

AN EXPLORATION OF RE-ENACTING STEM EDUCATION FOR GIRLS IN DELTA STATE, NIGERIA

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Abstract

This paper explored the challenges and opportunities associated with promoting STEM education for girls in Delta State, Nigeria. It examined socio-cultural, economic, and educational barriers that hinder girls' participation in STEM fields. Key concepts such as educational reform, gender equality, and STEM education for girls were discussed in relation to the issue at hand. The study identified significant obstacles, including cultural biases, lack of infrastructure, and inadequate policy frameworks, which prevent girls from pursuing STEM education. The paper highlighted the importance of curriculum reform, enhanced teacher training, mentorship programs, and community involvement in fostering an inclusive learning environment. It concluded that re-enacting STEM education for girls in Delta State is crucial for addressing gender disparities in STEM fields and promoting national development. Hence, by creating an environment that supports girls in STEM, Nigeria can contribute to the global advancement of science and technology. Recommendations included collaboration between the government and private sector to improve STEM infrastructure, especially in rural areas, and the formulation of policies that encourage girls' participation in STEM education and careers.

Keywords: STEM Education, gender equality, educational reform, policy support, teacher training

Introduction

The exploration of re-enacting science, technology, engineering, and mathematics (STEM) education for girls in Delta State is crucial for addressing gender disparities and promoting national development. STEM disciplines are increasingly recognized for their transformative impact on innovation, economic growth, and social equality (Eze et al., 2023; Adeyemi, 2022). In Nigeria, where science and technology sectors remain predominantly male-dominated, the underrepresentation of girls not only limits their potential but also hampers the country's broader progress. Re-enacting STEM education for girls is therefore vital to ensure gender equality, unlock the full potential of girls, and contribute to the nation's human capital development. National and global discussions on gender equality in education emphasize the need for targeted interventions to close the gender gap in STEM fields. Researchers suggest that the persistent underrepresentation of girls in these disciplines is due to systemic barriers, such as societal norms, inadequate teacher training, and a lack of effective policy implementation (Okoroafor & Emeka, 2022). In Delta State, these challenges are exacerbated by cultural and socio-economic factors that limit opportunities for girls to pursue STEM-related studies.

Historically, women and girls have faced significant exclusion from STEM education. Educational systems have often perpetuated gender biases through outdated curricula, teaching practices, and cultural stereotypes. In the early 20th century, the perception that technical and scientific subjects were unsuitable for women severely restricted their access to these fields. Contemporary studies reveal that such barriers still persist. For example, Akinola and Oladipo (2021) found that gender stereotypes and the lack of female role models in STEM discourage girls from pursuing careers in these fields. UNESCO (2021) reported that women represent only 33 percent of researchers globally, with even lower representation in sub-Saharan Africa, where cultural norms

further reinforce gender disparities in education. The integration of STEM disciplines is essential for sustainable development in nations, especially in addressing critical challenges such as poverty, unemployment, healthcare deficits, and infrastructure gaps. In Nigeria, STEM education is key to tackling these issues and ensuring the country's economic and social advancement. However, the effective implementation of STEM education remains uneven, particularly for girls and students in rural areas. Johnson and Musa (2023) argue that overcoming these challenges requires a multifaceted approach, including curriculum reforms, teacher training improvements, and increased support from both government and local communities. Therefore, this paper examines the current state of STEM education in Nigeria, focusing specifically on Delta State. It discusses the barriers that girls face in accessing STEM education and proposes strategies for re-enacting STEM education for girls. By addressing these challenges and fostering an inclusive educational environment, the paper aims to empower girls in Delta State to pursue STEM education and contribute to the national development of Nigeria.

Conceptualization

Re-enacting refers to the process of rethinking and revising existing educational systems, practices, or policies to enhance their relevance, efficiency, and inclusivity. Peters and Waterman (2018) define re-enacting as revisiting outdated practices and restructuring them to meet contemporary needs. Jones (2020) suggests that re-enacting involves not only revising existing practices but also aligning them with evolving societal demands. Johnson and Hill (2021) further emphasize that re-enacting requires a complete realignment of systems and practices to make them more effective in addressing current challenges. In the context of STEM education for girls in Delta State, re-enacting involves revising current educational practices to make STEM (Science, Technology, Engineering, and Mathematics) fields more accessible, engaging, and supportive for girls, particularly in overcoming gender biases and other barriers limiting their participation.

