

Chemistry Teachers' Preparedness for Inclusive Classrooms in Nigeria: A Conceptual Review

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ABSTRACT

Inclusive education has become a global priority for achieving equitable and sustainable development in education. In science education, especially chemistry, teachers' competence and readiness are vital for ensuring all learners including those with disabilities and diverse needs participate actively in scientific learning. This position paper discusses the preparedness of chemistry teachers for inclusive classrooms in Nigeria, identifying barriers to effective implementation and potential solutions to strengthen teacher capacity. Based on the principles of the National Policy on Inclusive Education (Federal Ministry of Education, 2023) and existing literature on inclusive pedagogy, teacher competence, and STEM education, the paper views teacher preparedness as a multidimensional concept involving pedagogical skills, inclusive attitudes, technological proficiency, and adaptable teaching methods. Evidence from previous research shows that, despite policy commitments, many Nigerian chemistry teachers lack adequate training in differentiated instruction, assistive technologies, and classroom management for inclusion. Structural challenges such as insufficient funding, weak policy enforcement, and limited professional development opportunities further hinder teachers' ability to support diverse learners effectively. The paper emphasizes that enhancing chemistry teachers' preparedness is crucial for promoting scientific literacy, developing problem-solving skills, and building a society capable of sustainable development. Recommended strategies include increased funding for inclusive STEM education, curriculum updates in teacher training, regular professional development for current teachers, and stronger oversight of inclusive education policy implementation. In conclusion, investing in teachers' capacity is essential to translate the principles of inclusive education into effective classroom practices that support national development objectives.

METHODOLOGY

This paper employs a conceptual review approach to explore the preparedness of chemistry teachers for inclusive classrooms in Nigeria. Relevant literature was sourced from academic databases such as Google Scholar, ResearchGate, ERIC, and Scopus-indexed education journals. The literature search was guided by key terms including inclusive education in Nigeria, teacher preparedness for inclusive classrooms, inclusive STEM education, chemistry education and inclusion, and teacher professional development in Nigeria.

The studies considered for this review were selected based on their relevance to issues of teacher preparation, the implementation of inclusive education policies, and science education practices in developing countries, with particular emphasis on Nigeria. Greater priority was given to peer-reviewed journal articles, policy documents, and institutional reports from credible organizations such as UNESCO, the World Bank, and the Federal Ministry of Education. The selected sources were subsequently analyzed and synthesized thematically in order to identify recurring patterns relating to teacher preparedness, implementation barriers, and possible strategies for enhancing inclusive chemistry education.

Keywords: Inclusive Education, Chemistry Teacher Preparedness, Professional Development, Educational Policy, Chemistry Education.

INTRODUCTION

Education serves as a fundamental mechanism through which individuals acquire the knowledge, competencies, and values necessary for meaningful participation in society. Contemporary educational philosophy emphasizes that access to quality education should not be restricted by factors such as gender, disability, socioeconomic background, ethnicity, or religion. This principle is strongly reflected in Nigeria's educational framework, particularly in the National Policy on Education which recognizes education as a fundamental right of every citizen regardless of personal or social circumstances (Federal Ministry of Education, 2013). In recent decades, this commitment has increasingly been articulated through the concept of inclusive education. According to Adigun et. al. (2025), studies also highlight growing efforts to improve inclusive teaching practices in Nigeria, particularly through teacher training and the integration of emerging technologies that support diverse learners in mainstream classrooms.

Inclusive education represents an educational approach aimed at ensuring that all learners, especially those historically marginalized or excluded, have equitable access to meaningful learning opportunities within mainstream educational settings. According to UNESCO (2013), inclusive education involves the continuous process of identifying and removing barriers that hinder participation and achievement among learners with diverse needs. Rather than segregating students with disabilities or learning difficulties, inclusive education advocates the restructuring of school systems, teaching methods, and learning environments to accommodate diversity. Nwosu et. al. (2025) explained that inclusive education is the most effective way to ensure all children have a fair chance to attend school, learn, and develop essential skills to succeed. It has become a central focus in Nigeria's educational policy system. Within the Nigerian educational context, inclusive education has gained increasing attention following the introduction of the National Policy on Inclusive Education (Federal Ministry of Education, 2013). The policy emphasizes equal access to quality education and promotes the integration of learners with diverse abilities into mainstream classrooms. However, translating policy intentions into classroom realities requires significant transformations in teaching practices, school resources, and teacher preparation.

