Contextualizing Introductory Computer Science: Insights from African Faculty

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Abstract

Contextualizing computer science education has been recognized as a key factor in enhancing student engagement and learning outcomes. This study investigates the initial perceptions of university computer science faculty in Africa regarding the benefits, adoption challenges, and institutional support required for the successful integration of contextually relevant materials into introductory computer science (CS1) courses. Faculty then assessed a set of previously developed contextually tailored materials, grounded in Banks' Additive Approach to curriculum reform and aligned to the CS curricula 2023. The research adopted qualitative methods, gathering data through open-ended surveys from 22 CS faculty across 9 African countries. Thematic analysis identified key patterns in the responses from faculty, who generally expressed positive perceptions of integrating contextualized materials. They agreed such materials could enhance engagement without distracting from core objectives, but emphasized the need for careful integration. Insights from faculty highlighted that successful implementation requires substantial institutional support, including curriculum reform, textbook development, and faculty training, with universities playing a critical role in adoption.

CCS Concepts

• **Social and professional topics → Computing education**; **CS1**.

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1 Introduction

Across the globe, contextualization of educational materials plays a pivotal role in enhancing educational relevance and effectiveness [23, 28]. Tailoring educational content to specific cultural and regional contexts is crucial in Africa, where diverse cultures and unique societal challenges require customized teaching approaches. Some research highlights the success of contextualization in boosting students' engagement and understanding in CS, but challenges remain, including institutional constraints and a need for more culturally responsive teaching methods in Africa [26].

Our previous work has sought to address this need by creating contextually appropriate materials to guide African instructors in introductory CS (CS1) courses [18]. These materials, incorporating cultural elements such as architecture, art, cuisine, and social customs, were designed with Banks' Additive Approach to

Multicultural Education Reform, which involves appending culturally relevant content to the existing curriculum [8] and the ACM/IEEE/AAAI Computer Science Curricula 2023 (CS2023) [20] as a basis for CS1 content. These contextualized materials were pilot-tested with faculty in six African countries and aimed to facilitate a more culturally relevant and technically rigorous learning experience.

This study builds upon our previous work by investigating the materials in depth with 22 African CS faculty, to address the following research questions regarding the design of the materials:

RQ1: How do CS faculty perceive the importance of integrating contextually appropriate CS education materials in CS1 courses at African universities?

RQ2: How do CS faculty in Africa perceive the balance between maintaining technical rigor and integrating cultural relevance in CS1 materials?

RQ3: How are CS faculty in Africa currently contextually adapting their materials, and how can Higher Education Institutions (HEIs) support their integration?

2 Background

Research on culturally responsive and context-based pedagogies emphasizes the importance of integrating local or familiar content into the curriculum [8, 17, 21]. In particular, Banks' Additive Approach to curriculum reform involves the insertion of cultural elements into existing course structures without diluting core academic content [9]. Although originally developed for multicultural education in primary and secondary contexts, this approach has also been explored within computing education settings [2, 3, 23, 25].

2.1 Contextualization in CS Education

The debate over contextualizing CS education centers on how best to engage students and, simultaneously, ensure mastery of foundational concepts. Papert's seminal work on *constructionism* suggests that meaningful learning occurs when students can connect new knowledge to personal or cultural contexts [23]. Building on this premise, contextualization efforts in computing courses often embed culturally relevant examples, problems, and case studies to make computing concepts more relatable [15], inspired by culturally responsive pedagogies [1].

As many African universities have large class sizes, limited resources, and multilingual student populations, integrating culturally relevant content may lead to higher engagement and reduce the sense of alienation for first-year CS students [9, 17]. Using localized examples, e.g., referencing local cuisines, regional transportation challenges, or culturally specific stories, may increase students' motivation and engagement and enable them to apply CS concepts to real-world problems in their home contexts [24]. These efforts also help shift the perception of CS from being a purely Western discipline to one that resonates with the lived experiences of African learners.

Implementing contextualized instructional materials in African higher education presents a variety of challenges. Institutional constraints, such as a focus on traditional lecture-based formats, rigid curricula, or limited access to CS resources, pose significant barriers [4, 12]. Faculty often lack training or exposure to culturally responsive pedagogies, leading to uncertainty about how to balance technical rigor with local cultural elements [8, 19]. Nonetheless, research supports the view that respecting and integrating students' cultural backgrounds can substantially enrich the learning process in computing [28].

