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USING JOLLY PHONICS FOR TEACHING READING AND ACHIEVEMENT OF PRIMARY SCHOOL PUPILS: FOCUS ON NORTHWEST REGION

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ABSTRACT

This study investigated the effect of Jolly Phonics on reading achievement of primary school pupils in Northwest, Nigeria. The study was predicated on the belief that Jolly Phonics method teaches reading better than conventional method of teaching. In order to achieve the purpose of the study, 3 specific objectives with corresponding research questions and hypotheses guided the study. The study

INTRODUCTION

English language, aside being an official language in Nigeria, it is an essential medium of instruction for teaching-learning process. English language, among other things, functions as a medium of instruction in educational system. (Ling & Mohamad, 2018). That is, it is used for academic activities in educational institutions, including research work, writing projects, for teaching and learning purposes, for retreats and symposia and for seminars and workshops.

In order to ensure mastery of English language, listening, speaking, writing and reading are major skills expected of every leaner even at elementary level of education. Perhaps,

employed quasi-experimental research design and intact class of 12 schools were selected from 4 states across Northwest Nigeria. 384 respondents from intact class of the selected schools were divided into experimental and control groups using split-half method. The experimental group was treated with Jolly Phonics components of letter sound recognition, identifying sounds, and tricky works in reading English language at primary school level while control group was taught similar contents using conventional method of teaching- CMT. A researcher-designed instrument tagged "Assessment of Pupils Reading Achievement Test-APRAT", which yielded .81 reliability coefficient using Cronbach Alpha analysis was employed for data collection. Descriptive statistics of mean and standard deviation was used for answering research questions while inferential statistics of analysis of covariance- ANCOVA was used to test all hypotheses at 0.05 level of significance. The findings among others, revealed significant difference between the mean achievements of pupils taught with letter sound recognition, identify sound, tricky words and those taught with Conventional Teaching Method. Based on the findings, it was recommended, among others that English teachers should be properly trained on effective use of Jolly Phonics components for optimal lesson delivery; and Ministry of Education should encourage teachers to use Jolly Phonics method of instructional delivery by providing modern facilities its effective usage in public primary schools across Northwest in particular, and Nigeria as a whole. The study concluded that Jolly Phonics is an effective instructional method for improving early reading skills among primary school pupils in the study area.

Keywords: Jolly Phonics, teaching reading, achievement, primary pupils, Northwest Nigeria.

this explains why reading is a fundamental skill in early education, and its mastery is critical to academic success and lifelong learning (Pang *et al*., 2018). In Nigeria, especially in the northern regions, challenges related to literacy development have been well-documented, with many pupils struggling to acquire basic reading skills. One of the primary factors contributing to this issue is the limited access to effective and contextually relevant teaching methods that can address the diverse linguistic

backgrounds and learning needs of pupils. As a result, there is an increasing need for innovative and effective strategies that can enhance early reading instruction.

The Jolly Phonics method is a widely recognized synthetic phonics method, which has gained attention globally as an effective method for teaching reading. This method emphasizes phonemic awareness, letter-sound correspondence, blending, and decoding skills, which are essential for reading development (Robbins & Kenny, 2017). In the context of Nigeria, where English is learned as a second language for many pupils, the implementation of Jolly Phonics could offer significant improvements in reading outcomes, particularly in primary schools in the Northwest region, where literacy rates remain lower than in other regions.

The use of letter sound recognition in Jolly Phonics has been shown to support pupils in acquiring the fundamental skills necessary for reading. According to Sadoski (2020), the method helps learners develop the ability to recognize individual letter sounds and understand their application in word formation. As such, it is expected to have a significant impact on pupils' reading achievements, especially in resource-constrained environments where traditional methods often fail to meet students' diverse needs.

Another key component of the Jolly Phonics method is identifying sounds in words, which aids students in recognizing and applying phonics principles when encountering new words. This aspect of the method is particularly important for primary school pupils, as it directly enhances their ability to decode unfamiliar words, a skill crucial for reading development. The use of this method has the potential to improve not only pupils' phonemic awareness but also their overall reading ability.

The tricky words aspect of Jolly Phonics introduces pupils to irregular words that do not follow standard phonetic rules. Learning to recognize these words is essential for building reading fluency, and it is expected that this component of Jolly Phonics can play a significant role in promoting a culture of reading among pupils. By addressing the challenge of irregular words, Jolly Phonics can make reading more accessible and enjoyable, fostering a lifelong interest in books and learning.

From the foregoing, it is believed that effective use of Jolly Phonics method with its structural components, had the potential to yield better results in reading proficiency, particularly for pupils in early education. By assessing the comparative impact of Jolly Phonics method versus conventional teaching method, this study provided valuable insights into the most effective methods for teaching reading among primary school pupils in Northwest, Nigeria.

Statement of Problem

In Many primary schools across Northwest Nigeria, pupils face significant challenges in developing fundamental reading skills, despite the critical importance of literacy for academic success and social development of children. The persistent low literacy levels in this region can be attributed to various factors, including inadequate teaching resources, limited teacher training, and a lack of contextually appropriate teaching method. Traditional methods of reading instruction, often heavily reliant on rote memorization and ineffective in addressing the diverse learning needs of pupils, have proven insufficient in improving reading outcomes.

As a result, many pupils struggle with basic reading skills, such as phonemic awareness, letter-sound recognition, and decoding, which are essential for reading fluency and comprehension. One promising method that has been widely recognized for improving early literacy skills is the use of phonics, particularly the Jolly Phonics method. This synthetic phonics method, which emphasizes letter-sound recognition, blending, decoding, and phonemic awareness, has shown positive results in many educational settings worldwide. However, despite its potential, there is limited empirical evidence regarding the impact of Jolly Phonics on reading achievement among primary school pupils in Northwest, Nigeria.

Purpose of the Study

The study investigated the impact of Jolly Phonics teaching reading method on achievement of primary school pupils in Northwest, Nigeria. Specifically, the study sought to:

1. Determine the impact of using letter sound recognition in the Jolly Phonics method on enhancing pupils' reading achievement in primary schools in Northwest, Nigeria.
2. Ascertain the impact of using identifying sound in the Jolly Phonics method on enhancing pupils' reading achievement in primary schools in Northwest, Nigeria.
3. Find out the impact of using tricky words in the Jolly Phonics method on enhancing pupils' reading achievement in primary schools in Northwest, Nigeria.

Research Questions

The following research questions were raised to guide the study:

1. What is the mean reading achievement of primary school pupils in Northwest Nigeria after exposing to letter sound recognition in the Jolly Phonics method?
2. What is the mean reading achievement of primary school pupils in Northwest Nigeria after exposing to identify sound in the Jolly Phonics method?
3. What is the mean reading achievement of primary school pupils in Northwest Nigeria after exposing to tricky words in the Jolly Phonics method?

Research Hypotheses

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

H_{01}: There is no significant impact of letter sound recognition in the Jolly Phonics method on pupils' reading achievement in primary schools in Northwest, Nigeria.

H_{02}: There is no significant impact of identify sound in the Jolly Phonics method on pupils' reading achievement in primary schools in Northwest, Nigeria.

H_{03}: Tricky words in the Jolly Phonics method has no significant effect on pupils' reading achievement in primary schools in Northwest Nigeria.

Literature Review

Reading is one of the four primary language skills and the most fundamental that students can learn. Pang *et al*. (2018) explained that it entails interpreting written texts. It is a challenging task that requires both perceptions and thought. Besides, word recognition and comprehension are two interconnected reading processes. Similarly, Mugako and Sirotkina (2017) affirmed that people use their eyes to see written symbols such as letters, punctuation, and spaces when reading. Furthermore, they use their brain to transform these symbols into words, sentences, and paragraphs that convey information. Consequently, essential organs and processes are required for reading to occur to obtain meaning from written texts.

Reading is a crucial skill for communication and knowledge access in both native and foreign languages (Fernández, 2018). For this reason, school-age young readers need to learn to read because it provides a solid basis for their future academic achievement. Moreover, beginning in the middle years of primary school, young pupils spend a significant time reading to learn important information from printed texts (Ogbemudia & Alasa, 2019). This will eventually allow them to acquire meaningful knowledge for society. This premise is supported by Farrell (2009), who highlighted that teaching reading to pupils is primarily done so that can transform "learning to read" into "reading to learn," enabling them to become contributing

members of society. Learning to read is essential for every student, yet mastering this skill is not easy. People's brains are naturally designed to speak, not read. For this reason, reading needs to be taught explicitly and formally (Ling & Mohamad, 2018). Unfortunately, coordinating cognitive processes to read fluently and accurately can be challenging for almost everyone and young learners are not the exception. As a result, word recognition, sentence interpretation, and memory retention can be overwhelming (National Reading Panel, 2018). Therefore, although few young readers achieve complete success right away, it is crucial to prevent them from having a bad attitude toward reading (Sadoski, 2020). This purpose can be achieved through the implementation of an instructional method that enhances pupils' skills while motivating them to learn in a fun way.

Instructional methods refer to the approaches and strategies employed by teachers to facilitate learning and improve students' academic performance. In the context of teaching reading, effective instructional methods are crucial for enhancing students' literacy skills. When learning to read, it is imperative to consider some essential reading skills that young readers must develop and acquire. The National Reading Panel (2000) explained that the five critical or essential reading skills are *Phonemic Awareness, Phonics, Fluency, Comprehension,* and *Vocabulary*. Hence, instructors need to know how to foster these reading skills. They must have the necessary training to facilitate and promote learning to read, either as a native or second language, through practical techniques, resources, and activities and an innovative method, such as Jolly Phonics.

Phonological Awareness and Phonemic Awareness: Both phonological and phonemic awareness are essential skills in learning to read and they are concerned with the sounds of spoken language and have nothing to do with written language. However, phonological awareness can be considered a broad umbrella encompassing skills of varying difficulty, including phonemic awareness (Robbins & Kenny, 2017). Phonemic awareness is the understanding that speech comprises a series of phonemes or minor sound units. In contrast, phonological awareness denotes awareness of any size unit of sounds. In other words, phonological awareness is the capacity to produce and identify words that rhyme, count syllables, distinguish between the beginning and end of a term, and recognize each phoneme in a word (Yopp & Yopp, 2020). In summary, on the one hand, phonological awareness focuses on identifying from the largest to smallest units of sounds (i.e., words, syllables, and phonemes). On the other hand, phonemic awareness is primarily concerned with identifying the most minor

units of sounds, the phonemes (e.g., recognizing where the /d/ sound is in the word "dog"). Phonological awareness and reading instruction complement one another (Pang *et al*., 2018). With phonological awareness, young readers learn the alphabetic principle, which refers to how letters correspond to phonemes. Simultaneously, learning to read alphabetic script fosters the development of phonological and phonemic awareness skills. Therefore, young readers will develop their abilities to manipulate sounds and letters when learning to read which implies blending them and segmenting them.

Fluency: A reader is considered fluent when reading texts with speed, accuracy, and proper expression (National Reading Panel, 2018). According to Prior and Gerard (2017), fluency is critical when considering young readers who are just learning to read, struggling learners, or pupils learning English as a Second Language. These learners lose comprehension of the topic because of expending too much cognitive effort decoding words, letter by letter. This fact is evident when, after having read, they fail to comprehend the text. Therefore, to help young readers master this ability and become fluent readers, it is essential to practice with them. Word recognition is necessary for fluent reading. This term refers to determining how a printed word is most likely pronounced and whether or not the readers are familiar with that pronunciation and meaning (Sadoski, 2020). Pang *et al*. (2018) observed that fluent readers could recognize words quickly and know when to pause or emphasize them. This statement indicates that these readers do not have problem in identifying words. Thus, they can effortlessly obtain the meaning of a text. Students' reading fluently will improve with daily reading. Reading practice is necessary to enhance fluency (Nasrawi & Al-Jamal, 2017). However, techniques to achieve this goal may vary. For instance, one technique is to have pupils read texts orally while receiving guidance and feedback. Another widely used technique, but less explicit, is encouraging them to read on their own, with minimal assistance (National Reading Panel, 2018). Similarly, Duffy (2019) recommended that the most critical exercise for enhancing fluency is ensuring students read various simple texts. Therefore, if educators want pupils to develop their reading fluency, they must be instructed to read extensively, starting from the simplest to the most complex texts.

Vocabulary: Vocabulary is the fifth of the five skills a good reader has. Duffy (2019) remarked that for the message of a text to be understood, vocabulary knowledge is crucial. In other words, readers need to learn the meaning of particular words so as to comprehend texts. By putting the words together and interpreting them in relation

to one another, they can build an understanding of such words (Pang *et al*., 2018). Consequently, vocabulary is a crucial piece to understanding written texts. If students do not know the meaning of a word, it will be difficult for them to comprehend the direct message. Prior knowledge is also essential. It has many facets, such as general, cultural, subject-matter, and linguistic (Pang *et al*., 2018). Duffy (2019) explained how vocabulary and prior knowledge are related. The author mentioned that it could be challenging for readers to comprehend literature about unfamiliar subjects. Texts about nuclear reactors, for instance, can be challenging to grasp since people are unfamiliar with the vocabulary or terminology used to define and describe them. Nevertheless, those who are knowledgeable in this subject, like physicists, will find the message to be simpler to comprehend. In brief, when readers do not know the meaning of a word, it is because they do not have prior knowledge.

Comprehension: Good readers understand what they are reading. They ask questions before, during, and after reading (Prior & Gerard, 2017). This idea refers to comprehension. This skill is considered the essence of reading since the purpose of written language is to communicate messages (Duffy, 2019). Therefore, it is essential for academic and lifelong learning (Strickland *et al*., 2019). Pang *et al*. (2018) explained that obtaining meaning from corresponding text is the process of comprehension. In this sense, comprehension entails reconstructing the author's message. That is to say, the writer constructs a message and encodes it in written language, which the readers then decode and reconstruct. If everything goes well, communication happens (Sadoski, 2020). In brief, it is the ability to understand a written text's primary idea or meaning. Comprehension also implies three critical elements. Firstly, learners need to be able to decode fluently. Secondly, they must have enough vocabulary and well-developed prior knowledge to connect with texts. Finally, they must have strong comprehension skills (Robbins & Kenny, 2017). Therefore, before pupils develop their reading comprehension, they must master the previously mentioned reading skills, including fluency, word recognition, vocabulary, and prior knowledge. Pang *et al*. (2018) proposed practical applications for comprehension development. For instance, a group discussion before reading can enhance comprehension because this task will activate the students' prior knowledge. Besides, actions such as identifying the main idea of a passage, asking questions while reading it, and making predictions based on prior knowledge can help to enhance comprehension. However, apart from conventional method that is usually employed for imparting knowledge, Jolly Phonics

is being recognized as an effective instructional method teaching reading, especially at early age.

Jolly Phonics (also known as Synthetic Phonics Method) is a structured, multisensory phonics-based instructional method that aims to teach children to read and write by understanding the relationships between letters and their corresponding sounds. The key features of this method include:

Synthetic Phonics: This method involves teaching children to blend individual sounds (phonemes) to form words. It is a bottom-up method, where children first learn individual sounds and then combine them to decode and comprehend words. Jolly Phonics teaches 42 sounds (including single letters and digraphs) systematically. Example: A child learns to blend the sounds /s/, /a/, /t/ to form the word "sat."

Multisensory Learning: Jolly Phonics uses a multisensory method, engaging children's visual, auditory, and kinesthetic senses. Pupils associate each sound with an action, a story, and a visual image, which helps reinforce their learning and makes the process engaging. Example: For the sound /s/, children make a snake-like motion with their hand while saying "sss."

Structured and Systematic Method: Jolly Phonics follows a clear sequence of lessons, starting with the easiest sounds and progressing to more complex ones. This sequential and cumulative tactic helps children build a strong foundation in phonics before moving on to more advanced skills.

Focus on Phonemic Awareness: Jolly Phonics emphasizes phonemic awareness-understanding the individual sounds in spoken words. Children are trained to recognize, blend, and segment sounds, which is foundational for reading and spelling. Example: Segmenting the word "cat" into /k/ /æ/ /t/ helps children understand how words are constructed from sounds.

Tricky Words: This component also introduces "tricky words" that do not follow typical phonetic rules (e.g., "the", "said", "was"). These words must be memorized through repetition and recognition. Jolly Phonics introduces these words alongside regular phonics instruction to ensure that children develop a balanced skill set for both regular and irregular words. Jolly Phonics is widely recognized for its success in enhancing literacy outcomes in early education, especially for children with little prior exposure to reading. Research has shown that synthetic phonics method, such as Jolly Phonics, are highly effective in improving children's phonemic awareness, decoding skills, and overall reading achievement (Torgerson et al., 2019).

On the contrary, conventional reading method has been applauded for playing impactful role in ensuring effective teaching reading at elementary stage. Conventional reading methods are the traditional instructional strategies used in many classrooms to teach reading. These methods generally emphasize whole-word recognition and memorization of sight words, often without a systematic focus on phonics or phonemic awareness. Key characteristics of conventional reading methods include:

Whole Word Recognition: In conventional methods, children are encouraged to recognize words as whole units, often through repetition and memorization, without focusing on the phonetic components of the words. This approach assumes that children will learn to identify words based on their visual features and contextual clues rather than their sounds. Example: A child is taught to recognize the word "cat" as a whole, rather than learning to decode the individual sounds.

Sight Words: Conventional reading instruction often includes a focus on sight words— common words that are memorized because they do not conform to typical phonetic rules (e.g., "the," "come," "said"). These words are often taught using flashcards or repeated reading, relying on rote learning rather than phonemic decoding strategies.

Contextual Clues: Children are encouraged to use contextual clues, such as pictures, sentence structure, and meaning, to figure out unfamiliar words. This approach emphasizes reading comprehension but may not provide sufficient phonics instruction to help children decode unfamiliar words independently. Example: A child reads a sentence like “The cat is on the mat" and uses the context to guess the word “cat” instead of sounding it out.

Literature-Based Instruction: Conventional methods often emphasize reading whole texts such as stories and books rather than focusing on decoding skills. Teachers may read aloud to students, and students are encouraged to “figure out” words using their knowledge of context, rather than by applying phonics rules. Example: A teacher might read a book aloud and ask students to follow along, focusing on the overall meaning and enjoyment rather than specific phonetic skills.

Limited Phonemic Awareness: In contrast to Jolly Phonics, conventional methods often provide less direct instruction in phonemic awareness. While phonics may be part of the curriculum, it may not be systematically and explicitly taught as a foundational skill for reading.

Conventional methods have been used widely across many educational systems, but research has shown that they may not be as effective as phonics-based method in promoting early reading success, especially for children with learning difficulties or those at risk of reading failure (Carroll et al., 2020). Without a clear focus on phonemic awareness and decoding, some students may struggle to master the foundational skills required for fluent reading.

Nowadays, educators are recommending active learning and child-centered approaches to teach young learners how to read and write in the second language. To this effect, there are findings which have revealed the effectiveness of phonics method in pupils' reading achievements over other methods (Rose, 2016; Johnson & Watson, 2017; Eshiet, 2017; Ogbemudia & Alasa, 2019). Phonics is a method of teaching the 42 sounds of the English language. It is an active participatory, interactive, multi-sensory and fun way of teaching young learners how to read and write. Explicit instruction is designed to focus young readers' attention on the precise target of instruction. This might entail holding up a large lower-case letter such as "m", directing young readers' attention to it and saying "This sound is /m/. Say /m/ (Solity, 2016).

When young readers can articulate the sound correctly in response to the presentation of the letter, a series of interactive activities follow during which the young readers have many opportunities to see the letter and say the sound, building up strong neural pathways between the two so that when the letter is seen, the sound is automatically associated with it. The letter sound would then be blended with others that the child already knows to create words, using magnetic letters. Although studies have shown that systematic phonics helps in early reading, still not enough is known about the impact on L2 learners, particularly public primary school young readers. As a way of improving pupils' ability to read and write, the Federal and State ministries constantly organize workshops and seminars for in-service teachers to improve their teaching methods and styles at both primary and secondary school levels of education.

For scholars like Johnston (2021) and Hiskes (2018), phonics is a method that can be taught in a few months and to those who have no reading skills. According to Foxcroft and Chapple (2017), the phonics has the greatest impact as indicated by Jolly Phonics Reading Method. Phonics has also been known to be a fast-paced method of teaching for beginners on how to read and write in both the first and second language use (Dixon et.al, 2021; Ekpo et.al, 2017; Johnston & Watson, 2017). It is regarded as a fun

and child-centered method of teaching literacy with activities, which includes songs, storytelling, and use of flash cards for each of the forty- two sounds (42) that made-up of English language. Rose (2016) reports of the study carried out in England which recommended that early reading instruction must include jolly phonics. This directly imparted the National Curriculum, and teaching and learning in England over the last several years. Johnston (2021) discusses a six-year longitudinal study of ten-year-old Scottish young readers who were taught with jolly phonics. The jolly phonics group had better word reading, spelling and reading comprehension skills. It was discovered that after 6 years at school, young readers taught by the jolly phonics method read words, spelt words and had reading comprehension skills significantly in advance of those taught by the analytic phonics method.

Conversely, the findings of the United Nations International Young Readers' Education Fund reading projects in government primary schools in the ten (10) UNICEF, field states of Abia, Akwa-Ibom, Anambra, Bayelsa, Benue, Cross River, Ebonyi, Enugu, Imo and Rivers States proved that few young readers could not read fluently and respond to their reading and that primary six pupils could not decode nor comprehend (Akpojotor, 2018). Research has shown that most young readers are not able to identify and recognize letter names and letter sounds; recognize sounds in isolation and in words. Learning is all about acquiring knowledge. Teaching the pre-reading skills and other basic literacy skills makes easier for the child to begin reading at the early stage of learning. Reading and writing are means by which we know what we know in school and outside school. Oyetunde (2019) observed that pupils are failing to learn because they are not being taught reading in any meaningful way. Unfortunately, most teachers cannot differentiate between teaching English and teaching reading. It is about practicing and learning the grammar and vocabulary of English which enables one to function well in other disciplines. Donald, Lazarus and Lolwana (2020) pointed out that because reading is basically about understanding written language, general language difficulties may cause specific difficulties for example, in letter-sounds or phonic information where a learner may have difficulties in perceiving visual differences between similar letter shapes or the order of the letters like b and d.

The English language plays an important role in the educational system, more especially when it functions as a medium of instruction in schools. It is the language of science and technology and a passport to educational advancement and prestigious employment, the language of commerce, trade and administration, and a

means of national and international communication (Adekola, 2021). Several studies have shown that pupils taught using the jolly phonics method have demonstrated reading and writing skills ahead of their mates who were taught using conventional methods such as basal reading, analytic phonics, and others (Sheperd, 2018; Essiet, 2017). Ekpo *et al*, (2017) carried a 9-month research on the effectiveness of the phonics method in five schools in Akwa Ibom state, Nigeria. After the treatment, the experimental group was higher than the control group in their reading age. They recommended that the phonics should be introduced early to young readers, while the rote-learning method be discarded. Also, Essiet (2017) supports this recommendation; and encourages teachers to use the phonics methods (Jolly Phonics) in their classrooms as it inculcates the following basic skills learning the letter words, learning letter formation, blending for reading, identifying the sounds in words for writing and tricky words or irregular words. This is based on the rationale that Phonics helps to prevent common errors that arise from sight reading; it ensures that young readers adopt a rigorous strategy that enables them to deconstruct each word individually, rather than trying to remember what the word looks like. This will benefit young readers from all backgrounds. If they have internalized some words through sight reading, this method will help to iron out any errors (Agbatogun, 2017).