Science education and chemistry in particular plays a critical role in national development. Chemistry serves as a gateway discipline that underpins fields such as medicine, engineering, agriculture, environmental science, and industrial technology. Through chemistry education, students develop analytical thinking, experimental skills, and problem-solving abilities necessary for innovation and technological advancement. Consequently, ensuring equitable participation in chemistry learning is essential for building a scientifically literate population capable of contributing to economic growth and societal development. In inclusive classrooms, the role of the chemistry teacher becomes even more significant. Chemistry teachers are responsible not only for delivering subject content but also for creating learning environments in which chemistry students with diverse abilities can actively participate and achieve meaningful learning outcomes. Research consistently identifies teacher quality as one of the most influential factors affecting student learning outcomes (World Bank, 2020). Effective teachers possess strong content knowledge, pedagogical competence, and the ability to adapt instruction to diverse learners. Teachers are vital to the implementation of inclusive education (Bada & Jita, 2023). Abigun et. al. (2025) noted that emerging research emphasizes that the success of inclusive education depends largely on teachers' willingness and preparedness to adopt innovative instructional strategies and technologies that enhance participation for learners with diverse needs. This is achieved by organizing trainings aimed at cultivating attitudes, values, and pedagogical skills necessary for fostering a supportive and inclusive classroom environment. By developing these competencies, teachers will be better prepared to address the diverse needs of learners, promote equity in participation, and create a space where all students can flourish and contribute meaningfully to a skilled, inclusive society. The preparedness of the chemistry teacher, therefore, becomes a critical determinant of the success of inclusive education. Preparedness extends beyond mastery of subject content to include teachers' attitudes toward inclusion, their confidence in teaching diverse learners, their ability to employ differentiated instruction, and their familiarity with assistive technologies that support learning. Studies such as Nwosu et al. (2021) and Specht et al. (2016) emphasize that teacher education programs play a significant role in shaping teachers' beliefs, competencies, and willingness to implement inclusive practices.

Despite the growing emphasis on inclusive education in Nigeria, several studies indicate that many chemistry teachers lack adequate preparation for teaching in inclusive classrooms. Teacher education programs often provide limited exposure to practical inclusive pedagogy, focusing instead on theoretical identification of special needs rather than strategies for effective classroom adaptation. As a result, teachers may feel ill-equipped to address the diverse learning needs present in contemporary classrooms. Given the strategic importance of chemistry education for national development, examining the preparedness of chemistry teachers for inclusive instruction becomes particularly important. Strengthening teacher capacity in this area can contribute significantly to developing a skilled workforce, reducing educational inequalities, and promoting social inclusion. This paper therefore examines the concept of chemistry teacher preparedness within inclusive classrooms in Nigeria. It identifies the major barriers limiting teachers' readiness for inclusive teaching and proposes practical pathways for strengthening teacher competence as a means of building a skilled and inclusive society. This review contributes to the growing discourse on inclusive science education by synthesizing current evidence on chemistry teacher preparedness in Nigeria and identifying practical strategies for strengthening inclusive instructional practices.

Chemistry Teacher Preparedness for Inclusive Chemistry Education

Teacher preparedness is widely regarded as a crucial determinant of effective teaching and meaningful learning outcomes, particularly in classrooms characterized by diverse learner needs. In the context of inclusive education, teacher preparedness refers to the extent to which educators possess the knowledge, pedagogical competencies, professional attitudes, and instructional skills necessary to effectively facilitate learning for students with varied abilities, backgrounds, and learning styles. Preparedness therefore extends beyond subject matter mastery to include the ability to adapt instructional practices, employ differentiated teaching strategies, and utilize appropriate learning resources that ensure equitable participation of all learners. For chemistry teachers, preparedness encompasses several dimensions. These include a strong command of chemical concepts, proficiency in laboratory instruction, the ability to design inquiry-based learning experiences, and competence in adapting instructional strategies to accommodate students with diverse learning needs. In addition, teachers must be familiar with assistive technologies and alternative instructional tools that support learners with disabilities or learning difficulties. When chemistry teachers possess these competencies, they are better positioned to create engaging and inclusive learning environments where chemistry students can actively construct knowledge and develop essential scientific skills. Such skills including critical thinking, experimentation, and problem-solving are fundamental to fostering innovation and scientific literacy, both of which are necessary for national development and socio-economic advancement.

