

Female Participation in Technical, Vocational Education and Training in Nigeria: Yaba College of Technology as a Case Study

*Omokungbe, Obafemi & Doherty, Funmilayo
Yaba College of Technology, Lagos, Nigeria*

Abstract

In recent times, there has been a global rise in the consciousness of the impact of gender issues in education and national development. Despite the documented benefits to economic and social development of women and the constitutional guarantee for equal rights under the law to all citizens, the advancement of the status of women in Nigeria is still far from satisfactory. Elimination of gender disparity at all levels of education is one of the major global goals in the pursuit of sustainable development. This paper therefore aims to analyze the pattern of gender enrolment in Nigerian polytechnics with a focus on Yaba College of Technology (YCT) for five academic sessions. Data was collected from the Center for Information Technology Management, YCT and from relevant publications. Findings reveal that there has been improvement in few polytechnics including Yaba College of Technology (YCT), however, there exists disparity in favour of males in engineering programmes. Analysis of gender enrolment status in YCT shows that the Gender Parity Index (GPI) increased from 0.72 in 2014/2015 to 0.85 in 2018/2019 academic session. It was observed that female enrolments increased for higher national diploma for the same courses with low participation in national diploma and a generally low participation of females in the STEM programmes was observed but with improvement in industrial maintenance engineering, computer science, physics, and statistics. GPI analysis indicated that parity had been reached for chemistry, physics with electronics, statistics, and agricultural extension and management programmes in YCT. Mainstreaming the gender perspective in all policy planning, implementation and evaluation activities is necessary at bridging gender inequality in the educational sector so as to fully explore the competence, experience and potential of women.

Keywords: YCT, female participation, STEM, TVET, gender parity

Introduction

Globally, there is increasing emphasis and importance placed on gender equality as a matter of concern. The growing disparity has become so endemic that the society is finding it difficult to proffer solutions (Opatoyinbo, et al., 2015). Cultural practices and traditions are major reasons for this, as they play a fundamental role in ascribing status to men and women. The promotion of equal access for women to TVET started in earlier decades, but the most significant effort was carried out in September 1995 during the Fourth World Conference on Women in Beijing, China. Thereafter, UNESCO's Medium-Term Strategy for 1996–2001 laid down actions to secure gender equality. According to UNESCO (1995), the gap between the male and female literacy rates is not

just about men and women and the educational opportunities provided for them, but it is also a statement about the society's development, and its capacity and willingness to provide such opportunities. Today, inequalities still persist in certain regions of the world and more prominently in some sectors, of which education is one. This imbalance is noticeable in gender enrolment at all levels and types of education, as well as across various disciplines and programmes, especially at the tertiary level (Opatoyinbo & Babatunde, 2016). The situation assessment done on gender parity in access to education in different countries showed that Nigeria has 5% gender gap in enrolment into primary education, Bolivia as 0%, Yemen has 31%, and Zambia has 1 % (Agu & Omenyi, 2013).

Senior secondary school enrolments in Nigeria by geopolitical zones, indicate a higher percentage in male enrolment in northern part of the country compared to the southern geopolitical zones (Table 1). According to NBS, (2018), there is a disparity in favour of males in enrolment for West African Examinations Council (WAEC), however, an improvement in the performance of females in the West African Examinations Council (WAEC) results statistics for 5 credits in Nigeria (2016 – 2018) was observed. In year 2016, 2017 and 2018, percentage of females that had 5 credits and above, including mathematics and English language were 50.0%, 59.5% and 51.0% respectively. Education and women empowerment has for a long time become a global issue, Nigeria inclusive (Schultz, 2002).

Table 1

Secondary School Students' Enrolment by Gender and Geo-political Zones 2014/2015

Zone	M	F	M+F	Difference (%)
North Central	579,140	469,729	1,048,869	20.81
North East	225,156	146,786	371,942	42.14
North West	499,557	300,919	800,476	49.62
South East	364,555	397,689	762,244	8.69
South-South	348,830	347,210	696,040	0.46
South West	623,097	633,071	1,256,168	1.58

National bureau of statistic, 2015

Technical vocational education and training (TVET) implies life-long learning and preparation for responsible citizenship (Okwelle & Okeke, 2016). This form of education is perceived as one of the crucial elements in enhancing economic productivity (Abudulahi, 2016). As observed in most developed countries in the world today, TVET is expected to produce and supply intermediate craftsmen, technicians, semi-skilled and skilled manpower that will be capable of functioning very well in all sectors in the industry critical to national development (Okwelle, 2010).

