



## Reimagining STEM Education in Indigenous Languages: Are Secondary School Physics Teachers Ready?

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### Abstract

*Persistent underachievement in senior secondary school physics continues to threaten the realization of Nigeria's STEM development goals. National examination reports from WAEC, NECO, and UTME consistently indicate unsatisfactory performance in Physics, with failure rates exceeding 50% in several years, despite repeated curriculum reforms and pedagogical innovations. This study critically examines language of instruction as a fundamental but underemphasized factor influencing students' conceptual understanding of Physics, drawing on the renewed advocacy by the Science Teachers Association of Nigeria (STAN) for the integration of indigenous languages into STEM education. Guided by sociocultural and cognitive learning theories, the study synthesizes empirical evidence demonstrating that instruction in learners' familiar languages reduces cognitive load, enhances comprehension of abstract scientific concepts, and improves long-term retention. Historical insights from the Ife Six-Year Primary Science Project further highlight the pedagogical viability of mother-tongue science instruction while exposing systemic challenges related to policy inconsistency and resource development. Survey data collected from 44 secondary school Physics teachers reveal moderate overall readiness to teach Physics using indigenous languages (mean  $\approx 2.37$  on a 4-point scale), but limited professional preparation, with only 11.4% reporting prior training in indigenous-language STEM instruction. Inferential analyses show no statistically significant differences in readiness based on gender, school type, teaching experience, or qualification, suggesting that constraints are largely structural rather than individual. The study concludes that while indigenous-language-based Physics instruction holds substantial cognitive and educational promise, its effective implementation requires deliberate policy commitment, systematic teacher training, standardized scientific terminology, and sustained instructional support.*

**Keywords:** Physics, Indigenous Languages, STEM Education, Teachers Readiness

### Introduction

The decision of the Science Teachers Association of Nigeria (STAN) to re-ignite the language issue in relation to STEM education during her 65th Annual Conference is not only timely, it is indeed a bold and visionary step towards decolonizing science education and bridging the gap between scientific knowledge and cultural identity. Despite decades of educational reforms, the persistent poor achievement of students in secondary school physics remains a pressing concern in Nigeria. Evidence from the three major terminal examinations—namely the West African Senior School Certificate Examination (WASSCE) conducted by the West African Examinations Council (WAEC), the National Examination Council (NECO), and the Unified Tertiary Matriculation Examination (UTME)—consistently reflects low performance levels in physics (Akanbi & Kolawole, 2021; WAEC, 2022). Beyond poor achievement, students' declining interest and negative attitude toward physics present an equally troubling challenge, as many perceive the subject as abstract, difficult, and irrelevant to their daily experiences (Okoli & Ogbeba, 2020). In response, several instructional reforms have been introduced, shifting from traditional teacher-centered lecture methods to more interactive, student-centered approaches such as inquiry-based learning, simulations, and problem-solving strategies. However, the anticipated improvement in students' performance and engagement has remained minimal (Ogunleye & Adeyemo, 2021). Comparative analyses further show that Nigeria's gains



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in science education, particularly in physics, are still highly unsatisfactory when compared with nations in the Asian continent that have prioritized innovation in science education, teacher quality, and contextualized pedagogy (Lee & Tan, 2018; World Bank, 2021). This enduring gap underscores the urgent need to rethink pedagogical frameworks and to explore culturally responsive strategies, such as the integration of indigenous languages, in order to make physics more accessible, meaningful, and transformative for Nigerian learners. Therefore, rethinking instructional delivery in indigenous Nigeria languages is not out of place. Although, this initiative is not a recent development, it can be traced to the early effort of Babatunde Fafunwa, one time Minister for Education in Nigeria who coordinated the “Ife Six-Year Yoruba Language Primary Science Project,” The project which was initiated in 1970 at the University of Ife (now Obafemi Awolowo University), sought to use Yoruba language, a widely spoken indigenous language in South West Nigeria, as the medium of instruction for teaching science at the primary level. The philosophy underpinning the project was straightforward: children learn more effectively, meaningfully, and productively when taught in their mother tongue rather than in a foreign or colonial language (Adeoye et al., 2020). Although, the groundbreaking project was not without challenges before it was finally jettisoned as failed curriculum programme. A major difficulty was the lack of equivalent scientific terms in Yoruba, which necessitated the creation of new terminologies or the adaptation of existing ones. Another challenge was the diversity of Yoruba dialects, which complicated efforts to establish standardized vocabulary. Additionally, concerns arose regarding the transition of pupils to higher institutions where Yoruba-medium instruction was unavailable. Fafunwa himself acknowledged that this posed a significant limitation to the project’s long-term sustainability (Adeoye et al., 2020). Nonetheless, this pioneering effort laid the groundwork for contemporary discussions about the role of indigenous languages in decolonizing STEM education. Reflecting on STEM and language more than fifty years after Fafunwa’s innovation is not only relevant but also urgent in light of Nigeria’s educational realities today.