2.2 Positioning Cultural Elements in CS1

Maintaining technical rigor while including cultural references may be a key issue. For example, faculty may be concerned that switching from a canonical "sorting array of integers" example to one involving "sorting datasets of local produce prices" could dilute or complicate coverage of core concepts. Although Brown et al. [11] and Hofstede [19] do not address computing education directly, their work highlights the tension between decontextualized instruction and culturally situated knowledge, a tension relevant to this challenge. Studies emphasize that embedding culturally relevant examples must be done carefully, ensuring that local references genuinely reflect students' experiences and do not trivialize complex cultural contexts [17, 21].

At the same time, empirical studies in African contexts suggest that when thoughtfully implemented, contextualized programming instruction can enhance engagement and understanding of core concepts [13, 14].

These studies highlight that CS1 curriculum design for African universities can be improved by applying frameworks like Banks' Additive Approach, appending culturally relevant content while safeguarding the foundational learning outcomes. Freire [16] argued that education becomes truly empowering when it is linked to the sociocultural realities of learners. Transposed into CS education, this principle can encourage student engagement, motivation, and long-term success, both within and beyond the classroom.

2.3 Additional Strategies for African Contextualization

Prior work in African secondary and higher education emphasizes the importance of contextualized projects and the integration of indigenous knowledge [13–15, 25]. For example, Anohah and Suhonen proposed a conceptual model for designing culturally enriched learning environments in computing education, based on Akan culture in Ghana, highlighting how indigenous learning resources, scaffolds, and activities can support conceptual understanding [2]. Similarly, creating HIV/AIDS educational websites in Tanzania fostered motivation through a relevant and significant project [13, 14]. Expanding on this work, Fendler and Winschiers-Theophilus propose a framework for Contextualised Software Engineering Education, emphasizing the need for culturally situated teaching methods, local content repositories, and student profiles aligned with regional values, infrastructures, and communication practices [15]. Building on these foundational studies, our work investigates how faculty across diverse African institutions approach contextualization in CS1 curricula, highlighting both shared challenges and locally grounded innovations.

2.4 Synthesis

Across these themes, the literature strongly suggests that curriculum design in CS1 for African universities can be enriched by applying frameworks like Banks' Additive Approach. By appending culturally relevant content while safeguarding foundational learning outcomes, educators can promote student engagement, identity development, and long-term success in CS fields [9].

3 Method

To answer the research questions, a set of contextualized materials was presented to participants alongside a survey on their value.

3.1 Instruments

3.1.1 Contextualized Materials Activity Catalog. Participants were presented with an activity catalog, a set of culturally relevant materials, developed in our previous study for African CS instructors to use in their CS1 courses [18]. Designed to engage students through local contexts, these materials aim to support meaningful learning. They are available on *Zenodo*[1].

Here is an example from the Nigerian context.
In Fulani culture, the hierarchical structure of a clan is crucial for maintaining social order and cultural traditions. Each clan member has a specific role and responsibilities within the clan.

Your task is to create a hierarchical structure representing a Fulani clan using dictionaries and tuples in Python. Define a nested dictionary to represent the hierarchical structure of a Fulani clan. Each clan member should have a `name`, `role`, and a list of `children` representing their subordinates.

```
Clan Head (Arɗo Usman)
|-- Sub-Clan Leader (Ibrahim)
|   `-- Family Head (Ali)
|       |-- Youth (Hassan)
|       `-- Elder (Abubakar)
`-- Sub-Clan Leader (Musa)
    `-- Family Head (Amina)
        |-- Youth (Fatima)
        `-- Elder (Zainab)
```

3.1.2 Survey. The survey, conducted via Google Forms to gather faculty responses, provided an informational cover sheet and a statement of informed consent to ensure ethical data collection.

We collected data on participants' demographic profiles, such as years of teaching experience (including years of teaching CS1), the location of their institution, and the level of students they teach. Additionally, we posed eight open-ended questions grouped into two thematic areas: (1) general perspectives on contextualized materials and (2) views on the activity catalog. These questions were adapted from prior work [18], with revisions to elicit teachers' opinions on the developed contextualized CS1 materials, which we have also made available on *Zenodo*[2].

