp Microblog in learning social studies in Umar Suleiman college of education Gashua?

Methodology

The research adopted survey design. Survey research is defined as “the collection of information from a sample of individuals through their responses to questions” (Check & Schutt 2012). The population of this study comprises of all the Pre-Service Teachers in Umar Suleiman college of education Gashua. which comprises social studies pre-service teachers that making a total of 539 students in the schools. Simple random sampling technique was used in selecting the respondents. The researcher use Krejcie & Morgan (1970) and Sambo (2008) in determining the sample size is 225. The instrument used for data collection was a researcher designed questionnaire. A questionnaire tagged “Perception and Attitude of Pre-service Teachers on the use of WhatsApp Microblog in Learning (PAPAWML)” was employed. The questionnaires contained two sections and were harmonized in one single questionnaire; Section A requires the respondents’ demographic information (school, gender and age of the pre-service teachers), while Section B was sub divided into two sub-sections. Sub-Section A, contains 7 statement items on pre-service teacher’s perception on use of WhatsApp Microblog in learning in Umar Suleiman college of education Gashua, Sub-Section B contains 7 statement items on pre-service teacher’s attitude towards the use of WhatsApp Microblog in learning in Umar Suleiman College of education Gashua.

The questionnaire was adopted four Point likert-scales in which the respondents chooses from the options provided. The Respondents were required to respond to the items by ticking (√) against the appropriate option that reflects their belief, attitude and perception. The instrument was validated by three lecturers from Department of Curriculum and instruction not below the rank of senior lecturer at Federal college of education (Technical) Potiskum. All the corrections, grammatical errors, spelling errors, way of itemization and recommendations made by the experts were effected and final copy of the instrument was drafted and subjected for the purpose of pilot testing. The instrument for the data collection was pilot tested in other to ascertain and ensure its reliability. The pilot testing was carried out by the researcher at FCE (T) Potiskum using social studies pre-service teachers. The instrument was administered to 30 pre-service teachers and collected back after three working days. The reliability of the instrument was ascertained using Cronbach alpha reliability coefficient. An instrument is considered more reliable, if its calculated reliability coefficient is closer to 1 and less reliable when the calculated

reliability coefficients is closer to 0. The data obtained from the administration of the questionnaire were analyzed using descriptive and inferential statistics. The research questions one and two were answered using mean score and standard deviation, where a mean score cut off of 2.5 was considered agreed while a mean score of 2.4 and below was considered not agreed with respect to the research question. All analysis was tested at 0.05 levels of significance using statistical package for social sciences (SPSS).

Results

The results on the perception and attitude of pre-service teachers on the use of WhatsApp Microblog in teaching and learning Social Studies at Umar Suleiman College of Education, Gashua. The findings are analyzed based on the research objectives and questions, providing insights into the acceptance of integrating WhatsApp microblog as a learning tool. The discussion interprets these results in relation to existing perception and attitude of pre service teachers for digital learning adoption in teacher education.

Analysis of Demographic Data of the Respondents

Table 1: Frequency and Percentage Distribution of the Respondents by age

Age	Frequency	Percentage
18-23 Years	258	47.87%
24-27 Years	168	31.54%
28- Above years	113	20.59%
Total	539	100%

Table 1 shows that 258 (47.87%) of the respondents took part in the study are between the age of 18-23 years, followed by 168 (31.54%) between the age of 24-27years and 113 (20.59%), having 28- above years.

Table 2: Frequency and Percentage Distribution of the Respondents by school

School	Frequency	Percentage
School of Education	110	21.01%
School of Science	182	28.%
School of Vocational	108	21.3%
School of Language	97	19.4%
School of G.S.E	48	10.3%
Total	539	100%

Table 2: shows that 110 (21.01%) of the respondents took part in the study are from Sch of Education, School of Science 182 (28. %), School of Vocational 108(21.3%), School of Language 97 (19.4%), and School of G.S.E 48 (10.3%).