STEM Education is an integrated approach to learning that combines science, technology, engineering, and mathematics to prepare students to tackle real-world challenges through problem-solving, critical thinking, and innovation. Bybee (2013) defines STEM education as an interdisciplinary approach designed to engage students in activities that require the use of knowledge from these subjects to address complex problems. Sanders (2009) elaborates that STEM education encourages students to apply their learning in a collaborative and innovative manner to meet global and societal needs. Tsupros et al. (2009) further explain that STEM education provides students with the tools to become innovators and leaders in fields that are central to economic growth and technological development. In the context of this study, STEM education in Delta State refers to the integration of these four fields in schools with the aim of fostering the development of skills such as critical thinking, creativity, and collaboration. Re-enacting STEM education for girls involves ensuring that girls in Delta State have the support and opportunities to develop these skills and succeed in STEM-related fields.

STEM Education for Girls focuses on the initiatives, policies, and practices specifically designed to encourage and empower female students to pursue education and careers in STEM fields. According to UNESCO (2017), STEM education for girls aims to close the gender gap by providing girls with the resources, mentorship, and support needed to succeed in these areas. Moletsane et al. (2018) argue that effective STEM education for girls requires overcoming cultural and societal biases that discourage girls from pursuing STEM fields. Dweck (2008) emphasizes the importance of a growth mindset, which encourages girls to view challenges as opportunities for

growth and to develop resilience against barriers such as stereotypes and a lack of role models. In this study, STEM education for girls in Delta State refers to strategies that aim to provide girls with the academic, emotional, and social support necessary to thrive in STEM education, including access to scholarships, mentorship programs, and tailored curricula that foster a sense of confidence and curiosity.

Critical Appraisal is the systematic evaluation of existing practices, policies, or research to assess their strengths, weaknesses, and applicability. Crombie (2012) defines critical appraisal as the process of rigorously evaluating research findings to determine their quality, validity, and relevance. Burls (2009) suggests that critical appraisal involves applying research findings to real-world contexts to inform decisions. Greenhalgh (2019) highlights that critical appraisal allows for evidence-based decision-making, particularly in complex fields such as education. In this study, critical appraisal involves reviewing the existing STEM education policies, practices, and gender equity initiatives in Delta State to identify areas that require improvement, with a focus on increasing girls' participation in STEM. The critical appraisal of current practices provides the foundation for re-enacting STEM education for girls by highlighting the systemic barriers and challenges that need to be addressed. As a result, the integration of the concepts of re-enacting, STEM education, STEM education for girls, and critical appraisal creates a comprehensive framework for exploring how to improve STEM education for girls in Delta State. Re-enacting STEM education involves revisiting and revising educational practices to make them more inclusive, especially for girls. STEM education, as an integrated approach, lays the foundation for preparing students for the challenges of a technology-driven world. STEM education for girls focuses specifically on eliminating gender disparities in STEM, providing girls with the resources, encouragement, and support necessary to succeed. Critical appraisal ensures that existing policies and practices are rigorously assessed and revised to better meet the needs of girls. Together, these concepts form a coherent approach to fostering gender equity and empowering girls in STEM education, with the goal of re-enacting a more inclusive educational system in Delta State.

The Current State and Challenges of STEM Education in Nigeria

STEM education in Nigeria holds immense potential for driving innovation, economic growth, and sustainable development. However, the current state of STEM education is fraught with challenges, ranging from inadequate infrastructure to systemic gender disparities. Addressing these obstacles is crucial to unlocking the full potential of Nigeria's youth and bridging the gaps in global competitiveness.

Lack of Infrastructure: A critical impediment to STEM education in Nigeria is the lack of adequate infrastructure. Many schools, especially in rural areas, lack basic facilities such as functional laboratories, reliable electricity, and conducive learning environments. These shortcomings hinder students' ability to engage in practical, hands-on learning, a cornerstone of STEM education. The World Bank (2021) reported that over 60% of public schools in Nigeria lack functional science laboratories, a situation that severely limits the quality of STEM education across the country.