[1]https://doi.org/10.5281/zenodo.14238903
[2]https://doi.org/10.5281/zenodo.15875672

3.2 Participants and Recruitment

The authors used their professional networks to reach CS faculty based in Africa through both direct contact and open invitation. The activity was shared with colleagues who, in turn, shared it with their colleagues, reaching a wide audience of CS instructors in Africa.

Twenty-two (22) responses from CS faculty based in Africa were received. The demographics of the respondents are described in Table 1.

Table 1: Participant Demographics (N = 22)

Code	Institute type	Country	University teaching (yrs)	CS teaching experience (yrs)	Location
P1	Public	Tanzania	7	7	Urban
P2	Private	Cameroon	9	8	Urban
P3	Public	Ethiopia	7	4	Urban
P4	Public	Tanzania	5	2	Rural
P5	Public	Botswana	8	5	Urban
P6	Private	Kenya	7	5	Rural
P7	Private	Nigeria	12	12	Rural
P8	Private	Nigeria	16	16	Rural
P9	Private	Nigeria	5	5	Rural
P10	Private	Nigeria	4	4	Rural
P11	Private	Tanzania	10	10	Urban
P12	Private	Nigeria	2	2	Rural
P13	Private	Nigeria	9	5	Rural
P14	Public	Botswana	20	12	Urban
P15	Private	Nigeria	12	10	Rural
P16	Private	MC	6	1	Rural
P17	Public	Ghana	2	2	Urban
P18	Public	Uganda	3	3	Urban
P19	Public	SA	27	10	Rural
P20	Public	SA	15	15	Urban
P21	Public	SA	4	4	Urban
P22	Public	Ghana	10	10	Urban

Note. MC = Multi-country; SA = South Africa

3.3 Data Analysis

This study employed thematic analysis on the open-ended responses. As outlined by Braun and Clarke [10], this method ensures flexibility and systematically identifies, organizes, and provides insights into patterns of meaning across the dataset. Two researchers manually coded the data. One author coded the data and generated themes based on the research questions. Another author then validated the themes. Disagreements were resolved through discussion to ensure coherence, avoid overlap, and identify overarching themes.

4 Results

This section presents key themes from our analysis, with supporting participant quotes. Participants are referenced as P#, where # represents the participant number listed in Table 1.

4.1 RQ1: Perception and Use of Contextualized Materials

To address RQ1, we analyzed responses on the role, current use, and perceived impact of contextualized materials in teaching.

4.1.1 Value of Contextualized Materials for Students. All faculty participants stated that contextualized materials, when implemented correctly, would benefit African students. Most participants expressed that using contextualized materials would **enhance understanding of CS** by making it easier for them to understand the content. Multiple participants mentioned that these materials bridge the gap between abstract concepts and known knowledge. P6 stated that, *"it ensures that students can connect abstract concepts to their own cultural, social, and economic realities, fostering deeper understanding and practical relevance".*

P7 wrote: *"materials that are based on cultural beliefs or local contents will help the students to properly understand different techniques better because the local contents are familiar to them. It is like moving from known to unknown."* This highlights a challenge in CS education, particularly in Africa: analogies and scenarios which are unfamiliar and cause misunderstandings or additional extraneous cognitive load, and don't support the *intended* outcome: the CS concepts being illustrated.

Roughly 40% of the participants mentioned that the use of contextualized materials would **transform the learning experience** from being dry, uninteresting, and not applicable to being relevant to their context. P2 wrote that contextualized materials *"can foster a more inclusive, impactful, and transformative learning experience."* Multiple participants indicated that small changes to generic teaching materials in the style of the catalog could profoundly impact how students view CS, which is particularly valuable when students do not often see themselves in Western textbooks and examples.

Close to half of the participants indicated that contextualized materials give students **motivation to tackle unique and thorny problems**. P2's vision of contextualized teaching in CS is that it *"is not just about making learning relatable; it is a strategic move to nurture a generation of computer scientists who are empowered to drive local innovation, solve pressing challenges, and contribute meaningfully to Africa's socio-economic development."*

This aligns with Transformative Learning Pedagogy [22], which emphasizes that connecting learning to familiar, real-world contexts boosts self-efficacy and active engagement.

4.1.2 Long Term Benefits of Contextualized CS Education. Given the faculty's finite classroom time, we asked participants to consider the potential long-term benefits of contextualizing CS education.