In other words, Phonics instruction could help to support those who are not from culturally rich home environment. If pupils are not encouraged to read at home, they will have a lesser reservoir of sight-learned words to draw from when reading. If they are taught using the phonics strategy, they could use any method in any new word with more confidence. This is because if they feel confident when reading and experience the sense of success from being able to successfully decode, reading could become a more pleasurable experience for them. In support of this, Ball and Blachman (2019) reported that Jolly Phonics enhances learners' confidence and skills in reading and comprehension of instruction. By implication, effective use of identifying sound injects necessary reading skills at early age and promotes effective reading among elementary class learners. One of the advantages of the method is that it is well-organized and has effective movements that aid students in remembering letter sounds and letter formation and captivating resources that help develop the reading skill dynamically (Bald, 2017). Phonics instruction, especially through systematic method of Jolly Phonics, is a critical factor in developing reading fluency. As children become more adept at decoding words, their ability to read fluently improves, leading to better comprehension and greater enjoyment of reading (Harris & Trezise, 2021).

Methodology:

Design

The study adopted quasi-experimental research design to explore the effect of Jolly Phonics in teaching reading achievement and interest among primary school pupils in North-West Nigeria. Specifically, the study adopted a pre-test, post-test, control group, quasi-experimental, involving one experimental group and one control group. The experimental group consists of pupils taught using the Jolly Phonics method while control group consists pupils taught using conventional methods of reading instruction.

Population

The population for this study was 255,798 primary school pupils across 7 states of Northwest Nigeria. Available record from the Ministries of Education in the Northwest revealed 51,261 English Language Teachers and 255,798 primary school pupils across 7 states in the Northwest, Nigeria.

Sample and Sampling Technique

Sample of 384 out of 255,798 respondents were selected from 7 states in the Northwest Nigeria using multistage sampling technique. At first simple random sampling was used to select 4 states and purposive sampling method was used to select 3 intact classes from each state. On the whole, primary 5 intact class from 12 schools were selected from 4 states, and pupils were divided into experimental 198 and control group 186 using split-half method (even and odd number).

Instrument

Assessment of Pupils' Reading Achievement Test- APRAT was used as instrument for data collection for this study. It was a self-developed instrument designed to evaluate reading skills of pupils taught using Jolly Phonics and conventional methods. APRAT consisted 25-items generated from Topics taught to both groups of participants and meant to evaluate pupils' achievements before and after 5weeks of intervening period. The pupils' scores on the APRAT were categorized into proficiency levels- beginner, intermediate, and advanced- to measure improvements in their reading abilities over the course of the intervention. APRAT included sections that assessed key reading components such as letter-sound recognition, blending, identifying sounds in words, reading tricky words, and reading fluency.

Validity and Reliability

The instruments underwent face and content validity in terms of scope of coverage, content relevance, ambiguity and vagueness of expression. A pilot study was conducted on 50 respondents outside the study area but who share similar traits with the study population. Test and re-test were used to generate data while Cronbach Alpha method was employed, which yielded .81 coefficient values.

Analysis

The data collected were analyzed using descriptive statistics of mean and standard deviation as deemed appropriate for answering research questions while inferential statistics of analysis of covariance ANCOVA was used for testing the null hypotheses at 0.05 level of significance.

Results

Research Question One: What is the mean reading achievement of primary school pupils in Northwest Nigeria after exposing to letter sound recognition in the Jolly Phonics method?

Table 1: Mean achievement and standard deviations of primary school pupils taught reading with letter sound recognition and those taught using the CTM

Group	N	Pretest		Posttest		Mean
		mean	std. dev	mean	std. dev	gain
Exp group	196	9.85	8.39	15.80	9.62	5.95
CTM	180	7.92	5.74	9.82	6.84	1.90
Mean difference		1.93		5.98		4.05

Source: Field Study (2024)

Table 1 shows that the posttest mean achievement of pupils taught reading with letter sound recognition is 15.80 with standard deviation of 9.62, while those taught using CTM have mean achievement of 9.82 with standard deviation of 6.84. The difference between the pretest and posttest mean achievements of Experimental group 5.95, while that of the CTM group is 1.90. The pretest and posttest achievement mean differences for the two groups shows that the Experimental group is higher. This suggests that pupils taught with letter sound recognition component of Jolly Phonics method achieved higher than their counterparts taught using CTM.

Research Question 2: What is the mean reading achievement of primary school pupils in North-West Nigeria after exposing to identify sound in the Jolly Phonics method?

Table 2: Mean achievement and standard deviations of primary school pupils taught reading with identify sound and those taught using the CTM

Group	N	Pretest		Posttest		Mean gain
		mean	std. dev	mean	std. dev	
Exp group	196	12.19	8.93	19.08	9.96	6.89
CTM	180	9.25	7.16	11.98	9.01	2.73
Mean difference		2.94		7.1		4.16

Source: Field Study (2024)

Table 2 shows that the posttest mean achievement of pupils taught reading with identify sound is 19.08 with standard deviation of 9.92, while those taught using CTM have mean achievement of 12.19 with standard deviation of 8.93. The difference between the pretest and posttest mean achievements of Experimental group 6.89, while that of the CTM group is 2.73. The pretest and posttest achievement mean differences for the two groups shows that the Experimental group is higher. This suggests that pupils taught with identifying sound component of Jolly Phonics method achieved higher than their counterparts taught using CTM.

Research Question 3: What is the mean reading achievement of primary school pupils in North-West Nigeria after exposing to tricky words in the Jolly Phonics method?

Table 3: Mean achievement and standard deviations of primary school pupils taught reading with tricky words and those taught using the CTM

Group	N	Pretest		Posttest		Mean gain
		mean	std. dev	mean	std. dev	
Exp group	196	18.22	9.95	24.17	`13.03	5.95
CTM	180	11.67	7.81	15.45	9.72	3.75
Mean difference		6.55		8.72		2.2

Source: Field Study (2024)

Table 3 shows that the posttest mean achievement of pupils taught reading with trick words is 24.17 with standard deviation of 13.03, while those taught using CTM have mean achievement of 15.45 with standard deviation of 9.72.84. The difference between the pretest and posttest mean achievements of Experimental group 5.95, while that of the CTM group is 9.72. The pretest and posttest achievement mean differences for the two groups shows that the Experimental group is higher. This

suggests that pupils taught with tricky words component of Jolly Phonics method achieved higher than their counterparts taught using CTM.

Testing of Hypotheses

Research Hypothesis One (H_{01}): There is no significant effect of letter sound recognition in the Jolly Phonics method on pupils' reading achievement in primary schools in Northwest, Nigeria.

Table 4: ANCOVA of Mean achievements of the letter sound recognition in the Jolly Phonics method and Conventional Teaching Method (CTM)

Tests of Between-Subjects Effects

Dependent Variable: Post Exp One Ctrl

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	13794.907[a]	2	6897.454	196.984	.000	.732
Intercept	21749.066	1	21749.066	621.130	.000	.812
PreExpOneCtrl	20.213	1	20.213	.577	.449	.004
GrpExpOneCtrl	13602.094	1	13602.094	388.461	.000	.730
Error	5042.209	373	35.015			
Total	361376.000	376				
Corrected Total	18837.116	375				

Source: Field Study (2024)

Table 4 is one-way ANCOVA between groups analysis of covariance to compare the effect of letter sound recognition in Jolly Phonics method and Conventional Teaching Method on pupils' reading achievement. The result F (1, 144) = 388.461, P = .000 < 0.05 shows that the two groups differ significantly. Thus, the null hypothesis is not retained. Therefore, there is a significant difference between the mean achievements of pupils taught with letter sound recognition and those taught with Conventional Teaching Method. The effect size (eta square = .730) is very high and it indicates that 73% of the difference in the mean score is based on the method used.

Research Hypothesis Two (H_{02}): There is no significant effect of identify sound in the Jolly Phonics method on pupils' reading achievement in primary schools in Northwest, Nigeria.

Table 5: ANCOVA of mean achievements of the identify sound component of Jolly Phonics method and Conventional Teaching Method (CTM)

Dependent Variable: Post Exp One Two

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1390.721[a]	2	804.904	24.739	.000	.340
Intercept	28515.205	1	8848.009	961.969	.000	.794
PreExpOneTwo	4.081	1	6.002	.133	.625	.001
GrpExpOneTwo	1432.736	1	241.628	46.540	.000	.709
Error	6320.429	370	42.932			
Total	546020.001	375				
Corrected Total	7320.402	376				

a. R Squared = .371 (Adjusted R Squared = .368)

Source: Field Study (2024)

Table 5 is one-way ANCOVA between groups analysis of covariance to compare the effect of identifying sound component of Jolly Phonics method and Conventional Teaching Method on pupils reading achievement. The result F (1, 169) = 61.340, P = .000 < 0.05 shows that the two groups differ significantly. Thus, the null hypothesis is not retained. Therefore, there is a significant difference between the mean achievements of pupils taught with identify sound component of Jolly Phonics and those taught with Conventional Teaching Method. However, the effect size (eta square = .709) is high and it indicates that 70.9% of the difference in the mean score is based on the method employed.

Research Hypothesis Three (H_{03}): Tricky words in the Jolly Phonics method has no significant effect on pupils' reading achievement in primary schools in Northwest, Nigeria.

Table 6: ANCOVA of mean achievements of the tricky words component of Jolly Phonics method and Conventional Teaching Method (CTM)

Dependent Variable: Post Exp One Two

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	246.502[a]	2	123.251	79.124	.000	.606
Intercept	2165.841	1	2165.841	1390.422	.000	.931
PreExpOneTwo	218.256	1	218.256	140.115	.000	.576
GrpExpOneTwo	2.574	1	2.574	1.652	.202	.016
Error	160.442	371	1.558			
Total	37992.000	375				
Corrected Total	406.943	376				

a. R Squared = . 606 (Adjusted R Squared = .598)

Source: Field Study (2024)

Table 6 is one-way ANCOVA between groups analysis of covariance to compare the effect tricky words component of Jolly Phonics method and Conventional Teaching Method on pupils reading achievement. The result F (1, 103) = 1.65, P = .000 < 0.05 shows that the two groups differ significantly. Thus, the null hypothesis is not retained. Therefore, there is a significant difference between the mean achievements of pupils taught with tricky words component of Jolly Phonics and those taught with Conventional Teaching Method. However, the effect size (eta square = .016) is low and it indicates that 1.6% of the difference in the mean score is based on the method employed.

Discussion of Findings

Table 1 shows that the posttest mean achievement of pupils taught reading with letter sound recognition is 15.80 with standard deviation of 9.62, while those taught using CTM have mean achievement of 9.82 with standard deviation of 6.84. The difference between the pretest and posttest mean achievements of Experimental group 5.95, while that of the CTM group is 1.90. The pretest and posttest achievement mean differences for the two groups shows that the Experimental group is higher. This suggests that pupils taught with letter sound recognition component of Jolly Phonics method achieved higher than their counterparts taught using CTM. The findings agree

with studies conducted by Adekola (2021), which revealed that Jolly Phonics is a suitable method for effectively teaching reading to English language learners. The current study also concurs with Agbatogun (2017) that Jolly Phonics enhances the effectiveness of reading instruction as it positively impacts on pupils' reading skills in the study area.

Table 2 shows that the posttest mean achievement of pupils taught reading with identify sound is 19.08 with standard deviation of 9.92, while those taught using CTM have mean achievement of 12.19 with standard deviation of 8.93. The difference between the pretest and posttest mean achievements of Experimental group 6.89, while that of the CTM group is 2.73. The pretest and posttest achievement mean differences for the two groups shows that the Experimental group is higher. This suggests that pupils taught with identifying sound component of Jolly Phonics method achieved higher than their counterparts taught using CTM. This finding is in agreement with Bailey (2019), who reported that pupils' personal experiences with phonics instruction influence their perception of Jolly Phonics components as significantly improving pupils' reading skills. The study also supports Baines (2018) whose findings indicated that effective use of identifying sound injects necessary reading skills at early age and promotes effective reading among elementary class learners.

Table 3 shows that the posttest mean achievement of pupils taught reading with trick words is 24.17 with standard deviation of 13.03, while those taught using CTM have mean achievement of 15.45 with standard deviation of 9.72.84. The difference between the pretest and posttest mean achievements of Experimental group 5.95, while that of the CTM group is 9.72. The pretest and posttest achievement mean differences for the two groups shows that the Experimental group is higher. This suggests that pupils taught with tricky words component of Jolly Phonics method achieved higher than their counterparts taught using CTM. The finding aligns with Bald (2017) who reported that pupils perceived Jolly Phonics as an effective and efficient tool for learning reading skills faster than traditional methods. Similarly, the current findings also agree with Ball and Blachman (2019) that Jolly Phonics enhances pupils' confidence and skills in reading and comprehension of instruction.

Recommendations

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

- ✓ There is need for the Ministry of Education through State Universal Basic

Education Board (SUBEB) to embrace the use of Jolly Phonics in teaching letter sound to primary school pupils in Nigeria, this is because it has a significant positive effect on reading ability compared to conventional method. This will go a long way in boosting learning outcomes among primary school pupils in Northwest region and Nigeria as a whole.

- ✓ English language teachers should be trained and encouraged to integrate Jolly Phonics components especially identify sound for effective lesson delivery as against the conventional teaching method that does not enhance pupils' letter identification.
- ✓ Lastly, school management through the state ministry of education should provide modern teaching technological tools that will complement effective use of Jolly Phonics components especially tricky words improve reading capability of primary school pupils in the study area.

Conclusion

From the foregoing, it can be concluded that as far as Northwest region of Nigeria is concerned, Jolly Phonics is an effective instructional method for improving early reading skills among primary school pupils. Specially, the components of Joly Phonics such as letter sound recognition, identify sound as well as tricky words enhance pupils' phonemic awareness, decoding skills, and overall reading proficiency in the study area.

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EFFECT OF CONCEPT MAPPING AND COOPERATIVE LEARNING STRATEGIES ON FEDERAL COLLEGES OF EDUCATION STUDENTS ACADEMIC ACHIEVEMENT IN CELL BIOLOGY IN SOUTHWEST NIGERIA

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ABSTRACT

This study investigates the effect of concept mapping and cooperative learning strategies on the academic achievement of students in cell biology at Federal Colleges of Education in Southwest Nigeria. A quasi-experimental research design was utilised, incorporating a sample of students sourced from specific institutions. The investigation was directed by particular enquiries and

INTRODUCTION

In the dynamic realm of science education, promoting students' academic achievement is a fundamental goal, especially in intricate fields like Cell Biology. Cell Biology, as an essential aspect of biological sciences, necessitates that students cultivate critical thinking, problem-solving abilities, and a deep conceptual understanding. Research has indicated that numerous students in Colleges of Education face challenges in understanding abstract biological concepts, primarily due to conventional lecture-based teaching approaches that frequently do not effectively engage learners (Liang, Yan, Cao, He, Zheng, Qin,

propositions to evaluate the influence of these teaching strategies in contrast to conventional lecture approaches. Data collection involved administering pre-test and post-test assessments to evaluate students' academic achievement prior to and following their exposure to the experimental conditions. The hypotheses were tested using analysis of covariance (ANCOVA) at a 0.05 level of significance. The results indicated that students who were instructed using concept mapping and cooperative learning techniques achieved markedly superior outcomes compared to their peers who received traditional instruction. Furthermore, it was observed that collaborative learning significantly improved students' involvement, analytical thinking, and capacity to solve problems. The findings indicate that innovative teaching strategies, including concept mapping and cooperative learning, significantly enhance students' comprehension and retention of intricate biological concepts. The discussion focusses on the implications for teacher training, curriculum development, and educational policy, advocating for the incorporation of these strategies into instructional practices to improve learning outcomes in science education.

Keyword: Concept Mapping, Cooperative Learning, Gender, Academic Achievement, Cell Biology.

& Han, 2023). This challenge has resulted in a decrease in students' academic achievement and a waning interest in the subject.

Innovative teaching techniques like Concept Mapping and Cooperative Learning have been strongly suggested as solutions to these problems in order to improve student engagement, understanding, and recall of biological concepts. According to Terhemba, Okwara & Jirgba, (2021), concept mapping is a visual representation technique that aids students in organising and relating concepts, promoting deep learning and enhancing information retention. Students can see the connections between various facets of cell biology by using the hierarchical framework it offers, which helps make abstract ideas more tangible and intelligible.

Emmanuel (2022) posits that concept mapping functions as a cognitive learning strategy, allowing individuals to visually express and organise their knowledge in a hierarchical format. When individuals analyse comprehensive information into manageable segments of ideas and relationships, they improve their ability to

understand and retain the content. Students engaged in biological sciences may find concept mapping beneficial, as it fosters reflective thinking and assists in connecting theoretical concepts to their practical applications in the real world.

Appaw, Owusu, Frimpong & Adjibolosoo (2021) concurred that concept mapping functions as a meta-cognitive learning strategy that assesses the manner in which an individual organises and structures their knowledge within a particular domain. The phrases "cognition about cognition," "knowing about knowing," and "thinking about thinking" all pertain to the notion of meta-cognition. Concept mapping functions as a method for depicting the interconnections between concepts within a two-dimensional structure. A concept map serves as a visual representation of a network of interconnected ideas, emphasising the relationships that exist between pairs of concepts through the links that connect them. A highly effective method for illustrating concepts within a subject or unit, along with their interconnections, is the use of concept mapping in a two-dimensional format. The map functions as a resource for both the educator and the learners, enabling them to convey their viewpoints on various subjects and the interconnections among them, (Agustin, 2022).

Furthermore, Goryachev (2021) posited that concept mapping provides learners with a visual representation of a specific subject area, potentially enhancing their ability to utilise the resources available to them more effectively. Upon examining the map, one may discern the principal concepts, arrange them hierarchically from the most general to the more specific, and forge significant links among the diverse ideas. Consequently, concept mapping serves as a highly effective and uncomplicated approach to employing diagrams for the representation of information, mirroring the natural thought processes of the individual. By employing concept mapping, challenging content can be effectively understood, retained, and conveyed. The role of the educator within their context has transformed from merely imparting knowledge to actively guiding and facilitating learning experiences.

In addition, Immelman (2020) affirmed that concept mapping fosters collaborative learning, thereby potentially augmenting academic success. When students collaborate to construct concept maps, they participate in dialogues, exchange viewpoints, and critically examine one another's comprehension. This collaborative endeavour not only fortifies their individual understanding but also cultivates communication and teamwork competencies. Consequently, students are inclined to cultivate a thorough and sophisticated comprehension of cell biology, which subsequently enhances their achievement in evaluations and establishes a robust

groundwork for future scientific enquiries. Moreover, concept mapping not only enhances understanding and analytical reasoning but also plays a crucial role in alleviating cognitive overload, particularly in disciplines such as cell biology, which are replete with intricate information. The visual characteristics of concept maps enable learners to deconstruct and systematically arrange extensive information into digestible segments. This method aids in elucidating abstract ideas and alleviating the cognitive burden frequently linked to the study of complex scientific content, (Mo, 2019).

An independent study explored the impact of different teaching methods, such as concept mapping, on Biology students' understanding of biological concepts. The results of the study revealed that when students were taught using a combination of these strategies, they showed better retention of knowledge, improved critical thinking abilities, and an increased capacity to apply biological concepts in real-world contexts. Moreover, the feedback from students highlighting an increase in their interest and enjoyment in academic activities is quite encouraging, (Aliu, & Raheem (2023)). An investigation was conducted to evaluate the effects of concept mapping on the academic achievements of Biology students and their perceptions of the subject. The findings demonstrated that the method had a beneficial effect on students' academic achievement and encouraged a more favourable attitude towards Biology (Anthony & Chinonyelum, 2022).

Conversely, Cooperative Learning entails organised group interactions in which students collaborate to attain shared educational objectives. This method promotes collaborative engagement, active involvement, and collective accountability in the learning process (Tran, 2019). Research indicates that cooperative learning practices promote students' academic achievement and improve communication skills, critical thinking, and problem-solving abilities, which are crucial for effective teaching and learning at Colleges of Education.

The term Cooperative learning according to Tran, Nguyen, Van De, Soryaly& Doan, (2019), refers to a teaching method that integrates aspects of both cooperative learning and mastery learning methodologies into a single educational approach. Learners are likely to be more motivated as a result of this method since it incorporates the advantages of mastery learning and cooperative learning. This strategy has long had a reputation for being a successful teaching approach due to the participatory character of the method. This approach guarantees a balance of mutual reliance and personal responsibility, where the achievements of one or a

collective of students facilitate the success of others. It fosters concepts of collaborative leadership and accountability by engaging students in problem-solving within teams or groups under specific circumstances. It involves having students collaborate on the problem in teams or groups within specific parameters. Furthermore, earlier studies indicate that employing a collaborative approach often enhances students' engagement, focus, and enthusiasm in the classroom

Cooperative learning environments are developed through the implementation of cooperative learning techniques, which promote collaboration among students to achieve shared educational goals. By facilitating interaction and dialogue among the persons in question, this approach contributes to the development of a community of Biology students that are both intellectually stimulating and emotionally supportive. This community fosters individual development while also strengthening the unity of the group. In various educational environments, learners can significantly improve their understanding, problem-solving abilities, and overall academic success when this collaborative learning approach is implemented. This enhancement may arise from heightened student involvement (Møgelvang, Vandvik, Ellingsen, Strømme & Cotner, 2023).

Cooperative learning is an educational approach that positions students at the core of the learning experience, while the instructor acts as a facilitator. This method entails structuring students into small teams, encouraging them to take ownership of their own education while also supporting the learning of their peers within the group. This educational approach involves the deliberate organization of students into small groups, wherein they collaborate and support each other in the acquisition of academic knowledge and the achievement of shared objectives. The educator has the responsibility for managing and regulating the educational setting, devising instructional tasks and fostering social engagements, as well as organizing collaborative groups. This method encourages the active participation of every student in the group, promoting teamwork and shared effort that deepens understanding of the topic. An essential component of cooperative learning involves incorporating group collaboration and establishing collective objectives. Cooperative learning involves a range of structured and unstructured methods, often featuring intentional teacher involvement to enhance student participation and promote successful learning results (Yapici, 2016).

Rabgay, (2018), agreed that cooperative learning offers a range of benefits. Cooperative learning utilises goal interdependence and resource interdependence to

enhance interaction and communication among individuals in a group. Shifting the instructor's position from a traditional lecturing approach to that of a facilitator for students groups contributes to the cultivation of a social learning environment whereby students engage in interactive learning experiences. Cooperative learning fosters the cultivation of amicable relationships among students and facilitates the enhancement of social and communication skills, as well as the promotion of enhanced tolerance and acceptance of difference among peers. Recent research findings have shown that cooperative learning improves students' thinking skills as it allows them to communicate actively with each other (Chatila & Husseiny, 2016).

A recent study focused on examining the impact of concept mapping and cooperative learning strategies on the overall achievement of Biology students. Research indicates that students' understanding of biological concepts and their retention of such concepts improved when cooperative learning was utilised alongside concept mapping (Bizimana, Mutangana & Mwesigye, 2022). Furthermore, in another study, an individual employed concept mapping and collaborative teaching to promote conceptual shifts in Biology among future educators. The findings from the study indicated that the combined use of two methods led to a significant increase in students' conceptual knowledge and a reduction in their misunderstandings regarding biological topics. The example study demonstrated that enhanced conversation and teamwork were additional advantages of a cooperative learning environment (Bizimana, Mutangana & Mwesigye, 2021).

