

PROGRESS OF GENDER EQUALITY IN SURVEYING EDUCATION ENROLMENT INTO SCIENCE COURSES AT COLLEGE OF EDUCATION GINDIRI PLATEAU STATE.

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Abstract

This study employs a descriptive research survey design to investigate gender disparities in enrolments within the School of Sciences at the College of Education, Gindiri, Plateau State, Nigeria, from 2010 to 2019. Utilizing purposive sampling techniques, the research data comprises secondary data from students' enrolment lists for the years included in this study from the six departments in the schools of science, and the data was categorized by gender. Data were analysed to examine trends in male and female enrolments across various science disciplines. Results reveal varying degrees of gender disparity, with subjects like physics and mathematics exhibiting significant imbalances favouring male students, while disciplines like biology and integrated science demonstrate more balanced gender distributions. Analysis of enrolment trends from 2010 to 2019 highlights persistent male dominance in science enrolments, albeit with a temporary shift towards gender equity observed in 2016. The findings underscore the importance of targeted interventions to address gender disparities in Science, Technology, Engineering, and Mathematics education and promote greater gender equity in science enrolments.

Key words: Gender Disparity, Science Education, Gender Equity, gender Enrolment.

Introduction

Globally, the imperative of gender equality has garnered widespread recognition and acknowledgment, emerging as a pressing concern in contemporary society. The escalating disparity between genders has become entrenched to such an extent that devising effective solutions has proven challenging (Opatoyinbo & Babatunde, 2016). Primarily, this discrepancy stems from entrenched traditional and cultural norms, which play a pivotal role in assigning social status to individuals based on their gender. According to the United Nations Educational, Scientific, and Cultural Organization (Khan, 2017). The disparity in literacy rates between males and females transcends mere access to education; it reflects broader societal dynamics, including developmental capacity and the commitment to providing equitable opportunities for all. Despite significant strides in educational access worldwide, inequalities persist, particularly within certain regions and sectors, with education being notably affected. This inequity is particularly evident in gender-focused initiatives, particularly within tertiary education programmes.

While strides have been made to bridge the gender gap in surveying education, the issue of gender inequality remains a significant concern in Nigeria and in sub-Saharan Africa as submitted by the United Nations Educational, Scientific and Cultural Organisation. (Makama,

2013; UNESCO, 2017). The imbalance between male and female participation in surveying courses underscores the need for intensified efforts to achieve gender equality, especially within the context of Millennium Development Goal 3 (MDG 3) on gender equality and women's empowerment (Statistics South Africa, 2015). The importance of assessing gender equality in education, particularly in terms of school enrolments at the primary, secondary, and tertiary levels, has been highlighted (Sahin, 2014). Despite progress, women have historically lagged behind men in educational attainment, prompting global leaders to prioritize gender equality within the Millennium Development Goal (MDG) through United Nations (UN WOMEN, 2013). However, it is crucial to evaluate whether this equality is merely quantitative, in terms of enrolment numbers, or qualitative, in terms of access to quality education and opportunities with a special reference to science enrolment.

Gender equality, as outlined in the MDGs, aims to dismantle societal barriers that limit women's participation and hinder their development. Literature has emphasized that traditional gender roles often relegate women to subordinate positions, hindering their involvement in development efforts (Offiong et al., 2021). Moreover, certain academic disciplines, such as science and mathematics, are often perceived as masculine, while others, like home economics and secretarial studies, are considered feminine, further perpetuating gender stereotypes (Ikkatai et al., 2021).

In light of these challenges, it is imperative to reevaluate efforts to promote gender equality in surveying education and ensure that women have equal opportunities to pursue careers in this field. Addressing gender disparities in education is not only a matter of social justice but also essential for sustainable development and the achievement of broader development goals in Nigeria.

Gender Disparities and inequality is pervasive in science, technology, engineering, and mathematics (STEM) fields globally (Stout et al., 2016; Su & Rounds, 2015). Where women are underrepresented in physical sciences like chemistry, engineering, and computer science compared to men (Buchmann, 2013; Zedeck, 2003).

Gender differences in STEM Pursuits come to light as women show less interest in pursuing careers in STEM fields compared to men, often opting for other occupations (Ceci & Williams, 2010). Stereotypes associated with certain STEM fields deter women from identifying with and aspiring to careers in those areas (Cheryan et al., 2016). Another factor contributing to this challenge is shown in the gender discrepancy in academic performance, where Male students tend to outperform female students in STEM subjects like chemistry (Cheryan et al., 2016; Wrigley-Asante et al., 2023). Factors such as self-efficacy, anxiety, and spatial ability contribute to gender differences in achievement (Tenaw, 2013; Villafañe & Lewis, 2016).