Brief History of Yaba College of Technology

Yaba College of Technology, was established in 1947 as an immediate successor to Yaba Higher College. It attained autonomous status in 1969 by virtue of Decree 23 which granted it the exclusive mandate to provide full-time and part-time courses of instruction and training in Technology, Applied Science, Commerce and Management and in such other fields of applied learning relevant to technical, vocational and industrial needs of Nigeria. It presently has 8 Schools. The vision of the college, is “to be the leading higher educational institution in Nigeria by providing first-rate academic, professional and entrepreneurial education to our students, who are empowered to make a positive impact in the technological and socio-economic development of the country”; and its mission, therefore, is “to produce knowledgeable and innovative graduates, worthy in skill and character, through effective teaching, learning and research for the technological advancement of Nigeria” (www.yabatech.edu.ng). The College through the Women in Technical Education and Employment (WITED), a polytechnic organ aimed at identifying factors impeding women’s participation in technical education, training and employment, has been promoting women and girls’ participation in TVET through various sensitization programs.

Indices for Assessing Gender Parity

One of the universal tools used to assess the extent of attainment of gender equality was the Gender Parity Index (GPI). The GPI reflects females' level of access to education compared to that of males. The achievement of the gender goal is defined as a GPI value ranging from 0.97 to 1.03 (UIS, 2010). Gender parity in education is reached when the females’ gross school enrolment ratio divided by the corresponding ratio for males is between 0.97 and 1.03. A GPI equal to 1 indicates parity between females and males. In general, a value less than 1 indicates disparity in favour of males and a value greater than 1 indicates disparity in favour of females (Opatoyinbo & Babatunde, 2016).

Literature Review

Female Enrolment in Polytechnics in Nigeria

Despite the documented benefits to economic and social development of women and the constitutional guarantee for equal right under the law to all citizens, the advancement of the status of women in Nigeria is still far from satisfactory. The participation of women in technical and vocational education is abysmally low (Akor *et al.*, 2015). Elimination of gender disparity at all levels of education is one of the major global goals in the pursuit of sustainable development across the globe (Oludayo, *et al.*, 2019). The gap in the number of male and female intake is more noticeable in the Polytechnics and in science and engineering disciplines (NUCHEP, 2004). The statistics of polytechnics are not much better. For instance, enrolment at the polytechnics increased slightly from 214,391 in 2005/06 to 225,171 in 2010/11. Gender parity ratios also recorded a decline from 0.71 in 2005/06 to 0.62 in 2010/11, and total enrolment shows an overall average of 38.57% for percentage female participation. Student enrolment in polytechnics by programme type and gender as at 2005/2006 shows disparity in favour of males for both technology-based and non-technology based programmes. Only 56,603 (16.6%) of female students were in technology-based programme compared to 77,420 (22.7%) undergoing non-technology-based programmes.

According to the National Board for Technical Education (NBTE) digest of statistics, males and females enrolled in the polytechnics and colleges of technology for 2014/15 academic year in Nigeria indicate that males outnumbered females by eighteen (18) percent. The summary of enrolment by polytechnics in Nigeria for the same academic year showed a disparity in favour of males for national diploma programmes except for some institutions like Yaba College of Technology, Federal Polytechnic Ilaro, and Federal Polytechnic, Nekede with GPI of 0.77, 0.86, and 0.96. The same pattern was observed for the higher national diploma programmes with some improvement as some institutions like Federal Polytechnic, Ilaro and Federal Polytechnic, Nekede having GPI of 1.18 and 1.47 respectively. Summary of enrolment by programmes in Polytechnics and Colleges of Technology for 2014/15 academic year shows a disparity in favour of males in engineering programmes, with some programmes like Industrial Maintenance Engineering and Mechanical Engineering Technology recording GPI of 0, however the science and technology based programmes indicates an improvement in the participation of females with science laboratory technology having GPI of 1.16 for national diploma courses. Other programs that recorded disparity in favour of males were Chemical Engineering Technology, Computer Engineering Technology, Civil Engineering Technology and Elect/Electronics Engineering with GPI of 0.30, 0.25, 0.10, and 0.10 respectively, at the national diploma level. The pattern was the same for the higher national diploma level.

In recent times, there has been a global rise in the consciousness of the impact of gender issues in education and national development. Hence, it has become imperative to come up with policies that would further reduce the gender gap in enrollment in STEM. The findings of this study will add to the existing knowledge on gender gaps in enrolment with particular focus on STEM. The results of the study would assist the relevant authorities in formulating possible ways to close gender gaps that are in existence. This paper therefore dwells on the pattern of gender enrolment in Nigerian Polytechnics with a focus on Yaba College of Technology, for five academic sessions, from 2014/15 to 2018/19.