Shortage of Qualified STEM Teachers: The scarcity of qualified STEM educators is another significant challenge. Many teachers lack the necessary training to deliver STEM content effectively, and teacher training programs often fail to incorporate modern methodologies and technological tools. This issue is even more pronounced in rural areas, where attracting and retaining skilled educators is difficult. The Nigerian Educational Research and Development Council (2019)

highlighted that outdated teaching methods focused on rote learning continue to dominate classrooms, thereby limiting students' critical thinking and problem-solving skills.

Gender Inequality in STEM Education: Gender inequality remains a persistent issue in STEM education in Nigeria. Societal norms, stereotypes, and economic barriers often discourage girls from pursuing STEM fields. According to UNESCO (2021), only 22% of STEM graduates in Nigeria are women, reflecting a stark gender imbalance. Factors such as early marriage, poverty, and limited access to quality education further exacerbate this disparity, particularly in regions like Delta State, where cultural norms and inadequate infrastructure restrict opportunities for girls to thrive in STEM disciplines.

Outdated STEM Curriculum: The STEM curriculum in Nigeria fails to meet the demands of the rapidly evolving global economy. It often isolates subjects, providing little emphasis on interdisciplinary learning or real-world applications. Emerging fields like artificial intelligence, robotics, and biotechnology receive minimal attention in Nigerian classrooms. Johnson and Musa (2023) argued that the outdated curriculum not only hinders innovation but also contributes to the mismatch between graduates' skills and labor market demands.

Economic Constraints: Economic barriers significantly restrict access to STEM education for many Nigerian families. The high costs of tuition, textbooks, laboratory equipment, and other resources often make STEM education inaccessible, particularly for students in rural and low-income communities. Eze, Okonkwo, and Adebayo (2023) noted that poverty frequently forces families to prioritize immediate needs over long-term educational investments, depriving talented students of opportunities to excel in STEM fields.

Challenges Facing Girls in STEM Education in Delta State

The challenges facing girls in STEM education in Delta State are deeply rooted in socio-cultural, economic, and infrastructural factors. Despite the increasing global push for gender equality in education, girls in Delta State continue to face significant barriers that hinder their participation and success in STEM fields. These challenges include socio-cultural barriers, lack of female role models, poor infrastructure, gender bias, economic constraints, and early marriage.

Socio-Cultural Barriers: Socio-cultural norms and gender stereotypes play a significant role in limiting girls' participation in STEM education in Delta State. In many communities, girls are socialized to believe that STEM subjects, particularly mathematics and engineering, are more suited to boys (Adeniran & Odebode, 2017). These cultural biases discourage girls from pursuing STEM subjects and contribute to the low representation of women in STEM fields. Furthermore, some parents prioritize the education of boys over girls, especially in rural areas, where traditional gender roles are more entrenched. Traditional beliefs about gender roles in many communities in Delta State still emphasize that women should focus on domestic responsibilities, while men should pursue careers in more intellectually demanding fields, including science and technology. These deep-seated stereotypes dissuade girls from pursuing STEM subjects, often instilling the perception that these fields are "masculine." Research by Oviawe and Uddin (2014) on Nigerian perceptions of female participation in science and technology highlights the powerful role of cultural expectations in shaping educational choices. For instance, many families encourage their daughters to focus on arts and humanities because these are seen as more compatible with future roles as wives and mothers. Such attitudes persist, despite global trends toward gender equity in education and labor markets.

Lack of Female Role Models: The absence of female role models in STEM fields further exacerbates the gender gap in STEM education. Girls in Delta State often lack access to female mentors and professionals who can inspire and guide them in their pursuit of STEM careers (Chumo, 2014). Without visible examples of successful women in STEM, many girls may feel that these fields are not meant for them, leading to a lack of motivation to pursue STEM education. The presence of female educators, professionals, and mentors in science and technology can inspire young girls to pursue STEM education. Unfortunately, in Delta State, women are severely underrepresented in these sectors, creating a visibility gap that hinders the aspirations of young girls.