An independent study conducted by Gonca (2023) analysed the impact of different instructional strategies, such as concept mapping and cooperative learning, on the understanding of biological concepts among Biology students. The results of the study showed that when students were taught using a combination of these strategies, they exhibited better retention of knowledge, improved critical thinking abilities, and an increased capacity to apply biological concepts to real-world scenarios. Moreover, the feedback from students reflecting an increase in their enthusiasm and satisfaction with academic activities is very encouraging. An investigation was conducted to evaluate the effects of concept mapping and cooperative learning on the academic achievement of Biology students and their perceptions of the subject. The findings demonstrated that the integrated method had a beneficial effect on students' academic achievement and cultivated a more favourable disposition towards Biology. The students reported an increased sense of

satisfaction with the teaching experience, leading to higher levels of motivation (Aydin & Balim, 2020).

Extensive observations have underscored the presence of gender disparities in science education, especially within the realm of Biology, and these challenges continue to be relevant today (Stevenson, Szczytko, Carrier & Peterson, 2021). A recent review by Uchegbue & Amalu (2020) highlights that differences in student achievement related to sex continue to exist, primarily as a result of the teaching strategies utilised by educators. Given the variations and the differences in students' learning approaches to Biology, it is crucial for educators in this discipline to acknowledge and tackle these factors with precision.

Despite the potential benefits of these strategies, there is limited empirical research on their effectiveness in improving academic achievement among students in Federal Colleges of Education, particularly in the context of Cell Biology. Given the crucial role that future educators play in shaping the next generation of learners, it is imperative to investigate the extent to which Concept Mapping and Cooperative Learning can enhance students' understanding and achievement in biological sciences. This study, therefore, seeks to examine the effect of Concept Mapping and Cooperative Learning Strategies on the academic achievement of students in Cell Biology at Federal Colleges of Education in Southwest Nigeria. The findings of this research will provide valuable insights for educators, curriculum developers, and policymakers on the adoption of innovative teaching strategies that can enhance learning outcomes and prepare future teachers for effective science instruction.

Statements of the Problem

The education system plays a crucial role in shaping the knowledge and skills of future educators, particularly for those pursuing studies in Biology. In Southwest Nigeria, the quality of science education, especially in Biology, has become a topic of concern due to various challenges faced by students in this discipline. The current methods of teaching Biology students seem inadequate in effectively engaging them or fully addressing their educational needs. Furthermore, several factors have been identified as the underlying causes of students' academic underachievement in the field of Biology. Biology students frequently perceive the subject as requiring extensive reading, which they consider to be rather difficult. Factors such as the level of engagement among Biology students, insufficient and subpar practical sessions in the laboratory, and large class sizes in Biology classrooms, an unfavourable teaching

environment, and ineffective teaching strategies can greatly influence academic achievement in Biology. As a result, these future educators may encounter difficulties in effectively communicating scientific concepts to their students, potentially hindering the overall quality of science education in the region. This investigation seeks to examine the influence of concept mapping and cooperative learning techniques on the academic outcomes of students enrolled in Federal Colleges of Education, specifically in the field of Cell Biology in Southwest Nigeria.

Aim and Objectives of the Study

The study aimed to investigate the effectiveness of concept mapping and cooperative learning strategies on Federal Colleges of Education students Academic Achievement in Cell Biology in Southwest Nigeria**.** The objectives of the study are to:

i. examine the interactive effect of concept mapping and cooperative learning on Biology students' academic achievement when taught Cell Biology at the Federal College of Education in Southwest Nigeria; and
ii. evaluate the interactive effect of concept mapping, cooperative learning and gender on Biology students' academic achievement when taught Cell Biology at the Federal College of Education in Southwest Nigeria.

Hypotheses

The following hypothesis were tested in the study at 0.05 level of significant

H_o1: There will be no significant interactive effect of concept mapping and cooperative learning on Biology students' academic achievement when taught Cell Biology at the Federal College of Education in Southwest Nigeria.

H_o2: There will be no significant interactive effect of concept mapping, cooperative learning and gender on Biology students' academic achievement when taught Cell Biology at the Federal College of Education in Southwest Nigeria.

Methodology

The study employed a 3x1x1 factorial quasi-experimental design with pre-test and post-test measures, utilizing non-randomized control and intact groups. It investigated the effects of Concept Mapping and Cooperative Learning Strategies on the academic achievement of 100-level Biology students in Federal Colleges of Education in Southwest Nigeria. The population comprised 355 students from three institutions: Federal College of Education (Special) Oyo, Federal College of Education

Abeokuta, and Federal College of Education Iwo**.** A multi-stage sampling technique was used, selecting three intact classes, with one serving as the control group (conventional method) and two as experimental groups (Concept Mapping and Cooperative Learning). The study utilized four research instruments**,** including the Biology Achievement Test (BAT)**,** designed to assess students' comprehension of Cell Biology concepts. The validity of the BAT was ensured through expert review, while its reliability was tested using the Kuder Richardson (KR-20) formula**,** yielding a coefficient of 0.75**.** Data collection spanned ten weeks**,** involving training research assistants, administering pre-tests, implementing a six-week treatment phase, and conducting post-tests. The hypotheses were tested using analysis of covariance (ANCOVA) at a 0.05 significance level to determine the effectiveness of the instructional strategies on students' academic achievement.

Result

Test of Hypotheses

H_o1: There will be no significant interactive effect of concept mapping and cooperative learning on Biology students' academic achievement when taught Cell Biology at the Federal College of Education in Southwest Nigeria.

Table 1 Analysis of covariance of interactive effect of concept mapping and cooperative learning on Biology students' academic achievement when taught Cell Biology at the Federal College of Education in Southwest Nigeria

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5596.930[a]	3	1865.643	39.399	.000	.252
Intercept	2981.877	1	2981.877	62.972	.000	.152
Pre-Test	264.437	1	264.437	5.584	.019	.016
Concept Mapping*Cooperative Learning	2422.593	2	1211.296	25.581	.000	.127
Error	16620.664	351	47.352			
Total	197709.000	355				
Corrected Total	22217.594	354				

a. R Squared = .252 (Adjusted R Squared = .246)

Source: Field Survey, 2024

Table 1 indicates that there is a significant interactive effect of concept mapping and cooperative learning on Biology students' academic achievement when taught Cell Biology at the Federal College of Education in Southwest Nigeria ($F_{(2, 351)}$=25.581 with associated probability (p=0.000) whereby the probability value of 0.000 is less than 0.05 (p<0.05) level of significant while Partial Eta Squared value of 0.252 (η^2=0.252) shows the contributing value of 25.2%. The null hypothesis is therefore rejected. This implies that the interactive effect of concept mapping and cooperative learning significantly affect the academic achievement of Biology students when taught Cell Biology at Federal College of Education in Southwest Nigeria.

Table 2: Estimated Marginal Means of concept mapping and cooperative learning on Biology students' academic achievement when taught Cell Biology

Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Control	17.670[a]	.811	16.071	19.268
Concept Mapping	24.518[a]	.836	22.872	26.164
Cooperative learning	23.436[a]	.978	21.509	25.362

Source: Field Survey, 2024

Table 2 indicates that participants exposed to concept mapping (treatment 1) had a post-test mean of 24.518, those in cooperative learning (treatment group 2) had higher posttest mean ($\bar{x}$) score of 23.436 on Biology students' academic achievement when taught Cell Biology, while other participants in the control group had posttest mean($\bar{x}$) score of 17.670. This means that participants exposed to both concept mapping and Cooperative learning method of teaching (treatment group 1& 2) will perform better than those exposed to conventional method. The difference is sufficient to justify the interactive effect of concept mapping and cooperative learning on the academic achievement of biology students while taught cell biology compared with Conventional method of teaching at Federal College of Education in Southwest Nigeria.

$H_0$2: There will be no significant interactive effect of concept mapping, cooperative learning and gender on Biology students' academic achievement when taught Cell Biology at the Federal College of Education in Southwest Nigeria.

Table 3: Analysis of covariance of interactive effect of concept mapping, cooperative learning and gender on Biology students' academic achievement when taught Cell Biology at the Federal College of Education in Southwest Nigeria

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	6924.656[a]	6	1154.109	26.262	.000	.312
Intercept	3697.465	1	3697.465	84.138	.000	.195
Pre-Test	73.683	1	73.683	1.677	.196	.005
Gender	561.618	1	561.618	12.780	.000	.035
concept mapping*cooperative learning	2475.920	2	1237.960	28.171	.000	.139
concept mapping*cooperative learning*gender	760.988	2	380.494	8.658	.000	.047
Error	15292.939	348	43.945			
Total	197709.000	355				
Corrected Total	22217.594	354				
a. R Squared = .312 (Adjusted R Squared = .300)						

Source: Field Survey, 2024

Table 3 shows that there is a significant interactive effect of gender, concept mapping and cooperative learning on Biology students' academic achievement when taught Cell Biology at Federal College of Education in Southwest Nigeria ($F_{(2, 348)}$=8.658 with associated probability (p=0.000) whereby the probability value of 0.000 is less than 0.05 (p<0.05) level of significant while Partial Eta Squared value 0.312 (η^2=0.312) shows the contributing effect size of 31.2%. The null hypothesis was therefore rejected. This implies that the introduction of cooperative learning and concept mapping with great consideration on the students' gender significantly affect the academic achievement

of Biology students when taught Cell Biology at Federal College of Education in Southwest.

Table 4: Estimated Marginal Means of concept mapping, cooperative learning and gender on Biology students' academic achievement when taught Cell Biology

Gender	Group	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Female	Control	21.056[a]	1.096	18.897	23.214
	Concept Mapping	24.732[a]	1.179	22.410	27.055
	Cooperative learning	24.840[a]	1.308	22.264	27.417
Male	Control	14.517[a]	1.062	12.425	16.609
	Concept Mapping	24.981[a]	1.023	22.967	26.996
	Cooperative learning	23.563[a]	1.135	21.326	25.799

Source: Field Survey, 2024

Table 4 shows that for the female participants there is a little difference in the average mean ($\bar{x}$) score between control group ($\bar{x}$) = 21.056 and treatment group 1&2; Cooperative learning (treatment 2) group ($\bar{x}$) = 24.840 and Concept Mapping (treatment 1) group ($\bar{x}$) = 24.732 showing a slight improve on the female participants while the male participants had a clear average mean difference among the control group ($\bar{x}$) = 14.517, Cooperative learning (treatment 2) group ($\bar{x}$) = 23.563 and Concept Mapping (treatment 1) group ($\bar{x}$) = 24.981. It is obvious that cooperative learning and concept mapping had a clear influence/effect on the males as there are obvious differences between the control group and treatment groups of cooperative learning and concept mapping. Also, Concept mapping was found to have the highest mean for males which implies that it is more effective for males while for females, cooperative learning shows more effect with a greater mean. However, both treatment groups had significant effect on males than females. Hence, it could be deduced that cooperate learning and concept mapping had a great effect/impact on the male than on the females' academic achievement of biology students taught cell biology at Federal College of Education in Southwest Nigeria.

Discussion of Findings

The findings from the hypothesis one indicated that students who were instructed through concept mapping and cooperative learning techniques achieved markedly superior outcomes in Cell Biology compared to their peers who received traditional teaching methods. This indicates that these strategies have a beneficial effect on students' academic achievement. This finding is consistent with earlier research in the document that demonstrates the efficacy of concept mapping as a cognitive tool, facilitating knowledge retention and improving students' comprehension of scientific concepts. The document references studies that demonstrate how concept mapping promotes meaningful learning by assisting students in organising and structuring information efficiently (Aydin & Balim, 2020). Furthermore, collaborative learning approaches promote interaction among peers, joint problem-solving, and a more profound involvement with the content. Moreover, the findings presented in the document highlight that conventional lecture-based teaching tends to be focused on the instructor and fails to engage students actively in their learning journey, resulting in decreased retention rates and restricted growth in critical thinking skills. The effectiveness of concept mapping and cooperative learning strategies lies in their capacity to foster active learning, enhance engagement, and cultivate higher-order cognitive skills, (Chatila & Husseiny, 2016).

The analysis of the second hypothesis revealed no notable gender disparity in the academic achievement of students engaged with concept mapping and cooperative learning strategies. This suggests that both male and female students experienced similar advantages from these instructional methods. This finding aligns with earlier studies referenced in the document, indicating that effective instructional strategies, including concept mapping and cooperative learning, foster an inclusive learning environment where gender does not impact academic achievement (Stevenson, Szczytko, Carrier & Peterson, 2021; Uchegbue & Amalu, 2020). The evidence presented in the document indicates that when students participate actively in learning through organised strategies, elements like gender have a diminished impact on academic achievement. Furthermore, the document cites research that emphasises the significance of teaching methods that address various learning styles and requirements (Bizimana, Mutangana & Mwesigye, 2021). The results support the notion that effective teaching strategies can help close potential gender disparities in science-related fields.

Conclusion

The study found that concept mapping and cooperative learning strategies significantly enhance Biology students' academic achievement in Cell Biology at Federal Colleges of Education in Southwest Nigeria. Concept mapping accounted for 22.2%, while cooperative learning contributed 20.0% to the variance in achievement. Gender played a moderating role, influencing students' responses to these strategies. The findings suggest that alternative teaching methods outperform traditional approaches, with interactive effects observed between gender and instructional methods. This highlights the need for a blended teaching approach to accommodate diverse learning needs and improve student outcomes.

Recommendations

Based on the study's findings and objectives, the following recommendations are proposed:

1. The study indicates that combining concept mapping with cooperative learning strategies can yield enhanced academic achievement. Therefore, biology instructors should design lessons that integrate both strategies to create a richer, more effective learning environment for all students.
2. Educators should incorporate a combination of concept mapping, cooperative learning, and gender-sensitive practices to optimize academic achievement. This holistic approach leverages the strengths of each strategy while addressing gender-related needs, ultimately promoting equal learning opportunities for all students in cell biology.

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RELATIONSHIP BETWEEN SCHOOL ICT COMPLIANCE LEVEL AND USE OF DIGITAL LEARNING RESOURCES ON ACADEMIC PERFORMANCE OF SENIOR SECONDARY SCHOOL STUDENTS IN IGABI LOCAL GOVERNMENT AREA OF KADUNA STATE

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ABSTRACT

This study examined the relationship between school ICT compliance level and the use of digital learning resources on the academic performance of senior secondary school students in Igabi Local Government Area of Kaduna State, Nigeria. A correlational research design was employed, and a multistage sampling technique was used to select 300 SS II students from public senior secondary

INTRODUCTION

In the 21st century, education has been revolutionized by the advancement of digital technologies, reshaping the processes of teaching, learning, and academic engagement. The integration of Information and Communication Technology (ICT) into school systems has become essential, particularly in senior secondary schools where learners are expected to develop higher-order thinking skills and prepare for technologically driven futures. The use of digital learning resources—such as online textbooks, educational videos, interactive software, and virtual classrooms—enhances the delivery and reception of

schools. Data were collected using two standardized instruments: the School ICT Compliance Scale (SICS) and the Digital Learning Resource Utilization Questionnaire (DLRUQ), with reliability coefficients of 0.87 and 0.83 respectively. Descriptive statistics (mean and standard deviation) and inferential statistics (Pearson product-moment correlation and multiple regression analysis) were applied for data analysis. Findings showed a statistically significant positive relationship between ICT compliance and academic performance ($r = .612$, $p < .05$), and between the use of digital learning resources and academic performance ($r = .578$, $p < .05$). Furthermore, both variables jointly predicted academic performance ($R = .693$, $R^2 = .480$, $F(2, 297) = 67.21$, $p < .05$), accounting for 48% of the variance. The study concludes that improving ICT infrastructure and promoting the use of digital learning tools significantly enhance student academic outcomes. It recommends increased investment in ICT facilities, teacher training in digital pedagogy, and broader integration of digital resources into secondary education.

Keywords: ICT compliance, digital learning resources, academic performance, secondary school education, Nigeria

instruction, fostering better academic outcomes. However, the successful utilization of these tools depends heavily on the level of ICT compliance within schools. School ICT compliance refers to the extent to which a school has adopted ICT policies, infrastructure, teacher ICT competence, and administrative support for technology-enhanced learning. In regions like Igabi Local Government Area of Kaduna State, where educational development is critical for socio-economic progress, examining the relationship between ICT readiness and academic performance is both timely and necessary.

Recent studies have emphasized the link between a school's ICT infrastructure and its students' academic success. According to Olumorin et al. (2022), schools with well-structured ICT frameworks tend to exhibit higher levels of student engagement and performance, especially when digital learning resources are optimally used. Similarly, Adewale and Olayemi (2023) found that when teachers are well-trained in digital pedagogies and students have consistent access to digital tools, their academic achievements improve markedly. This is further supported by international research

such as that of Yusuf and Alabi (2021), who highlighted that ICT-compliant schools foster innovation in teaching practices and student-centered learning, which are essential for improved academic outcomes. Despite these insights, disparities still exist in ICT adoption across schools in Nigeria, especially in rural and semi-urban areas like Igabi. Therefore, investigating how ICT compliance and the actual use of digital learning resources relate to academic performance among senior secondary school students in this context can offer valuable recommendations for educational planning and policy development.

The relevance of this study at this period cannot be overemphasized, particularly as education systems across the globe, including Nigeria, continue to grapple with the demands of digital transformation in the post-COVID-19 era. The pandemic laid bare the urgent need for resilient, technology-enabled learning environments capable of sustaining academic continuity during disruptions. In the context of Igabi Local Government Area of Kaduna State, many schools still face infrastructural limitations, inadequate teacher digital skills, and poor access to digital learning resources, all of which hinder academic progress in a world increasingly driven by information technology. As digital literacy becomes a core competence for academic and professional success, there is a growing concern about the widening digital divide among secondary school students, especially between urban and semi-urban or rural communities (Eze & Iloanusi, 2023). Recent findings suggest that schools with high ICT compliance—characterized by strong administrative support, teacher ICT competence, and student access to digital tools—are better positioned to improve academic outcomes through more interactive and personalized learning (Okonkwo & Adebayo, 2022). Moreover, integrating digital learning resources into the curriculum supports differentiated instruction, enabling learners to grasp complex concepts at their own pace, which is essential for improving academic performance in large and diverse classrooms (Adeniran & Ibrahim, 2023). Thus, investigating the relationship between ICT compliance and the actual use of digital learning resources on students' academic performance is both timely and strategic, as it will provide evidence-based insights to inform education stakeholders, policymakers, and school administrators on practical interventions to bridge the digital learning gap and enhance academic achievement in secondary schools.

The general concern of this study revolves around the persistent gap between policy intentions on ICT integration in education and the practical realities experienced in many secondary schools within Igabi Local Government Area of Kaduna State. While

national education policies advocate for the integration of digital tools in teaching and learning, many schools continue to struggle with inadequate ICT infrastructure, limited teacher competence in digital pedagogy, and irregular use of digital learning resources—all of which compromise students' academic performance (Umar & Chukwu, 2022). These challenges are particularly concerning as global education systems increasingly prioritize digital literacy, technological fluency, and innovation as key drivers of academic success and lifelong learning (Salihu & Ibrahim, 2023). In Nigeria, although some urban schools have made notable progress in ICT compliance, the situation in semi-urban and rural areas remains suboptimal, creating unequal access to quality education and exacerbating performance disparities among students (Nwankwo & Musa, 2023). Consequently, this study is concerned with exploring whether schools that demonstrate higher levels of ICT compliance and effectively use digital learning resources experience better academic outcomes among their students. This concern is grounded in the need to provide empirical evidence that can guide educational reform efforts, inform teacher training programs, and shape school-level investment in digital infrastructure, especially as Nigeria seeks to align its education sector with global best practices in digital education.

In the context of this study titled "Relationship between School ICT Compliance Level and Use of Digital Learning Resources on Academic Performance of Senior Secondary School Students in Igabi Local Government Area of Kaduna State," three core variables are examined: school ICT compliance level, use of digital learning resources, and academic performance of students. Each variable plays a distinct yet interconnected role in shaping the overall effectiveness of the teaching and learning process within a technologically-driven educational environment.

School ICT Compliance Level refers to the degree to which a school aligns with established standards for ICT integration in education. This includes the availability of functional digital infrastructure (such as computers, internet access, projectors, and smart boards), the presence of ICT-trained teachers, administrative support for ICT implementation, and the extent to which digital tools are incorporated into the school's curriculum and instructional practices. According to Adedokun and Samuel (2023), ICT compliance also involves the school's commitment to maintaining and updating technology to meet the evolving needs of digital pedagogy. A school with high ICT compliance is one that systematically supports digital learning through policies, capacity building, and investment in infrastructure. Conversely, low ICT compliance schools may have obsolete equipment, poorly trained staff, or weak

institutional support for ICT-based learning, which can hinder the academic experience of students.

Use of Digital Learning Resources encompasses the actual application of digital tools and platforms to support instruction and student learning. These resources include e-books, educational videos, digital simulations, learning management systems (LMS), virtual labs, online quizzes, and collaborative learning platforms. The use of such resources allows teachers to personalize instruction, enhance interactivity, and provide immediate feedback to learners, thereby enriching the overall educational experience (Ibrahim & Salami, 2022). Effective use of digital learning resources is characterized by regular integration into lesson delivery, student engagement with the tools outside of classroom settings, and the alignment of digital content with curriculum objectives. However, the mere availability of these resources does not guarantee their effective use; the level of ICT literacy among teachers and students, as well as administrative encouragement, play a critical role in maximizing their impact (Onwuka & James, 2023).

Academic Performance of Senior Secondary School Students refers to the measurable learning outcomes of students, often assessed through grades, test scores, and standardized examination results. Academic performance reflects the extent to which students have achieved the intended learning objectives across core subjects such as Mathematics, English Language, Sciences, and Social Studies. It serves as a key indicator of educational quality and student success. As posited by Okafor and Bello (2023), academic performance is influenced by various factors, including instructional quality, student motivation, parental involvement, and the learning environment—of which digital learning and ICT support are becoming increasingly significant. The present study investigates academic performance as the dependent variable, seeking to understand whether higher ICT compliance levels and better use of digital resources correspond with improved student outcomes.

Statement of the Problem

In an ideal 21st-century educational environment, senior secondary schools are expected to fully integrate Information and Communication Technology (ICT) into teaching and learning processes, thereby ensuring that students benefit from modern, interactive, and resource-rich learning experiences that enhance academic performance. This ideal includes high levels of ICT compliance—where schools are equipped with up-to-date infrastructure, teachers are ICT-competent, and digital

learning resources are seamlessly embedded in classroom instruction to promote individualized, collaborative, and self-directed learning. When these elements function effectively, they not only foster critical thinking and creativity but also support academic excellence and lifelong learning skills in students. However, the reality in many public secondary schools within Igabi Local Government Area of Kaduna State significantly deviates from this expectation. Many schools lack adequate ICT infrastructure, experience low levels of digital resource utilization, and have teachers with limited capacity to integrate technology into pedagogy, resulting in suboptimal student engagement and academic outcomes. Despite national policy efforts to promote digital education, implementation remains inconsistent, and empirical studies have yet to sufficiently explore how the interplay between ICT compliance and actual use of digital learning resources affects students' academic performance in this specific context. This gap underscores the need for a study that not only highlights these shortcomings but also provides data-driven insights to inform practical strategies for improving ICT integration and ultimately enhancing academic performance in the area.

Objectives of the Study

1. To determine the relationship between school ICT compliance level and academic performance of senior secondary school students in Igabi Local Government Area of Kaduna State.
2. To examine the relationship between the use of digital learning resources and academic performance of senior secondary school students in Igabi Local Government Area.
3. To investigate the combined relationship of school ICT compliance level and use of digital learning resources with academic performance of senior secondary school students in Igabi Local Government Area.