Methodology

Details on the number of candidates admitted into STEM programmes, at both ordinary national diploma (ND) and higher national diploma (HND) levels in Yaba College of Technology from 2014/15 to 2018/19 academic sessions were covered in this study. The enrolment status into the departments by full-time male and female students for the five academic sessions was analyzed. Data on the enrolment status of the college was obtained from the Center for Information Technology Management (CITM), YCT. Simple percentages were used to present the gender enrolment status of the students into different disciplines. The study also used secondary data and relevant publications. The Gender Parity Index (GPI) was also calculated.

Findings

Gender Enrolment in Programmes in Yaba College of Technology

The summary of total enrolment population by sex and year for all programmes is shown in Table 2. The trend shows that female enrolment for all programmes in YCT increased from 41.72% in 2014/2015 session to 46.06% in 2018/2019 academic session. The GPI increased from 0.72 in 2014/2015 to 0.85 in 2018/2019 academic session, although gender parity has not been reached. Female enrolment for the 2014/2015 academic session was 4539 and in 2018/2019 academic session it increased to 5781.

Table 2

Summary of Enrolment Population in YCT

Year	2014/2015		2015/2016		2016/2017		2017/2018		2018/2019	
Sex	F	M	F	M	F	M	F	M	F	M
% of Total Population	41.72	58.28	42.77	57.23	43.55	56.45	45.39	54.61	46.06	53.94
Population	4,539	6,341	5,011	6,706	5,097	6,607	5,788	6,963	5,781	6,770
GPI	0.72		0.74		0.77		0.83		0.85	

Female Enrolment in ND and HND Engineering Programmes in Yaba College of Technology

Enrolment by percentages in ND engineering programmes in Table 3 show that more female students enrolment was recorded in Agricultural and bio-environmental engineering with 34.34% in 2014/2015 academic session, although the trend showed a decrease over the years. Comparing the HND and ND enrolments in engineering programmes, the trend showed that the female enrolments increased for HND for the same courses with low participation in ND. This implies that more female students enrolled and participated in HND engineering programmes after their ND engineering program. This trend is observed in all the programmes with both ND and HND, which are civil engineering, computer engineering, electrical engineering, industrial maintenance engineering, mechanical engineering and metallurgical engineering. For example, in 2018/2019 academic session, ND mechanical and metallurgical engineering had 3.66%, and 6.45% respectively for female enrolments and an increase was recorded for the HND with 6.25% and 11.11% respectively.

The institution runs Part Time National Diploma and Higher National Diploma Courses in the Centre for Continuous Studies (CCS) and one of the advantages is that students who are working can also study at the same time. The lecture periods are convenient for those who are working. This may create opportunities for more female students to work and study at the same time and may be responsible for the slight increase observed in some programmes. The HND admission covers a large number of other institutions aside YCT, as HND admission is not limited only to YCT ND students. Students with ND in engineering courses from other TVET institutions in Nigeria seek admission into the HND program in YCT. This may be the likely reason for the higher female enrollment into HND Engineering programmes in some years observed in this study.

The trend in female enrolment for ND industrial maintenance engineering over the five academic sessions was from 14.75% to 11.81%, while for HND industrial maintenance engineering it was from 22.35% to 20.79%.

Table 3

Enrolment in Percentages in Engineering Programmes (ND)

Year	2014/2015		2015/2016		2016/2017		2017/2018		2018/2019	
ND	F	M	F	M	F	M	F	M	F	M
Agricultural & Bio-Environmental Eng.	34.34	65.66	30.21	69.79	24.74	75.26	19.40	80.60	15.38	84.62
Chemical Eng.			8.33	91.67	17.31	82.69	24.19	75.81	28.00	72.00
Civil Engineering	4.74	95.26	5.41	94.59	7.18	92.82	10.34	89.66	10.53	89.47
Computer Eng.	10.53	89.47	6.13	93.87	10.47	89.53	7.94	92.06	9.43	90.57
Electrical Eng.	7.34	92.66	4.68	95.32	3.48	96.52	3.93	96.07	5.88	94.12
Electrical Maintenance Eng.	14.75	85.25	12.76	87.24	10.83	89.17	12.88	87.12	11.81	88.19
Marine Eng.	7.69	92.31	7.89	92.11	5.26	94.74	11.54	88.46	11.59	88.41
Mechanical Eng.	2.64	97.36	4.61	95.39	4.39	95.61	3.07	96.93	3.66	96.34
Mechatronics Eng.			5.41	94.59	4.11	95.89	6.00	94.00	5.50	94.50
Metallurgical Eng.	7.22	92.78	10.19	89.81	11.79	88.21	10.19	89.81	6.45	93.55
Welding & Fabrication Eng.	11.11	88.89	2.08	97.92	5.71	94.29	4.71	95.29	0.86	99.14