Language has long been recognized as a central factor in education, particularly in the teaching of STEM subjects, which demand high levels of conceptual understanding. Physics, as a core science subject, exemplifies this challenge. Abstract concepts in physics, such as energy, momentum, and electromagnetism are deeply linguistic in nature, requiring precise terminology for comprehension. In many African and Asian countries, including Nigeria, these subjects are traditionally taught in colonial languages such as English, French, and Portuguese (Brock-Utne, 2017). While this practice reflects global academic trends, it often alienates learners who struggle with limited proficiency in the language of instruction. The need to decolonize education by integrating local languages into STEM teaching has gained renewed attention. Scholars such as Bamgbose (2000) argue that local languages can enhance comprehension, reduce cognitive barriers, and foster greater learner engagement. Vygotsky’s (1978) socio-cultural theory of learning further supports this perspective, emphasizing that students internalize knowledge more effectively when instruction is delivered in a language they deeply understand. Similarly, Cummins (2000) highlights the role of linguistic familiarity in improving abstract reasoning and conceptual transfer. Taken together, these theories underscore the importance of language as a tool for both communication and cognition in STEM education.

Research in cognitive science has consistently demonstrated the advantages of mother-tongue instruction. Bialystok (2022) notes that learners grasp complex ideas more effectively when taught in a familiar language, largely because their cognitive load is reduced. Without the additional burden of translating between languages, learners can focus directly on the conceptual demands of STEM subjects. Neuroscientific evidence also indicates that native languages form deeply ingrained neural pathways, which provide a foundation for future learning (Kuhl, 2023). When science is taught in local Nigerian languages such as Yoruba, Hausa, or Igbo, these neural pathways are activated, leading to deeper comprehension and improved retention of knowledge. Equally important is the cultural dimension of language use in education. Language is not only a tool of communication but also a carrier of culture, shaping how people perceive and interact with the world (Mother Language in Science Education and Communication, 2023). By incorporating indigenous languages into STEM instruction, scientific concepts can be linked to learners lived experiences, making them more relatable and meaningful. For example, the initiative “Science in Yoruba” demonstrates how scientific ideas can be expressed within Yoruba’s linguistic framework through either extension of existing words or through careful borrowing and adaptation (Science in Yorùbá, 2024). Such efforts highlight the feasibility of embedding scientific knowledge within local cultural contexts, thereby fostering scientific discourse that extends beyond the classroom into everyday community life. Today, different



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instructors of science have emerged on the social media using the indigenous languages to promote STEM education. Subjects such as mathematics and chemistry have gained prominence in this regard (<https://www.youtube.com/shorts/broKcG05sMw>; <https://www.youtube.com/shorts/dMjfv55oQg>) Studies conducted across Africa consistently indicate that learners achieve better academic outcomes when instruction is delivered in their mother tongue rather than in a foreign language. Evidence from Ethiopia, for example, shows that pupils taught science in local languages outperform their counterparts taught in foreign languages in terms of examination scores, confidence levels, and practical competence (Learning Science Through the Mother's Tongue in Ethiopian Primary Schools, 2023). These findings suggest that the use of familiar languages enables learners to engage more deeply with scientific content. In the Nigerian context, similar gains are anticipated if indigenous languages are systematically integrated into STEM instruction. Teaching science through languages spoken at home helps bridge the divide between learners' everyday experiences and formal schooling, thereby allowing scientific ideas to build upon learners' existing linguistic and cultural knowledge frameworks. This approach is also consistent with widely accepted pedagogical principles that emphasize progression from the known to the unknown. When instruction draws on learners' prior linguistic and cultural experiences, abstract and complex STEM concepts become more accessible and less intimidating (Adetunji & Olagunju, 2021). As a result, students are more likely to develop strong problem-solving skills and positive attitudes toward science learning. These outcomes are particularly significant for Nigeria, where scientific literacy and innovation are central to national development goals.