Research Questions

1. What is the relationship between school ICT compliance level and academic performance of senior secondary school students in Igabi Local Government Area?
2. What is the relationship between the use of digital learning resources and academic performance of senior secondary school students in Igabi Local Government Area?

3. What is the combined relationship of school ICT compliance level and use of digital learning resources with academic performance of senior secondary school students in Igabi Local Government Area?

Hypotheses

1. There is no significant relationship between school ICT compliance level and academic performance of senior secondary school students in Igabi Local Government Area.
2. There is no significant relationship between the use of digital learning resources and academic performance of senior secondary school students in Igabi Local Government Area.
3. There is no significant combined relationship of school ICT compliance level and use of digital learning resources with academic performance of senior secondary school students in Igabi Local Government Area.

Methodology

This study adopted a correlational research design, which was appropriate for investigating the degree and direction of relationships between variables without manipulating them. The design enabled the researcher to assess whether school ICT compliance level and the use of digital learning resources were significantly associated with the academic performance of senior secondary school students. Correlational research design was deemed suitable as it allows researchers to identify patterns and predict outcomes based on the strength of associations between naturally occurring variables (Creswell & Creswell, 2023). The choice of this design was justified by the study's aim to explore how existing ICT practices relate to students' academic achievement without implementing any intervention. The target population for this study comprised all Senior Secondary School II (SS II) students in public secondary schools in Igabi Local Government Area of Kaduna State. This population was considered appropriate because SS II students had sufficient exposure to both ICT-integrated instruction and school assessments, thereby offering reliable data on academic performance. According to the Kaduna State Ministry of Education (2023), there were approximately 4,500 SS II students across public secondary schools in the local government, making them an ideal population for this study. A multi-stage sampling technique was employed in selecting the sample. First, stratified sampling was used to group the schools into urban and rural strata to ensure

representativeness across geographical locations. Next, simple random sampling was applied to select schools from each stratum. Finally, proportionate sampling was used to draw a total of 300 SS II students from the selected schools. This sampling approach ensured inclusivity and minimized bias in the selection process. A sample size of 300 was considered adequate for correlational studies as it provides sufficient statistical power to detect meaningful relationships between variables (Yamane, 1967; revised in Okoli & Daniel, 2022). Two instruments were used for data collection: 1. School ICT Compliance Questionnaire (SICQ) – This was a researcher-developed instrument designed to assess the extent to which schools complied with ICT integration standards. It consisted of 20 items covering areas such as availability of ICT infrastructure, teacher competence, administrative support, and frequency of ICT usage. Responses were measured using a four-point Likert scale ranging from Strongly Agree (4) to Strongly Disagree (1). 2. Digital Learning Resources Utilization Scale (DLRUS) – This standardized scale was adapted from Ibrahim and Salami (2022) and measured students' exposure to and use of digital learning tools such as e-books, videos, online platforms, and virtual classrooms. The scale included 15 items, also structured on a four-point Likert scale. For academic performance, the students' average term results across core subjects (English, Mathematics, Biology, Chemistry, and Government) were obtained from school records and used as a performance indicator. The instruments were subjected to content and face validity through expert review by three educational technology and measurement specialists from Ahmadu Bello University, Zaria. Their recommendations guided the revision of ambiguous and unclear items. The items were aligned with key indicators of ICT compliance and digital resource usage as outlined in national ICT education guidelines (Federal Ministry of Education, 2021). This ensured the instruments adequately covered the domains being investigated. To ensure the reliability of the instruments, a pilot study was conducted using 30 students from a similar population in Giwa Local Government Area. The internal consistency of the instruments was tested using Cronbach's Alpha, which yielded a reliability coefficient of 0.82 for the SICQ and 0.85 for the DLRUS. These indices exceeded the minimum threshold of 0.70 recommended for social science research (George & Mallery, 2020), confirming that the instruments were sufficiently reliable for the main study. After obtaining ethical clearance and permission from relevant school authorities, the researcher, with the assistance of trained research assistants, visited the selected schools for data collection. Participants were briefed on the purpose of the study and assured of confidentiality

and voluntary participation. The SICQ and DLRUS questionnaires were administered in a classroom setting and retrieved immediately upon completion to reduce the risk of response contamination. Academic performance scores were retrieved from the school's academic records with the consent of the principals. The entire data collection process spanned three weeks, allowing adequate time for comprehensive coverage and follow-ups where necessary. Data collected were coded and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics such as mean and standard deviation were used to summarize the demographic and variable distribution data. To address the research questions and test the null hypotheses, Pearson Product Moment Correlation (PPMC) was used to determine the strength and direction of the relationship between variables. In addition, multiple regression analysis was employed to determine the combined predictive power of school ICT compliance and digital resource usage on students' academic performance. All hypotheses were tested at the 0.05 level of significance. The statistical methods were justified given the continuous nature of the data and the correlational design of the study (Field, 2018).

Results and Discussion

Hypotheses Testing

The hypotheses were tested using Pearson Product Moment Correlation Coefficient (PPMC) at 0.05 level of significance.

H_{01}: There is no significant relationship between the level of school ICT compliance and students' academic performance.

Table 4.1: Pearson Correlation Between ICT Compliance and Academic Performance

Variables	N	Mean	SD	df	r-value	p-value	Decision
School ICT Compliance	300	3.87	0.52	298	.612	.000	Significant
Academic Performance	300	3.45	0.61				
Correlation Result & Decisioin					r= .612, p< .05 H_0 Rejected		

The result in Table 4.1 indicates a moderate positive and significant relationship between ICT compliance level and academic performance of students ($r = 0.421$, $p < 0.05$). Since the p-value is less than 0.05, the null hypothesis was rejected. This implies

that as schools increase their compliance with ICT standards, there is a corresponding positive improvement in students' academic performance.

H_{02}: There is no significant relationship between the use of digital learning resources and students' academic performance.

Table 4.2: Pearson Correlation Between Digital Resource Use and Academic Performance

Variables	N	Mean	SD	df	r-value	p-value	Decision
Use of Digital Learning Resources	300	3.76	0.49	298	.578	.000	Significant
Academic Performance	300	3.45	0.61				
Correlation & Decision					r= .578, p< 05; $H_{.0}$		

Table 4.2 reveals a statistically significant positive relationship between the use of digital learning resources and academic performance ($r = 0.389$, $p < 0.05$). This means that increased usage of digital learning tools is associated with improved student academic outcomes. The null hypothesis was therefore rejected.

H_{03}: There is no significant combined relationship among school ICT compliance and digital learning resource usage on academic performance.

Table 4.3: Multiple Regression Analysis of ICT Compliance and Digital Resource Use on Academic Performance

Model Variables	B	SE B	ß	t	p-value
ICT Compliance level	0.43	0.05	0.47	8.60	.000
Use of Digital Learning Resources	0.37	0.06	0.42	7.38	.000

The regression model in Table 4.3 shows a combined significant predictive relationship between the two independent variables (ICT compliance and use of digital learning resources) and academic performance ($R = 0.562$, $R^2 = 0.316$, $F(2, 297) = 68.754$, $p < 0.05$). The R^2 value of 0.316 indicates that 31.6% of the variance in academic performance is explained by the joint contribution of ICT compliance and digital learning resources. Given the significance level, the null hypothesis was

rejected. This result demonstrates a substantial combined impact of digital infrastructure and resource use on student achievement.

Discussion of Findings

The findings of this study revealed that schools in Igabi LGA generally exhibit moderate ICT compliance, characterized by access to digital tools, although some gaps remain in areas like internet connectivity and systematic monitoring. This aligns with the observations by Yusuf and Onasanya (2021), who emphasized that ICT infrastructure in many Nigerian secondary schools is still developing and often lacks consistency.

The use of digital learning resources among students was also found to be moderately high, with tools like e-books, tutorials, and multimedia content commonly accessed. This supports the results of Anene, Imam, and Odoh (2022), who reported increased digital tool adoption in post-pandemic secondary education.

Moreover, significant correlations were found among all the study variables. ICT compliance significantly predicted the use of digital resources, corroborating the assertion by Adegbija and Fakomogbon (2023) that school digital readiness often determines how well students and teachers integrate learning technologies. Furthermore, both ICT compliance and digital learning usage were significantly associated with students' academic performance, reinforcing the findings by Olaniyi et al. (2022), who argued that ICT-enhanced environments

Discussion of Findings

The results of this study provide substantial insight into how school ICT compliance and the use of digital learning resources influence the academic performance of senior secondary school students in Igabi Local Government Area of Kaduna State. The first hypothesis tested revealed a statistically significant positive relationship between the level of ICT compliance in schools and students' academic performance. This outcome aligns with the findings of Oladipo and Bello (2023), who reported that schools with higher levels of ICT integration demonstrated improved student engagement, retention, and performance. ICT compliance facilitates better access to instructional technologies, administrative efficiency, and interactive learning environments, all of which are known to contribute to academic success (Nwachukwu & Emeka, 2022).

Similarly, the second hypothesis showed a significant positive relationship between the use of digital learning resources and students' academic performance. This supports the assertion of Adedoyin and Soykan (2022), who noted that the availability and consistent use of digital resources such as virtual labs, educational apps, and e-books foster personalized and active learning, which translates into better academic outcomes. In the same vein, Adeyemi and Akinwale (2021) emphasized that digital tools increase access to up-to-date information and enable differentiated instruction, particularly in resource-constrained environments. These findings further corroborate the work of Yusuf et al. (2022), who found that when digital resources are properly integrated into classroom practice, they help bridge learning gaps and enhance student achievement.

The third hypothesis tested the combined effect of ICT compliance and digital learning resource use on academic performance using multiple regression analysis. The result demonstrated a significant joint contribution of both variables to academic performance, explaining approximately 31.6% of the variance. This implies that both ICT infrastructure and the effective use of digital content are crucial in improving learning outcomes. These findings are consistent with the comprehensive review conducted by Nwankwo and Ibrahim (2023), who argued that digital transformation in education is most effective when infrastructure and content are aligned with curriculum goals and pedagogical practices. Additionally, a meta-analysis by Okafor and James (2023) emphasized that digital learning environments supported by robust ICT policies yield significantly higher academic gains than traditional methods.

Overall, the findings of this study align with the growing body of literature that supports the integration of technology into secondary education as a driver of academic performance. The empirical evidence suggests that investment in ICT infrastructure and the purposeful use of digital resources should be prioritized by school administrators and policymakers to enhance students' academic development in Nigeria and similar contexts.

Conclusion

This study investigated the relationship between school ICT compliance level and the use of digital learning resources on the academic performance of senior secondary school students in Igabi Local Government Area of Kaduna State. The findings clearly demonstrated that both ICT compliance and digital resource use have a statistically significant and positive impact on students' academic performance. Moreover, the

joint influence of these two variables explained a substantial proportion of the variation in students' academic outcomes. These results underscore the crucial role of technology in enhancing educational effectiveness, especially in an era where digital competence is a key skill for both teaching and learning. The implication is that educational institutions that lag in ICT infrastructure and digital integration may inadvertently compromise the academic potential of their students.

Thus, it can be concluded that improving ICT compliance in schools and increasing access to and utilization of digital learning resources are strategic levers for advancing students' academic achievement. Without consistent efforts to upgrade technological infrastructure and train teachers and students to competently use digital tools, the full benefits of education in the digital age may not be realized.

Recommendations

Based on the findings and conclusion of the study, the following recommendations are proposed:

1. Government and school authorities should prioritize investment in ICT facilities such as computers, internet connectivity, interactive boards, and other digital tools in senior secondary schools. This will ensure compliance with national ICT education policies and support a digital learning environment conducive to academic growth.
2. Continuous professional development programs should be organized to equip teachers with the necessary digital literacy and pedagogical skills to integrate ICT tools and digital resources effectively into their teaching practices.
3. Schools should adopt digital resource platforms such as e-libraries, educational software, and online learning management systems. These should be curated to align with the secondary school curriculum and made readily accessible to students both in and outside the classroom.
4. Educational policy makers should enforce and monitor ICT standards across public secondary schools to ensure consistent compliance. Schools that demonstrate commitment to digital learning innovation should be supported and recognized to encourage best practices.
5. Partnership among government, non-governmental organizations, private tech companies, and communities should be encouraged to fund and support digital transformation in schools, particularly in underserved areas like parts of Igabi LGA.

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EFFECTS OF ACTIVITY-BASED TEACHING STRATEGY ON ACADEMIC ACHIEVEMENT AND RETENTION IN BASIC SCIENCE CONCEPTS IN UPPER BASIC LEVEL IN MAKURDI, BENUE STATE, NIGERIA

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ABSTRACT

The study investigated the effect of Activity-Based teaching strategies on the academic performance and retention of Basic Science concepts among upper basic level students in Makurdi, Benue State. A total of 120 Basic Science students in upper basic 2 were randomly selected, consisting of 51 males and 69 females, and were pre-tested and divided into experimental and control groups.

INTRODUCTION

Science is a body of organized knowledge and a process of inquiry geared toward understanding nature to enhance human living standards. Many scientists define science based on their perception and understanding of the subject. According to Okebukola (2020), science comprises intellectual activities conducted by researchers to discover and organize information about the natural world for the benefit of humanity. The primary focus of science is data collection, with the ultimate goal of discerning patterns in natural phenomena.

The Oxford Encyclopedia of Science (2023) outlines science as consisting of the following:

Students in the experimental group were instructed on selected basic science concepts using the Activity-Based teaching approach, while their achievement and ability to retain information were compared to those in the control group, who received the same instruction through traditional lectures. Data from pre-tests, post-tests, and follow-up tests were analyzed to assess group equivalence as well as the achievement and retention capabilities of both groups. Two hypotheses were tested using t-test statistics with a significance level of P-value 0.05, leading to several key findings: Students who learned through the Activity-Based teaching strategy (Experimental group) performed significantly better than those taught via lecture method. Additionally, students who engaged in the Activity-Based instructional strategy retained the learned concepts considerably more effectively than those who received instruction through lectures. Based on these results, several recommendations were proposed, including that teachers of Basic Science should adopt Activity-Based instructional strategies in their teaching, as it improves both achievement and retention in upper basic level students.

Keywords: Activity-Based Learning, Basic Science Education, Retention in Science, Lecture Method vs. Active Learning, Academic Achievement.

a) The systematic observation of natural events to discover facts and formulate testable laws and principles.
b) An organized body of knowledge derived from observations, verifiable through further investigation.
c) Specific disciplines within this body of knowledge, such as biology, chemistry, physics, geology, and astronomy.

At the junior secondary school level, Basic Science was introduced to provide foundational skills for advanced scientific studies (Adeyemi, 2021). The subject aims to develop cognitive, physical, and social competencies, equipping individuals to contribute meaningfully to society. Basic Science adopts a holistic approach to nature, establishing it as a distinct discipline. These definitions demonstrate that science is not merely a compilation of facts but an active process of inquiry (Adeyemi, 2021).

Basic Science (formerly Integrated Science) was introduced in Nigerian secondary schools in 1972 following recommendations by the Science Teachers Association of Nigeria (STAN, 2022) to integrate Biology, Chemistry, and Physics. Over time, the curriculum evolved, shifting from Integrated Science to Basic Science as part of the Nigerian Educational Research and Development Council's (NERDC, 2021) restructuring of the 9-year Basic Education Programme to align with the Sustainable Development Goals (SDGs). This reform required revising the curricula for primary and junior secondary schools (JSS 1–3).

The current Basic Science curriculum emphasizes technological development and equips students with essential skills for scientific learning (Federal Ministry of Education, 2023). While the core content remains similar, it now incorporates foundational technological concepts to promote innovation and problem-solving.

Various studies (Ogunleye, 2021; Abdullahi, 2022) have shown that many Basic Science teachers lack adequate qualifications, which negatively impacts student academic performance. A key issue is teachers' inability to implement appropriate activity-based teaching strategies, often defaulting to traditional lecture methods that have been linked to poor learning outcomes in Junior Secondary Schools (Adeyemi, 2020; Ogunleye, 2021).

Despite the Federal Government of Nigeria's efforts to support science education through initiatives like the National Science and Technology Fund (revised in 2021) and policies outlined in the National Policy on Education (FRN, 2022), science is still frequently taught as rote memorization of facts rather than emphasizing process skills and practical applications that make science relevant to societal needs (Federal Ministry of Education, 2023).

As noted by Okebukola (2020), science education suffers from pedagogical deficiencies that prevent students from connecting scientific knowledge to daily life. Research by Nwosu (2021) confirms that Nigerian schools predominantly use traditional lecture methods for science instruction. Furthermore, Adeyemi (2020) found that most science teachers fail to actively engage students in the learning process. Comparative studies by Bala (2021) demonstrate that problem-solving methods significantly outperform traditional approaches in promoting academic achievement, particularly in complex scientific concepts.

The persistent use of inappropriate teaching strategies and lack of instructional materials remains a major challenge in Basic Science education (STEM Education Review, 2022). Poor student performance in science subjects can be directly

attributed to ineffective teaching methods (UNESCO, 2021). This study investigates how Activity-Based Strategies could improve academic achievement in Basic Science. According to contemporary research (Ezeudu, 2022), Activity-Based Teaching Strategy engages students with the same enthusiasm as their natural activities. As highlighted by STEM Education Review (2022), this method introduces joy, teamwork, and respect for diverse opinions while reducing the abstractness of scientific concepts. Modern pedagogical studies (Ojediran, 2021) show that this approach creates a positive learning environment even for challenging topics.

Activity-Based teaching aligns with constructivist learning theories by providing hands-on experiences with concrete objects (Njoku, 2023). This approach accelerates learners' ability to organize knowledge, apply concepts, and predict outcomes. As demonstrated by Adekunle (2022), proper implementation through varied stimulating experiences facilitates conceptual understanding from concrete to abstract levels, enabling students to develop hypothetical reasoning skills.

The strategy effectively utilizes local resources in instruction, as recommended by Nigeria's current National Policy on Education (FRN, 2022). Activity-Based instruction engages all three learning domains and makes abstract concepts more tangible through hands-on experiences (Federal Ministry of Education, 2023). This meaningful learning enhances retention and improves academic performance. Such activities broaden students' perspectives, showing how scientific knowledge benefits communities beyond academic contexts. The Nigerian Basic Science Curriculum (2021) emphasizes activity-based approaches to develop essential science process skills.

This teaching method fosters valuable group interactions that develop teamwork, idea exchange, and respect for different viewpoints from early education stages (Global Education Monitor, 2022). A key advantage is the effective use of local materials as substitutes for expensive equipment. Recent studies (Okafor, 2023) confirm that Activity-Based strategies increase student engagement, improve retention, build confidence, and enhance intrinsic motivation - all critical factors for academic success in science education.

However, research (STEM Education Review, 2022) indicates that many science teachers remain unprepared for inquiry-based instruction, finding activity-oriented methods challenging to implement. This study examines the effectiveness of Activity-Based strategies on JSS2 students' achievement and retention in Basic Science. Retention, defined as the ability to maintain and recall learned information (Educational Psychology Review, 2021), depends on effective memory encoding. The

nature of learning materials significantly impacts retention through factors like meaningfulness, familiarity, and concreteness (Cognitive Science Journal, 2022).

Gender differences in education continue to draw research attention (Bala, 2021; UNESCO, 2021). Contemporary studies define gender as the spectrum of masculine and feminine traits present in individuals (World Health Organization, 2021). Traditional socialization still influences career expectations, with girls often encouraged toward "feminine" subjects (Global Education Monitor, 2022). However, recent findings (African Journal of Educational Research, 2023) show girls excelling in traditionally "masculine" subjects like mathematics and science when given equal opportunities. This study investigates gender differences in Basic Science achievement using Activity-Based methods.

Statement of the Problem

Recent reviews confirm that Basic Science is not being taught effectively in Nigerian schools (Ogunleye, 2021). According to contemporary research (Adeyemi, 2022), the subject should be taught practically, yet many teachers continue to emphasize rote memorization over active learning. This approach has negatively impacted both student performance and interest in the subject.

Activity-Based teaching strategies, as demonstrated by current pedagogical studies (Njoku, 2023), empower students to independently plan investigations, collect and analyze data, and draw conclusions. This learner-centered approach fosters meaningful learning and develops essential science process skills. Students gain opportunities to formulate and test hypotheses, articulating their findings in their own words (STEM Education Review, 2022).

Recent literature indicates that approximately 70% of science instruction still relies on traditional lecture methods (Federal Ministry of Education, 2023). This persistent teaching approach has been directly linked to ongoing poor achievement in Basic Science (UNESCO, 2021). While lecture methods may facilitate syllabus coverage and lesson planning, modern educational research (Okebukola, 2022) confirms their inadequacy in promoting meaningful learning across diverse learner populations. This underscores the need for alternative teaching strategies that can fundamentally improve science skill acquisition, with Activity-Based methods being strongly recommended in current studies.

As a universal driver of human development, Basic Science education thrives when students actively participate while teachers facilitate the learning process (Global

Education Monitor, 2022). Despite numerous research efforts to improve science achievement, the persistent use of lecture methods continues to hinder progress (African Journal of Educational Research, 2023). Contemporary observations (Bala, 2021; Okafor, 2022) confirm that the ongoing over-reliance on lecture methods remains a primary contributor to poor performance among junior secondary students. This study aims to address these challenges and propose sustainable solutions to enhance Basic Science education outcomes.

Objectives of the Study

The focus of this research is to examine the impact of Activity-Based teaching strategies compared to Lecture Teaching Strategies on the academic performance and retention levels of upper basic level students. In particular, the study aims to achieve the following objectives:

- Assess the impact of Activity-Based teaching strategies on the academic performance of Basic Science students in upper basic level.
- Determine if the Activity-Based teaching approach improves retention capability among Basic Science students in upper basic level.Research Questions

The research examines these key questions:

1. How do Activity-Based teaching strategies compare to traditional lecture methods in terms of academic performance of upper basic level students studying Basic Science?
2. How do Activity-Based and lecture teaching strategies influence the retention capabilities of Basic Science students in upper basic level?

Hypotheses

The research proposes the following null hypotheses:

Ho_1: There is no significant variation in academic performance among upper basic level students who learn Basic Science through an Activity-Based teaching strategy compared to those who are taught the same concepts using the lecture teaching method.

Ho_2: There is no significant difference in retention skills between students who are taught Basic Science using an Activity-Based teaching strategy and those who learn through the lecture method.

Methodology

The study utilized a quasi-experimental design featuring pre-test, post-test, and post-post-test measures with both experimental and control groups. Initially, both groups underwent pre-testing to confirm their equivalence, followed by a six-week treatment period, after which a post-test was conducted to evaluate students' academic achievement, and a post-post-test was administered two weeks later to assess retention levels. The sample for this study consisted of 120 upper basic II students from four secondary schools located in the Makurdi metropolis. Two intact classes of Upper Basic Science II students were selected for the study through purposive sampling to ensure they exhibited similar academic performance and class sizes. The assessment tool, known as the Basic Science Cognitive Skills Achievement Test (BSCSAT), was created by the researchers and based on topics outlined in the National Curriculum for junior secondary school Basic Science. These topics were chosen as they are part of the Basic Science curriculum and can be taught using both Activity-Based and Lecture teaching strategies. The reliability of the instrument was evaluated using data from a pilot study, yielding a Cronbach alpha coefficient of 0.87. Data collection was facilitated by four research aides, with prior approval from the principals of the selected schools to involve their educators and students. Students in the experimental group were instructed using an activity-based learning approach, while the control group received instruction through the lecture method over the course of six weeks. The assessment was administered to students in the classroom as a post-test following the completion of the teaching sessions. This method was essential since students needed to assess their perceived learning difficulties only after the instruction period. The researchers and their assistants collected the completed answer sheets right after the assessment. Data analysis was performed using mean and standard deviation to address research questions, while t-tests and ANOVA statistics were used to evaluate hypotheses at a 0.05 alpha level.