Table 4 shows female and male enrolment in percentages for HND engineering programmes. The findings reveal a generally low participation of females in the engineering programmes. However, comparing the engineering courses, there was high female enrolment in industrial maintenance engineering in 2014/2015 academic session which was 22.35% and 20.79% in 2018/2019 academic session, compared to electrical engineering which had 6.37% in 2014/2015 and 6.67% in 2018/2019. Some of the factors that affect female participation in STEM fields range from societal beliefs and the stereotypic belief that boys are better than girls in STEM, cultural factors which affect the interest of girls in STEM. Females tend to believe that they lack the ability and toughness to succeed in STEM.

Table 4

Enrolment in Percentages in Engineering Programmes (HND)

Year	2014/2015		2015/2016		2016/2017		2017/2018		2018/2019	
Sex	F	M	F	M	F	M	F	M	F	M
Civil Engineering	11.76	88.24	6.88	93.12	7.26	92.74	7.44	92.56	11.71	88.29
Computer Eng.	17.90	82.10	20.24	79.76	25.63	74.38	19.29	80.71	13.27	86.73
Electrical Eng.	6.37	93.63	7.76	92.24	8.46	91.54	6.72	93.28	6.67	93.33
Industrial Maintenance Eng.	22.35	77.65	17.65	82.35	18.94	81.06	22.48	77.52	20.79	79.21
Mechanical Eng.	8.89	91.11	9.15	90.85	9.68	90.32	8.07	91.93	6.25	93.75
Metallurgical Eng.	22.22	77.78	7.50	92.50	7.94	92.06	11.27	88.73	11.11	88.89

Female Enrolment in ND and HND in Science, Technology and Mathematics Programmes in Yaba College of Technology.

Results show the female and male percentage enrolment in science, technology and mathematics programmes at the ordinary national diploma (ND) level. Female enrolments for ND computer science increased from 18.70% in 2014/2015 to 20.32% in 2018/2019 academic session. This same trend was observed for food technology with increase in female enrolment from 70.83% to 78.49%, for printing technology an increase of 5.26% to 10.64% was observed, for quantity surveying, an increase of 20.80% to 22.12% was observed for female enrolments over the five academic sessions. It was observed that programmes such as food technology, hospitality management, industrial design-fashion, leisure and tourism, nutrition and dietetics, office technology management, science laboratory technology, textile technology and polymer technology have high percentages of female enrolment. Female enrolment by percentage for ND statistics program was observed to be 42.95% in 2018/2019 and 46.88% in 2014/2015 academic session. However there was a decrease in percentage female enrolments for ND Architecture, surveying and geo-informatics, urban and regional planning and textile technology over the five academic sessions

Results also show the female and male percentage enrolment in science, technology and mathematics programmes at the higher national diploma (HND) level. Comparing the HND and ND enrolments in some programmes, the trend shows that the female enrolments increased for HND for the same courses with low participation in ND. This trend was observed for architecture, building technology, computer science, estate

management and evaluation, quantity surveying, and textile technology. Over the years, from 2014/2015 to 2018/2019 academic sessions, female enrolment increased for HND architecture, biochemistry, chemistry, estate management and evaluation, physics with electronics and statistics.

Gender Parity Index (GPI) for STEM courses from 2014/2015 to 2018/2019 Academic Sessions in YCT

The achievement of the gender goal is defined as a GPI value ranging from 0.97 to 1.03. Calculations of the Gender Parity Index (GPI) of data available for female against male student enrolment in STEM programmes, indicate that parity between females and males has been reached for some courses such as chemistry, physics with electronics, statistics, and agricultural extension and management programmes. Programmes such as food technology, hospitality management, nutrition and dietetics, office technology management and science laboratory technology show that GPI value greater than 1 which indicates disparity in favour of females. Many of the engineering programmes show a GPI value less than 1 indicating a disparity in favour of males.

Conclusion

It is established in this research that gender disparity exists in STEM programmes, even though remarkable efforts are being made by the institution. YCT has an active chapter of Women in Technical Education and Employment (WITED), a polytechnic organ which seeks to improve the participation of the girl-child in mathematics, science and technical education. It is hoped that more awareness and sensitization will further encourage females to show more interest towards engineering and technology-based programmes in YCT.