Problem-solving, technical ability and critical thinking were highlighted by 13 of the 22 participants. P6 said that using contextualized materials: *"helps students apply theoretical knowledge to real-world scenarios, enhancing their career readiness by fostering practical skills and industry relevance,"* and *" sharpens critical thinking and problem-solving abilities, as students engage with complex, culturally diverse challenges in a globalized technological landscape".*

Motivation, creativity and innovation were recurring themes. Nine participants noted that contextualized materials will yield dividends because student motivation will extend beyond classroom learning. P2 mentioned, *"... This approach to education fosters a generation of students who are adaptable, thoughtful, and empowered to shape the future of technology in their communities and beyond."* P16 mentioned that, *"They offer students immediate ways to utilize their learnings within their communities. Most of my [...] students want to solve real problems rather than just learn material."*

Cultural relevance and ethical acumen were brought up by eight participants. Incorporating contextualized materials will lead to students who can develop solutions *"that are technically sound and culturally aware"* (P2). Another participant (P19) highlighted that students would be more able to relate their work decisions to real-life experiences, leading to more conscious awareness in their work.

Career readiness was the final theme identified. P5 stated that *"Students gain deeper critical thinking, problem-solving, and creative skills. By solving community-centric problems, they become more career-ready and innovative in a global tech environment."*

4.2 RQ2: Perception of Developed Materials.

Participants reviewed our catalog of contextualized materials [18] and shared their perceptions along with suggestions for improvement. This section analyzes their responses.

4.2.1 Aligning Contextual Content to CS1 Learning Objectives. Eleven of the participants gave a strong indication that the objectives are well aligned to the CS1 learning outcomes. However, four participants indicated that they did not feel that the materials were related to CS1 outcomes. They felt cultural content may distract from the learning objectives, increase the complexity of the learning, or emphasize cultural/tribal differences or stereotypes.

P2 stated: *"While cultural examples enhance relatability, overly complex cultural scenarios might distract from the core learning objectives. For instance, if an example requires too much explanation about cultural practices before students can engage with the coding aspect, it could slow down progress. [...] In some cases, cultural content could unintentionally introduce additional layers of complexity. For instance, designing a system in a local language might require addressing linguistic challenges (e.g., grammatical rules) before focusing on the core CS1 objectives."*

4.2.2 Real-world relevance and problem-solving. Ten of the participants stated that content is relatable to students' lived experiences and that the known domain would improve their learning. P6 indicated that the materials make *"programming more relatable to their lived experiences, as seen in examples where students learn programming concepts through local games or storytelling, which bridge the gap between theory and practice".*

4.2.3 Increased motivation, engagement, creativity, and curiosity. Five participants highlighted the potential increase in motivation and engagement, which could lead to increased creativity and curiosity on the part of students. One participant noted that, *"It is very helpful in learning and even teaching, as both a tutor and student comprehend well what they try to implement. It also fosters creativity as it awakens curiosity, that's a knack to problem solving."* (P1)

One response drew on the relationship the materials can have on an understanding of one's own culture, as P11 poignantly stated, *"The approach is effective. The integration of cultural elements reminds us of the history of the specific tribe. So it is learning programming at the same time history, so it becomes PROGISTORY."*

4.2.4 Skepticism and Caution. While learning history is important, four participants expressed reservations. P21 believed that leaning more towards tangible aspects of culture, such as *"food, clothing, and games,"* would be more effective than qualitative aspects such as *"tribes, poems, and music."* This is because this participant believes the earlier education, *"K3-K12 'ruines'[sic] most cultural things."*

P14 elaborated on this theme, stating: *"I am a bit skeptical of some of the cultural elements as the students may not be familiar with them, which may not give them the true benefits of contextualization. This is because we are living in a global village of which some of the cultural elements, if too specific to certain cultures, may not work for the benefit of those outside such cultures."*

4.2.5 Improvements to Enhance Contextualized Materials. To explore adoption, we asked participants how the materials could be improved to fit their teaching philosophy and context, and how they might better reflect local cultures.

Diversifying scenarios with local real-world problems in the African context was suggested by seven participants. P4 stated *"Apart from entertainment local cases, using real case examples from agriculture, e-government, African outbreak diseases (Ebola, Muburg, etc.) on how they have been addressed should be added as well"*. Others agreed, but reiterated the care required to incorporate examples that do not overshadow or complicate the learning of CS.