The importance of teacher preparedness has long been recognized within the broader discourse on educational quality. A well-prepared teaching workforce contributes significantly to national development by equipping learners with the knowledge and competencies needed to participate productively in society. Despite this recognition, concerns remain regarding the adequacy of teacher preparation in Nigeria. Teacher education programs in the country have often been criticized for not sufficiently equipping teachers with the pedagogical competencies required for contemporary classrooms. Buckler et. al. (2025) study exploring inclusive teaching experiences in Nigerian schools reveal that teachers often face institutional constraints, including limited professional training and insufficient classroom support systems.

Empirical studies have continued to highlight persistent weaknesses in teacher preparation and professional competence. For instance, reports by the International Organization for Migration (2024), Umeora and Jacob (2020), and the World Bank (2020) indicate that many teachers across different levels of the Nigerian education system demonstrate gaps in pedagogical knowledge and instructional effectiveness. These limitations often manifest in classroom practices where teachers struggle to identify and address the learning needs of students who experience academic difficulties. Pinnock (2016) similarly observes that in many Nigerian classrooms, teachers rarely recognize or adequately support learners who require additional instructional assistance. Such findings suggest that teacher preparedness remains a critical challenge in the implementation of inclusive education. Recognizing these challenges, the Nigerian government has introduced policy initiatives aimed at strengthening inclusive education practices. The National Policy on Inclusive Education represents a significant policy framework designed to ensure equitable access to quality education for learners with diverse needs. According to the Federal Ministry of Education (2023), inclusive education

involves the systematic removal of barriers that hinder participation in learning and seeks to ensure that all learners including those who may otherwise be marginalized or excluded are actively engaged in meaningful educational experiences. This policy reflects a broader commitment to social justice and educational equity by emphasizing the need for educational systems that accommodate learner diversity.

The policy also highlights the critical role of teachers in achieving inclusive education objectives. Effective implementation of inclusive education depends largely on teachers' capacity to adapt instruction, manage diverse classrooms, and create supportive learning environments. Consequently, the policy underscores the importance of continuous professional development aimed at equipping teachers with inclusive pedagogical competencies, adaptive teaching strategies, and a deeper understanding of learner diversity. Through such professional learning opportunities, teachers can acquire the skills and confidence required to address the educational needs of students with different abilities, learning styles, and socio-cultural backgrounds.

In recent years, efforts to promote inclusive education in Nigeria have increasingly focused on strengthening teacher training programs. Studies by Nwosu et al. (2024) and Pinnock (2016) indicate that teacher training has become a central strategy in improving inclusive practices within Nigerian schools. Chemistry teachers, like other subject teachers, are typically trained in faculties of education within universities or in colleges of education where they receive instruction in both subject content and educational pedagogy. One of the primary objectives of teacher education in Nigeria, as articulated in the National Policy on Education (Federal Ministry of Education, 2013), is to ensure that teachers acquire adequate mastery of academic disciplines alongside pedagogical skills that enable them to effectively facilitate learning. An important aspect of this objective involves preparing teachers to respond to learners with special educational needs. To achieve this, teacher education institutions have incorporated foundational courses such as educational psychology, classroom management, and introductory studies in special needs education into their curricula. These courses are intended to provide future teachers with basic knowledge about learner development, individual differences, and strategies for supporting students who require additional assistance. However, despite these curricular adjustments, concerns remain regarding the depth and effectiveness of such training. Evidence suggests that many of these courses provide only introductory knowledge about special education without adequately addressing practical strategies for inclusive teaching. Nwosu et al. (2024) and Unachukwu and Nwosu (2019) note that the focus of these courses often centers on identifying categories of special needs rather than equipping teachers with concrete pedagogical approaches for managing inclusive classrooms. As a result, teachers may graduate with theoretical awareness of inclusion but lack the practical competence required to implement inclusive instructional strategies effectively.

In chemistry education, this gap becomes particularly significant due to the unique demands of the subject. Chemistry instruction frequently involves laboratory activities, experimental demonstrations, and abstract conceptual explanations that may present challenges for learners with disabilities or different learning preferences. Teachers must therefore possess specialized pedagogical skills that enable them to modify laboratory procedures, provide alternative instructional resources, and implement differentiated assessment methods that accommodate diverse learners. Without adequate preparation in these areas, inclusive chemistry education becomes difficult to implement effectively. Strengthening chemistry teacher preparedness is therefore essential for improving learning outcomes and promoting educational equity. When teachers are adequately trained and supported, they are more capable of designing inclusive lessons that encourage active participation and collaborative learning. Such teachers can adopt flexible instructional approaches that accommodate diverse learning needs while maintaining academic rigor in science education. Moreover, well-prepared teachers are better able to foster positive classroom environments where all students feel valued, supported, and motivated to learn.