Despite efforts to bridge the gender gap, women remain underrepresented in surveying and STEM fields in Nigeria's tertiary institutions (Cheryan et al., 2016; Villafañe & Lewis, 2016). The underrepresentation of women in STEM fields is influenced by societal stereotypes, lack of interest, and gender discrimination, coupled with factors such as self-efficacy, anxiety, and spatial ability, contribute to gender differences in academic performance in subjects like chemistry (Minear, 2016). While progress has been made in addressing gender disparities in STEM education, significant challenges remain in achieving gender equality, particularly in fields like chemistry and surveying (Minear, 2016). It is against this background that the

researcher sought to establish the comparative analysis of gender enrolment of students in science-oriented courses in the College of Education Gindiri.

Methods

The researcher used a descriptive research survey design. the population of the study includes students in the school of sciences, College of Education Gindiri. The purposive sampling techniques were used to select the sample population for this study using the enrolment list of students by gender in the School of Sciences of the College of Education Gindiri, from 2010 to 2020. The departments include Biology, Chemistry, Integrated Science, Mathematics, Physical and Health Education (PHE), and Physics.

Result

Since the focus of this research was on female admission into the School of Sciences, College of Education Gindiri (2010-2020). Secondary data from admission and graduation lists of the school were used for this research.

Table 1; Total enrolment (%) of male and female students into the six departments of the School of Sciences (between 2010-2019).

DEPARTMENT	GENDER			
	MALE	PERCENTAGE (%)	FEMALE	PERCENTAGE (%)
BIOLOGY	1084	58%	770	42%
CHEMISTRY	1,026	58%	740	42%
PHYSICS	647	71%	266	29%
MATHEMATICS	426	85%	76	15%
INTER.SC	240	45%	293	55%
P.H.E	290	54%	244	46%

Table 1 above presents the enrolment data for different subjects categorized by gender in the surveyed institution over the specified period.

Biology Enrolments: Male students constituted 58% (1084) of the total enrolments, while female students comprised 42% (770). The enrolment distribution indicates a relatively balanced representation between male and female students in biology.

Chemistry Enrolments: Similar to biology, male students dominated the enrolments with 58% (1026), while female students accounted for 42% (740) of the total enrolments. The distribution of enrolments in chemistry closely mirrors that of biology.

Physics Enrolments: Male students overwhelmingly dominated physics enrolments with 71% (647), while female students represented only 29% (266) of the total enrolments. Physics exhibited the highest gender disparity among the subjects surveyed, with a significantly higher proportion of male students.

Mathematics Enrolments: Mathematics had the highest disparity in enrolments between male and female students, with 85% (426) male students compared to only 15% (76) female students.

The enrolment distribution in mathematics reflects a significant gender gap, with male students comprising the vast majority.

Integrated Science Enrolments: Male students accounted for 45% (240) of the total enrolments in interdisciplinary science, while female students represented 55% (293). Interdisciplinary science exhibited a more balanced gender distribution compared to other subjects.

Physical and Health Education (P.H.E) Enrolments: Male students comprised 54% (290) of the total enrolments in physical and health education, while female students constituted 46% (244). The enrolment distribution in P.H.E indicates a relatively balanced representation between male and female students.

Overall, the enrolment data across different subjects highlights varying degrees of gender disparity, with subjects like physics and mathematics showing a significant imbalance favouring male students. Conversely, subjects like biology and interdisciplinary science exhibit a more balanced gender distribution. Efforts to address gender disparities in STEM enrolments should consider targeted interventions to encourage female participation, particularly in subjects with significant underrepresentation.

Table 2; Total Enrolment (%) of male and female Students into the School of Sciences (between 2010-2019)

YEAR	GENDER			
	MALE	PERCENTAGE (%)	FEMALE	PERCENTAGE (%)
2010	529	71%	219	29%
2011	183	67%	89	33%
2012	616	67%	302	33%
2013	225	72%	87	28%
2014	210	67%	104	33%
2015	336	66%	174	34%
2016	384	50%	385	50%
2017	625	59%	439	41%
2018	337	56%	267	44%
2019	268	45%	323	55%

Table 2: resents the enrolment data for sciences in the surveyed institution over the period from 2010 to 2020, categorized by gender.

Enrolment Trends: From 2010 to 2015, male students consistently dominated the enrolments in sciences, ranging from 66% to 72%. Conversely, female students constituted the minority of enrolments during this period, ranging from 28% to 34%.

Year-wise Analysis: In 2010, male students comprised 71% (529) of the total enrolments, while female students represented 29% (219). Similar enrolment patterns were observed in 2011, with 67% (183) male students and 33% (89) female students. Enrolment percentages remained relatively stable in subsequent years, with slight fluctuations. In 2016, a significant shift occurred where enrolments became more balanced, with male and female students each

representing 50% of the total enrolments. However, this balance was short-lived as enrolment disparities resurfaced in the following years.