Table 3: Mean and Standard Deviation of pre-service teachers' perception on the use of WhatsApp microblog in learning

S/N	Statement	Mean	SD
1	Increase students' motivation to learning.	3.27	0.77
2	Motivates students' to interact using a group	2.65	1.02
3	Increase students' content knowledge	3.46	0.89
4	Compensates paucity of face to face interactions in classroom	3.23	0.78
5	Increase students' self-confidence.	2.97	0.76
6	Give students the opportunity to correct and revise	2.81	0.78
7	Provides group work, peer interaction, teacher and students interaction, synchronous and asynchronous interaction	2.68	0.88

Cumulative mean 2.86

Table 3. Reveals the response of respondents on the pre-services' teacher's perception on the usefulness of WhatsApp microblog in learning social studies. It shows that the majority of the respondents agree that pre-service teachers perceived WhatsApp microblog is useful in learning while the rest of the respondents disagree that pre-service teachers perceived WhatsApp microblog is useful in learning. This is because the cumulative mean is 2.86 which is greater than the decision mean which is 2.50. This implies that pre-service teachers perceived WhatsApp microblog is useful in learning social studies.

Research Question Two: what is pre-service teachers' attitude towards the use of WhatsApp Microblog in learning?

To answer this question, respondents were asked to rate their attitude towards the use of WhatsApp microblog in learning. Mean and standard deviation was used to analyses the data. The result is presented in table 4.4

Table 4: Mean and Standard Deviation of pre-service teachers' attitude towards the use of WhatsApp microblog

S/N	Statement	Mean	SD
1	Are using WhatsApp microblog in learning	3.28	0.77
2	Are using WhatsApp microblog in learning social studies regularly	2.64	1.01
3	Like the use of WhatsApp microblog in learning social studies	3.50	0.81
4	Enjoy the activities they do using WhatsApp microblog in learning Social Studies	3.25	0.74
5	Like the use of WhatsApp microblog in learning Social Studies because is fascinating and fun.	3.01	0.72
6	Easily understand what they were being taught in Social Studies using WhatsApp microblog	2.83	0.76
7	Are happier using WhatsApp microblog in learning Social Studies	2.68	0.86

Cumulative mean 2.87

Table 4. Reveals the response of respondents on the pre-services' teacher's attitude towards the use of WhatsApp microblog in learning social studies. It shows that the majority of the respondents agree that pre-service teachers are having a positive attitude towards the use of WhatsApp microblog in learning while the rest of the respondents disagree that pre-service teachers are having a positive attitude towards the use of WhatsApp microblog in learning. This is because the cumulative mean is 2.86 which is greater than the decision mean which is 2.50. This implies that pre-service teachers are having a positive attitude towards the use of WhatsApp microblog in learning social studies.

Discussion

Pre-service teachers' perceived that WhatsApp microblog is very useful tool when used in learning social studies and there is significance difference between pre-service teacher's perception on the usefulness of WhatsApp Microblog in learning social studies in colleges of education based on their age. This finding is in agreement with that of Orachorn (2016) which revealed that students and lecturers perceived that social media technology is useful and will improve students' performance when used in learning. This finding is not in agreement with a study conducted by (Amry, 20 whose findings revealed that there is existing significant

difference among lecturers' level of perception on the use of social media tools in teaching and learning.

The findings revealed that there is no existing significant difference among pre-service teachers on the attitude to use of WhatsApp microblog in learning social studies across the college of education based on their ages. This finding is in-line with a study conducted by (Eric, 2012) which revealed that there is existing difference among teacher's level of readiness to use the internet for teaching in their respective institution where difference is found not to be significant.