Integrating inclusive education principles into both pre-service and in-service teacher education programs represents an important strategy for achieving this goal. Pre-service training ensures that prospective teachers enter the profession with foundational knowledge of inclusive pedagogy, while in-service professional development enables practicing teachers to continually update their skills in response to evolving educational demands. Continuous professional learning opportunities such as workshops, seminars, mentoring programs, and collaborative learning communities can further enhance teachers' competence and confidence in implementing inclusive instructional practices.

Ultimately, strengthening chemistry teacher preparedness has implications that extend beyond classroom instruction. By equipping teachers with the skills and knowledge required to support diverse learners, education systems can improve student participation in science learning, enhance scientific literacy, and nurture the development of problem-solving competencies among learners. These outcomes are essential for preparing a skilled workforce capable of addressing complex societal challenges and contributing to sustainable national development. Consequently, investment in teacher preparedness represents a strategic pathway toward building a more inclusive, equitable, and knowledge-driven society.

Barriers To Chemistry Teacher Preparedness In Nigeria

Although Nigeria has made notable progress in the formulation of policies that promote inclusive education, several systemic challenges continue to limit the preparedness of chemistry teachers to effectively implement inclusive instructional practices in secondary schools. The success of inclusive education depends not only on policy frameworks but also on the readiness of teachers to translate these policies into meaningful classroom practices. In many Nigerian schools, however, teachers face structural, institutional, and professional barriers that constrain their capacity to provide equitable learning opportunities for all students. Research evidence indicates that the teaching and learning of science, technology, engineering, and mathematics (STEM) subjects in inclusive classrooms are often hindered by a combination of factors such as inadequate funding, limited implementation of inclusive education policies, societal barriers, and insufficient opportunities for teacher training and professional development (Obera, 2020). These challenges collectively affect the quality of instruction and reduce teachers' confidence in managing diverse classrooms. As a result, many teachers struggle to effectively support learners with varying academic abilities, learning styles, and special educational needs.

Inadequate Training and Professional Development of Teachers

One of the most significant barriers to chemistry teacher preparedness in Nigeria is the limited emphasis placed on inclusive pedagogy within teacher education and professional development programs. While teacher training institutions provide instruction in subject content and general teaching methods, the specific competencies required for inclusive teaching are often insufficiently addressed. Inclusive education requires teachers to possess specialized pedagogical skills that enable them to adapt instruction, modify laboratory activities, and provide alternative learning strategies for students with diverse learning needs. Studies have shown that both general education teachers and special education teachers frequently report inadequate preparation for implementing inclusive STEM education. Williams et. al. (2018) found that many teachers lack the professional training necessary to effectively manage inclusive classrooms within science and technology disciplines. Similarly, Williams et. al. (2018) emphasize that teachers require a comprehensive set of competencies including knowledge, instructional skills, positive attitudes toward inclusion, and adequate professional support in order to successfully address the challenges associated with teaching learners who have unique educational needs in STEM subjects. Recent research on inclusive classrooms in Nigeria, according to Adigun et. al. (2025), suggests that many teachers still feel underprepared to implement inclusive pedagogical strategies effectively, particularly when technological tools and differentiated instruction are required.

In the context of chemistry education, the lack of specialized training becomes particularly problematic due to the practical and experimental nature of the subject. Chemistry instruction often involves laboratory experiments, demonstrations, and the manipulation of scientific equipment, all of which may require adaptation for students with disabilities or learning difficulties. Teachers who have not received adequate preparation in inclusive science pedagogy may therefore find it difficult to design laboratory experiences that ensure active participation of all learners. Consequently, inadequate training limits chemistry teachers' ability to create inclusive learning environments that foster scientific understanding among diverse groups of students.

Financial Constraints

Another major barrier affecting chemistry teacher preparedness for inclusive instruction is the persistent problem of inadequate funding within the Nigerian education system. Financial resources play a crucial role in determining the availability of instructional materials, laboratory facilities, assistive technologies, and teacher

training opportunities that support inclusive science education. However, many public secondary schools in Nigeria operate under severe resource constraints, making it difficult to provide the infrastructure and materials necessary for effective teaching and learning. Obera (2020) notes that the overall quality and accessibility of education in Nigeria have been adversely affected by insufficient government investment in the education sector. Similarly, Akinyemi and Isiugo, as cited in Cleopas (2020), argue that chronic underfunding has contributed significantly to the deterioration of educational facilities and instructional resources across Nigerian schools. When basic educational infrastructure is already limited, implementing inclusive education which often requires additional support systems, specialized equipment, and teacher training becomes even more challenging.