Despite its advantages, the integration of indigenous languages into STEM education faces substantial challenges. One major difficulty is the lack of standardized scientific terminology in Nigerian languages. Many advanced scientific and physics concepts have no direct equivalents in languages such as Yoruba, Hausa, or Igbo. Although initiatives such as "Science in Yoruba" have contributed to the development of new terminologies, the process remains incomplete and requires ongoing linguistic creativity and broad stakeholder consensus (Terminological Development for Teaching and Learning Physics in the Igbo Language, 2025).

Another critical challenge is the scarcity of instructional materials in indigenous languages. The limited availability of textbooks, laboratory manuals, and teaching aids constrains teachers' ability to adopt indigenous-language instruction. Producing such resources demands substantial financial investment, collaboration between scientists and linguists, and sustained policy commitment (Federal Ministry of Education, 2023). Teacher preparedness further compounds the problem. Even when teachers are fluent speakers of local languages, many lack the pedagogical training or confidence required to teach complex scientific concepts effectively in those languages (Eze, 2022). Nigeria's linguistic diversity also poses logistical and policy challenges. With over 500 indigenous languages, decisions about which languages to prioritize inevitably raise concerns about equity and inclusion. While Yoruba, Hausa, and Igbo are widely spoken, an exclusive focus on these languages risks marginalizing minority language groups, making balanced policy implementation essential (Stakeholders Express Mixed Feelings, 2017). Nevertheless, several pathways exist for gradual integration. Introducing indigenous-language instruction at the primary level is particularly promising, as learners at this stage are most comfortable using their mother tongue (Revisiting African Education, 2010). A bilingual or multilingual model that combines indigenous languages with English may offer a practical compromise, preserving the benefits of mother-tongue instruction while maintaining access to English as the global language of science (How Language Barriers Are Impeding Science Learning, 2025). Ultimately, while the cognitive and cultural benefits of indigenous-language instruction are well established (Bialystok, 2022; Adegbija, 2021; UNESCO, 2023), implementation remains limited, largely due to issues of teacher readiness. Addressing gaps in terminology, training, and resources—alongside empirical investigation of teacher preparedness across school types and locations (Jegade, 2021; Akinyemi, 2022)—is crucial. This study therefore seeks to provide evidence that can inform policies aimed at making STEM education in Nigeria more inclusive, effective, and culturally responsive.

### **Objectives of the Study**

The main objective of this study is to examine secondary school physics teachers' readiness to teach physics using indigenous Nigerian languages. Other specific objectives include:

1. To examine the influence of gender on secondary school physics teachers' readiness to teach physics in indigenous Nigerian languages.



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2. To investigate the extent to which school type (public and private) affects teachers' readiness to integrate indigenous languages in physics instruction.
3. To determine how school location (urban and rural) influenced physics teachers' readiness to teach physics in local languages
4. To examine how years of teaching experience influenced physics teachers' readiness to adopt indigenous-language in physics classrooms.
5. To find out how academic qualifications influenced physics teachers' readiness to teach physics using indigenous Nigerian languages.

### Research Questions

1. What opinion do secondary school physics teachers hold in their readiness to teach physics using indigenous languages?
2. How does gender influence secondary school physics teachers' readiness to teach physics in indigenous Nigerian languages?
3. To what extent does school type (public versus private) affect teachers' readiness to integrate indigenous languages into physics instruction?
4. In what ways does school location (urban versus rural) influence the readiness of physics teachers to teach physics in indigenous Nigerian languages?
5. How do years of teaching experience affect physics teachers' readiness to adopt indigenous-language pedagogy in physics classrooms?
6. What is the impact of academic qualifications on teachers' readiness to teach physics using indigenous Nigerian languages?