Poor Infrastructure and Access to Resources: Many schools in Delta State, especially in rural areas, lack the necessary infrastructure and resources to provide quality STEM education. The absence of well-equipped science laboratories, modern teaching aids, and access to information technology makes it difficult for girls to engage fully in STEM subjects (Nnamani, Akabogu, Ulloh-Bethel & Ede, 2018). This limits girls' access to online learning resources and STEM-related opportunities. Many schools in Delta State lack the necessary resources to deliver effective STEM education. In particular, rural areas face significant infrastructural challenges, such as inadequate laboratories, insufficient access to learning materials, and poorly trained teachers. According to the Nigerian Ministry of Education (2019), less than 40% of public schools in the state have functioning science laboratories, and only 25% of STEM teachers have undergone specialized training. Without the proper infrastructure, girls are deprived of the hands-on experience critical to mastering STEM subjects.

Gender Bias in the Classroom: Gender bias in the classroom is another significant challenge facing girls in STEM education. Teachers may unconsciously favor boys over girls in STEM subjects, providing boys with more encouragement and attention in mathematics and science classes (Ning et al., 2023). This bias can undermine girls' confidence in their abilities and discourage them from actively participating in STEM subjects. When girls feel that they are not given equal opportunities to succeed, it can negatively affect their interest and performance in STEM education.

Economic Barriers: Poverty is another key barrier to girls' access to STEM education. In Delta State, many families prioritize the education of boys over girls due to financial constraints. This is especially prevalent in rural communities where poverty rates are higher, and girls are often encouraged to marry early or take on work to support their families, rather than continuing their education. Economic factors also contribute to the low participation of girls in STEM education. In some families, limited financial resources force parents to prioritize the education of boys over girls, especially in expensive subjects such as engineering and computer science (Ning et al., 2023). This economic disparity further widens the gender gap in STEM education, as girls may be unable to afford the necessary materials, textbooks, or extracurricular activities that support their STEM learning.

Early Marriage and Teenage Pregnancy: Early marriage and teenage pregnancy remain pressing challenges in Delta State, particularly in rural areas. According to UNICEF (2018), approximately 38% of girls in Nigeria are married before the age of 18, and Delta State has one of the highest rates of teenage pregnancy in the country. These factors contribute to high dropout rates among girls, limiting their access to advanced education, particularly in fields like STEM. Early marriage often leads to the discontinuation of girls' education, and teenage pregnancy further disrupts their academic progress. These challenges exacerbate the gender gap in education and limit opportunities for girls to pursue careers in science and technology.

Opportunities for STEM Education in Nigeria

Despite the challenges, there are numerous opportunities to enhance STEM education in Nigeria and harness its potential for national development. Several factors indicate a promising future for STEM education in the country.

1. **Government Initiatives:** The Nigerian government has acknowledged the importance of STEM education and introduced initiatives aimed at enhancing its development. The National Policy on Science and Technology Education underscores the need to promote STEM at all educational levels (Federal Ministry of Education, 2014). Programs like the Digital Girls Club and the Catch Them Young initiative focus on increasing female participation in STEM and fostering early interest in science and technology (Akinyemi & Olatunji, 2021). Additionally, the government's drive to diversify the economy away from oil provides an opportunity to invest in STEM education, creating a skilled workforce capable of supporting growth in sectors like technology, agriculture, and renewable energy (Ogunleye, 2020).
2. **Public-Private Partnerships (PPPs):** Public-private partnerships present a practical solution to the infrastructure and funding challenges facing STEM education in Nigeria. Private companies, especially in the technology and energy sectors, have collaborated with schools and universities to provide resources, training, and mentorship to students (Akanbi & Balogun, 2019). Technology giants such as Google and Microsoft have launched initiatives to enhance digital literacy and coding skills among Nigerian students (Ekwueme & Ogbodo, 2020). Expanding these partnerships to focus on more targeted STEM education programs, particularly in underserved regions, can significantly enhance the accessibility and quality of STEM education (Adeyemo & Ige, 2021).
3. **Educational Technology (EdTech):** The growing field of educational technology (EdTech) presents a unique opportunity to address gaps in STEM education. Online learning platforms, virtual labs, and mobile applications can help students access high-quality STEM education, even in areas with limited traditional infrastructure (Fapohunda & Akinyemi, 2019). Several Nigerian startups, such as ULesson and Tuteria, have emerged in the EdTech sector, offering innovative solutions to educational challenges (Nwogbaga, 2021). These digital tools are particularly effective in reaching rural students and narrowing the gender gap by providing flexible learning options for girls (Owoeye & Odusanya, 2020).
4. **International Support and Collaboration:** Nigeria has received substantial international support for its STEM education initiatives. Organizations like UNESCO, the World Bank, and the African Development Bank have funded various projects focused on infrastructure development, teacher training, and scholarship programs for girls (World Bank, 2019). Furthermore, Nigerian universities have partnered with international institutions to enhance research and innovation capacity in STEM fields (Adeyemi & Raji, 2021). Strengthening these international collaborations can facilitate knowledge exchange and capacity building in emerging STEM disciplines, thereby improving STEM education across the country.

