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GENDER DIVERSITY IN TECHNICAL AND VOCATIONAL EDUCATION IN NIGERIAN COLLEGES OF EDUCATION: CHALLENGES AND OPPORTUNITIES

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Abstract
Gender diversity in technical education remains a critical issue in Nigerian Colleges of Education, with female participation significantly lower than that of males. This study explores the challenges and opportunities associated with gender diversity in technical and vocational education and training (TVET) programmes using a secondary sources, including relevant texts, journals, official publications, historical documents, and the internet. It identifies key barriers such as socio-cultural norms, economic constraints, and institutional challenges that limit female enrollment in technical disciplines. Findings reveal that traditional gender roles, financial limitations, and the absence of gender-sensitive policies continue to discourage female students from pursuing technical education. Despite these challenges, there are emerging opportunities to enhance gender diversity in technical education. Initiatives by organizations such as the Association of Professional Women Engineers of Nigeria (APWEN) aim to promote the inclusion of women in engineering and technical fields. APWEN advocates for the education and empowerment of women to contribute meaningfully to the economy's production sector. The study also highlights other opportunities for improvement, including policy reforms, financial support, mentorship programmes, and industry collaborations to promote inclusivity. To address these challenges, the study recommends enforcing gender-sensitive policies, providing scholarships, raising awareness, recruiting more female educators, and creating mentorship programmes. It emphasizes the need for collective action from policymakers, educators, communities, and industries to bridge the gender gap in technical education. By fostering a more inclusive learning environment, Nigerian Colleges of Education can empower more women to contribute meaningfully to national development and technological advancement.

Keywords: Gender diversity, Technical and Vocational Education and Training, women in STEM, socio-cultural barriers.

Introduction

Gender diversity in technical education within Nigerian Colleges of Education remains a critical issue, as female participation in these programmes continues to lag behind that of their male counterparts. This disparity is influenced by a complex interplay of socio-cultural, economic, and institutional factors that discourage women from pursuing technical and vocational education and training (TVET). Socio-cultural barriers, such as entrenched beliefs about gender roles, significantly impact female enrollment in technical fields. Onyeocha *et al* . (2023) highlight that societal perceptions often regard technical disciplines as male domains, leading to limited encouragement for women to engage in these areas. This cultural bias is further reinforced by family and peer pressures, which may prioritize early marriage over educational attainment for women.

Economic factors also play a pivotal role in shaping gender diversity in technical education. Dokubo and Deebom (2017) identify poverty and a preference for investing in male education as significant contributors to the low enrollment of women in technical programmes. Financial constraints often compel families to allocate resources toward male children, perceiving them as future breadwinners, thereby limiting educational opportunities for female children. Institutional challenges within educational settings further exacerbate this gender disparity. Research indicates that classroom dynamics and teacher attitudes can perpetuate gender stereotypes, discouraging female students from fully participating in technical subjects. For instance, male students often receive more attention and encouragement in technical classrooms, which can undermine the confidence and engagement of their female peers.

Gender diversity in Nigerian technical education is heavily influenced by deep-rooted cultural norms that associate technical and vocational skills with masculinity. A study by Ezeudu *et al*. (2021) found that societal expectations push women toward "care-oriented" professions (e.g., nursing, teaching) while

discouraging them from "tool-based" fields like engineering and mechanics. This bias is reinforced by media portrayals and familial attitudes, where parents often dissuade daughters from pursuing technical careers due to perceived incompatibility with traditional gender roles (Nwankwo & Eze, 2022).

Additionally, religious beliefs in some Nigerian communities perpetuate the idea that women should prioritize domestic roles over technical careers. Musa *et al* . (2023) highlight that in northern Nigeria, cultural and religious restrictions further limit female participation in technical education, with fewer than 15% of students in government technical colleges being female. Economic hardship exacerbates gender disparities in technical education. Okafor and Adeoye (2023) note that families with limited resources often invest more in sons' education, believing they will yield higher economic returns. This is compounded by the direct and indirect costs of technical training, including:

Tuition and material costs (e.g., welding kits, engineering tools).

Transportation challenges, as many technical colleges are located in industrial areas far from residential zones, posing safety concerns for female students (Ajayi & Ojo, 2022). A World Bank (2023) report on Nigeria's education sector revealed that female students in technical programmes are 30% more likely to drop out due to financial pressures compared to their male counterparts.

Many Nigerian technical institutions lack infrastructure that supports female inclusion, such as:

- Inadequate sanitary facilities, deterring female students from attending classes (UNICEF, 2022).
- Male-dominated classrooms, where female students face subtle discrimination, including being excluded from group projects or hands-on training (Okorie & Bello, 2023).

Research by Adewumi *et al* . (2023) found that instructors in technical colleges often unconsciously favor male students in practical sessions, assuming they are

"naturally better" at handling machinery. Female students also report experiencing discouragement, with some lecturers suggesting they switch to "easier" courses.

Many female students are unaware of technical career opportunities due to poor career counseling in schools. A British Council (2023) survey found that 68% of female students in Nigerian technical colleges had never interacted with a female engineer or technician, reinforcing the perception that these fields are not for women.