Conclusion

From the finding of the study, it was deduced that pre-service teachers are aware of the use of WhatsApp microblog in learning. Similarly, pre-service teachers were ready to use WhatsApp microblog for learning social studies across in College of Education, pre-service teachers perceived that WhatsApp microblog is very useful in learning social studies across in Colleges of Education and Pre-service teachers have positive attitude towards the use of WhatsApp microblog in learning social studies across in College of Education

Recommendations

- i. The school authority should organize capacity building workshop to pre-service teachers on the existence and use of WhatsApp microblog in leaning on pre-service teacher's colleges of education Yobe state so as to make them fully aware of the use of WhatsApp microblog in learning.
- ii. Tertiary institutions should support pre-service teachers with infrastructures and gadgets that will enable the lecturers to utilize WhatsApp microblog in learning social studies in other to make them more ready to use such tools in learning.

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REVIEW OF EMPIRICAL STUDIES ON INFLUENCE OF SCHOOL ENVIRONMENT ON STUDENTS' ACADEMIC PERFORMANCE

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ABSTRACT

This comprehensive review synthesizes findings from ten empirical studies that examine the impact of the school environment on students' academic performance. The study aims to critically evaluate relevant research, highlighting the ways in which school surroundings influence educational outcomes. Conducted across nine countries—specifically two from Pakistan and one each from India, Kenya, Nigeria, Ghana, Tanzania, South Africa, and Uganda—the reviewed studies revealed several weaknesses, particularly in the clarity of background information and problem statements, as well as in their methodologies. Additionally, the review identifies a 20% gap in the correct usage of the definite article "the" at the beginning of study titles. These insights have significant implications for educators, policymakers, and stakeholders who seek to enhance students' achievement across various contexts. By addressing these weaknesses, future research can contribute more effectively to understanding and improving the school environment's role in fostering academic success

Key words: *Influence, School Environment, Academic Performance.*

Introduction

The value of educational outcomes is significantly influenced by a variety of environmental factors, including school facilities, classroom climate, and overall infrastructure. Numerous studies have investigated the relationship between these factors and students' academic performance in various educational contexts. This critique evaluates several key studies that focus on the impact of the school environment on academic achievement, specifically examining the core variables of school environment and students' performance (Nduka & Eke, 2017; Usman & Jibril, 2019; Kato & Mugisha, 2020; Mwalimu & Mkapa, 2021). Each of these studies offers valuable insights into the complex interactions among school facilities, classroom

environments, and students' performance. This critique will analyze the strengths and weaknesses of each study, focussing on their background information, problem statements, and methodologies, which include research design, population, sample, data collection instruments, validity, reliability, and data analysis methods. By examining these aspects, this critique aims to highlight the contributions of these studies to the existing body of knowledge while identifying areas for improvement in future research.

Methodology

The approach to be taken with this research will involve reviewing relevant, peer-reviewed articles published within the past 9 years, though only those papers which fall directly on the key elements being examined which are influence of school environment and students' academic performance.

Empirical Studies on Influence of School Environment on Students' Academic Performance

Mwangi and Gathumbi (2016) investigated effect of school environment on academic performance of secondary school students in Nairobi County, Kenya. The study utilized a sample of 300 students and teachers from 10 randomly selected schools. A mixed-method approach was adopted, combining questionnaires and interviews to assess factors like school facilities, classroom management, teacher motivation, and safety within the learning environment. The findings indicated that schools with well-maintained facilities, such as adequate classrooms, clean sanitation, and libraries, had students performing better in national exams. Furthermore, schools with safer environments and motivated teachers were linked to higher academic performance. The study called for policy actions to address disparities in school environments, particularly in underprivileged areas. Mwangi and Gathumbi's study on the impact of the school environment on students' academic performance in Nairobi County provides a well-grounded background, drawing attention to disparities in school facilities and their potential effects on student outcomes. The study could have drawn more extensively on previous research in Kenya or other parts of Africa to better situate its findings within a broader context. The statement of the problem is well-defined, highlighting the need to address inequalities in the school environment that contribute to academic disparities, particularly in underprivileged areas.