### Methodology

This study employed a quantitative, cross-sectional survey design to examine secondary school physics teachers' readiness to teach physics using indigenous Nigerian languages. A survey approach is appropriate for eliciting self-reported perceptions, attitudes, and beliefs at a single point in time and is widely applied in educational research contexts (Creswell & Creswell, 2018). The target population comprised secondary school physics teachers who are members of the Science Teachers Association of Nigeria (STAN) WhatsApp community, which includes approximately 300 active participants. A Google Form questionnaire link was shared within the group, yielding responses from 44 teachers and a response rate of 14.6%. Although the response rate appears modest, it is consistent with participation levels commonly reported for online and mobile-based surveys, particularly those administered via WhatsApp and similar platforms (Manji et al., 2021). Recent methodological studies further indicate that online educational surveys often achieve response rates within this range due to voluntary participation, varying digital literacy, and differential access to internet-enabled devices (Torrejón Guirado et al., 2024). As such, the achieved sample is comparable to those reported in similar empirical studies. Data were collected using a researcher-developed instrument titled *Questionnaire on Readiness to Deliver Physics Instruction in Local Languages (Q-REDEPHILL)*. The questionnaire comprised two sections: Section A captured demographic and professional characteristics, including gender, school type, school location, highest academic qualification, and years of teaching experience. Section B consisted of 26 four-point Likert-type items (1 = Strongly Agree to 4 = Strongly Disagree) designed to measure dimensions such as teachers' readiness, confidence, perceived benefits to students, perceived challenges, and institutional support for indigenous-language physics instruction. For inferential analysis, a readiness composite score was computed as the unweighted mean of four items assessing knowledge of local-language physics terminology, confidence in explaining complex concepts, ability to translate physics content, and adaptability of teaching style. Lower composite scores indicated higher self-assessed readiness. Face validity was established through expert review, while internal consistency was assessed using an ordinal reliability coefficient appropriate for Likert-scale data (Chalmers, 2017; Park, 2024). A pilot test (n = 25) yielded an ordinal alpha of 0.78, indicating acceptable reliability, with confidence intervals estimated via bootstrap procedures in line with current recommendations (Kennedy & Orheruata, 2022; Park, 2024). Data cleaning involved removing duplicates and invalid entries, followed by recoding and composite score computation. Analysis was conducted using Python (NumPy and SciPy), incorporating descriptive statistics, independent-samples t-tests, one-way ANOVA, permutation tests, bootstrap confidence intervals (4,000 replications), and Cohen's *d* effect sizes to ensure robust and transparent inference (Harpe, 2015; Amrhein et al., 2019; Lakens, 2017).



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### Presentation of Results

A total of 44 secondary school physics teachers participated in the study. The demographic distribution shows that most respondents were male (72.7%), while 27.3% were female. Slightly more than half (52.3%) had between 11–20 years of teaching experience, 38.6% had over 21 years of experience, and only 9.1% had 0–10 years. In terms of qualification, 47.7% held B.Sc/B.Ed degrees while 52.3% possessed M.Sc/M.Ed degrees. The majority of teachers (77.3%) worked in public schools, whereas 22.7% were employed in private schools. Furthermore, most taught in urban locations (65.9%) while 34.1% taught in rural areas. Importantly, only 11.4% reported ever receiving training on using indigenous languages to teach physics. Table 1 presents the demographic information.

**Table 1: Demographic Characteristics of Respondents**

Variable	Category	Frequency	Percentage
Gender	Male	32	72.7
	Female	12	27.3
Teaching Experience	0-10	4	9.1
	11-20	23	52.3
	21+years	17	38.6
Academic Qualification	B.Sc/B.Ed	21	47.7
	M.Sc/M.Ed	23	52.3
School Ownership	Public	34	77.3
	Private	10	22.7
School Location	Urban	29	65.9
	Rural	15	34.1
Training on Local-Language Teaching	Yes	5	11.4
	No	39	88.6

### Teachers' Readiness to Teach Physics Using Indigenous Languages

To understand teachers' level of preparedness for delivering physics instruction in indigenous languages, descriptive statistics were computed for each readiness component. Overall, the findings indicate moderate readiness, with notable variation across sub-dimensions. As presented in Table 2, teachers reported the highest perceived readiness in their *knowledge of physics terms in local languages* ( $M = 2.76$ ,  $SD = 1.01$ ), suggesting some familiarity with indigenous vocabulary used in physics instruction. Conversely, scores related to *perceived challenges* were relatively low ( $M = 1.98$ ,  $SD = 0.79$ ), indicating that teachers anticipate significant barriers in implementing indigenous-language instruction. Confidence in translating physics concepts ( $M = 2.30$ ,  $SD = 0.90$ ) and perceived benefits to students ( $M = 2.45$ ,  $SD = 0.90$ ) fell within the mid-range, showing moderate belief in the practicality and potential impact of the initiative.