RESULTS

This research examined the impact of Activity-Based teaching strategies compared to Lecture Teaching Strategies on the academic performance and retention levels of upper basic level students.

Research Question 1: How do Activity-Based teaching strategies compare to traditional lecture methods in terms of academic performance of upper basic level students studying Basic Science?

In the context of data analysis, the null hypothesis is rephrased for evaluation at $P \leq 0.05$.

Ho_1: There is no significant variation in academic performance among upper basic level students who learn Basic Science through an Activity-Based teaching strategy compared to those who are taught the same concepts using the lecture teaching method.

The results from the Basic Science Cognitive Skills Achievement Test (BSCSAT) were examined using t-test statistics to determine whether there was a notable difference in achievement between the experimental group and the control group. A summary of the findings is shown in Table 1.

Table 1: Analysis of Mean Scores from the Post-test of the Experimental Group (EG), which was taught through the Activity-Based Method, and the Control Group (CG), which was instructed using the Lecture Method, using a t-test

Group	N	Mean score	S.D	S.E	t-cal	t-crit.	df	P-value
Experimental	60	32.61	2.69	0.30	33.45	1.96	78	0.00
Control	60	19.91	2.09	0.23				

Significant at $p \leq 0.05$

The information shown in Table 1 reveals that the experimental group achieved a mean score of 32.61, which is higher than the control group's mean score of 19.91. This result addresses the first research question. It is thereby confirmed through empirical evidence that students instructed using the Activity-Based Teaching Strategy obtained higher mean scores compared to those in the control group. To analyze the related Ho_1, the subsequent examination is provided: According to Table 1, the computed t-value is 33.45. This figure surpasses the critical t-value of 1.96 at $\alpha=0.05$ with 78 degrees of freedom. This indicates a significant difference exists between the mean scores of the experimental and control groups, favoring the experimental group. As a result, the hypothesis is rejected. This indicates that the experimental group, which learned Basic Science concepts via the Activity-Based teaching strategy, performed significantly better than the control group, which received the same

content through the Lecture teaching strategy. Therefore, the null hypothesis, which suggests no significant difference, is rejected.

Research Question 2: How do Activity-Based and lecture teaching strategies influence the retention capabilities of Basic Science students in upper basic level?

In the context of data analysis, the null hypothesis is rephrased for evaluation at $P \leq 0.05$.

Ho_2: There is no significant difference in retention skills between students who are taught Basic Science using an Activity-Based teaching strategy and those who learn through the lecture method.

To evaluate this hypothesis, the data from the post-post test were analyzed using t-test statistics. A summary of the findings is presented in Table 2.

Table 2: t-test Evaluation of the Average Scores from Post-post-Test Data for the Experimental Group Engaged in Activity-Based Learning Compared to the Control Group Participating in Lecture-Based Instruction

Group	N	Mean Score	S.D	S.E	t-cal value t-value	t.crit	df	P-
Experimental	60	34.48	2.58	**0.40**	**30.37 0.000**	**1.96**	**78**	
Control	**60**	**19.31**	**1.58**	**0.25**				

It can be observed from Table 2 that the mean score of the experimental group is 34.48, which exceeds the control group's mean score of 19.31. This outcome addresses research question No 2. It has been empirically shown that students who were subjected to activity-based teaching strategies achieved higher mean scores compared to their counterparts in the control group. According to Table 2, the computed t-value is 30.37. This value surpasses the critical t-value of 1.96 at $\alpha=0.05$ with df=78; additionally, the observed P-value was 0.00, which is below $p \leq 0.05$. This indicates a significant difference between the post-test mean scores of the experimental and control groups, favoring the experimental group. Consequently, the hypothesis is dismissed. This suggests that the experimental group, which learned measurement concepts through Activity-Based teaching strategies, retained the concepts more effectively than the control group that was taught the same

measurement content using the traditional Lecture Method. Thus, the null hypothesis, which posits that there is no significant difference, is consequently rejected.

Discussion of findings

The objective of this research is to examine the impact of Activity-Based teaching methods on the academic performance and retention of Basic Science concepts among upper basic level students. To fulfil this objective, students in the Experimental Group (EG) were taught Basic Science concepts through Activity-Based teaching methods. Conversely, students in the Control Group (CG) were instructed in the same concepts using the traditional lecture-based approach limited to the "talk and chalk" method. The learners in both the experimental group (EG) and Control Group (CG) were subsequently evaluated through post-tests and post-post-tests, comparing their achievements and retention capabilities based on the variables being studied. The findings indicated that students in the experimental group performed significantly better than those in the control group.

Hypothesis 1

The results of testing Hypothesis 1 show that students in the Experimental Group (EG), who were taught Basic Science Concepts using the Activity-Based Teaching Strategy, performed significantly better and achieved higher scores than their counterparts in the Control Group (CG). The significant difference in achievement—mean scores of 32.61 (EG) versus 19.91 (CG)—at a significance level of 0.05, demonstrates the greater effectiveness of the Activity-Based Teaching Strategy over traditional lecture-based ("chalk and talk") methods. This finding supports the idea that teaching methodology plays a crucial role in shaping learners' achievement in science (Johnson & Lawson, 2021).

According to recent studies, Activity-Based Teaching encourages learners to construct their own knowledge, which enhances long-term retention and application (Smith et al., 2020). Teachers should prioritize science curriculum topics that involve hands-on activities, allowing students to discover solutions independently while receiving guided support (Nguyen & DeLuca, 2022).

In Activity-Based Teaching, students engage with concrete materials and participate in interactive tasks, which promote meaningful learning by reducing abstractness and fostering a motivating learning environment (Kumar & Singh, 2023). As emphasized in recent literature, science is an intellectual endeavor aimed at exploring the natural

world and applying this knowledge for human benefit—a process best facilitated through active, inquiry-based learning (National Research Council, 2020).

Hypothesis 2

The post-post test results showed that the Experimental Group (EG), exposed to the Activity-Based Teaching Strategy, retained Basic Science Concepts significantly better than the Control Group (CG), which was taught using the traditional lecture method. The EG achieved a mean score of 34.48, compared to the CG's 19.31. The statistically significant difference between these scores confirms that the Activity-Based approach led to more effective learning and higher retention than the lecture method (Harrison et al., 2021).

Recent research supports that Activity-Based Learning, when implemented with a variety of stimulating, hands-on experiences, facilitates progression from concrete to abstract thinking, enabling deeper conceptualization (Lee & Talbert, 2020). As learners engage with this method, they develop the ability to reason hypothetically, evaluate multiple solutions, and think beyond immediate physical representations (OECD, 2022).

This finding aligns with contemporary studies criticizing the traditional lecture method as ineffective for meaningful learning (Freeman et al., 2020). Lecture-based teaching often prioritizes syllabus coverage over engagement, leaving students as passive recipients of information (Prince et al., 2021). In contrast, active learning strategies—such as problem-solving and inquiry-based tasks—promote long-term retention by embedding knowledge in meaningful contexts (Brown & McDaniel, 2023).

Conclusions

Based on the results of this study, the following conclusions were reached:

(1) The teaching strategies that educators utilize in science instruction significantly impact students' academic performance and retention.

(2) Activity-Based teaching strategies enhance the effective understanding of Basic Science concepts.

(3) Students instructed in Basic Science concepts through Activity-Based Teaching Strategies demonstrated significantly better retention of the material compared to those who learned the same concepts through traditional Lecture Teaching Strategies.

(4) The Lecture method of teaching science appears to be less effective than Activity-Based teaching strategies in conveying Basic Science concepts, as it negatively influences students' academic performance and their retention of the learned concepts.

Recommendations

Based on the conclusions and findings of this study, the following suggestions are proposed:

(1) Basic Science instruction should be organized in a manner that enables students to effectively understand and remember the concepts taught. Implementing the Activity-Based teaching strategy appears to be effective in achieving this objective, and it should be integrated into the Basic Science curriculum at the secondary school level.

(2) Professional development programs for Basic Science educators, including seminars, workshops, and conferences, should be offered to teach them how to effectively apply the Activity-Based teaching strategy in conveying Basic Science concepts.

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RELATIONSHIP AMONG SELF ESTEEM, SCHOOL ADJUSTMENT AND ACADEMIC PERFORMANCE OF STUDENTS IN COLLEGE OF EDUCATION ILORIN, KAWARA STATE, NIGERIA

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ABSTRACT

This study examined the relationship among self-esteem, school adjustment and academic performance of College of Education students Ilorin, Kwara State, Nigeria. Correlational research design was employed to collect the data. Three research questions, hypotheses and basic assumptions were raised to guide the study. The total population of the study was four

INTRODUCTION

Students' academic performances have been the area of interest for higher education. Investigation of factors related to the academic performance of tertiary institution students become a topic of growing interest in higher educational circles. There is diversity in academic performance of students, some students perform very well while others perform poorly and low academic performance causes withdrawn from tertiary institution. It is the student's efforts, attitude and determinations that determines their academic performance Jamiu, (2023).

Maslow's hierarchy of needs is a theory in psychology proposed by Abraham Maslow. Maslow subsequently extended the idea to include his observations of humans' innate curiosity. Humans are fueled by a desire to achieving

thousand, nine hundred and eighty-three (4,983) NCE II regular Students of College of Education Ilorin. The researcher used adopted instruments namely; Rosenberg Self-Esteem Scale (RSES), School Adjustment Questionnaire (SAQ), and Academic Performance Test (APT) for data collection. Data was analyzed using percentages for the demographic variables and Pearson Product Moment Correlation Coefficient (r) was used to test the hypotheses. The findings showed that self-esteem had significant positive relationship with academic performance, school adjustment had significant positive relationship on academic performance and school adjustment had significant positive relationship on self-esteem. The study concluded that self-esteem and school adjustment have positive relationship with academic performance of College of Education Students Ilorin. Based on the findings, it was recommended that school counsellors and lecturers should encourage students to maintain a high self-esteem for better academic performance. Efforts should be made by the school managements and counsellors to encourage students to adjust well in school for better academic performance.

Key words: Relationship, Self Esteem, School Adjustment, Academic Performance and College of Education Students.

goals. Attaining goals helps human satisfy specific needs and desires. Maslow used the terms "physiological", "safety", "belonging and love", "esteem", "self-actualization" and "self-transcendence" to describe the pattern that human motivations generally move through. He is famous for his "Hierarchy of Needs" and it also shows how important Maslow believed self-esteem to be:

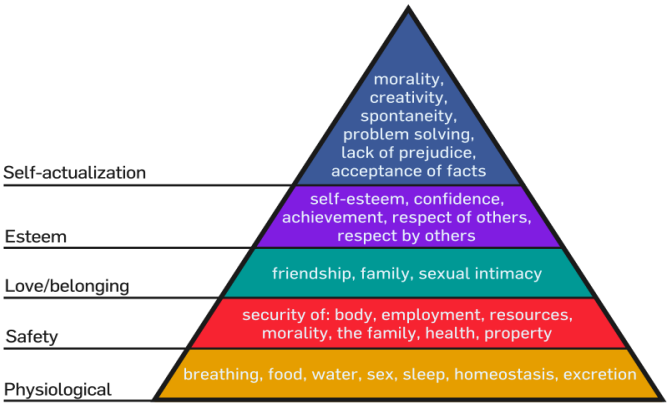

Figure 1: Maslow's Hierarchy of Needs.

Lower needs must be satisfied before higher order needs can be reached. The needs are categorized into a hierarchy, by which certain needs must be met before others (Kendra, 2018).

In line with idea of Jamiu, (2017) Education is the foundation for the development of any society in all spheres of life. It is an investment as well as instrument that can be used to achieve a more rapid economic, social, scientific, technological and cultural development in the country. Jamiu, (2024) opined that an educated person who is well and relevantly positioned in the society is expected to be a valuable asset. Therefore, the purpose of education is for human development which at first is seen through academic performance. Hence, academic performance is a ladder or a stepping stone to individual's future prospect. It is the outcome of education that extent to student, teacher and institution in other to achieved educational goals. The quality of education is mostly assessed on the basis of academic performance and achievement scores.

The school related factor may not be enough on whether an individual academic performance will be good or bad. Thus, the student's self-esteem plays tremendous roles in building the personality and determining academic performance. Therefore, identifying factors that affect academic performance and suggesting some measures is critically important in helping students improve their academic performance Jamiu, (2023). He added that, it is expected that students will perform better, when they adjust well in school. School adjustment can be related to factors such as personal skill, concentration, attention, motivation, social, cultural factor and psychological factors. It is therefore helpful to students with needs, objectives, and desires to make plans and attempt to accomplish those goals, because plans made and not executed are as good as failure.

Jamiu, (2023). In another vain, said that, school adjustments plays vital role in students' academic performance because one of the pillar which student's life is based is on their progress, achievement, and attitude towards school activities, social support and academic motivation. Therefore, for students to adjust well in school, it is influenced with the combination of students' personal characteristics and their experiences. Students who are able to adjust well in school to the change circumstances in their school can feel more comfortable, live in harmony and well-adjusted life that enhances academic performance. Thus, school adjustment is a person's interaction with the environment and enablement to cover academic achievement, personal growth and accomplishment of life goals.

Self-esteem can be either positive (high self-esteem) or negative (low self-esteem). Therefore, Students get disturbed through their acquisition of self-esteem (high self-esteem and low self-esteem) which actually affect their school adjustment. According to Aryana, (2018) students with high academic achievement tend to feel more

confident in contrast to those who lack confidence in them may achieve less academically. However, self-esteem refers to how an individual feel about or how an individual evaluates himself. This evaluation serves as an important role because it affects an individual's attitude and behaviour towards academic performance. In addition, there is lot of differences in the characteristics of low and high self-esteem individual. Low self-esteem individual tend to underestimate their abilities and undeserved to be successful, but these are absent in individual who has a high self-esteem. Hence, having high self-esteem makes the individual to evaluate himself in a positive way and feel good with strong view of success. Therefore, high self-esteem motivates the individual internally to work hard in order to achieve successful academic performance.

Self-respect is about the individual having the courage to stand up for themselves when they are being treated in a manner that is less than what they deserve. It is also about knowing their worth and having the ability to adjust their life and remove people from it if they are treating them poorly. If an individual have respect for themselves, they will naturally demand respect from others without having to do much of anything. People who have self-respect treat everyone else with respect, but acknowledge that not everyone else will do the same Aryana, (2018).

Components of self-esteem as stated by personal self development.Co.uk as follows: sense of control and personal responsibility, sense of belonging and acceptance and lastly sense of competence.

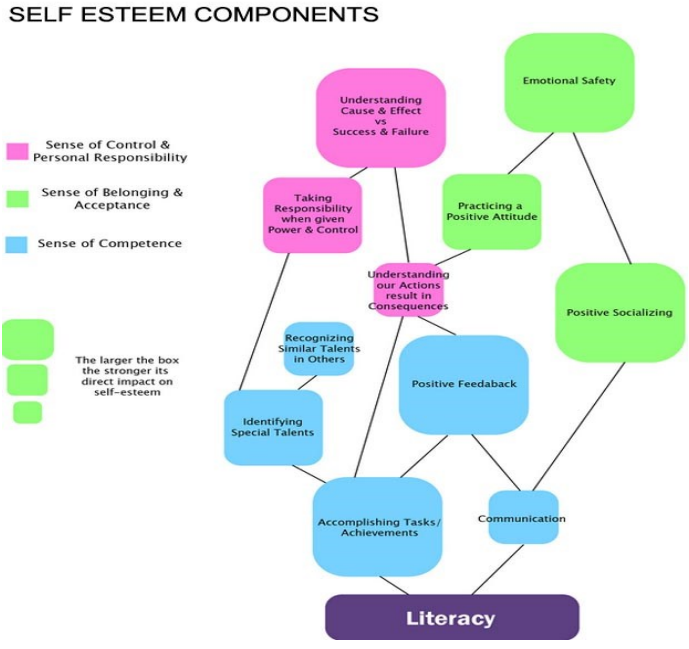

Figure 2: Components of Self-esteem – source – Development.Co.uk, (2017)

Self-esteem is a form of self – acceptance, personal appreciation and subjective respect of individual. It is to evaluate the difference between individual's image of self and ideal self. Muhammad, Syed and Khalid (2019) stated that to understand the self-esteem level of the individual, it is by

looking at the discrepancy between how the individual perceive oneself and the self they could like to be. Hence, self-esteem represents the individual's feelings such as self-acceptance, personal appreciation, overall acceptance of the personality and self-love. Therefore, it is the negative and positive attitude of the individual to oneself, as it arises in the result of self-evaluation on the individual basic psychological needs. Hence, self-esteem and school adjustment works together for better academic performance. It is in this respect that the researcher embarked on a study to examine the relationship among self-esteem, school adjustment and academic performance of College of Education Students Ilorin, Kwara State, Nigeria.

Statement of the Problem

The poor academic performance of students has become a source of great concern to all stakeholders in education. As observed by the researcher, College of Education Ilorin is not an exception. Many students enter into school with the ambition of coming out with flying colours but unfortunately, they encounter a lot of problems which is attributed to self-esteem and school adjustments.

Some students spend time, energy and money in studying without fruitful result, they end up being frustrated as their goal is not realized. Perhaps, the fear of failure as a result of self-worth leads students to the alarming rate of examination malpractice. This in turn, poorly affect their attitude to academic activities because when a learner fails to adjust well in college, his academic performance will be negatively affected. In order to achieve this desire of qualitative education and fill the gap of performance between students' academic excellence the researcher feels it is necessary to examine the relationship among self-esteem, school adjustment and academic performance of students in College of Education Ilorin, Kwara State, Nigeria.

Objective

The objectives of this study are to determine:

1. The relationship between self-esteem and academic performance of students in College of Education Ilorin, Kwara State, Nigeria.
2. The relationship between self-esteem and school adjustment of students in College of Education Ilorin, Kwara State, Nigeria.
3. The relationship between school adjustment and academic performance of students in College of Education Ilorin, Kwara State, Nigeria.

Research Questions

The following research questions were raised in line with the objectives:

1. What is the relationship between self-esteem and academic performance of students in College of Education Ilorin, Kwara State, Nigeria?
2. What is the relationship between self-esteem and school adjustment of students in College of Education Ilorin, Kwara State, Nigeria?
3. What is the relationship between school adjustment and academic performance of students in College of Education Ilorin, Kwara State, Nigeria?

Research Hypothesis

The following hypothetical statements are formulated for the purpose of the study:

1. There is no significant relationship between self-esteem and academic performance of students in College of Education Ilorin, Kwara State, Nigeria.
2. There is no significant relationship between self-esteem and school adjustment of students in College of Education Ilorin, Kwara State, Nigeria.
3. There is no significant relationship between school adjustment and academic performance of students in College of Education Ilorin, Kwara State, Nigeria.

Methodology

Correlational research design was adopted for this study. Thus, correlational design simply aimed at determining the relationships between two or more variables and how strongly they related to each other. This is justified based on the view of Baji, Mamman and Ugochukwu (2018) that when researchers want to find out about the relationships between variables, then correlational design is more appropriate.

Results

The analyses of the data and discussions arising from the findings of the study are stated from demographic data to hypotheses testing.

Table 1: Presentation of Demographic Data in Frequency and Percentages by Gender.

	Gender	Frequency	Percent
	Male	126	57.8
	Female	92	42.2
	Total	**218**	**100.0**

Showed the presentation of the bio data variables in frequencies and percentages. This includes the sex of the students all from the College of Education Ilorin, Kwara

State, Nigeria. A total of 126 representing 57.8% are males and the rest 92 or 42.2% are female students.

Hypotheses Testing

Hypothesis one: There is no significant relationship between self-esteem and academic performance of students in the College of Education Ilorin, Kwara State, Nigeria.

Table 2: Pearson Product Moment Correlation between Self-esteem and Academic Performance of Students in the College of Education Ilorin, Kwara State, Nigeria.

Variable	N	Mean	SD	Df	R	P–value
Self-esteem	218	28.5321	3.10067			
				216	0.667**	0.013
Academic Performance	218	13.6239	4.04534			

****Correlation is significant at the 0.05 level.**

The result revealed that p value of 0.013 is lower than the 0.05 alpha level of significance while the correlation coefficient r = 0.667 at df 216.Results of the Pearson Product Moment Correlation (r) statistics revealed that significant relationship existed between self-esteem and academic performance of students in the College of Education Ilorin, Kwara State, Nigeria implying that the higher the students' self-esteem, the higher their academic performance and vice versa. Therefore the null hypothesis which states that there is no significant relationship between self-esteem and academic performance of students in the College of Education Ilorin, Kwara State, Nigeria was rejected.

Hypothesis Two: There is no significant relationship between School Adjustment and Self -Esteem of students in the College of Education Ilorin, Kwara State.

Table 3: Pearson Product Moment Correlation between School Adjustment and Self Esteem of Students in the College of Education Ilorin, Kwara State, Nigeria.

Variable	N	Mean	SD	Df	r		P- value
Self esteem	218	28.5321	3.1006				
				216	0.725**		0.001
School Adjustment	218	63.0321	6.3828				

****Correlation is significant at the 0.05 level**

The computed p value of 0.001 is lower than the 0.05 alpha level of significance while the correlation coefficient r = 0.725 at df 216. Results of the Pearson Product Moment Correlation (r) statistics showed that significant relationship existed between school adjustment and self- esteem of students in the College of Education Ilorin, Kwara State, Nigeria implying that the higher the students school adjustment the higher their self- esteem and vice versa. Therefore the null hypothesis which stated that there is no significant relationship between school adjustment and self-esteem of students in the College of Education Ilorin, Kwara State, Nigeria was rejected.

Hypothesis Three: There is no significant relationship between self-esteem, School Adjustment and academic performance of students in the College of Education Ilorin, Kwara State, Nigeria.

Table 4: Pearson Product Moment Correlation between Self-esteem, School Adjustment and Academic Performance of Students in the College of Education Ilorin, Kwara State, Nigeria.

Variable	N	Mean	SD	Df	r	P- value
self-esteem, School Adjustment	218	63.0321	6.3828			
				216	0.709**	0.020
Academic Performance	218	13.6239	4.04534			

****Correlation is significant at the 0.05 level.**

The p value of 0.020 is lower than the 0.05 alpha level of significance while the correlation coefficient r = 0.709 at df 216. Results of the Pearson Product Moment Correlation (r) statistics revealed that significant relationship existed between self-esteem, school adjustment and academic performance of students in College of Education Ilorin, Kwara State, Nigeria implying that the higher the students school adjustment, the higher their academic performance and vice versa. Therefore the null hypothesis which stated that there is no significant relationship between self-esteem, school adjustment and academic performance of students in the College of Education Ilorin, Kwara State, Nigeria was rejected.

Discussions

The major findings of this study showed that self-esteem and school adjustment correlated with academic performance of students. Theoretically, the findings were supported by William self –esteem theory and Rosenberg theory of self-esteem that

focused on the role self-esteem plays in individual's lives and psychological well-being. In agreement, Maslow theory of needs viewed that human behaviour is driven by needs, one of which is the need for a sense of personal importance, value or self-esteem. Hence, the need for individual satisfaction of self-esteem becomes relevant in life. In addition, Skinner proposed that differences in individuals learning experiences are the main reason behind individual differences in behaviour. Therefore, Skinner is based upon the idea that learning is a function of change in overt behaviour. The best way to understand behaviour is to look at the causes of an action and its consequences (Mcleod, 2017). To this learning theory, behaviour is learned and any learned behaviour can be unlearned. According to social learning theory in congruence with the findings, it emphasized that behaviour is learned from interactions and observations individuals experience with other people. Within this theory, learning takes place indirectly by receiving information, observing others or modelling.