However, a clearer articulation of specific gaps in the existing literature would have further strengthened the problem statement.

The methodology is a mixed-method approach, combining qualitative and quantitative techniques, which is a strength of the study. The population consists of students and teachers from 10 randomly selected schools, with a sample size of 300 respondents. While this sample size is sufficient, the study would have been improved by ensuring that the sample included schools from both affluent and disadvantaged areas to allow for more comparative analysis. Data were collected through questionnaires and interviews, which is appropriate for capturing both statistical data and personal insights. The study does not provide adequate information on the validity and reliability of the instruments, which raises concerns about the accuracy of the data collected. The method of data analysis includes both qualitative and quantitative techniques. While the mixed-methods approach is a strength, more detailed information about population and statistical tools, and on how the qualitative data (from interviews) were analyzed in conjunction with quantitative data would have improved the clarity and robustness of the findings.

Mampane and Bouwer (2018) examined the relationship between school climate and academic achievement in secondary schools in South Africa. Using a sample of 500 students from urban and rural schools, the study analyzed aspects such as peer relationships, teacher behavior, and school leadership. A correlational research design was adopted, with data collected through questionnaire and interviews. Findings revealed that schools with positive climates—characterized by strong peer networks, supportive teacher-student relationships, and effective leadership—achieved higher academic performance, particularly in math and science subjects. Schools with negative climates, including bullying and poor teacher-student interactions, showed lower performance levels. The study concluded that improving the social and emotional climate of schools can significantly enhance student achievement. The background of Mampane and Bouwer's study on the relationship between school climate and academic performance is well-articulated, with a focus on peer relationships, teacher behavior, and leadership as critical elements influencing student achievement. The study benefits from a broader focus on social and emotional aspects of the school environment, which are often neglected in research on academic performance. The statement of the problem clearly identifies gaps in understanding how school

climate affects academic outcomes, particularly in South Africa, making a strong case for the need for this research. However, the problem statement could have been strengthened with more specific data on the impact of school climate on academic performance within the South African context.

The methodology is a correlational research design, which is suitable for analyzing relationships between school climate and academic achievement. The population consists of 500 students from both urban and rural schools, which provides a balanced sample for comparative analysis. Data were collected through questionnaire and interviews, which is a strength, as it allows for the collection of both quantitative and qualitative data. However, the study does not discuss the validity and reliability of the instruments used, which weakens the credibility of the findings. The method of data analysis focuses on correlations between school climate and academic outcomes, which is appropriate for the research design. However, the correlational design limits the study's ability to establish causality, which could have been addressed by employing a longitudinal design or experimental methods.

Usman and Jibril (2019) examined the influence of the school environment on students' academic performance in urban and rural secondary schools in Kaduna State, Nigeria. The study employed a comparative research design, with 200 students sampled from urban and rural schools using a multistage sampling technique. The research used questionnaire and focus group discussions to gather data on factors such as school infrastructure, teacher quality, and the availability of learning resources. The findings revealed significant disparities between urban and rural schools in terms of infrastructure and academic performance. Students in urban schools, where facilities were more adequate and teachers better qualified, performed significantly better than their rural counterparts. The study recommended targeted interventions to bridge the gap in school environments between urban and rural areas to improve overall academic performance.

The study presents a solid background, highlighting the disparity in educational resources between urban and rural schools, which is a pertinent issue in Nigeria. The statement of the problem is clear and relevant, focusing on the differences in school environments and their impact on academic performance. This focus is important as it addresses inequalities in educational provision, particularly in rural areas.

The methodology is appropriate, with a comparative research design allowing for an effective comparison between urban and rural schools. The use of 200 students selected through multistage sampling provides a balanced representation of both school types. The combination of questionnaire and focus group discussions is a strength, as it captures both quantitative data and qualitative insights into the challenges faced by rural schools. The data analysis is well-executed, with significant differences found between urban and rural schools in terms of infrastructure and academic performance. The use of both descriptive and inferential statistics is appropriate for analyzing these disparities.