**Table 2: Summary of Teachers' Readiness Scores**

Readiness Component	Mean	SD
Knowledge of physics term in local language	2.76	1.01
Confidence translating physics concepts	2.30	0.90
Perceived student benefits	2.45	0.90
Perceived challenges	1.98	0.79

### Group Differences in Readiness

Group-based descriptive comparisons were conducted to examine whether teachers' readiness varied according to demographic and professional characteristics. As shown in Table 3, the mean readiness scores across groups were generally close, indicating minimal practical differences. For instance, female teachers reported slightly higher readiness ( $M = 2.43$ ,  $SD = 0.67$ ) than males ( $M = 2.20$ ,  $SD = 0.54$ ), while public and private school teachers demonstrated almost identical readiness levels ( $M = 2.27$  and  $2.26$  respectively). Differences across qualification levels and teaching experience were also small. Notably, teachers with 0–10 years of experience recorded the highest mean score ( $M = 2.50$ ,  $SD = 1.29$ ), though the high standard deviation suggests substantial variability within this subgroup.



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**Table 3. Group Mean Differences in Readiness**

Variables	Category	Frequency	Mean	SD
Gender	Male	32	2.20	0.54
	Female	12	2.43	0.67
School Type	Private	10	2.26	0.73
	Public	34	2.27	0.54
School Location	Urban	29	2.32	0.60
	Rural	15	2.17	0.53
Highest Level of Qualification	M.Sc./M.Ed	22	2.26	0.53
	B.Sc./B.Ed	21	2.25	0.63
Years of Teaching Experience	0-10 years	4	2.50	1.29
	11-20 years	23	2.30	0.47
	21 years and above	17	2.18	0.51

To statistically determine whether the observed group differences were meaningful, inferential tests were conducted, including independent samples t-tests, permutation tests, bootstrap confidence intervals, Cohen's *d*, and one-way ANOVA where appropriate. The results, summarized in Table 4, reveal that none of the demographic or professional variables significantly predicted readiness. The gender difference, though directionally favoring female teachers, was not statistically significant ( $t = -1.14, p = .26$ ), and the permutation test corroborated this finding ( $p = .26$ ). Similarly, school type, location, and qualification all produced non-significant results, with bootstrap confidence intervals for mean differences crossing zero in all cases. Effect sizes (Cohen's *d*) ranged from  $-0.39$  to  $0.27$ , indicating uniformly small effects. A one-way ANOVA examining differences across teaching experience levels also found no statistically significant effect ( $F = 0.56, p = .58$ ). This suggests that readiness to teach physics in indigenous languages is relatively uniform across teacher groups, regardless of background or experience.

**Table 4. Inferential Statistics Summary**

Comparison	Test	Test statistic	p-value	Permutation p	Mean Difference (Bootstrap 95% CI)	Cohen's <i>d</i> (Bootstrapped 95% CI)	Interpretation
Gender	t-test	-1.14	0.26	0.26	-0.23(-0.65,0.17)	-0.39 (-1.09,0.35)	Not Significant
School Type	t-test	-0.05	0.96	0.97	-0.01 (-0.50,0.42)	-0.02 (0.82,0.87)	Not Significant
Location	t-test	0.85	0.40	0.41	0.16 (-0.18,0.45)	0.27 (0.32,0.90)	Not Significant
Qualification	t-test	0.03	0.98	1.00	0.01 (-0.34,0.34)	0.01 (0.56,0.69)	Not Significant
Experience	ANOVA	0.56	0.58				Not Significant

## Discussion of Findings

This study investigated secondary school physics teachers' readiness to teach physics using local languages, focusing on perceived competence, confidence, and adaptability. The overall moderate readiness score ( $M = 2.37, SD = 0.76$ ) suggests that while teachers are not opposed to the idea, they may not feel fully prepared to implement local language instruction in physics classes. This aligns with research on teacher readiness in related domains, where moderate readiness often reflects positive beliefs about innovation coupled with a recognition of practical and pedagogical challenges (e.g., surveys of teacher readiness for blended or digital learning) (Gülsemin Durmuş Çemçem et al., 2024). Teachers scored highest on items assessing their knowledge of physics terminology and their perceived ability to translate concepts into local languages. This suggests that teachers recognize the importance of linguistic accessibility, which echoes findings in studies of language integration in education, where familiarity with local linguistic contexts is associated with greater instructional confidence (e.g., community-based language instruction research) (Ezepue et al., 2023). However, the lower readiness in adapting teaching strategies indicates that knowledge alone may not be sufficient without pedagogical support and training — a finding consistent with research showing that teachers often feel constrained by a lack of institutional or instructional