The result of this study revealed that a significant relationship existed between self-esteem and academic performance of students in College of Education Ilorin, Kwara State, Nigeria ($r = 0.667$, $p = 0.013$). This is in agreement with the findings of Aryana (2018) who investigated a study on the relationship between self-esteem and academic achievement in the pre-university students. The result revealed that there was significant ($p<0.01$) positive relationship between self-esteem and academic achievement. The study suggested that high self-esteem is an important factor and strengthen the prediction of academic achievement in students. Muhammad, Syed and Khalid (2019) in their study on self-esteem and academic performance among University students, also found that there was a significant positive relationship ($r=0.879$, $p<.01$) between self-esteem and academic performance, which is in agreement with the findings of the result.

Conclusion

Based on the findings of this study, the researchers concluded that positive relationship exists between each of the variables based on the responses from the respondents, it was concluded that self-esteem of students of College of Education Ilorin, Kwara State, Nigeria is high and that self-esteem had relationship with academic performance of students in College. Secondly, from the findings, relationship existed between school adjustment and academic performance of students in College of Education Ilorin, Kwara State, Nigeria. Thus, the students that

were interested in their courses improved better in their academic performance. Therefore, school adjustment and self-esteem of students have positive relationship on students' academic performance.

Recommendations

In line with the above findings, the researcher recommended that:

1. School counsellors and teacher should encourage students to maintain a high self-esteem for better academic performance.
2. School adjustment of the students can be further improved by school counsellors and school authority encouraging students to develop a positive attitude towards school work and activities that are helpful to enhance academic performance.
3. Efforts should be made by the school counsellors and managements to encourage students to adjust well in school through guidance and counselling services for better academic performance.

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AN APPRAISAL OF THE ATTITUDE OF MUSLIM PARENTS TOWARDS GIRL-CHILD EDUCATION IN SOUTHERN KADUNA, KADUNA STATE.

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ABSTRACT

This research investigates the attitudes of Muslim parents towards their daughters' Western education in Southern Kaduna State. Despite global recognition of education as a fundamental human right and its crucial role in societal advancement, various socio-cultural and religious factors influence parental attitudes, particularly regarding female education. This study explores

INTRODUCTION

The challenges faced by girl-children in Northern Nigeria, particularly in relation to education, are multifaceted and deeply rooted in cultural, religious, and socio-economic factors. The issues of early marriage, teenage pregnancies, and poverty significantly hinder their access to education and opportunities for personal and professional development.

The 1990 Jomtien Declaration of Education For All (EFA) aimed to address these inequalities by promoting child, adult, and family education as a means to eradicate poverty and create new opportunities. Despite various initiatives, including the National Policy on Women Education in 2010, the enrollment rates for girls remain lower than those for boys. This disparity is exacerbated by cultural practices, religious misinterpretations, and socio-economic barriers that affect parental attitudes towards education.

the intersection of Islamic teachings, cultural practices, economic challenges, and security concerns that shape these attitudes. Five research questions were established to examine the significance of girls' education for Muslim parents, the existing and expected roles of Muslim parents, and contributions from government and community for girls' education. The sample comprises sixty Muslim parents and five teachers/educational workers. Data was collected through semi-structured interviews and analyzed using a content analysis approach. Findings highlight the importance of nuanced understandings of Islamic perspectives on education and suggest strategies for policymakers, religious leaders, and community stakeholders to promote inclusive educational practices. The research reveals parents' positive perceptions towards their daughters' Western education, while also presenting the severe scarcity of human and physical infrastructure for girl-child education in the area. Recommendations include financial aid for poor students, provision of new school locations, ensuring the availability of school buildings, and supporting infrastructure and teachers for existing schools.

Keywords: Attitudes, Muslim Parents, Girl-Child, Girl-Child Education, Southern Kaduna

Parental involvement is crucial for the educational success of children, particularly girls. Parents' educational levels, socio-economic status, and cultural beliefs significantly influence their attitudes towards their children's education. For instance, parents with lower educational attainment may feel inadequate in supporting their children's academic needs, leading to reduced involvement in their education. Additionally, family circumstances, such as single parenthood or financial constraints, can further limit parental engagement.

The societal perception of girl-child education often reflects a bias that prioritizes the education of boys over girls, based on traditional views of gender roles. This is particularly evident in regions like Kaduna State, where early marriage and confinement practices are prevalent. Despite the Islamic teachings that advocate for the pursuit of knowledge for all, some families use religious justifications to deny girls access to education.

To address these challenges, it is essential for families and society to recognize the importance of girl-child education not only for individual empowerment but also for broader socio-economic development. Educating girls has been shown to have a significant impact on poverty reduction, family well-being, and sustainable development. Therefore, stakeholders must work collaboratively to create an environment that supports and encourages the education of girls, ensuring that their rights to education are upheld and that they can realize their full potential.

The path to improving girl-child education in Northern Nigeria requires a concerted effort to change societal attitudes, enhance parental involvement, and provide the necessary resources and support systems. By prioritizing girl-child education, communities can foster a more equitable and prosperous future for all. This study aims to explore the mindset of Muslim parents towards their daughters' education to identify barriers and areas for improvement.

Statement of the Research Problem

This research on Muslim parents' attitudes towards girl-child education in Southern Kaduna is essential because education is the foundation of every society and should be accessible to all, regardless of gender. The issue of girl-child education is not confined to a specific region or country; it is a global concern. Education is a vital tool for individuals to navigate their environments and shape their destinies. In Nigeria, particularly in the northern regions, girl-child education remains a significant challenge (World Bank, 2022).

Factors contributing to this problem include the exploitation of girls for hawking goods, early marriages due to poverty, and the perception that educating girls is a waste of resources. Discrimination against girl-child education must be addressed to ensure equal access to education, as outlined in the National Policy on Education. Muslim parents in Southern Kaduna need to be educated on the importance of girl-child education and discouraged from engaging their daughters in early marriages and hawking. Teachers should also be sensitive to the needs of girl-children to enhance enrollment and retention, thereby achieving the Sustainable Development Goals (SDGs) (UN, 2015).

Research Questions

The research formulated the following questions to achieve its objectives:

i. What are the attitudes of Muslim parents towards their girl-child education in Southern Kaduna?
ii. What factors contribute to the negative attitudes of Muslim parents towards their girl-child education in Southern Kaduna?
iii. Does the status of Muslim parents affect their girl-child education in the study area?
iv. What are the implications of the negative attitudes of Muslim parents towards their girl-child education in Southern Kaduna?
v. What measures and solutions can be implemented to enhance positive attitudes of Muslim parents towards their girl-child education in the study area?

Research Objectives

The objectives of this research are to:

i. Examine the attitudes of Muslim parents towards their girl-child education in Southern Kaduna.
ii. Identify the contributing factors for the negative attitudes of Muslim parents towards their girl-child education in Southern Kaduna.
iii. Evaluate how the status of Muslim parents affects their girl-child education in the study area.
iv. Assess the implications of the negative attitudes of Muslim parents towards their girl-child education in Southern Kaduna.
v. Propose possible measures and solutions to enhance positive attitudes of Muslim parents towards their girl-child education in the study area.

Significance of the Research

This research is of utmost importance as it aims to provide educational planners, school administrators, teachers, policymakers, parents, and all stakeholders with a clear understanding of fundamental issues related to daughters' Western education in Southern Kaduna. The findings and recommendations are expected to enlighten Muslim parents about their responsibilities towards their daughters' education, ultimately enhancing girls' education and enabling them to contribute to the development of their communities and the nation. The benefits of girls' education are numerous and far-reaching (Malala Fund, 2021).

Literature Review

The education of the girl-child is a critical issue in many developing countries, including Nigeria. In particular, the attitudes of parents, especially in Muslim communities, play a significant role in shaping educational opportunities for girls. This literature review examines the socio-cultural, economic, and religious factors influencing the attitudes of Muslim parents towards girl-child education in Southern Kaduna, synthesizing recent empirical studies and reports to provide a comprehensive understanding of the current landscape.

i. **Socio-Cultural Factors:** Socio-cultural beliefs and practices significantly influence parental attitudes towards girl-child education. According to Adamu et al. (2021), traditional gender roles often dictate that girls should prioritize domestic responsibilities over academic pursuits. This perspective is deeply rooted in cultural norms that view education for girls as unnecessary, as their primary roles are seen as wives and mothers. Odukoya (2020) supports this view, noting that many Muslim parents perceive investing in their daughters' education as a waste of resources, particularly when economic constraints are present.

   Furthermore, the influence of patriarchal structures cannot be overlooked. A study by Nwankwo et al. (2022) highlights that in many Muslim families, fathers often make educational decisions, and their preferences typically favor boys over girls. This gender bias is reinforced by societal expectations that prioritize male education as a means of securing family lineage and economic stability. The implications of these socio-cultural factors are profound, as they contribute to the systemic underrepresentation of girls in educational institutions.

ii. **Economic Factors:** Economic constraints are a significant barrier to girl-child education in Southern Kaduna. The World Bank (2022) reports that poverty remains a critical issue, with many families unable to afford school fees, uniforms, and other educational expenses for their daughters. This economic strain often leads families to prioritize boys' education, as they are perceived to have better prospects for future income generation.

   A recent report by the United Nations Development Programme (UNDP, 2021) emphasizes that economic empowerment of women is essential for improving educational outcomes for girls. The report suggests that when families experience financial stability, they are more likely to invest in their daughters'

education. However, in regions where poverty is prevalent, such as Southern Kaduna, the cycle of poverty perpetuates gender disparities in education.

iii. **Religious Influences:** Religious beliefs and interpretations also play a crucial role in shaping attitudes towards girl-child education. While Islamic teachings advocate for the pursuit of knowledge for all, including women, cultural interpretations often overshadow these teachings. According to a study by Aliyu and Ibrahim (2021), many Muslim parents in Northern Nigeria hold misconceptions about Islamic teachings, believing that educating girls contradicts traditional values.

Moreover, the intersection of religion and culture can lead to conflicting attitudes towards education. For instance, while some parents may support the idea of education for girls, they may simultaneously adhere to cultural practices that limit their educational opportunities, such as early marriage. This duality creates a complex environment where religious beliefs can both support and hinder girl-child education (Amina et al, 2021).

iv. **Security Concerns:** In recent years, security concerns have emerged as a significant barrier to girl-child education in Northern Nigeria. The rise of insurgency and violence, particularly from groups like Boko Haram, has led to increased parental anxiety regarding the safety of their daughters in schools. A study by Nwankwo et al. (2022) found that many parents are reluctant to send their daughters to school due to fears of abduction and violence, further exacerbating the gender disparity in education.

The impact of insecurity on educational access is profound. According to UNICEF (2021), the ongoing violence has resulted in the closure of many schools, disproportionately affecting girls. The report emphasizes the need for targeted interventions to ensure the safety of girls in educational settings, highlighting that without addressing security concerns, efforts to promote girl-child education will be significantly undermined.

v. **The Impact of COVID-19:** The COVID-19 pandemic has further intensified existing inequalities in education, particularly for girls. A report by UNICEF (2021) indicates that school closures disproportionately affected girls, leading to increased dropout rates and early marriages. The pandemic has highlighted the urgent need for targeted interventions to support girl-child education and ensure that girls are not left behind in the recovery process.

The economic fallout from the pandemic has also exacerbated financial constraints for many families, making it even more challenging to prioritize education for girls. As families struggle to recover economically, the risk of girls being pulled out of school for domestic labor or early marriage increases (Malala Fund, 2021).

The literature indicates that the attitudes of Muslim parents towards girl-child education in Southern Kaduna are shaped by a complex interplay of socio-cultural, economic, religious, and security factors. While there is a growing recognition of the importance of girls' education, deeply entrenched beliefs and practices continue to hinder progress. Addressing these barriers requires a multifaceted approach that includes community engagement, economic support, and enhanced security measures to create a safe and conducive learning environment for girls.

Recent studies emphasize the need for educational policies that are sensitive to the cultural and religious contexts of Muslim communities. Programs that engage parents and community leaders in discussions about the benefits of girl-child education can help shift attitudes and promote greater investment in girls' schooling. Additionally, economic empowerment initiatives that provide financial support for families can alleviate some of the economic pressures that contribute to gender disparities in education.

The literatures reviewed indicate that the attitudes of Muslim parents towards girl-child education in Southern Kaduna are shaped by a complex interplay of cultural, economic, and security factors. While there is a growing recognition of the importance of girls' education, deeply entrenched beliefs and practices continue to hinder progress. Addressing these barriers requires a multifaceted approach that includes community engagement, economic support, and enhanced security measures to create a safe and conducive learning environment for girls.

Methodology

This research employed both quantitative and qualitative methods, as recommended by Creswell, J.W. & Creswell, J.D (2022) and Flick, U (2013). The population for this study consists of Muslim parents in Southern Kaduna, specifically in the local governments of Jaba, Jama'a, Sanga, Kaura, Kachia, and Zangon Kataf. Data was collected in three stages:

i. Gathering data on the number of girls' schools in each local government area from Cluster Education Officers.

ii. Reviewing previous studies on parents' attitudes towards their daughters' education.
iii. Conducting semi-structured interviews with participants, with consent obtained for audio recording. Each interview lasted 20-30 minutes.

The data collected was transcribed and analyzed using relational analysis, a type of content analysis approach. This method focuses on both explicit and implicit concepts within the data. Findings were discussed with local educationists to ensure reliability and contextual relevance.

Findings

The research identified several factors affecting girl-child education in Southern Kaduna, including parental cultural beliefs and place of residence, which contribute to negative attitudes towards girl-child education. The findings of the study regarding the relationship between various parental backgrounds and girl-child education present a complex picture.

The results indicate that there is no significant relationship between the economic background of students' parents and girl-child education. This finding contradicts the conclusions of Edinyang et al. (2020), who suggested that families with better economic standing tend to encourage girl-child education. This discrepancy may suggest that other factors, such as cultural or social influences, could play a more critical role in determining educational outcomes for girls, regardless of economic status.

The results concerning the relationship between parents' cultural background and girl-child education align with the findings of Ifeoma (2020), which also indicated no significant relationship. This supports Charles (2019), who argued that issues surrounding girl-child education are a global phenomenon that transcends cultural boundaries. This suggests that cultural attitudes may not be as influential in shaping educational opportunities for girls as previously thought.

The findings related to parents' religious background and girl-child education contradict the findings of Abdigafar, Hellen, and Willy (2019), who posited that the dominant religious group in a society influences girl-child education. However, the results are consistent with Igbolo and Ejue (2019), who found that the religious practices of parents do affect their attitudes toward girl-child education. This indicates that while the overarching religious context may not directly impact

educational outcomes, individual religious practices and beliefs can still play a significant role.

Finally, the study's findings on the relationship between government policies and girl-child education corroborate the results of Ma et al. (2019), which indicated that government policies actively promote girl-child education at all levels. This suggests that effective governmental initiatives can positively influence educational access and opportunities for girls, reinforcing the importance of policy support in addressing educational disparities.

Also, the study found that Muslim parents often do not provide equal access to education for their daughters compared to their sons, with many girls' education terminating at the primary level. Punctuality and enrollment of girl-children in school are crucial for their educational progression. Cultural and traditional practices hinder girls' education, with many being engaged in early marriages, despite religious teachings encouraging knowledge acquisition for all (UNESCO, 2021).

Conclusion

The study highlights a prevalent preference among Muslim parents in Southern Kaduna for male children over female children when it comes to education. This preference poses significant challenges to the educational opportunities available to girls in the region. The research identifies social exclusion and gender discrimination as common issues affecting female children, particularly within the Hausa and Fulani communities. These factors hinder the effective participation of girls in formal education.

There is an observed unfair distribution of educational resources and opportunities, which further limits the participation of Muslim women in various sectors of the economy. The study points out that early marriage significantly obstructs girls' rights to education, as it often leads to the termination of their educational pursuits. Additionally, the use of girls as domestic labor and for street hawking instead of attending school is prevalent. The informants interviewed provided insights and recommendations on how to improve girl-child education in the area, indicating a community awareness of the issues at hand.

Recommendations

This study recommends the following:

i. Encouragement for Education: Muslim parents in Southern Kaduna should be actively encouraged to send their daughters to school. Awareness campaigns can help shift cultural perceptions regarding the value of female education.
ii. Government Support for Schools: The government should establish more primary and secondary schools specifically for girls to motivate and facilitate their education. This includes ensuring that schools are accessible and adequately equipped.
iii. Financial Assistance: Scholarships and subsidies should be provided by the government for female students attending public schools. This financial support can alleviate the economic burden on families and encourage them to prioritize education for their daughters.
iv. Recruitment of Female Teachers: More female teachers should be recruited to serve as role models for girl-children. Having female educators can inspire girls and create a more supportive learning environment.
v. Quality Education Mechanisms: The government should implement mechanisms to ensure quality and easily accessible education for girls in the region. This includes training for teachers, improving school infrastructure, and ensuring that educational materials are available.

These recommendations aim to address the barriers to girl-child education in Southern Kaduna and promote a more equitable educational landscape for all children, regardless of gender.

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DIGITAL LITERACY SKILLS FOR ACCESS AND UTILIZATION OF ONLINE INFORMATION RESOURCES AMONG STAFF AND STUDENTS OF COLLEGE OF EDUCATION AKWANGA NASARAWA STATE, NIGERIA

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ABSTRACT

This study examines the digital literacy skills essential for accessing and utilizing online information resources among staff and students at the College of Education (COE) Akwanga, Nasarawa State, Nigeria. Despite institutional investments in electronic resources, low usage persists, prompting an investigation into underlying challenges and skill gaps. A cross-sectional survey

INTRODUCTION

Digital literacy is the capacity to find, assess, create, and convey information using digital technology effectively and efficiently. Digital literacy, according to the European Commission (2017), is the capacity to use a variety of digital devices to effectively and critically navigate, assess, and produce information. Digital literacy is defined by the American Library Association (2013) as the capacity to locate, assess, use, and produce information using digital technologies, communication tools, or networks. According to Bawden (2008) digital literacy skill is defined as the embodiments or conglomeration of attitudes, understanding and skills to handle or communicate information and knowledge effectively, using some digital media and formats. The

design was employed, with data collected via the Staff and Student Digital Literacy Skills for Access and Utilization of Online Information Resources Questionnaire (SSDLSAUOIRQ). A proportional random sample of 398 participants (staff: 55; students: 343) was drawn from a population of 7,990. Descriptive statistics and logistic regression analysis revealed critical findings: (1) Key challenges include inadequate internet accessibility (mean=3.9), lack of conducive learning environments (mean=3.8), computer anxiety (mean=3.7), and insufficient training (mean=3.6); (2) Logistic regression identified computer/internet experience (OR=1.89, p=0.002), training (OR=1.66, p=0.007), positive attitudes toward technology (OR=2.02, p=0.042), and utilization of online resources (OR=1.10, p=0.006) as significant predictors of digital literacy. The scale demonstrated high reliability (Cronbach's α=0.872). Results underscore systemic gaps in infrastructure, pedagogy, and support, hindering effective engagement with digital resources. The study concludes that institutional interventions—including targeted training programs, curriculum modernization, and improved infrastructure—are imperative to enhance digital competencies. Recommendations advocate for collaborative efforts among college management, government agencies, and library vendors to address technophobia, expand internet access, and align practices with global educational standards. This research contributes to discourse on digital equity in Nigerian higher education and offers actionable strategies for fostering digitally literate academic communities.

Keywards: Digital literacy Skills, Access, Utilization, online, Information Resources.

Researcher view digital literacy as skills or ability to locate, understand, evaluate, organize and analyze and present information digitally. Digitally literate people are better able to network with others, obtain information, and navigate the digital world. Critical information evaluation skills, such as shaping the reliability of sources and spotting false news, are also part of digital literacy.

Any kind of digital data or content that can be shared or accessed electronically is referred to as digital resources or online Information resources. Digital resources include any forms of online-accessible digital content, such as text, photos, audio, and

video that may be accessed using a computer or mobile device (Library of Congress, 2021). "Digital resources" are defined as "electronic materials that can be accessed and used to support teaching, learning, and research". They may consist of a wide range of resources, including databases, software, e-books, online articles, videos, audio files, and digital photographs. These resources can be accessed using a variety of digital devices, including computers, cell-phones, tablets, and other internet-capable gadgets. They are frequently disseminated via online channels like websites, social media, and electronic databases.

It can be further deduced that digital literacy skills are precondition for Staff and students of College of Education Akwanga to function effectively in the digitized and globalized learning environment. E-resources are potentially powerful tools for extending educational opportunities which are popularly used by staff and students for timely information retrieval, ability to search multiple files at the same time and convenience in remote accesses. Digital literacy skills are very essential in accessing and utilizing electronic information resources. This is because, staff and students with digital literacy skills will able to use the ever-changing technologies as the information management tools of the digital age (Jun & Pow, 2011), and specifically, in pursuing academic success by effectively searching, accessing and retrieving information for assignments, research report writings and other daily academic routines (Edem and Egbe2016). Competence in digital literacy would also be useful to staff and students in College of Education (information generation, storage, retrieval, utilization, dissemination/communication and evaluation), and in doing this lawfully and ethically. However, electronic information resources are those resources that are available online and accessible via the use of technological devices such as computer networks, internet, desktop computers, laptop computers, tablets, smarts phones, CD-ROMs readers, memory card readers, projectors, world wide web (www), and digital libraries (Obaseki, 2014). Similarly, Odunewu and Aluko-Arowolo (2018) posit that electronic information resources are computer-based resources such as e-books, e-journals, e-conference proceedings, e-dictionaries, e-encyclopaedias, e-newspapers, e-magazines, Online Public Access Catalogues (OPACs), Web public access catalogues (WebPAC), e-manuscripts, e-maps, e-thesis, e-dissertations, e-research reports, e-reference services, among others. In fact, utilization electronic information resources require some fundamental digital literacy skills such search, access and retrieval skills, downloading skills, documents conversion skills, etc. This implies digital literary skills enable staff and students of college of education as professional and future

professionals and educators to apply digital technologies and tools like the internet, computer systems and accessories, mobile phones, etc., in problem solving, communication with others (e.g. lecturers, scholars and colleagues), receiving and sharing knowledge and information, as well as in being aware of their responsibilities and rights in the digital academic community.

Statement of the Problem

College of Education Akwanga Library has invested so much despite the shrinking budget by subscribing to online resources to ensure that staff and students access and utilize these online resources. However, observation and statistical usage of the online library resources show that the usage of these resources is low. However, there is an avalanche of electronic information resources, which may pose challenges for library users in accessing these resources as it requires library users to have certain digital literacy skills to have a proper interface with the electronic system, navigate and search for the needed information online. Ndagi and Madu (2018) stressed that many lecturers in universities in Nigeria have been encountering problems in a bid to access and utilize e-resources to support their functions due to their low level of information literacy skills cum ICT literacy skills. Thus, many Nigerian university students, especially in areas like information retrieval and evaluation, have weak digital literacy abilities (Ojokheta & Imogie, 2020). Many students may find it difficult to traverse digital platforms or access online databases because they are unfamiliar with the most recent digital tools and resources accessible to them. Nze and Lateef (2021) in (Green) made it known that libraries have often use digital tools to enhance access to its digital collections for research with structural and scholarly markup. Utilize the benefits of electronic resources in their academic work. The need for this study was impelled after discovering that most academic staff and Students were unable to find relevant and current materials for their studies, research and seminar despite the fact that the College of Education Akwanga library provides a large quantity of electronic resources. This research investigates the digital literacy skills for access and utilization of online information resources among staff and students of college of education Akwanga, Nasarawa State.