Despite these challenges, several initiatives are making strides:

- The Nigerian government's Adopt-A-TechGirl initiative (2023) provides scholarships and mentorship for young women in technical fields.
- UN Women's STEM Her programme partners with Nigerian polytechnics to offer free technical training for women (UN Women, 2023).
- Private sector involvement, such as Google's Women Techmakers Nigeria, sponsors coding boot camps and apprenticeships for female students (Google Nigeria, 2023).

Despite these challenges, there are emerging opportunities to enhance gender diversity in technical education. Initiatives by organizations such as the Association of Professional Women Engineers of Nigeria (APWEN) aim to promote the inclusion of women in engineering and technical fields. APWEN advocates for the education and empowerment of women to contribute meaningfully to the economy's production sector. Addressing the gender gap in technical education requires a multifaceted approach that includes policy reforms, community engagement, and targeted support for female students. By confronting socio-cultural biases, alleviating economic constraints, and fostering inclusive educational environments, Nigerian Colleges of Education can create pathways for increased female participation in technical disciplines, thereby contributing to broader national development goals.

Statement of the Problem

Despite various efforts to promote gender inclusivity in technical education, Nigerian Colleges of Education continue to experience a significant gender imbalance in technical and vocational education and training (TVET) programmes. Female enrollment in technical disciplines remains disproportionately low compared to their male counterparts, limiting women's contributions to national development and technological advancement.

Several factors contribute to this gender disparity, including deeply ingrained socio-cultural norms, economic constraints, and institutional challenges. Traditional gender stereotypes often discourage female students from pursuing technical courses, reinforcing the perception that such fields are male-dominated. Additionally, financial barriers and family preferences for investing in male education further reduce opportunities for women to participate in technical education. Within educational institutions, a lack of gender-sensitive policies, limited female role models, and biased classroom dynamics further hinder female students' engagement and retention in technical programmes.

This gender gap in technical education has far-reaching implications, including the underrepresentation of women in STEM-related careers, reduced economic empowerment for women, and a slower pace of technological and industrial growth. While various government policies and initiatives aim to address these challenges, their effectiveness remains uncertain due to inconsistent implementation and limited research on gender-responsive strategies in technical education.

Purpose of the Study

The main purpose of the study is to explore the challenges and opportunities associated with gender diversity in technical and vocational education and training (TVET) programmes.

Methods

This research primarily relies on secondary sources, including relevant texts, journals, official publications, historical documents, and the internet which

provided substantial material for the study. However, the investigation was confined to data from scholarly journals, books and online resources concerning gender diversity in technical and vocational education within colleges of education. This approach is suitable for understanding the socio-cultural, economic, and institutional barriers influencing gender diversity in the sector.

Concept of gender diversity in technical and vocational education within Nigerian colleges of education

Gender diversity in technical education refers to the equitable representation and participation of all genders, particularly focusing on increasing female involvement in technical and vocational education and training (TVET). In Nigerian Colleges of Education, gender diversity in technical fields remains a major concern due to persistent socio-cultural, economic, and institutional barriers that limit female enrollment and retention in technical disciplines (Onyeocha *et al* ., 2023). Achieving gender diversity is crucial for national development, economic growth, and the reduction of gender inequalities in such disciplines.

Challenges of Gender Diversity in Technical and Vocational Education in Nigerian Colleges of Education

Socio-Cultural Barriers

Deep-rooted socio-cultural norms and traditional beliefs in Nigeria often portray technical fields as male-dominated domains, discouraging female students from pursuing technical education. These perceptions are reinforced by societal expectations and family influences, which prioritize conventional gender roles over individual aspirations. As a result, many families and communities do not support women's pursuit of technical careers, further limiting female enrollment in TVET programmes (Onyeocha *et al*., 2023).

Several studies highlight the impact of these socio-cultural barriers on female participation in technical education. Onyeocha *et al*. (2023) conducted a study in Kaduna and found that traditional gender roles discourage female

students from considering technical careers, resulting in a 4:1 male-to-female ratio in TVET programmes. Similarly, Golley *et al*. (2024) found that in Delta State, cultural beliefs associating technical work with masculinity deter female students from pursuing STEM-related careers.

Furthermore, the absence of female role models in technical fields exacerbates the problem. Aina & Omoniyi (2021) conducted a study across six Nigerian states and reported that the lack of visible female representation in technical careers discourages young women from enrolling in TVET programmes. Without mentorship and role models, many female students struggle to envision a future in technical education, further widening the gender gap in these fields.

Economic Constraints

Financial limitations and economic factors play a critical role in the underrepresentation of women in technical education. In many Nigerian households, scarce financial resources are often allocated preferentially to male children, based on the perception that males have a higher likelihood of securing employment in technical fields. This economic bias significantly restricts educational opportunities for female students, limiting their access to TVET programmes (Dokubo & Deebom, 2017).

Several studies have highlighted the impact of financial constraints on female enrollment in technical education. Dokubo & Deebom (2017) examined technical colleges in Rivers State and found that parental influence and economic challenges were major factors contributing to low female participation in technical fields. Similarly, the World Bank (2022) reported that in Nigeria, financial barriers prevent many girls from pursuing technical education, as families often prioritize boys' education due to perceived better job prospects.