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support, even when they value instructional innovations (e.g., readiness for technology integration) (Gülsemin Durmuş Çemçem et al., 2024). The inferential analyses revealed no statistically significant differences in teachers' readiness across gender, school type, school location, years of experience, or qualification levels. Although this finding may appear unexpected, it suggests that perceptions and challenges associated with indigenous-language instruction are widely shared among teachers, regardless of demographic or professional background. Similar patterns have been reported where pervasive structural barriers, such as limited training and instructional resources, outweighed contextual differences (Ezepue et al., 2023). Additionally, the relatively small and uneven subgroup sizes ( $N = 44$ ) may have limited the detection of subtle effects; however, the application of permutation tests and bootstrap confidence intervals strengthens the robustness of the findings and confirms that observed effects were negligible to small (Gülsemin Durmuş Çemçem et al., 2024). Furthermore, years of experience and formal qualifications alone may not translate into competence in localized pedagogy, particularly when teacher education programs insufficiently emphasize indigenous-language instructional strategies, resulting in uniformly moderate readiness across groups (Dzormeku et al., 2024). The findings have important implications for professional development and policy. Moderate readiness — particularly around applying localized teaching strategies — underscores the need for targeted in-service training, curriculum support, and instruction materials developed in local languages. International evidence indicates that successful implementation of local or bilingual instruction requires more than positive attitudes; it demands structured preparation, adequate materials, and continuous support systems for teachers (e.g., studies of local language instruction initiatives in Nigerian and African education contexts) (Ezepue et al., 2023). Furthermore, the uniformity of readiness across groups suggests that interventions should be system-wide rather than targeted at specific demographics. Training programs that focus on pedagogical adaptation, bridging subject content with local language competencies, and reflective practice are likely to be beneficial.

While this study contributes novel empirical evidence on physics teachers' readiness to teach in local languages, several limitations should be acknowledged. The use of self-report measures may be subject to social desirability bias. The small sample size and cross-sectional design limit causal inference, though the use of robust resampling methods strengthens the reliability of findings under these constraints. Future research could employ longitudinal designs and mixed methods to capture evolving perceptions and contextual factors in more depth.

## Conclusion

This study investigated secondary school physics teachers' readiness to teach physics using local languages in Nigeria, and the findings revealed a moderate overall readiness score, reflecting a balance between positive attitudes and perceived limitations in instructional competence. Moderate readiness, in contexts where teachers acknowledge the *value of localized instruction but lack full confidence or systematic training*, aligns with research showing that teachers' beliefs about language use influence their instructional practices in linguistically diverse settings (Rinker & Ekinici, 2025). Teachers' higher scores on content knowledge and translation ability affirm that many educators recognize the benefits that local languages can bring to conceptual understanding. However, lower scores in adapting teaching strategies indicate a need for targeted professional development—something education research consistently emphasizes when pedagogical innovation is required (Obiakor, 2024). The absence of significant group differences (e.g., by gender, school type, experience) suggests that the perceived challenges and readiness levels are shared widely across diverse teacher subgroups, rather than concentrated among specific demographics. This pattern mirrors findings from research on language of instruction policies in Nigeria, where differences in implementation often reflect systemic constraints rather than individual teacher characteristics (Obiakor, 2024). Given that Nigeria's educational policy environment mandates localized instruction at early grades—but shows mixed implementation outcomes in secondary settings—the current results point to the importance of *institutional support systems*, resource development, and sustained teacher training initiatives. Research on language of instruction policy indicates that policy adherence varies by context and highlights the need for curriculum alignment and teacher readiness planning to support multilingual instruction (Obiakor, 2024). Moreover, educational research on multilingualism underscores that teachers' beliefs and preparedness for multilingual classrooms shape student learning outcomes and instructional strategies, suggesting that teacher education programs should embed linguistic diversity competencies into both pre-service and in-service training (Rinker & Ekinici, 2025).



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Despite the study's modest sample size, the use of resampling methods (permutation tests and bootstrap confidence intervals) strengthened the reliability of inferences under minimal statistical assumptions. This approach aligns with contemporary statistical guidance for small-sample educational research and provides robust evidence for interpreting group comparisons even when classical assumptions are not fully satisfied (Neuhäuser & Ruxton, 2024). Overall, the findings contribute valuable insight into the readiness of Nigerian secondary school physics teachers to adopt local language pedagogy, indicating that while teachers generally recognize its potential benefits, more comprehensive professional development, instructional resources, and policy support are required to translate readiness into effective classroom practices.

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