Re-enacting STEM Education for Girls in Delta State - A Feminist Approach to Gender Equality and Empowerment

The critical feminist discourse on re-enacting STEM education for girls emphasizes the necessity of dismantling the structural barriers that hinder their access to and success in STEM fields. Feminist scholars argue that STEM education should not merely focus on knowledge acquisition but also challenge the patriarchal structures that determine what girls are taught, how they are taught, and the roles they are expected to assume in society. Bell Hooks (1994) advocates for an education system that empowers all students rather than marginalizing them. Re-enacting STEM education for girls, therefore, becomes a political act, one aimed at challenging existing power dynamics and equipping girls with the tools necessary to question and reshape the status quo. This perspective frames STEM education as a pathway to economic independence and societal transformation, offering girls the opportunity to break free from traditional gender roles. In addition to feminist perspectives, there are significant economic and developmental reasons for promoting STEM education for girls. Studies have shown that increasing women's participation in STEM fields can substantially boost national economic performance. For instance, a McKinsey Global Institute report (2015) asserts that gender parity in the workforce, including STEM professions, could add an additional \$12 trillion to global GDP by 2025. In developing countries like Nigeria, the underutilization of women's potential in STEM fields represents a lost opportunity for national growth. Delta State, with its burgeoning oil industry, stands to benefit greatly from a more inclusive workforce in technology and engineering. STEM education equips girls with essential skills to participate in critical sectors, thereby contributing to national development and poverty reduction. Girls who pursue STEM careers often secure higher-paying jobs, improving their families' financial stability.

Education systems play a pivotal role in the feminist discourse surrounding the re-enactment of STEM education, as they both reflect and perpetuate gender inequality. In many countries, including Nigeria, girls are less likely than boys to be encouraged to pursue STEM subjects like mathematics and physics due to teacher biases, societal expectations, and a lack of female role models in these fields. The discourse on re-enacting STEM education calls for reforms that promote inclusivity in curricula, along with teacher training programs designed to inspire and support girls in STEM subjects. The absence of female role models in STEM careers is a significant deterrent for many girls. Therefore, creating mentorship programs and increasing the visibility of successful women in STEM can inspire and motivate girls to pursue these fields. In Delta State, a combination of socio-cultural, economic, and educational barriers limits girls' participation in STEM fields. Traditional gender roles, societal expectations, and limited access to quality STEM education have discouraged many girls from pursuing careers in these areas. Addressing these challenges requires the development of strategies to promote STEM education for girls, ensuring equal opportunities for their educational and professional advancement. STEM education is essential not only for national development but also for individual empowerment. According to the World Economic Forum (2020), STEM careers are among the fastest-growing and most lucrative globally, offering opportunities for innovation in sectors such as healthcare, energy, and information technology. Pursuing STEM education can open the doors to improved career prospects, financial independence, and the ability for girls to contribute meaningfully to society.

Promoting STEM education for girls is also crucial for achieving gender equality. UNESCO (2017) emphasizes that gender equality in STEM education is fundamental for empowering women and girls to participate in scientific, technological, and economic advancements. Closing the gender gap in STEM fields will foster a more inclusive workforce, encourage diverse perspectives, and generate innovative solutions. This, in turn, contributes to a more equitable society. By re-enacting

STEM education for girls, particularly in regions like Delta State, we can empower the next generation of women to assume leadership roles in fields vital to economic development and social progress.

Successful STEM Programs for Girls in Nigeria: Insights and Global Examples

Increasing girls' participation in STEM education has become a priority in many countries around the world. Successful programs from various regions offer important insights that could be applied to promote gender equality in STEM education in Delta State, Nigeria.