However, research also suggests that financial support can improve female retention in technical programs. Ajayi & Oladimeji (2020) studied the impact of vocational training funding and found that government-sponsored TVET

programmes significantly increased female retention rates when accompanied by financial assistance. This indicates that targeted funding and scholarship initiatives could help bridge the gender gap in technical education by providing equal opportunities for female students.

Institutional Challenges

Within educational institutions, systemic challenges further exacerbate gender disparities in technical education. A lack of gender-sensitive policies, insufficient female role models, and classroom dynamics that favor male students contribute to an unwelcoming environment for female students. These institutional barriers can diminish women's confidence and interest in technical fields. Research indicates that classroom dynamics and teacher attitudes can perpetuate gender stereotypes, discouraging female students from fully participating in technical subjects.

Educational institutions often lack gender-sensitive policies, female role models, and inclusive learning environments**,** which contribute to the low participation of women in technical fields. The absence of female lecturers in TVET programmes further discourages women from pursuing technical careers (Golley *et al*., 2024). Igbokwe & Ugwuanyi (2022) emphasized that technical education curricula in Nigeria do not sufficiently incorporate gender-sensitive teaching methods, making it difficult for female students to thrive.

Benefits of Gender Diversity in Vocational and Technical Education

a. Innovation and Technological Advancement

A gender-diverse learning environment fosters creative problem-solving, innovation, and diverse perspectives, which are essential for technological development and industrial growth (UNESCO, 2020).

b. Economic Empowerment and Female Students Development

When more female students participate in technical and vocational education, they contribute to a larger and more skilled labor force, helping to reduce unemployment and increase household incomes (World Bank, 2022).

c. Social and Educational Equity

Promoting gender diversity ensures that both men and women have equal access to educational resources, mentorship, and career opportunities, leading to a more inclusive and just society.

Opportunities for Enhancing Gender Diversity

Despite these challenges, several strategies have been identified to promote gender diversity in technical education:

Policy Reforms: Implementing and enforcing gender-sensitive policies within educational institutions can create a more inclusive environment. This includes developing guidelines that promote equal access and opportunities for all students in TVET programmes.

Awareness Campaigns: Community engagement initiatives that challenge traditional gender stereotypes can encourage families and societies to support female participation in technical education. Raising awareness about the benefits of gender diversity in technical fields is crucial for changing perceptions. Oluwakemi & Ayodeji (2023) found that when schools engaged parents and local leaders in gender-sensitization workshops, stereotypes around women in technical fields reduced, leading to greater family support for female students.

Financial Support: Providing scholarships, grants, and financial aid targeted at female students can alleviate economic barriers, enabling more women to enroll in and complete TVET programmes.

Mentorship Programmes: Establishing mentorship networks that connect female students with successful women in technical fields can provide role models, guidance, and support, enhancing retention and success rates, that is in line with Ubong & Okafor (2023) studied institutional reforms and reported that schools with mentorship programmes, gender-inclusive curricula, and flexible learning structures had higher female retention rates in technical courses.

Conclusion

Gender diversity in technical education within Nigerian Colleges of Education remains a pressing issue, as female enrollment and participation in TVET programmes continue to trail behind those of their male counterparts. Egun & Tibi (2010) found that less than 30% of students enrolled in technical education programmes in Nigerian Colleges of Education were female, highlighting a significant gender imbalance. This gap is largely influenced by socio-cultural beliefs, financial limitations, and institutional obstacles that deter women from pursuing technical careers. Although various policy measures have been introduced, progress has been slow due to ingrained societal attitudes and insufficient support systems for female students.

Nonetheless, overcoming these barriers presents a valuable opportunity for national growth. By adopting gender-inclusive policies, offering financial assistance, increasing awareness, and establishing mentorship initiatives, Nigerian Colleges of Education can create a more equitable and supportive learning environment. Boosting female participation in technical fields not only advances gender equality but also strengthens economic development and drives technological progress.

Achieving sustainable gender diversity in technical education requires a collaborative effort from policymakers, educators, families, and communities. Through strategic interventions and a strong commitment to inclusivity, Nigeria can narrow the gender gap in technical education and empower more women to succeed in STEM-related careers.

Recommendations

To enhance gender diversity in technical education in Nigerian Colleges of Education, the following recommendations should be implemented:

1. The government and educational regulatory bodies, such as the National Commission for Colleges of Education (NCCE) and National Board for Technical Education (NBTE), should enforce gender-sensitive policies that

promote equal access to technical education for both male and female students.

2. The government and educational regulatory bodies, such as NCCE and NBTE, should conduct community campaigns and incorporate awareness programmes into secondary school curricula to encourage female students to consider technical and vocational education as a viable career option.
3. The recruitment of more female lecturers in technical and vocational disciplines by the college management should be prioritized to serve as role models for female students.
4. The government and educational regulatory bodies should organize career counseling sessions to help secondary school female students understand the potential opportunities in technical and vocational education and related professions.

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