Using multilingual (local languages) and localizing learning materials was suggested by four participants, who highlighted the need to create content in the local languages students 'think' in. P1 wrote, *"Learning materials should be written in various local languages, as in most African countries, English is not the first language. Materials should be presented in the learner's thinking language."*

P19 extended the request to include IDEs: *"I would love to see integrated development environments layered to include local languages to program, document, and test code alongside and cultural ways of organising and visualizing the processes, e.g., stepping through code. Ultimately, it's good to have mainstream interfaces and more localised interfaces side-by-side, akin to a linguist's understanding of code-mixing and code-switching for language. It's possible to address that switching and mixing culturally, too, because so many students in Africa are dealing with two cultures, Western and African, and multiple languages. It's happening already. Why not do it with our coursework and our toolsets?"*

Adaptability in teaching materials was another major theme. Each activity in the catalog featured a cultural norm from a specific country. While clothing examples from Ghana might be relevant in other West African countries, they may not be applicable to Southern African nations. Thus, participants requested that we provide them with adaptable templates (as opposed to concrete examples) that people can customize to fit their locale's cultures. In addition, other participants requested that we present materials in an interactive format that is easy for them to search through, rather than a linear document.

Collaborative and peer learning approaches were suggested by four participants. P6 suggested, *"incorporating more interactive, hands-on activities that blend cultural storytelling with coding tasks, such as using local community data (e.g., farming yields or local markets) for algorithm exercises, and integrating group projects that encourage collaboration around culturally significant topics"*. P5 suggested we, *"Encourage students to propose their own cultural references for assignments, boosting ownership and creativity"*.

4.3 RQ3: Current Contextualization Efforts and HEI Support

Finally, we analyzed responses to RQ3 regarding the feasibility of developing contextualized materials both now and in the future.

4.3.1 Current Practices and Experiences. We first explored how CS faculty contextualize their teaching. One-third said they do not use contextualized materials, relying instead on textbooks and institutional guidelines. The rest described four ways they incorporate contextualization.

Adapting CS materials for local functionality such as ensuring values on slides were in their home metric units rather than typical US Imperial, and adapting NLP models to work with local languages (e.g., Swahili).

Contextualization through media and culture by using illustrative stories (P13), games (P21), and cultural norms (P7, P10) to explain certain concepts to students.

Contextualization through data exploration and analysis by using real-life, local datasets, they can help students learn about societal issues and trends. P19 mentioned that using datasets to understand excessive data costs of contract vs. prepaid has been one way they have brought the reality of Africa into the CS classroom.

Solving local lifestyle issues by designing CS questions identifying real-world problems relating to local economies, public transport, e-commerce and voting.

4.3.2 The Role of HEIs. Our analysis included the identification of themes that emerged from survey questions related to how HEI can support future contextualization of learning materials.

Curriculum reform and localization was mentioned by eight participants. Some highlighted that just as we improve our curriculum to meet industry standards, we should also think about how we can indigenize our curricula. Others advocated for universities to create textbooks and not rely on those from outside the continent. P4 wrote that universities should *"design a curriculum which incorporates local cases from e-government, Fintech, and agriculture while maintaining the international computing standards."*

Institutional support and policy changes were mentioned as being important for adoption and sustainability. P2 mentioned that *"Institutional changes that embed contextualized materials into the educational framework are essential for scaling these efforts and ensuring they are impactful and sustainable."* Four other participants offered similar opinions, including institutions offering *"incentives for lecturers to adopt or develop contextualized materials"* (P5).

Faculty development and training was mentioned by six participants. P2 said HEI's role is *"investing in faculty development, fostering collaboration with local stakeholders, and promoting policies that prioritize contextualization."*

Promoting decolonization was referenced by highlighting the global context of education while emphasizing the need for contextualization. P14 summarized by saying that *"Universities are global villages but they need to provide ways encouraging these local contextualizations, where possible, even using local languages to teach these or translating content into local languages."*

A need for contextualization strategies was mentioned by two participants. P21, however, warned that contextualized strategies in *"later, more specific modules would possibly distract the student more or not fit in as much."*

5 Discussion

5.1 Perception and Use of Contextualized Materials

African CS faculty overwhelmingly recognize the benefits of contextualized learning materials, aligning with global calls for culturally relevant pedagogy [7, 28]. Participants specifically highlighted the value of contextualization for enhancing the CS classroom experience in Africa. The faculty felt contextualized teaching and learning would support better performance, create a transformative learning environment, and better motivation to learn about unique African challenges. A significant majority actively adapt textbook materials and incorporate local examples, mirroring established contextualization approaches[7, 28]. However, a third of instructors reported not using contextualized materials, instead relying on standard resources for teaching introductory programming, possibly overlooking benefits noted in culturally responsive teaching literature [17]. These results highlight the need to prioritize the development of resources that facilitate wider adoption of contextualized materials, empowering both faculty and students in CS courses in Africa, as highlighted by Geneva Gay in her work on culturally responsive teaching [17].

