Framing Towards Culturally Relevant Practice in Nigeria High school Physics Education

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Abstract

Physics education in Nigeria is often critiqued for being **overly theoretical** and disconnected from **students' cultural contexts** and everyday lives. While students struggle to relate physics concepts to their lived experiences, teachers themselves are frequently blamed for lacking innovative or student-centered approaches. However, this perspective often overlooks the **colonial legacies and systemic barriers** that shape how teachers were trained and the resources available to them.

This study uses interviews with two in-service physics teachers in Nigeria to examine how they navigate these constraints and strive to reframe physics teaching in ways that resonate with their students.

Context

- Students enter school with diverse epistemologies, informed by **rich cultural traditions and practical knowledge rooted in their varied ethnic backgrounds**. However, Nigeria's education system is largely modelled on Western/colonial structures inherited from British Colonization.
- Nigeria's physics curriculum aims to prepare students for meaningful societal participation and a changing world. In partnership with international donors, the revised curriculum emphasizes Western scientific approaches, often marginalizing students' local ways of knowing, thinking, and doing science.
- Teachers in **Nigeria are often blamed when students struggle with physics,** with critics suggesting they simply have deficit mindsets about students or fail to teach in engaging ways. Yet, much less attention is paid to the colonial legacies and systemic structures that shape how teachers themselves were trained and the resources they have access to

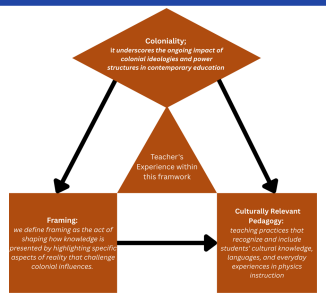
Methodology

- **Professional Development:** The participants for this study were teachers with whom the first author had previously worked with during a science teacher professional development workshop organized in Nigeria in 2024 in promoting scientific literacy, a project sponsored by the British Government in Nigeria.
- **Participants:** Two in-service physics teachers with over 5-10 teaching experience (obi and Esther) from the PD.
- **Data Collection:** Semi-structed zoom interviews
- **Analysis**: We analyzed teacher transcripts as narratives to explore how they frame instruction, express colonial influences, and use culturally relevant pedagogy (CRP). Through multiple readings and two coding rounds, we identified key ideas and connected them to broader themes of framing, CRP and coloniality.

Theoretical Framework

At the top, coloniality represents the enduring impact of colonial ideologies on education systems, structuring what counts as valid knowledge and whose knowledge is prioritized. At the center, **the teacher's experience functions as a dynamic site of negotiation**. It is within this lived space that educators interpret, resist, or reproduce these colonial structures through their day-to-day instructional decisions.

On one side, framing captures **how teachers interpret and present knowledge, what they highlight, simplify, or challenge especially when contesting colonial logics.** On the other, culturally relevant pedagogy (CRP) reflects instructional approaches that draw from students' cultural knowledge, languages, and everyday experiences. The bidirectional arrow between framing and CRP shows their interdependence: how a teacher frames knowledge affects how culturally responsive their instruction can be and vice versa.



Research Question and Findings

RQ: How do Nigerian high school physics teachers frame the teaching of physics within a curriculum context shaped by colonial legacies?

(1) The Concept of Universal approach in Teaching Physics

Esther emphasizes the importance of global learning

> *"If a Nigerian student meets a UK student, they should be able to collaborate, discuss similar concepts, work on the same kinds of projects, even invent something together. It shouldn't be a case where one knows far more than the other because of the way physics was taught."*
> *Esther*

Obi offers a more grounded critique of this ideal, asserting,

> *"In principle, yes, because the concepts of physics are universal. But in practice, no. Students have different needs and challenges depending on where they are."*
> -Obi

These reflections show that while teachers value the universality of physics knowledge, they firmly reject a **one-size-fits-all pedagogical model.** Instead, they advocate for a contextualized and culturally responsive approach that considers students' local realities, literacy levels, and lived experiences.

(2) Coloniality's Impact on Teacher Mindsets

Both teachers expressed admiration for the advanced practical models and technological integration seen in countries like the U.S., Japan, and China.

> *"In countries like China, Japan, and even the U.S., children begin working on scientific projects from a very young age... That's why we see them doing amazing things in technology,"*
> -Obi

Esther emphasized the need for curriculum reform to "*catch up*" with technological advancement, indicating a sense of lag or inadequacy.

These narratives reveal how coloniality shapes not just curriculum content but also how teachers view their own capacities, systems, and students, often framing the West as the benchmark and Nigeria as perpetually behind. As a result, despite their creativity and dedication, **teachers may undervalue the cultural resources and pedagogical innovations already present within their own context.**

(3) The Task of a Large Classroom

Both Obi and Esther reveal that culturally responsive teaching in Nigerian physics classrooms requires intentional strategies to engage all students, particularly in contexts of overcrowded classrooms and limited resources.

Teacher Obi described how, in classes of up to 90 students, he uses group work as a practical method for inclusion, stating,

> *"Each group has one of the top-performing students as a leader... I make sure to mix students of different performance levels... this way, knowledge is distributed."* -Obi

This approach helps create a collaborative mindset where stronger students support others, and struggling learners gain confidence. He added, "I brought them forward, encouraged them despite their fear... I told them, 'I see you. You haven't quite grasped this yet. Let's fix that. -Obi

Esther emphasized the importance of allowing students to express physics ideas in their own words and linguistic contexts, stating

> *"Sometimes I call on students to interpret a concept in their own words after I've simplified it.- Esther*

In large and under-resourced classrooms, culturally relevant teaching is not just about what is taught, but also about how every student is seen, heard, and supported, even when structural limitations persist.

(4) Language, its Misconception, and Strength

Within the context of Nigerian classrooms, where students bring diverse linguistic and cultural resources, teachers face the dual task of navigating misunderstanding while also honoring these assets.

"Teacher Esther recounted how students referred to plastic buckets as "rubber," leading them to assume that plastics are elastic. "*They'd say, 'Give me that rubber,' even if it's plastic,"* she explained. Rather than rejecting this understanding, Esther used it as a framing opportunity, inviting students to bring materials from their homes to test and compare

Obi demonstrated how language and cultural expression could be used as a resource. In a lesson on sound waves, he explored harmonics by drawing from students' ethnic backgrounds and musical traditions.

> *You can take two Yoruba men singing the same song, and their voices will still sound different—the tone, texture, and rhythm show harmonics in action. Students learn that harmonics aren't just in guitars (which many have never seen) but also in their own voices and culture, those are instrument too.*
> *-Obi*

This study calls for a deeper interrogation of how CRP is understood and implemented in contexts like Nigeria, where historical and structural factors shape classroom dynamics in unique ways. It suggests that while Ladson-Billings' original CRP framework is foundational, it needs to be expanded and adapted to better capture the realities of Nigerian classrooms, particularly how teachers navigate large classes, limited resources, and uneven foundational knowledge.

Citations

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