The study does not sufficiently discuss the validity and reliability of the instruments used, particularly the focus group discussions. This omission weakens the study's credibility. Additionally, while the sample size is adequate, the study would benefit from a larger sample, particularly in rural areas, to enhance the generalizability of the findings. Furthermore, the recommendations are somewhat broad; more specific strategies for improving rural school environments could have been provided.

Kato and Mugisha (2020) assessed the impact of school climate on the academic achievement of students in secondary schools in Kampala, Uganda. A sample of 300 students and 60 teachers from six secondary schools was selected using a purposive sampling technique. The study adopted a descriptive survey design, and data were collected through questionnaire and interviews. Key indicators of school climate, including teacher-student relationships, peer interactions, disciplines, and safety, were analyzed. The results showed that a positive school climate, marked by strong teacher support, healthy peer relationships, and effective discipline policies, was strongly associated with improved academic achievement. Conversely, schools with poor climates, characterized by low teacher morale, bullying, and a lack of discipline, exhibited lower academic performance. The study emphasized the need for school administrators to create supportive environments that foster both academic and social development. The background is well-articulated, focusing on the role of school climate in shaping academic performance. The study highlights key factors such as teacher-student relationships and discipline, which are crucial elements in understanding the school environment. The statement of the problem is clearly defined, addressing the link between a supportive school climate and improved academic outcomes.

The methodology is appropriate, with a descriptive survey design allowing for a comprehensive analysis of school climate. The use of purposive sampling to select 300 students and 60 teachers ensures that the study captures a range of perspectives on school climate. The combination of questionnaire and interviews is strength, as it allows for both quantitative data and in-depth qualitative insights. The data analysis effectively demonstrates the relationship between a positive school climate and academic achievement. The use of both qualitative and quantitative methods strengthens the study's conclusions.

The major weakness lies in the purposive sampling method, which may introduce bias, as the sample may not be fully representative of all schools in Kampala. Additionally, while the study highlights the importance of teacher-student relationships, it could have included more details about how specific indicators of school climate (e.g., discipline policies) were measured. Finally, the study does not adequately address the validity and reliability of its instruments, which may weaken the reliability of its findings.

Mwalimu and Mkapa (2021) explored the effect of school infrastructure on students' academic performance in public secondary schools in Tanzania. A sample of 350 students and 50 teachers was selected from 12 schools using stratified random sampling. The study used a mixed-method approach, combining questionnaire, interviews, and on-site observations to assess the quality and adequacy of school infrastructure, including classrooms, libraries, and sanitation facilities. The findings revealed a significant positive correlation between the availability of well-maintained infrastructure and students' academic performance, particularly in national examinations. Schools with better infrastructure, such as modern classrooms and well-equipped libraries, recorded higher students' achievement. In contrast, schools with dilapidated facilities experienced lower academic outcomes. The study recommended government investment in improving school infrastructure, especially in rural areas, to enhance educational quality. This study provides a comprehensive background on the importance of school infrastructure in shaping academic performance, particularly in Tanzania. The statement of the problem is well-formulated, focusing on the inadequate school facilities in many public secondary schools and their negative impact on student outcomes. This focus is highly relevant, as infrastructure is often a major barrier to quality education in many African countries.

The methodology is strong, with the study adopting a mixed-method approach that combines quantitative and qualitative techniques. The use of 350 students and 50 teachers selected through stratified random sampling is a strength, as it ensures a representative sample. The combination of questionnaire, interviews, and on-site observations allows for a thorough assessment of the school infrastructure and its impact on academic performance.

The data analysis is well-executed, with a significant positive correlation found between well-maintained infrastructure and higher students' achievement. The use of both quantitative and qualitative analysis enhances the depth of the findings.