5.2 Perception of developed CS1 contextualized materials.

Faculty in this study believe the developed contextualized materials may enhance students' understanding, problem-solving, and motivation; these perceptions are likely informed by prior teaching experiences and supported by research in Africa. For example, studies in Tanzania found increased motivation when students created culturally relevant digital content for HIV/AIDS education [13, 14], while research in Ghana showed that using indigenous symbols made programming more relatable and meaningful [3]. These findings support faculty views on the value of culturally contextualized CS materials for boosting engagement and learning outcomes.

Most participants agreed that the materials align with the Computer Science Curricula 2023 [20], ensuring students gain skills for the global CS field. This suggests the approach may be scalable and adaptable across Africa while adhering to ACM standards. Despite positive feedback, a few participants raised concerns about distractions from core objectives, as also noted in previous studies [11, 19]. These concerns included the risk of overemphasizing context, which could lead to overly complex cultural scenarios. Additionally, there were suggestions that tangible aspects of culture, such as "food, clothing, and games," would be more effective, which highlights the importance of carefully selecting cultural elements that are both relevant and accessible to students from diverse backgrounds [7].

Some participants also worried that students might not be familiar with very specific cultural elements. While it was generally felt that contextualization would simplify examples and bring them closer to students' contexts, there is also a risk that they overconstrain the examples to a local context. These concerns have been encountered in Africa before [5] and can be addressed by incorporating strategies suggested in prior work. Vesisenaho *et al.* [27] and Awaah *et al.* [6] both addressed these issues by having students develop their own examples and solutions to problems based on local contexts. Involving teachers, educators, and researchers can help address these challenges. Faculty suggested adding diverse real-world scenarios, using local languages for accessibility as demonstrated in [25], and incorporating hands-on, collaborative activities to promote peer learning and problem-solving. Ongoing evaluation was seen as crucial for tailoring materials and maximizing engagement.

5.3 Current Strategies and HEI Involvement

As shown in Sections 4.1 and 4.2, faculty widely support contextualized materials, seeing them as aligned with learning goals and beneficial to student engagement, but note that successful implementation will require institutional support, curriculum reform, and faculty development. Faculty from our study clearly support the idea that institutions may support by going beyond merely incorporating cultural elements into existing curricula and textbooks, which aligns with Banks' Additive Approach [7]. They propose changes to textbooks, curricula, and policies to better integrate local contexts. However, while we recognize the transformative [7] potential of more comprehensive curriculum and policy reforms, we are initially reviewing the additive approach as a starting point. This allows us assess contextualization in a controlled setting before pursuing broader curriculum and policy reforms. Universities should lead these reforms, create culturally relevant materials, and align policies with global and local contexts for lasting impact.

6 Limitations

The limitations of this study include recruiting participants through professional networks, which may introduce selection bias, potentially overrepresenting those already interested in contextualization. Additionally, we collected only faculty perceptions of the materials. Future research will include classroom-based evaluations to assess their actual impact in Africa.

7 Conclusion and Future Work

This study explored the initial perceptions of CS faculty in Africa regarding the integration of contextually relevant materials into introductory CS1 courses. Faculty evaluated materials that included cultural content aligned with CS1 learning outcomes in the 2023 CS curriculum. Using qualitative methods, we gathered perspectives from 22 CS educators across 9 African countries. The findings show generally positive perceptions, with educators noting that contextualized materials can support student engagement and learning when carefully designed. However, some participants highlighted the need for thoughtful integration to avoid potential drawbacks. The study underscores the importance of institutional support, including curriculum alignment, textbook development, and faculty training, for successful implementation. It also points to the need for continued collaborative research to evaluate the effectiveness of contextualized materials across diverse contexts in Africa.

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