Nigeria's Digital Girls Club: In Nigeria, one key initiative to encourage girls in STEM is the *Digital Girls Club*, launched by the Nigerian government. This program aims to equip young girls with digital skills, including coding, and prepare them for careers in technology. Although still in its early stages, the Digital Girls Club has shown great promise in increasing girls' involvement in STEM fields by providing them with access to digital tools and learning opportunities (Nigerian Ministry of Education, 2021). Additionally, the program fosters empowerment by giving girls the skills to thrive in the growing tech industry.

She Codes Africa: Another significant initiative in Nigeria is *She Codes Africa*, a program dedicated to training girls and young women in coding and digital skills. She Codes Africa offers mentorship, coding workshops, and networking opportunities, helping thousands of girls become proficient in programming languages and tech-related fields (She Codes Africa, 2021). The program's success in Nigeria highlights the impact that targeted mentorship and skill-building opportunities can have on increasing female participation in technology sectors.

African Girls Can Code Initiative: The *African Girls Can Code* program, supported by the African Union and the International Telecommunication Union (ITU), is another example of an initiative aimed at empowering girls in the technology sector. By providing girls with digital literacy, coding training, and mentorship, the program prepares them for successful careers in technology and innovation. The initiative has already seen great success, with a growing number of girls gaining the skills and confidence needed to pursue STEM careers (African Union, 2020).

Rwanda's Girls in ICT Program: Rwanda's *Girls in ICT* initiative is a standout example of a successful program designed to increase girls' participation in ICT fields. This initiative offers girls access to technology and provides specialized training in ICT, encouraging them to pursue careers in science and technology. The program has been instrumental in boosting the number of girls enrolling in ICT courses and has inspired similar programs across the African continent (Akman, 2020). The success of this initiative underscores the importance of providing targeted support and resources for girls to thrive in STEM disciplines.

India's Vigyan Jyoti Program: In India, the *Vigyan Jyoti* program focuses on encouraging girls, especially those in rural areas, to pursue STEM education and careers. By offering mentorship, scholarships, and hands-on learning opportunities, the program has successfully increased the number of girls pursuing science and engineering subjects at high school and university levels. This initiative demonstrates the potential of combining mentorship with practical learning experiences to drive gender equity in STEM education (Govt. of India, 2020).

Strategic Approaches for Re-Enacting STEM Education for Girls in Delta State, Nigeria

To address the gender disparity in STEM (Science, Technology, Engineering, and Mathematics) education in Delta State, Nigeria, it is critical to implement multifaceted strategies that break down existing barriers and provide girls with the opportunities and encouragement needed to pursue and succeed in STEM fields. These strategies must be tailored to the unique social, cultural, and economic contexts of Delta State, while drawing on successful global best practices to create a lasting impact. The following strategies can be employed to re-enact STEM education for girls in Delta State:

Curriculum Reform: It is essential to design a gender-sensitive curriculum that reflects the interests of girls and challenges traditional stereotypes. By incorporating examples of female role models and showcasing the real-world applications of STEM, particularly in areas such as healthcare, environmental protection, and social justice, girls are more likely to engage with STEM subjects. Studies suggest that girls are more motivated when they see the potential for societal impact through STEM education (Dabney et al., 2012).

Teacher Training and Professional Development: Teachers play a crucial role in shaping students' attitudes towards STEM subjects. It is necessary to provide ongoing professional development to help teachers adopt gender-sensitive teaching practices. This includes training teachers to combat unconscious bias and ensure that girls receive equal encouragement and opportunities in STEM subjects (Beaman et al., 2012).

Mentorship and Role Models: Establishing mentorship programs that connect girls with female role models in STEM is a powerful strategy for fostering interest and encouraging persistence in STEM fields. These mentors can provide guidance, inspiration, and real-world examples of success in STEM careers. Partnerships between schools, universities, and private-sector organizations can facilitate such mentorship programs.

Community and Parental Engagement: Changing cultural attitudes that limit girls' access to STEM education requires active involvement from the community and parents. Awareness campaigns should be launched to educate parents on the importance of STEM education for girls and the long-term benefits for their daughters. These campaigns should also address the economic barriers that prevent girls from pursuing STEM education by promoting scholarships and financial assistance.