Research Questions:

i. What is the level of digital literacy skills of staff and students accessing and utilizing online information resources at the College of Education Akwanga library?

ii. How does the level of digital literacy skills affect the staff and students' access and utilization of online information resources at the College of Education Akwanga?
iii. What digital literacy skill courses for searching and accessing online information resources are available for Staff and students of the College of Education, Akwanga?
iv. What challenges are encountered in learning digital literacy skills among staff and students of the College of Education, Akwanga?

Significance of the Study

The study will contribute in the following areas:

i. The College Library and Management of the College of Education, Akwanga, will benefit from, the study's findings and recommendations as this will guide the management on the level of digital literacy skills for staff and students for proper intervention.
ii. The staff and students of the College of Education, Akwanga will benefit from the research work because the findings will reveal and proper solution to the myriad challenges, they encounter in their digital literacy skills for optimum access and utilization of college online information resources.
iii. The findings of the research will also attract the library database vendors for their intervention in the College since they are College business partners in progress.
iv. The Ministry of Education will be a beneficiary of the study because the students will be full bake graduates with digital literacy skills that will in turn impact the same skills to the school pupils and students after their graduation and employed

Scope of the Study

The study investigates information literacy skills on Colleges of Education staff and students' utilization of electronic resources in libraries. The study will be delimited to the College of Education Akwanga, stratify random technique will be adopted.

Literature Review

Introduction

The related literature has been reviewed, and presented under the following sub-headings. The theoretical framework, and the conceptual framework on the digital literacy skills, access, and utilization.

Theoretical Framework

The concept of digital literacy skills on utilization of e-resources arose from the underutilization or non-utilization of Research and Development (R&D) outputs by staff and students of the institution. The subject of information acquisition, dissemination and use was deeply rooted or originated from science theories. Studied have been carried out on perceived level of ICT literacy skill, electronic resources utilization, influence of information literacy skill on electronic resources utilization as well as purpose of electronic resources utilization. For instance, Archibong, Ogbiji and Anijaobi-Idem (2010) investigated the ICT competence and challenges to ICT usage among academic staff in River state Nigeria. It was revealed that majority (53.3%) rated their ICT competence as low.

Moreso, Iyanda, Opele & Akintunde (2016) examined ICT literacy skills and internet usage patterns of library users in Osun State College of Education Ila-Orangun, Nigeria. It was recorded that the library users including lecturers possessed a moderate level of ICT competency/skill. Moreso, findings also indicate a significant relationship between ICT literacy skill of lecturers and other users and internet usage. In a study on Lecturers and students use of ICTs in Nigerian university education as a panacea for national development as conducted by Nwankwoala (2015) revealed that ICT usage contributed to national development. Moreso, Ivwighreghweta and Oyeniran (2013) examined the level of Usage and Awareness of E-resources by lecturers in two Federal University, Delta State Nigeria and found out that the level of usage of electronic resources among lecturers is high. Yebowaah and Pockey (2017) in their study on Awareness and Use of Electronic Resources among academic staff in Wa campus, Ghana find out that the level of awareness of electronic resources is high but the level of electronic resources utilization is low.

Ukachi (2015) conducted research titled "Correlation of university students' information literacy and their utilization of library electronic resources in Nigeria." The study adopted a purposive sampling technique and 12 university libraries with electronic resources subscription and Internet access, and 5% of the undergraduate student population at these universities, along with the 12 library heads, comprised the sample selected by the researcher in the southern west geopolitical area of Nigeria. The study findings indicated that some electronic sources were not fully used, and the undergraduate students lacked enough skills to adequately use the electronic sources in the library. The study also found a strong positive correlation between undergraduate skills in information literacy and electronic source use. This implies when a person's information literacy skills are high, the higher they can use digital sources.

This study presented a survey on effect of information literacy skills and utilization of electronic information resource in Gombe State University, by Chiroma (2023). The results from this study revealed high usage of the available electronic information resources, it was revealed that most of the electronic information resources available were often used, this electronic information resources were mostly used for lecture notes and for research purposes, they were also used for literature review and general information.

Conceptual Framework

The library is a universal phenomenon which underscores the importance of digital literacy skill resources and services to human activities. The American Library Association Glossary of Library and Information Science (1983) cited in Mohammed (2015), defined library as a collection of materials organized to provide physical bibliographic and intellectual access to a target group with a staff that is trained to provide services and programmers related to the information needs of the target group.

Information literacy is the ability of individuals to locate and decisively evaluate information. It is also the capability to make effective use of information in decision making and knowledge creation (Webber and Johnston, 2003). The library is the heart of any academic institution as it helps to provide, inform and educate the students through books, journals, audio visual materials and services. Higher institutions all over the world place high emphasis on qualitative and quantitative research products to fulfill their mission of teaching, learning, research and cultural development. The measure of value placed on any institution is determined by the access to right information and level of information literacy of the students and faculties which automatically affect the research output of that institution.

With the rapid advancement of Information Technology (IT) the library system has also revolutionized. Institutional libraries are now categorized with dynamic electronic resources as against the traditional printed paper material. Academics and students now have unrestricted accesses to global digital information resources, particularly through the internet for scholarly communication and publications (Ani and Ahiauzu, 2008).

Definitions of information literacy include the following elements:

- Ability to effectively search for information
- Familiarity when selecting and evaluating information
- Ease of use of a wide range of media
- Awareness of the problem of reliability and credibility of information

- Efficiency of information transmission to the others. (Ajegbomogun and Akintola, 2004).

Digital literacy skills facilitate staff and students' ability to access the vast electronic information resources and services for their academic tasks, as well as enhance their practical capability in using digital tools for research and information services. This competence can assist them in generating and sharing information through various media, while efficiently presenting or communicating with colleagues and others using technological processes and tools (Hague, 2010; Gee, 2012). As a matter of fact, digital literacy skills, which transcends just the ability to read, write, chat, make and receive calls and electronic mails can promote more proactive and effective use of digitized gadgets in solving academic and other multifaceted real-life problems of the staff and students of College of Education Akwanga.

Research Methodology

This chapter deals with the research design, population, sample and sampling techniques, instrumentation, validation, reliability of the instrument administration and procedure for data analysis.

Research Design

Survey research will be used in this study. Survey research design is a data collection technique in which information is gathered from respondents. The study will be cross-sectional correlation survey because it requires that data are collected at a particular tie from a large sample, for the purpose of describing the population represented by the sample at that time.

Population of the Study

The population of this study will consist of staff and students of college of Education Akwanga. The number of staff is 1,100 while, that of students is 6,890. The total population of the study therefore, is 7,990.

Sample and Sampling Techniques

The sample of this study will comprise of 5% sample size of staff and students of College of Education, Akwanga. The common techniques of the sample are the fact that a random sampling method is going to be used for staff and students of the

College of Education, Akwanga. Number of staff and students selected from the College was based on the population. Sample sizes of 55 staff and 343 students, which is 398 sample sizes used was based on Krejcie and Morgan (1970). Hence, in deciding the samples size it is not the size, but the extent to which the sample is truly a representative of the characteristic of the population that was used.

Instrument for Data Collection

The researchers will develop two instruments (questionnaire) for data collection. One for the staff and the second one for students, the instrument titled "staff questionnaire for impact of information literacy skills on staff and students of college of education for utilization of e-resources" (SQILSER) and "students' questionnaire for impact of information literacy skills on staff and students of college of education for utilization of e-resources" (SQILER).

Validation of the Instrumentation

The instrument (questionnaire) will be subjected to experts' judgment for face and content validation. The instrument was pilot tested on small portion of the target population who are not part of the sample respondent at college of education Efere Agyaragu, Lafia, Nasarawa State.

Method of Data Collection

The researcher personally administered the instrument and collected the data from the respondents i.e. staff and students of College of Education Akwanga.

Data Analysis and Techniques

Descriptive statistics was used to analyze respondent's bio-data information and the research questions of this study. Descriptive statistics involved using Statistical Package for Social Sciences (SPSS). Also, logistic regression was used to archive some objectives of the study.

Socio-Economic Characteristics of the Respondents

Table 1 Distribution of Respondents by distribution and retrieval of questionnaires

Questionnaires administered	Total number returned	Percentage (%)
398	398	100%

Source: Field Survey, 2025.

Table1 reveals that a total of 398 copies of questionnaires were administered to the respondents and the same numbers of the questionnaire were returned representing 100% returns.

Table 2 Distribution of Respondents by Gender

The distribution of respondents by sex was categorized into male and female as showed below on Table 2.

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	77	19.3	19.3	19.3
	Male	321	80.7	80.7	100.0
	Total	398	100.0	100.0	

Source: SPSS, 2025.

The above output provides a clear picture of the gender distribution in the dataset, which can inform further analysis and interpretation of the results. The tables 4 revealed that majority of the respondents (80.7%) are male, while 19.3% are female; the sample size is 398, indicating a relatively large dataset.

There are no missing values, as the total percentage adds up to 100%, this output confirms that the data is complete, and all respondents provided answers for the four variables.

Table 3 Distribution of Respondents by Marital Status

The output provides a clear picture of the marital status distribution in the dataset, which can inform further analysis and interpretation of the results.

Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Married	68	17.1	17.1	17.1
	Single	330	82.9	82.9	100.0
	Total	398	100.0	100.0	

Source: SPSS, 2025.

Table 3 revealed that majority of the respondents (82.9%) are single, while 17.1% are married, the sample size is 398, indicating a relatively large dataset and there are no

missing values, as the total percentage adds up to 100%. The significant proportion of single respondents may indicate a younger population or a student-dominated sample.

Table 4 Distribution of Respondents by Highest Qualification

Highest Qualification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	First degree	26	6.5	6.5	6.5
	Master degree	15	3.8	3.8	10.3
	ND	9	2.3	2.3	12.6
	PhD	5	1.3	1.3	13.8
	SSCE	343	86.2	86.2	100.0
	Total	398	100.0	100.0	

Source: SPSS, 2025.

Table 4 shows that majority of the respondents (86.2%) have a Secondary School Certificate of Education (SSCE) as their highest qualification. A small proportion of respondents have higher qualifications, such as first degree (6.5%), master's degree (3.8%), ND (2.3%), and PhD (1.3%), the sample size is 398, indicating a relatively large dataset.

The result implies that the dominance of SSCE holders suggests that the sample may be comprised of younger individuals or those in the early stages of their academic or professional careers. The relatively low proportion of respondents with higher qualifications may limit the generalizability of the findings to more educated populations.

Table 5 Distribution of Respondents by Institution

Institution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Staff	55	13.8	13.8	13.8
	Student	343	86.2	86.2	100.0
	Total	398	100.0	100.0	

Source: SPSS, 2024

The above result revealed that majority of the respondents (86.2%) is students and small proportions of respondents (13.8%) are staff members. The sample size is 398, indicating a relatively large dataset which indicate that the dominance of students suggests that the sample may be representative of the student population, but may not accurately represent the staff population. Researchers may need to consider the potential differences in perspectives, experiences, and behaviors between students and staff when interpreting the results.

Chronbach Alpha reliability test

The Scale is Digital Literacy Skills Challenges, number of items 12 with 398 respondents. The reliability statistics of Cronbach's Alpha: 0.872, the Cronbach's Alpha value of 0.872 indicates a high level of internal consistency reliability for the Digital Literacy Skills Challenges scale. All item-total correlations are above 0.5, indicating that each item is moderately to strongly correlated with the total scale score. Indicating that Digital Literacy Skills Challenges scale is a reliable and internally consistent measure. The Chronbach Alpha reliability test result indicates that the Digital Literacy Skills Challenges scale is a reliable and internally consistent measure, suitable for assessing digital literacy skills challenges.

Data Analysis and Results

Logistic Regression Analysis

A logistic regression was performed to achieve the first, second and third objectives of the study which is ascertain the level of digital literacy skills of staff and students accessing and utilizing online information resources at the College of Education Akwanga library, level of digital literacy skills affect the staff and students' access and utilization of online information resources at the College of Education Akwanga and how digital literacy skills are acquired for searching and accessing online information resources available for Staff and students of the College of Education, Akwanga.

Model Specification;

$$\boldsymbol{DLS = F(CIT, TS, ATT, UOI)}$$

Where: ***DLS*** *is* ***Digital Literacy Skills:*** *Measured by a standardized test (e.g., Digital Literacy Test) or a self-reported questionnaire****,*** *CIE is* ***Computer/Internet Experience:*** *Measured using a questionnaire. TS is* ***Training and Support****, ATT is* ***Attitudes towards***

Technology: *Measured using a standardized scale (e.g., TAM questionnaire) and UOI is* ***Utilization of Online Information Resources:*** *Measured using a questionnaire or log data from the library's online resources.* Results are presented in Table 5

Table 6: Logistic Regression Result

Dependent Variable: *Digital Literacy Skills*= (CIE, TS, ATT, *UOI*)

Logistic Regression Results

Variable	Coefficient	P-value	Odds Ratio
CIE	0.635	0.002*	0.8801
TS	0.504	0.007*	0.9183
ATT	0.702	0.042*	1.0375
UOI	0.097	0.006*	1.0937
Constant	0.311	0.081*	

Researcher's Computation using SPSS, 2025

Note: * means a parameter estimate is significant at 5% level of significance

Pseudo R^2 = 0.6223

Where; if Pi<0.05 there is relationship and Pi>0.05 there is no relationship

The logistic regression in Table 5 showed that CIE (Computer/Internet Experience) coefficient is 0.635 with a P-value 0.002 and odds Ratio of 1.887 (approximately). Indicating for every unit increase in computer/internet experience, the odds of having high digital literacy skills increase by approximately 88.7%. TS (Training and Support) coefficient of 0.504 with a P-value of 0.007. Implying that for every unit increase in training and support, will lead to increase in high digital literacy skills by approximately 65.5%.

ATT (Attitudes towards Technology) show a coefficient of 0.702 with a P-value of 0.042 and odds Ratio of 2.018 (approximately). Meaning that for every unit increase in positive attitudes towards technology, will result to higher digital literacy skills increase by approximately 101.8%. UOI (Utilization of Online Information), shows that the coefficient is 0.097 and P-value of 0.006 which significant at 5% level of significant. Indicating that for every unit increase in utilization of online information, the odds of having high digital literacy skills increase by approximately 10.2%. The coefficient of the constant is 0.311 with a P-value of 0.081 which is not significant at 5% level of significant.

This is achieved by comparing if the probability values if it is equal or smaller than 0.05 you can say that the variables are jointly in the model significantly affect the

dependent variable at 5% significance level. From the result, by comparing the probability values which is less than 5% level of significance or 0.05. Indicating that all the variables of (computer/internet experience, training and support, attitudes towards technology and utilization online information resources) have the potential of influencing the behavior of digital literacy skills of respondents in the study area.

Table 7. Challenges are encountered in learning digital literacy skills among staff and students of the College of Education, Akwanga

S/N	Factors	SA	A	U	D	SD	Total	X	Rmark
1	computer anxiety or technophobia	158 36.6%	100 25.1%	80 20.1%	35 8.7%	25 6.2%	398	3.7	Agreed
2	poor teaching methods by it lecturers	163 40.9%	95 23.8%	75 18.8%	45 11.3%	20 5.2%	398	3.7	Agreed
3	Access to finance	138 34.7%	90 22.6%	80 20.1%	75 18.8%	15 3.7%	398	3.5	Agreed
4	lack of conducive digital literacy learning environment	178 44.7%	90 22.6%	80 20.1%	30 7.5%	20 5%	398	3.8	Agreed
5	inaccessibility to internet facilities	168 42.2%	100 25.1%	80 20.1%	40 11.1%	20 5.2%	398	3.9	Agreed
6	high cost of digital skill training programmes	158 36.6%	90 22.6%	80 20.1%	40 11.1%	30 8.3%	398	3.6	Agreed
7	inadequate digital facilities	153 38.4%	100 25.1%	95 23.8%	30 7.5%	20 5.2%	398	3.7	Agreed
8	low digital and information literacy skills	158 36.6%	90 22.6%	80 20.1%	45 11.3%	25 6.2%	398	3.6	Agreed
9	inadequate digital technology training/practical	133 33.4%	85 21.3%	75 20.1%	60 15.1%	45 11.3%	398	3.3	Agreed
10	epileptic electricity power supply	133 33.4%	85 21.3%	75 20.1%	60 15.1%	45 11.3%	398	3.3	Agreed
11	financial incapacitation to acquire digital tools	133 33.4%	95 23.8%	80 20.1%	80 20.1%	10 2.5%	398	3.5	Agreed

From the table above revealed that majority of respondents agreed or strongly agreed with the challenges listed. The mean scores range from 3.3 to 3.9, indicating a moderate to high level of agreement with the challenges. The top challenges are lack of conducive digital literacy learning environment with a mean vale of 3.8 (44.7%) of respondents strongly agreed, and 22.6% agreed, inaccessibility to internet facilities with a mean vale of 3.9 (42.2%) of respondents strongly agreed, and 25.1% agreed and

computer anxiety or technophobia with a Mean value of 3.7 (36.6%) of respondents strongly agreed, and 25.1% agreed.

Additionally, poor teaching methods by IT lecturers shows a mean value of 3.7 (40.9%) of respondents strongly agreed, and 23.8% agreed, inadequate digital facilities mean value of 3.7 (38.4%) of respondents strongly agreed, and 25.1% agreed and low digital and information literacy skills (Mean: 3.6): 36.6% of respondents strongly agreed, and 22.6% agreed. The findings of the study focus on the need for improved digital literacy learning environments, internet accessibility, and teacher training. Addressing computer anxiety and technophobia through targeted interventions and support systems is crucial and the results can inform the development of strategies to enhance digital literacy skills among staff and students.

Conclusion

This study examined the digital literacy skills necessary for accessing and utilizing online information resources among staff and students at the College of Education (COE) Akwanga, Nasarawa State, Nigeria. Using a cross-sectional survey design, 398 participants (staff and students) were sampled to assess their digital literacy levels, challenges, and the impact of these skills on resource utilization. Key findings revealed that respondents faced significant barriers, including a lack of conducive learning environments, inadequate internet access, computer anxiety, and insufficient training. Logistic regression analysis identified factors such as computer/internet experience, training, positive attitudes toward technology, and utilization of online resources as critical influencers of digital literacy. The study concluded that while COE Akwanga provides electronic resources, low digital literacy skills hinder effective utilization, necessitating institutional and individual interventions.

Recommendation

In the light of the findings of this study, the following recommendations are germane in improving the digital literacy skills of staff and students of college of education Akwanga:

i. The college management should design and implement digital literacy programmes to educate and train staff and students to develop their knowledge and practical skills on the use of digital technologies.
ii. The National Commission for College of Education (NCCE) should restructure their curriculum in accordance with current trends in digital skills learning instead of dwelling on the traditional analogue methods of teaching.

iii. Staff and students of the college should see digital literacy skills as a need for living and success and therefore, should embrace it with open arms by making their personal sacrifice in acquiring digital literacy skills through self-sponsored training.
iv. Management of college should provide functional digital infrastructures like computers and internet facilities in order to prepare their staff and students for global competitiveness in the present information-saturated world.
v. The government through Ministry of education should provide electronic digital facilities as it assists library users in information resources and updating of knowledge

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ENHANCING UNIVERSITY COMPETITIVENESS THROUGH BENCHMARKING: A STUDY OF INDUSTRY AND BEST PRACTICE BENCHMARKING IN NIGERIAN PRIVATE UNIVERSITIES

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ABSTRACT

The study examined benchmarking as strategic management accounting tool for enhancing institutional competitiveness. The study investigated the adoption and application of benchmarking practices among highly competitive Nigerian private universities in the context of industry benchmarking and best practice benchmarking. The sample frame are duly accredited private

INTRODUCTION

The growth of private institutions in Nigeria has brought about competitions in the sector thereby prompting approaches and strategies for survival and competitiveness by the key industry players. Lucey (2003) pointed out that the success of entities is grossly premised on quality of decisions, hence the need for relevant and accurate industry-based and financial information to make informed decision on strategic choices. Decision makers are persistently on the lookout for techniques to gain competitive advantage through quality

universities. The scope of the study were the private universities in the southwest, North-Central and North east Nigeria. The study adopted purposive sampling techniques to arrive at top Five (5) private universities who were consistently ranked high in the last five years by the annual university ranking systems. Primary data for the study were gathered through structured questionnaire administered to Vice-chancellors, Registrars, Bursars, Directors and Student Alumni. The study employed Partial Least Square Structural Adjustment Model (PLS-SEM) to test the hypothesis arising from the objective. The relationship analysis reveals that several measures of competitiveness indicators exceeded the 0.5 threshold, suggesting that focusing on industry benchmarking, particularly through improvement initiatives and deliberate measures, significantly enhances competitive advantage. However, the weak influence of best practices benchmarking suggested that adopting global best practices without proper contextualization may not effectively improve competitiveness. It was concluded that focusing on industry benchmarks can help universities to create a culture of continuous improvement that drives competitiveness and attracts more students. Universities should prioritize structured benchmarking processes while ensuring best practices are adapted to local contexts.

Key words: Industry Benchmarking, Best practice Benchmarking, Institutional Competitiveness, Strategic Management Accounting, Universities.

enhancement (Krishnamoorthy & D'Lima, 2014). Meanwhile, competitive positioning requires a variety of information that a robust system such as Strategic Management Accounting (SMA) can make available. Benchmarking as a component of strategic management accounting is concept that facilitates long-term decisions through comparative approach in the recent time. The success stories of benchmarking in industrial sector has also lent credence to the ability of universities to leverage it for optimal resource utilization for cost reduction, improved academic program, research outputs, enhanced student and satisfaction, innovation and entrepreneurship.

In this context, benchmarking was considered a powerful modern management tool which, through self-assessment and a structured comparative institutional learning approach, provides higher education institutions with crucial information to increase

the quality of their institutional development and their strategic performance. Al-kharabsheh (2020) noted that benchmarking is not simply about performance measures, rather, a core business strategy with the senior management commitment as a prerequisite. Even as the European Centre for Strategic Management of Universities (EMSU) is calling for higher education institutions to be the key drivers in the development of a powerful innovative, sustainable and competitive knowledge society, benchmarking as a technique of Strategic Management Accounting has been attracting considerable attention for its effectiveness (Krishnamoorthy & D'Lima, 2014). Given the global shift from the conventional ways to a more strategic approaches to higher education competitiveness, Organization for Economic and Social Development (OESD, 2019), coupled with the knowledge of limited studies on the concept of benchmarking and institution competiveness in Nigeria, the current study is in appreciation of benchmarking as a the key component of strategic management accounting and how it could be deployed to improve the performance of higher institutions through strategic decisions. The study specifically aims to investigate the level of awareness about benchmarking among high performing private academic institutions in Nigeria and how it has impacted competitiveness.

Research Objective

The objective of the study is to evaluate the interactive effect of Industry benchmarking and best practice benchmarking on competitiveness of the top Nigerian private universities.