Inclusive chemistry education, in particular, demands significant financial investment. Laboratories must be equipped with accessible facilities and adaptive equipment that enable students with physical or sensory impairments to participate fully in scientific experiments. In addition, schools require learning materials designed to accommodate different learning styles, including visual aids, digital resources, and assistive technologies. Without adequate funding, teachers are unable to access these essential resources, thereby limiting their capacity to implement inclusive teaching strategies effectively. Furthermore, financial constraints often restrict opportunities for teachers to participate in professional development programs that could enhance their competence in inclusive instruction. Workshops, training seminars, and specialized certification programs in inclusive education typically require financial support from government agencies or educational institutions. When such funding is limited, teachers may lack opportunities to acquire the knowledge and skills needed to adapt their teaching practices to diverse classroom contexts.

Gaps in the Enforcement of Inclusive Education Policy

Despite the existence of policy frameworks that support inclusive education in Nigeria, weak policy implementation remains a significant barrier to effective practice. While national policies clearly articulate the importance of providing equitable educational opportunities for all learners, the translation of these policy objectives into practical classroom realities has been inconsistent. The National Policy on Education advocates inclusive schooling and emphasizes the need for educational systems that accommodate learners with diverse abilities. However, challenges such as limited funding, inadequate monitoring mechanisms, and insufficient accountability structures often hinder effective implementation of these policies. As a result, the goals outlined in policy documents are not always reflected in classroom practices. Jegede and Owolabi, as cited in Cleopas (2020), observe that a considerable gap frequently exists between policy formulation and policy implementation within the Nigerian education system. This disconnect has negatively affected the development of science education, as policy commitments are not consistently supported by adequate institutional structures and resources. Similarly, the National Policy on Education (Federal Republic of Nigeria, 2013) stipulates that special incentives and provisions should be made to support the study of science at all levels of the education system. However, the extent to which these provisions are implemented varies significantly across schools and regions.

Weak enforcement of inclusive education policies also affects chemistry teacher motivation and preparedness. When teachers operate within systems that lack clear guidelines, adequate supervision, and consistent support for inclusive practices, they may find it difficult to implement innovative instructional strategies. Strengthening policy enforcement mechanisms is therefore essential for ensuring that inclusive education policies translate into meaningful improvements in teaching practices and student learning outcomes.

Strategies To Building Chemistry Teacher Preparedness

Addressing the barriers that hinder chemistry teacher preparedness requires deliberate and coordinated efforts from policymakers, teacher education institutions, and educational stakeholders. Strengthening teacher capacity for inclusive instruction involves not only improving teacher training programs but also providing adequate resources, institutional support, and opportunities for continuous professional learning. The following strategies represent key pathways through which chemistry teacher preparedness for inclusive classrooms can be enhanced.

Adequate Funding for Inclusive Science Education

A key element in strengthening inclusive chemistry education is securing adequate financial resources.

Sufficient funding allows schools to purchase modern lab equipment, assistive technologies, and inclusive teaching materials tailored to diverse learners. It also enables educational institutions to hire qualified teachers and offer specialized support services essential for inclusive classrooms. Research shows that well-funded educational systems are better equipped to foster environments that enhance student engagement and success. O'Leary et al. (2020) stress the role of inclusive instructional resources in creating equitable STEM learning opportunities. Likewise, Olasehinde and Olatoye (2014) note that well-resourced settings significantly boost student motivation and academic outcomes.

In inclusive chemistry education, financial investment is crucial because science teaching often needs specialized facilities and materials. Proper funding guarantees well-equipped, accessible laboratories for students with various learning needs. Additionally, greater financial support from government bodies and educational stakeholders can help develop innovative teaching methods that foster inclusion, scientific curiosity, and academic achievement.