The study could have provided more detail on the validity and reliability of the instruments used, particularly for the questionnaire and interviews. Furthermore, while the findings are robust, the study could have delved deeper into the specific types of infrastructure improvements that would be most beneficial, particularly for schools in rural areas. The recommendations could have been more specific, providing clearer strategies for addressing infrastructure deficits.

Rafiq et al (2022) carried out a study on impact of school environment on students' academic achievements at the university level, the core aim of this research was to examine the impact of the school environment on students' academic achievements at the university level. This research focuses on how students perceive their school environment and how it affects their academic achievement. The research was quantitative and followed the positivism paradigm. The research adhered to the survey method approach and was conducted in the suburb of District Toba Tek Singh. Two male and two female secondary schools of Tehsil Pir Mahal were selected. The sample of 350 students was selected through a convenient sampling technique. The survey questionnaire was used, and the understanding of the student questionnaire was translated into Urdu for clear understanding. SPSS version 26.0 was used to analyse data. Percentage frequencies and correlation was conducted to obtain the results. It was examined that a strong correlation between student academic achievement and teacher support. A strongly disagree response was found among teacher support, timing and discipline, physical environment, hygiene and sanitation, equity and moral ethics, reading facility and cooperation among students, extracurricular activities, and academic achievement. Moreover, all such facilities were inadequate for the academic achievement of students. The research suggested improving all such facilities in public sector schools to improve the students' academic achievement. From the

research conducted the topic was appropriate and 3 questions and hypotheses each guided the study in line with the background problem of the study which was properly captured in the introduction and background for the study. Quantitative survey was used which is suitable based on the topic with a convenient sampling that might be biased which could be a flaw for generalisation of findings. And there was no detail on how the sampled size was arrived at even though it was good enough, data collection analysis was appropriately carried out but with correct statistical tool even though the reliability and validity of the instrument were not discussed in detail.

Kurniawan, Effendi and Dwita (2019) carried out a study on the effect of school environment, family environment and learning motivation on students' learning performance, the study is motivated by the students' low learning outcomes in accounting subject. The study was a descriptive associative research with the population of 75 accounting students of 12th grade in state vocational high school (*Sekolah Menengah Kejuruan Negeri—SMKN*) Bismen, Tanah Datar. The sample was selected using random sampling technique with a total sample of 64 students. The data were collected using a survey questionnaire. The data were analysed using path analysis. The results showed that; there is a significant influence of school environment on students' learning motivation, also there is a significant influence between family environments on students' learning motivation, again, there is a significant influence between the school environments on students' learning outcomes, 4) there is a significant influence of family environment on learning performance of XII AK students of SMK Bismen Tanah Datar, 5) there is a significant influence between learning motivation on learning performance of XII AK students in SMK Bismen, Tanah Datar. From the topic which begins with a definite article 'the' is a gap, however questions and hypotheses used to guide the study appropriately in line with the statement of the problem from the background and review of literature, the instrument used was appropriate and validated with reliability index to satisfaction, data collection and analysis was done with the right tools except for sampling which detail description was not explain how 64 sample was drawn from 75 population remains a weakness in the study.

Kausar, Kiyani and Suleman (2017) the study was carried out to investigate the effect of classroom environment on the academic achievement of secondary school students in the subject of Pakistan studies at secondary level in Rawalpindi district, Pakistan, effect of classroom

environment on the academic achievement of students in the subject of Pakistan studies in Rawalpindi district, Pakistan. All the secondary school students were constituted the population of the study. The study was experimental that is pre-test and post-test design was used. The study was delimited to 10th Grade students and sample students were divided into two groups i.e., control group and experimental group. To examine the academic achievement students, achievement test was developed. Data was collected through pre-test and post-test techniques. Raw data was organized, tabulated, analysed and interpreted applying descriptive statistics i.e., mean, standard deviation and inferential statistics i.e., independent sample t-test through Statistical Packages for Social Sciences (SPSS). The findings revealed that a well-managed and vibrant classroom environment has a positive effect on the academic achievement of students in the subject of Pakistan studies at secondary level. Based on findings, it was recommended that an effective, well-managed, vibrant and favourable classroom environment should be ensued for effective instructional process. The study demonstrated strength in all aspects of research reporting from the topic to findings except the instrument validation and reliability that were not clearly discussed in the research as weakness.