Literature Review

Concept of Benchmarking

Benchmarking can simply be described as systemic process of measuring and comparing an organization performance, process, and practices against the high performers, the industry leaders or best in class performer. Literatures including Elmuti and Kathawala (1997); Al-kharabsheh (2020) have traced the origin of benchmarking to Xerox Corporation in the late 1970s. In a bid to regain its feet from past failures and pressures, Xerox compared its operations to those of its competitors and found quality standards which eventually yielded one of the most celebrated results. European Centre for Strategic Management of Universities (ECSMU, 2010) as well as Babović, Raičević and Carić (2012) confirmed that university benchmarking originated from the private sector in a context of several financial and competitive

pressures. It was equally noted that benchmarking was developed in the United States of America in the middle of the 20th century with reference to IBM's significant competitive advantage in the global market. The concept of benchmarking reflects the process of frequently recognizing, analyzing, and applying best practices and procedures discovered both inside and outside an organization in order to improve performance. Krishnamoorthy & D'Lima, (2014) describes benchmarking from the perspective of human resources of public sector as *"a procedure where we can compare two or more business processes with our own in order to improve ourselves and achieve our ultimate goal"*. Al-kharabsheh (2020) concluded that Benchmarking in education occurs when measurable standards are set for learning.

Benefit of Benchmarking

Benchmarking is apparently inevitable tool for achieving excellence by the consistent application of the concept of Total Quality Management(TQM) and continuous improvement (Kaizen) because it entails self-assessment of institution, better understanding of the processes that support strategic formulation, measuring and comparing how well are others institutions performing, discovering of new ideas, obtaining data to support decision-making, set targets for improvement of processes and responding to sector performance indicators as well as continual review of new standards for the sector. Lukianenko et al (2022) explained that the ever changing world has prompted organizations like corporations and universities to navigate political, market and social turbulence. This calls for continuous generations of unconventional ideas and behaviours to drive innovations. Sekhar (2011) suggested to companies to identify what it can do differently to gain the competitive edge. Meanwhile, significant favourable differences from competitors are potential cornerstones of a firm's strategy.

Process of Benchmarking

From the numerous approaches posited by authors, Al-kharabsheh (2020) and Elmuti and Kathawala (1997), benchmarking entails planning, collecting information, analyzing, adapting and reviewing. These processes was streamlined as (i) identification of what needs to be benchmarked (ii) identification of institution that is to be compared to (iii) identification of method for collecting data (iv) identification of gaps in the existing performances by designing new future performances (iv) Reviewing the benchmarking findings and providing acceptance by setting up

functional goals (v) Developing plans of action (vi) Re-evaluation of benchmarking. They however considered selection of a small number or just one single leadership organization suitable for comparison and improvement of business as the safest approach to benchmarking.

Types of Benchmarking

There are several types of benchmarking, such as internal, external competitive, external functional, external generic, combined internal and external benchmarking (Babović et al, 2012). From the views of other authors, Dragola, and Cotirlea (2009) said benchmarking can be categorized from various benchmarking practices into the following: Internal benchmarking, external benchmarking, Functional benchmarking, Trans-institutional benchmarking, Implicit benchmarking (ranking) and Generic/process benchmarking. For this study, the emphasis is on industry benchmarking and best practice benchmarking. While industry benchmarking involves comparing an organization processes, performance or strategies with those of other organizations within the same industry, best practice benchmarking is about identifying and adopting of best practice from any organization regardless of the industry

Limitations of Benchmarking

As promising as the concept of benchmarking is, it could equally be counterproductive if the objective and the technique is misapplied. Al-Khalifa (2015) remarked that Benchmarking requires a significant investment of time, money and effort to be done correctly, hence benchmarking-conscious institution may be tempted to incur overwhelming cost if care is not taken. On the other hand, higher education systems are faced with challenges that include expanding access, containing costs, and ensuring the quality and relevance of provision (OECD, 2019). Therefore, benchmarking is expected to be used as a guide, and not an end in itself. Benchmarking is multifaceted and similar to re-engineering. Hence businesses must use benchmarking with some prudence (Krishnamoorthy & D'Lima, 2014). One of the obvious limitation is the focus on data as opposed to the processes that produced the data (Elmuti & Kathawala (1997). More so, the ethical and legal issues that may arise during the process of benchmarking include the impression that ideas are not shared to gain competitive advantage, but rather so that both partners can improve or benefit. Other pit falls are distrust and unfair trade practices that are possibly the main

areas of concern in case the recipient passes information received to a similar company, therefore violating the original intention. The concept of copyright, patent or trademark would also bring some limitations to the benchmarking process, because information, such as intellectual property, works, industrial designs, and computer programs which are not yet the idea of public domain (Proprietary information) which has been acquired or controlled by the company, that has not been published, may also constitute constraints. The European Centre for strategic management of Universities outlined some other possible pit falls as: (i) replacing rational thinking with benchmarking (ii) considering benchmarking as an end itself (iii) rushing into data gathering before the context. (iv) viewing benchmarking as a league table. However, it has been advised that participants should not be data driven, and data received should be treated as confidential. Both institution should be aware of and be sensitive to the other's expectations.

Benchmarking in Universities context

Universities operate in a quasi-market environment because they combine competition among institutions alongside collaboration and strong regulatory framework (ECSMU, 2010). It was pointed out that universities traditionally do not think in process terms, but rather in terms of the task they deliver such as teaching, research and community development which covers just a small element of the overall process. UNESCO Institute for Information Technologies in Education (UNESCO IITE) noted that Quality has always been a matter of major importance for higher education, hence quality assurance has become one of the critical issues for universities. Benchmarking has therefore been found to be one of the most commonly accepted and used methods in quality assurance, which enables the assessment of the effectiveness and performance of organizations (UNESCO IITE, 2023). Putting benchmarking in university in context implies understanding the process, and learning about what other universities do in relation to the wider environment and stakeholder, relying on peer group with a shared strategic interest, thinking about what kind of institution you want to be, identifying who performs better than you, understanding why they perform better than you, and improving your processes for better performance.

Comparative Institutionalism.

Comparative institutionalism approach to institutional theory emphasizes the complementarity and interdependence of institutional sub spheres, where the

presence and efficiency of one institution enhance the returns from another, giving rise to diverse paths of capitalist development Woodhouse (2024). However, the literature on comparative institutionalism underscores institutional diversity, positing that distinct advantages or disadvantages exist for various economic activities. This view explained why economic action does not happen in isolation but indeed within the institutional setup. The current study aligns with this theory because it compares different institutions such as government, economies or social systems to understand their similarities and differences. The key features include institutional comparison, contextual analysis and multidisciplinary analysis. The application include, policy analysis, institutional reform, globalization and development.

Empirical Review

Al-kharabsheh (2020) undertook a study on benchmarking as a strategic tool for achieving excellence in higher education in Jordan, using University of Harvard as a benchmark. The study employed EFQM Excellence model to assess the performance of institution where specific scores were determined. This profile was compared against other profile which then lead to benchmarking against institution that had demonstrated excellence at criterion parts level. It was found that benchmarking could provide improved activities and knowledge for benchmark comparators in the development of comprehensive measurement frameworks.

Johanson and Madsen (2022) studied the role of benchmarking from a management accounting and control perspective among Norwegian firms. After analyzing the final number of 115 respondents, it was found that Norwegian firms formally use benchmarking as a management practice in the context of KPIs, Balanced Scorecards, and Big Data Analytics. Non-users of benchmarking tend to use quality management systems more than benchmarking users. This finding is surprising contradiction because benchmarking is often used as part of the TQM approach. It was also observed that firms using benchmarking assign relatively little importance to budgets, implying that benchmarking could be a substitutive control practice to budgeting in the future. Non-adopters gave lack of benchmarking partners and poor knowledge about the concept as reasons for non-adoption. The most common benchmark discovered was operating margin, followed by customer satisfaction.

Methodology

The study examined the effect of benchmarking techniques on the competiveness of the high performing universities in Nigeria. The study cuts across private universities

in three regions. The southwest because of the concentration of private universities in the region, and to ensure regional diversity the study was extended to the North-Central as well as the North east. Nigeria private universities constitute the best context for the study due to their financial autonomy and their business nature that often support innovative approaches towards quality services and optimal use of the available resources. The sample frame is the list of accredited private universities. The study adopted Purposive sampling technique to arrive at top five (5) reputable private universities who have been existing for at least the past Five (5) years, whose programmes are duly accredited and were consistently ranked high by the annual university rating. Kothari and Gard (2014) describe purposive sampling technique as nonprobability sampling in which items for the sample are selected deliberately by the researcher because his choice concerning the items remain supreme. The key respondents were Vice-chancellors, Registrars, Bursars, Directors and Student/Alumni. Useful data were gathered through structured questionnaires administered to the principal officers of the institutions. In measuring the variables, the study was guided by extant literatures including Babović et al (2012). Dimitrova and Dimitrova (2017) also claimed that regardless of the differing opinions, it should be clear that the methodology of assessment of competitiveness of a higher institutions has to be multidimensional combining various criteria that determine the competitive opportunities and the results of the activity. Hence, the dependent variable (competitiveness), include position of the universities in the rating system on a national and international scale, quality of the educational service provided, student satisfaction, efficiency of the pricing policy, reputation of the university in the sector, among others. The study employed the use of empirical analysis tools including descriptive statistics, normality test for the Skewness and Kurtosis. Fornell-Larcker criterion was used to confirm the discriminant validity, while multicollinearity test was conducted to assess the correlation between the independent variable. Bootstrapping also showed path coefficients and insights into the relationships between variables. Other analyses were construct reliability and validity which demonstrates the reliability and validity of constructs used to evaluate the adoption of benchmarking in private universities. The hypotheses arising from the objectives of the study were tested using Partial Least Square Structural Adjustment Model (PLS-SEM). The model was assessed through a path model to determine the effect of benchmarking on competitiveness of Nigeria highly rated private universities.

Limitations and Future Study.

The study aimed for five (5) participants drawn from the Principal Officers and key decision makers of each sample university, with the hope of gathering responses 25 respondents as sample size. However, two of the universities returned only one (1) questionnaire each as the consensus opinion of the entire principal officers. Two other universities returned three (3) completed questionnaire each. The researcher resorted to student version of the questionnaire to gather information from the students in order to make up for the only university that did not respond. Future studies should expand the scope by increasing the number of universities. The scope could include a blend of highly and lowly ranked universities for more diverse samples to identify some limiting factors not captured. Additionally, further studies could adopt interview method for data gathering from the key principal officers of the universities to provide more insight about the relationship between variables. Future studies should consider student admission enrollment from the Unified Tertiary Matriculation Examinations (UTME) as a basis of measuring and selecting competitive universities

Data Presentation and Analysis

This chapter presents the result of the data collected from the respondents after data analysis. The study gives the interpretation of the results as well as the implications of the results on the study.

Table 1 Descriptive Analysis and Normality Test

	Mean	Standard Deviation	Excess Kurtosis	Skewness
Academic Excellence	4.300	1.005	0.589	-1.319
Benchmark Improvement	4.600	0.490	-2.018	-0.442
Benchmark Reviews	4.500	0.806	-0.260	-1.240
Best Practices Engagement	4.600	0.490	-2.018	-0.442
Deliberate Measure	4.300	0.458	-1.242	0.945
Department Consideration	4.400	0.663	-0.446	-0.712
Differentiation Strategy	4.500	1.025	1.739	-1.812
Discipline Maintenance	4.600	0.490	-2.018	-0.442
Fees Attraction	4.000	1.000	-0.671	-0.650
Global Recognition	4.300	1.005	0.589	-1.319
International School Fees	3.500	1.285	-1.833	0.153
Modern Facilities	4.500	0.500	-2.235	
National School Fees	4.300	1.100	-0.389	-1.152
Need Response	4.000	1.000	-0.671	-0.650
Program Introduction	4.200	0.980	0.359	-1.133
Quality Facilities	4.100	0.943	0.335	-0.991
Ranking	4.300	0.900	2.267	-1.569
Standard Recruitment	4.400	1.020	1.036	-1.544
Student Parent Relationship	4.000	1.000	-0.671	-0.650
World Best Practices	4.800	0.400	0.699	-1.624

Source: SmartPLS Output, 2025

Table 1 presents the mean, standard deviation, excess kurtosis, and skewness for various factors related to academic excellence and benchmarking in Nigerian private universities. The mean scores range from 3.500 to 4.800, indicating a generally positive perception among respondents regarding these factors. For instance, the highest mean score of 4.800 for "World Best Practices" suggests that respondents see this as a critical area for competitiveness. The standard deviations vary, with values like 0.400 for "World Best Practices" indicating low variability in responses, while a higher standard deviation of 1.285 for "International School Fees" suggests more diverse opinions on this issue. The skewness values, particularly the negative values for "Academic Excellence" (-1.319) and "Discipline Maintenance" (-1.812), indicate that responses are skewed towards higher ratings, suggesting a favorable view among respondents. The kurtosis values further imply that the distribution of responses is peaked, indicating consensus on these measures. These findings highlight the importance of benchmarking as a strategy for enhancing competitiveness in Nigeria's private universities, suggesting that institutions should focus on best practices to boost their academic reputation.

Figure 1 Assessment of Measurement Model

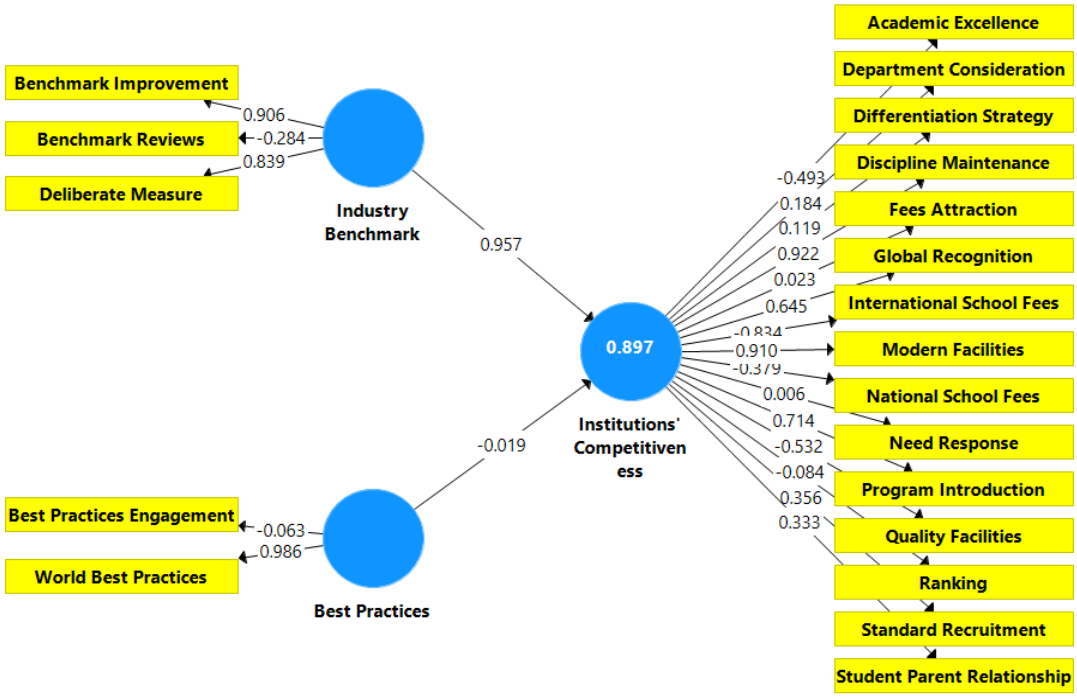

Figure 1: A path model of Benchmarking and Competitiveness of Nigeria Private Universities **Source:** SmartPLS Output, 2025

The structural model in figure 1 demonstrates the influence of benchmarking practices on institutional competitiveness in Nigerian private universities. Against the 0.5 threshold, Industry Benchmark shows strong indicator loadings for benchmark improvement (0.906) and deliberate measure (0.839), while benchmark reviews (-0.284) falls below the threshold and should be reconsidered. Best Practices exhibits one strong loading for world best practices (0.986), while best practices engagement (-0.063) falls below the benchmark. The relationship analysis reveals Industry Benchmark has a substantial positive impact (0.957) on institutional competitiveness, while Best Practices shows a negligible negative effect (-0.019). For competitiveness indicators, several measures exceed the 0.5 threshold, including global recognition (0.922), modern facilities (0.910), and need response (0.714), validating these as reliable measures. The implications for Nigerian private universities are clear. Focusing on industry benchmarking, particularly through improvement initiatives and deliberate measures, significantly enhances competitive advantage. However, the weak influence of best practices suggests that merely adopting global best practices without proper contextualization may not effectively improve competitiveness. Universities should prioritize structured benchmark improvement processes while ensuring best practices are adapted to local contexts.

Table 2 Construct Reliability and Validity

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Best Practices	**0.785**	**0.855**	**0.588**
Industry Benchmark	**0.733**	**0.805**	**0.535**
Institutions' Competitiveness	**0.714**	**0.750**	**0.584**

Source: SmartPLS Output, 2025

Table 2 showcases the reliability and validity metrics for the constructs measured in the study. Cronbach's Alpha values above 0.7 for all constructs indicate good internal consistency, with "Best Practices" scoring 0.785, "Industry Benchmark" at 0.733, and "Institutions' Competitiveness" at 0.714. Composite reliability scores further confirm these findings, with all values above the recommended threshold of 0.7. Additionally, the Average Variance Extracted (AVE) scores, particularly 0.588 for "Best Practices," suggest that these constructs explain a significant amount of variance in the data. This robust reliability and validity suggest that the constructs are well-defined and accurately measured the intended concepts, reinforcing the study's credibility. The

implications for Nigerian private universities are profound, as they can confidently use these constructs to evaluate their competitive strategies and make informed decisions based on reliable data.

Table 3 Discriminant Validity

	Best Practices	Industry Benchmark	Institutions' Competitiveness
Best Practices	**0.767**		
Industry Benchmark	0.532	**0.731**	
Institutions' Competitiveness	0.489	0.947	**0.764**

Source: SmartPLS Output, 2025

Table 3 illustrates the discriminant validity among the constructs. The values indicate that each construct is distinct from the others, with the highest correlation between "Best Practices" and "Industry Benchmark" (0.767), which still suggests a significant degree of uniqueness among constructs. This finding is critical as it confirms that the constructs do not merely overlap but rather provide distinct insights into the factors influencing competitiveness in Nigerian private universities. The implications of this discriminant validity are substantial; universities can tailor their strategies more effectively when they understand how these constructs interact and influence each other. This understanding can lead to more targeted interventions that enhance overall competitiveness.

Multicollinearity

This assesses the correlation between the independent variable. It is to know if two independent variables are not correlated and producing the same result. The variance inflation factor (VIF) is used in this study to assess likely correlation between the independent variables.

Table 4 Inner VIF Values

	Best Practices	**Industry Benchmark**	**Institutions' Competitiveness**
Best Practices			**1.394**
Industry Benchmark			**1.394**
Institutions' Competitiveness			

Source: SmartPLS Output, 2025

The Inner Variance Inflation Factor (VIF) values in Table 4 assess multicollinearity among the independent variables. With VIF values around 1.394 for both "Best Practices" and "Industry Benchmark," the results suggest that multicollinearity is not a significant issue in this study. This is crucial because it indicates that the independent variables can be considered separately without concern for inflated standard errors due to multicollinearity. The implications for Nigerian private universities are that they can confidently analyze the impact of each independent variable on competitiveness without the risk of misleading results due to overlapping influences.

Table 5 Bootstrapping Results Showing Path Coefficient for Structural Model

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Best Practices -> Institutions' Competitiveness	-0.019	-0.025	0.220	0.088	**0.930**
Industry Benchmark -> Institutions' Competitiveness	0.957	0.913	0.272	3.517	**0.000**

Source: SmartPLS Output, 2025

Table 5 presents the bootstrapping results for the path coefficients in the structural model. The path from "Industry Benchmark" to "Institutions' Competitiveness" shows a strong positive coefficient of 0.957 with a t-statistic of 3.517 and a p-value of 0.000, indicating a statistically significant relationship. In contrast, the path from "Best Practices" to "Institutions' Competitiveness" has a coefficient of -0.019, which is not statistically significant (p = 0.930). This suggests that while industry benchmarks are critical for enhancing competitiveness, best practices may not have the same direct impact. The implications for Nigerian private universities are clear: focusing on industry benchmarks could yield significant improvements in competitiveness, while best practices might require re-evaluation or a more nuanced application.

Table 6 Coefficient of Determination Score

	R Square	R Square Adjusted
Institutions' Competitiveness	0.897	0.884

Source: SmartPLS Output, 2025

Table 6 indicates the R-squared value of 0.897 for "Institutions' Competitiveness," suggesting that approximately 89.7% of the variance in competitiveness can be

explained by the independent variables in the model. This high R-squared value underscores the model's explanatory power and indicates that the constructs examined are highly relevant to understanding competitiveness in Nigerian private universities. The implications are significant; universities can utilize this model to predict competitiveness outcomes based on their benchmarking and best practices, allowing for strategic planning and resource allocation.

Table 7 Assessment of the Effect Size (f^2)

	Best Practices	Industry Benchmark	Institutions' Competitiveness
Best Practices			**0.003**
Industry Benchmark			**6.353**
Institutions' Competitiveness			

Source: SmartPLS Output, 2025

Table 7 assesses the effect size (f^2) for the independent variables. The f^2 value for "Industry Benchmark" is notably high at 6.353, indicating a large effect size and suggesting that improvements in industry benchmarking can substantially enhance institutions' competitiveness. In contrast, "Best Practices" shows an effect size of 0.003, indicating a negligible impact. This finding reinforces the importance of prioritizing industry benchmarks in strategic planning for Nigerian private universities, as they are likely to yield more significant competitive advantages compared to merely adopting best practices.

Results and Discussion

The path coefficient from "Industry Benchmark" to "Institutions Competitiveness" (0.957) demonstrates a strong and statistically significant positive effect, indicating that universities that adopt robust industry benchmarks can significantly enhance their competitive standing. This aligns with Al-kharabsheh (2020) who found that benchmarking can provide solutions to improve activities and provide benchmark comparators in the development of comprehensive measurement frameworks. Conversely, the path from "Best Practices" to "Institutions' Competitiveness" (-0.019) shows no significant impact, suggesting that simply adopting best practices may not be sufficient for improving competitiveness in the context of Nigerian private universities. This finding resonates with Johanson and Madsen (2022) who disclosed

that benchmarking is used in conjunction with other management accounting and control practices. It was also found that non-users of benchmarking tend to use quality management systems more than benchmarking users. The results from the current study indicate that "Industry Benchmark" is a pivotal factor influencing the competitiveness of Nigerian private universities, as evidenced by its strong path coefficient and significant statistical relationship. In contrast, "Best Practices" appears to have a negligible impact on competitiveness, suggesting that Nigerian private universities may need to rethink their strategies regarding the adoption of best practices. Therefore, the findings imply that a strategic focus on industry benchmarking is essential for enhancing competitiveness in the increasingly competitive landscape of higher education in Nigeria.

Conclusion and recommendations

The data from the respondents indicate that top Nigerian universities practice benchmarking in their managerial decision. Some of the institutions have successfully implemented benchmarking strategies to improve their academic offerings and operational efficiency. The study highlights the critical role of industry benchmarking in enhancing the competitiveness of Nigerian private universities. The strong positive relationship between industry benchmarks and institutional competitiveness underscores the necessity for universities to adopt benchmarking practices to remain competitive. In contrast, the negligible impact of best practices suggests that best practice should be approached with caution and tailored to specific institutional contexts. From the above, the study recommends as follows:

i. Nigerian private universities should prioritize the implementation of robust industry benchmarking practices by establishing partnerships with leading institutions both locally and internationally to share best practices and performance metrics.
ii. Universities should invest in training of staff on effective benchmarking techniques with technologies to collect and analyze data efficiently.
iii. Focusing on industry benchmarks can help universities to create a culture of continuous improvement that drives competitiveness and attracts more students.

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