Recent national reports further highlight the severity of funding challenges in Nigeria's education sector. Statistics from the National Bureau of Statistics and the Universal Basic Education Commission show that government spending on education has consistently fallen short of the UNESCO recommended benchmark of allocating 15–20% of the national budget to education. (Ebojele et al., 2025). In many public secondary schools, science laboratories remain poorly equipped, and access to assistive learning technologies is extremely limited (Aina & Olanipekun, 2021). In practical terms, adequate funding in the Nigerian context would involve upgrading laboratory infrastructure, providing adaptive laboratory tools for students with disabilities, supplying digital learning resources, and allocating specific budget lines for teacher training in inclusive STEM education. Countries such as South Africa and India have implemented targeted inclusive STEM initiatives that provide assistive laboratory tools, teacher training programs, and accessible learning materials models that Nigeria could adapt to strengthen inclusive chemistry education (Sedebo et al., 2024). Sedebo et al. (2024), also noted that experiences from other developing contexts demonstrate that targeted investment in inclusive STEM education can improve the participation of disadvantaged learners.

Effective Planning of STEM Lessons

Effective lesson planning represents another essential pathway for strengthening chemistry teacher preparedness. Inclusive classrooms require teachers to design lessons that consider the diverse abilities, prior experiences, and learning preferences of students. Thoughtful planning enables teachers to integrate differentiated instructional strategies that accommodate students who may require additional support while still maintaining academic rigor. In many Nigerian classrooms, poor learning outcomes in chemistry have been linked to instructional approaches that fail to consider students' backgrounds, interests, and real-life experiences. Effective lesson planning therefore requires teachers to align learning objectives, instructional methods, classroom activities, and assessment strategies with the diverse needs of learners. Tatar et al. (2016) emphasize that teachers' subject knowledge and instructional competence significantly influence students' learning outcomes in science education. When teachers possess strong content knowledge and carefully plan their lessons, they are better able to facilitate meaningful learning experiences that encourage inquiry, critical thinking, and problem-solving.

Inclusive lesson planning in chemistry can also involve the integration of real-world examples, locally available materials, and collaborative learning activities that make scientific concepts more accessible to students. Olasehinde and Olatoye (2014) suggest that incorporating everyday experiences and familiar contexts into science teaching can enhance students' understanding of scientific concepts while promoting active participation among learners with different abilities.

Continuous Training and Retraining of Teachers

Continuous professional development is essential for ensuring that chemistry teachers remain responsive to evolving educational demands and emerging innovations in science education. Professional development programs provide teachers with opportunities to update their pedagogical skills, learn new instructional technologies, and acquire strategies for managing inclusive classrooms effectively. Akinwumi and Falemu (2017) argue that teacher competence can be strengthened through sustained participation in professional learning activities such as workshops, conferences, and training seminars. These platforms enable teachers to exchange ideas, learn from experienced practitioners, and gain exposure to innovative teaching methods that can enhance classroom instruction.

For chemistry teachers working in inclusive environments, ongoing professional development is particularly important because inclusive education practices continue to evolve alongside advancements in educational technology and pedagogical research. Training programs focused on inclusive science education can equip teachers with the skills needed to modify laboratory activities, design differentiated assessments, and utilize digital tools that support diverse learners. Moreover, fostering a culture of continuous professional learning within schools can encourage collaboration among teachers and promote the sharing of best practices in inclusive instruction. Professional learning communities, mentorship programs, and peer collaboration initiatives can further support teachers in developing confidence and competence in implementing inclusive teaching strategies.

CONCLUSION

Chemistry teachers play a vital role in transforming inclusive education policies into effective classroom practice. However, inadequate training, limited funding, and poor policy implementation continue to impede teacher preparedness for inclusive chemistry classrooms in Nigeria. Enhancing teacher education programmes, increasing investment in inclusive STEM infrastructure, and providing more continuous professional development opportunities are crucial steps to address these issues. Policymakers and educational stakeholders must prioritise strategic investments in teacher capacity and inclusive learning resources to ensure all learners can participate fully in chemistry education and contribute to national development.

Limitations and Implications for Future Research

This study adopts a conceptual approach and is based primarily on the review and synthesis of existing literature rather than the collection of primary empirical data. Consequently, the arguments and conclusions presented in this paper draw largely from previously published studies, policy documents, and theoretical discussions related to inclusive education and teacher preparedness. Although this approach offers valuable insights into the challenges and prospects of inclusive chemistry education in Nigeria, it may not fully reflect the diverse realities of classroom practices across different regions of the country.

Future research should therefore employ empirical methodologies such as surveys, classroom observations, and quasi-experimental designs to investigate how chemistry teachers implement inclusive instructional practices within actual school settings. Such empirical investigations would provide stronger evidence regarding the effectiveness of professional development initiatives, funding interventions, and instructional strategies aimed at strengthening inclusive science education in Nigeria.

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