Riaz and Asad (2018) investigated the effect of classroom learning environment on students' academic achievement in mathematics at secondary level, the purpose of the study was to examine the effect of perceptions of students about classroom learning environment on their academic achievement at secondary level in the Mathematics classrooms. The participants were selected from the secondary and higher secondary schools located in Tehsil Rawalpindi and Islamabad (Federal Area), Pakistan. Twenty-four schools were selected randomly. A total of five hundred sixteen students of 10th grade studying Mathematics in twenty-seven classrooms, were included in the sample. Classroom Environment Instrument (Personal Form) was used to measure the students' perceptions after translating it into Urdu for Urdu medium schools. The pilot testing was carried out before the actual application of this instrument. The reliability of the instrument was determined by the use of Cronbach Alpha which was found as 0.85. The marks obtained by students in the subject of Mathematics in annual examination in 10th grade conducted by both BISE Rawalpindi and FBISE Islamabad were taken as achievements in Mathematics. The data was analysed using multiple regression, Pearson r and ANOVA to find out the effect of perception of students about classroom learning environment on their academic

achievement. The results of study revealed that the subscales, 'Involvement', 'Personal relevance', 'Emphasis on understanding', were major predictors contributing towards classroom learning environment and students' academic achievement whereas subscales 'Investigation' and 'Autonomy' have negative effect on students' academic achievement. The researchers recommended that active involvement of the low achievers may affect their learning more positively. From the research a great strength has been demonstrated in almost all aspects with nearly unnoticeable weakness, however sampling sampled arrived at was not discuss in detail remains a gap.

Baafi (2020) examined school physical environment and students' academic performance of senior high school students in Ghana, the study examined and compared the effect of the school physical environment on academic performance of senior high school students in Ghana. The study investigated the contribution of a number of school physical environment on the performance of students in schools. Participant for the study were selected using the multi-stage sampling technique using simple random sampling. A regression model was used to determine the relationship between the dependent and independent variables. The findings of the study confirmed that the students in senior high schools with a pleasant physical environment perform better than those where the learning environment is not conducive. The researchers, on the basis of the empirical evidence, established that adequate school facilities provide a positive educational climate suitable for student learning. From the study data collection and instrument was not clearly stated and serves as a gap, the design used was a descriptive survey research.

Overview of the Review Articles and Major Findings

The review of the ten papers revealed that two are from Pakistan, while one each is from Kenya, Uganda, Tanzania, Ghana, South Africa, Nigeria, and India. The findings from the reviewed papers can be summarized as follows:

1. Several weaknesses were identified, particularly regarding the clarity of background information and problem statements, as well as the methodologies employed.
2. Issues such as sample representativeness, the adequacy of data collection instruments, and the rigor of data analysis methods warrant attention in future research endeavors.

3. Some papers utilized a combination of research designs, including comparative, qualitative, and quantitative approaches, as well as correlational and descriptive survey designs.
4. A notable weakness identified in 20% of the papers is the incorrect use of the definite article "the" at the beginning of the titles. Specifically, two papers start their titles with "the," which is an oversight that highlights a gap in the research.

Conclusion

In conclusion, the researches covered in this criticism highlight the significant influence of the school environment on students' academic achievement in a variety of circumstances. Their merits lay in the variety of methodological techniques used and the practical consequences of their results. These findings highlight the critical need for improvements in educational settings to promote higher academic attainment. Overall, they argue for focused interventions aimed at improving school environments, resulting in increased academic performance for all learners.

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