Gender Disparity: The data indicates a persistent gender disparity in science enrolments, with male students consistently outnumbering female students throughout the decade. Despite fluctuations in enrolment percentages, male students consistently maintained a higher percentage of total enrolments compared to female students.

Impact of Interventions: The significant shift towards balanced enrolments in 2016 suggests that interventions or changes in policies may have influenced enrolment patterns. Further analysis is required to understand the factors contributing to this temporary balance and to develop strategies for sustaining gender-equitable enrolments in sciences.

Overall, the data underscores the need for ongoing efforts to address gender disparities in science enrolments and to promote greater gender equity in STEM education.

Discussion

The enrolment data presented for sciences in the surveyed institution from 2010 to 2020 reveals important trends and patterns regarding gender representation. The discussion below provides an analysis of the findings and their implications.

Persistent Gender Disparity: Despite efforts to promote gender equity in education, the data demonstrate a persistent gender disparity in science enrolments. Throughout the decade, male students consistently outnumbered female students in terms of percentage enrolments. This finding aligns with broader trends observed in STEM fields, where women remain underrepresented despite advancements in gender equality initiatives (Dube, 2015; Nguru, 2023; Quarshie et al., 2023).

Factors Contributing to Disparity: Several factors may contribute to the gender disparity observed in science enrolments. Societal norms and stereotypes regarding gender roles in education and career paths may influence students' choices (Di Prete & Buchmann, 2013). Additionally, systemic barriers such as access to educational resources, mentorship opportunities, and institutional support may disproportionately affect female students' enrolment in science courses.

Interventions and Their Impact: The data highlights a notable shift in enrolment patterns in 2016, where male and female students represented an equal percentage of total enrolments. While the exact factors driving this shift are not specified in the data, it suggests that interventions or changes in policies may have influenced enrolment dynamics. These interventions could include targeted recruitment efforts, scholarships, mentorship programmes, or curriculum adjustments aimed at promoting gender equity in science education (Psaki et al., 2022).

Challenges and Opportunities: Despite the temporary balance observed in 2016, enrolment disparities resurfaced in subsequent years. This underscores the challenges inherent in achieving sustainable gender equity in STEM education (Su & Rounds, 2015). However, it also presents opportunities for further research and intervention to address underlying barriers and promote inclusive learning environments that encourage female participation in science disciplines.

Research conducted by the American Association of University Women (AAUW) identifies several factors contributing to the gender gap in STEM fields, including implicit biases, lack of female role models, and limited access to resources and support networks (AAUW, 2018). Additionally, studies have shown that societal expectations and stereotypes regarding gender roles in education and careers influence students' self-perceptions and choices, further perpetuating the gender disparity in STEM enrolments (Haas et al., 2020).

The observed enrolment disparities underscore the need for continued efforts to address systemic barriers and promote inclusive learning environments in STEM education. Interventions such as mentorship programmes, targeted recruitment efforts, and curriculum adaptations can play a crucial role in encouraging greater female participation in science disciplines. By addressing these challenges, institutions can work towards achieving greater gender equity in STEM education, fostering diversity, innovation, and excellence in scientific fields.

The discussion findings are supported by scholarly research and reports from reputable organizations, including UNESCO and the AAUW, which corroborate the persistent gender gap in STEM education globally. These sources provide empirical evidence and theoretical frameworks that contextualize the observed enrolment disparities and highlight the multifaceted challenges facing female students in STEM fields.

Recommendations

1. **Improve Access to Supportive Learning Environments.** Create inclusive and resource-rich environments that support the academic success of all students, particularly females. This includes providing access to laboratories, learning materials, tutoring services, and peer networks sensitive to gender dynamics.
2. **Conduct Regular Monitoring and Evaluation of Enrolment Trends.** Institutions should establish systems for tracking enrolment data disaggregated by gender to evaluate the effectiveness of gender equity initiatives over time. Data-driven insights can inform policy adjustments and ensure accountability in achieving set equity goals.
3. **Foster Partnerships with Government and Non-Governmental Organizations.** Collaborations with government agencies, NGOs, and international bodies like UNESCO and AAUW can provide technical support, funding, and advocacy for initiatives aimed at narrowing the gender gap in STEM education.

Conclusion

In conclusion, the enrolment data for sciences in the surveyed institution from 2010 to 2020 highlights the persistent gender disparity in science education. While efforts have been made to promote gender equity, male students continue to outnumber female students in enrolments. The temporary balance observed in 2016 underscores the potential for interventions to influence enrolment patterns positively. However, sustained efforts are needed to address systemic barriers and promote inclusive educational environments that encourage greater female participation in science disciplines. By addressing these challenges, institutions can work towards achieving greater gender equity in STEM education, thereby fostering diversity, innovation, and excellence in scientific fields.

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