Government and Policy Support: Government policies play a significant role in advancing gender equality in education. In Delta State, the government should introduce policies that promote the participation of girls in STEM subjects, such as scholarships, affirmative action, and increased investment in school infrastructure, especially in rural areas. These efforts would help ensure girls have access to the resources needed to succeed in STEM education.

Intersectional Approach to Education: An intersectional approach recognizes the multiple layers of disadvantage that girls from rural areas face. Factors such as poverty, limited access to quality schools, and cultural norms must be addressed to ensure these girls can access and benefit from STEM education. This might include providing transportation, scholarships, and after-school programs tailored to their unique challenges.

Extracurricular STEM Activities: Encouraging girls to participate in extracurricular STEM activities, such as science clubs, robotics competitions, and coding workshops, can help develop their problem-solving skills and build confidence in STEM subjects. These activities provide hands-on learning experiences and foster collaboration with peers, which is essential for cultivating interest and enthusiasm in STEM fields (Okafor & Abiodun, 2021).

Leveraging Technology for STEM Learning: Technology can play a transformative role in re-enacting STEM education for girls. By integrating digital tools and online platforms into the STEM curriculum, girls can access a wealth of learning resources, including virtual labs, interactive tutorials, and online courses (Ibe, 2019). Schools should also ensure that girls have access to digital devices and internet connectivity, enabling them to engage with global STEM communities, mentors, and role models.

Contribution to Knowledge

This paper contributes to knowledge by highlighting the critical role of re-enacting STEM education for girls in Delta State as a pathway to achieving gender equality and national development. It identifies socio-cultural, economic, and infrastructural barriers hindering girls' participation in STEM and provides actionable strategies, including curriculum reform, teacher training, mentorship programs, and the integration of EdTech solutions. The paper emphasizes the transformative potential of STEM education in fostering societal progress and economic growth while offering practical recommendations to close the gender gap and ensure inclusive access to quality STEM education. By addressing these challenges, the study serves as a valuable resource for policymakers, educators, and stakeholders committed to advancing gender equity and sustainable development.

Conclusion

The paper concluded that re-enacting STEM education for girls in Delta State is essential for bridging gender disparities, empowering young women, and driving sustainable development. Addressing the socio-cultural, economic, and infrastructural barriers that hinder girls' participation in STEM requires a comprehensive approach. This includes curriculum reform, teacher capacity building, mentorship initiatives, community and parental involvement, and the implementation of supportive policies. Such measures transcend mere access to education, aiming to reshape societal attitudes and structures to ensure that girls are adequately prepared to thrive in STEM fields. Empowering girls through STEM education is not only a pathway to achieving gender equality but also a catalyst for innovation and economic advancement. By investing in these initiatives, Delta State and Nigeria can

The Way Forward

STEM education holds the key to innovation, economic growth, and national development. For Nigeria to fully unlock its potential in science, technology, engineering, and mathematics, a strategic and inclusive approach is essential to overcome existing challenges and barriers.

1. **Government and Private Sector Collaboration:** A unified effort between the government and private sector is crucial to enhance STEM infrastructure nationwide, particularly in rural and underserved regions. This should include building and equipping modern science laboratories, providing access to computers and reliable internet, and ensuring schools have stable power supply.
2. **Teacher Training and Curriculum Reform:** Continuous professional development for educators is vital. Training programs must focus on modern teaching methodologies and advancements in STEM fields. Additionally, the curriculum should prioritize practical, problem-solving approaches and foster interdisciplinary learning to prepare students for global challenges.

3. **Closing the Gender Gap:** Special attention is needed to promote gender equality in STEM education. Initiatives such as scholarships, mentorship programs, and career guidance tailored to girls, alongside advocacy to dismantle cultural barriers, are key to increasing female participation.
4. **Adoption of EdTech Solutions:** Integrating educational technology (EdTech) into schools can address infrastructural gaps and enhance the learning experience. Digital tools and platforms can ensure that students in remote and underserved areas have equitable access to quality STEM education.
5. **Community and Parental Engagement:** Sensitizing communities and parents about the value of STEM education, especially for girls, can help change societal perceptions. Advocacy and awareness programs should be implemented to foster widespread support for inclusive education.
6. **Policy Support and Implementation:** Governments at all levels must introduce and enforce policies that prioritize STEM education. These include allocating adequate funding, mandating gender parity initiatives, and supporting extracurricular STEM activities to inspire students.

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