The trend of low participation of female students may be due to the fact that at primary level, girls are more disposed to joining cooking, sewing, and home making clubs as part of their extra curricula activities in school, while boys join the mathematics and young scientist clubs. It is at this level that the girl child should be encouraged to develop interest in science-related activities. The girl child needs to be engaged in activities as young scientists, by exploring their environment. It is important for girls to be encouraged to choose science subjects from secondary school. The environment where the girl child finds herself also plays a significant role in making STEM courses interesting for girls. The interactions the girl child has with people around (teachers, parents and peers) greatly influence her attitude and orientation, according to Akinsowon and Osisanwo (2014). There is need for increased enlightenment programmes for females to overcome cultural factors as well as societal conditions. Mainstreaming the gender perspective in all policy planning, implementation and evaluation activities is necessary at bridging gender inequality in the educational sector so as to fully explore the competence, experience and potential of women.

Recommendations

A possible solution to the problem of gender gap is for institutions to come up with gender-responsive policies. Being gender responsive implies that specific needs of girls and women need to be understood and addressed with a view to achieving gender parity. Having female role models could also serve in motivating young girls to acquire interest in STEM programmes. Although TVET institutions in Nigeria cannot accommodate the large number of applicants, special consideration should be given to female applicants into STEM courses without compromising on merit. TVET institutions should consider collaborating with organizations, professional bodies and industries to endow scholarships to female students admitted for STEM programmes as this will encourage and promote female participation in STEM programmes. Relevant professional bodies can institute mentorship schemes for female students enrolled in STEM programmes and provide internship and employment opportunities for female students. TVET institutions should be disposed to employing more female trainers or teachers in their engineering and science departments.

References

- Abudulahi, E. N. (2016). Technical vocational education and training (TVET) in Nigeria: Issues and suggestions for productivity and sustainable national development. *International Journal of Research in Education*. 10(1), 30-49.
- Agu, N. N., & Omenyi, A. S. (2013). Gender enrolment status in higher education courses: A situation assessment and analysis of a South Eastern Federal University. *Journal of Emerging Trends in Educational Research and Policy Studies (JETERAPS)* 4(3): 517-524
- Akinsowon, O. A., & Osisanwo, F. Y. (2014). Enhancing interest in sciences, technology and mathematics (STEM) for the Nigerian female folk. *International Journal of Information Science*, 4(1), 8-12.
- Akor, R., Bakar, A. B., Hamzah, A. B. H., & Rashid, A. B. M. (2015). Exploring how Nigerian women foster action to be taken to involve more women participation in technical and vocational education. *International Journal of Education & Literacy Studies*. 3 (1).
- National Board for Technical Education (NBTE). (2011). Digest of Statistics. [Online.] Available url: www.nbte.gov.ng.
- National Board for Technical Education (NBTE). (2013). Brief on NBTE gender desk. Kaduna, Nigeria:
- National Board for Technical Education (NBTE) (2015). Digest of Statistics of Technical Vocational Education and Training (TVET) Institutions in Nigeria: 2014/2015. Volume 5.

- National Bureau of Statistic, (2015).
[http://education.gov.ng/wpcontent/uploads/2019/05/Student-Enrolment-by-Geo-Political -Zones-and-Gender-2014-2015.pdf](http://education.gov.ng/wpcontent/uploads/2019/05/Student-Enrolment-by-Geo-Political-Zones-and-Gender-2014-2015.pdf) (retrieved March 2, 2020)
- National Bureau of Statistic, (2018) http://education.gov.ng/wpcontent/uploads/2019/10/WAEC_RESULTS_STATISTICS_2016-2018.pdf (retrieved March 2, 2020)
- National Bureau of Statistics, NBS. (2008). Survey of Employment Status: 2006. Available url:www.nigerianstat.gov.ng/.
- NUCHEP. (2004) National Universities Curriculum on Activities of Discipline in the Universities in Nigeria.
- Okwelle, P. C. (2010). Strategies for improving enrolment into technical teacher education programmes through students' involvement in public relations activities. *Niger Delta Journal of Education*. 2(1&2), 57-63.
- Okwelle, P. C. & Okeke, B. C. (2016). An overview of the role of technical vocational education and training (TVET) in nation development. *African Journal of Historical Sciences in Education*. 12(1), 16-32.
- Okwelle, P. C. & Agwi, V. I. A. (2018). Strategies for improving female students' enrolment in Technical and Vocational Education programmes through public relations activities in Nigeria. *International Journal of Advanced Academic Research*. 4:1
- Oludayo, O. A., Popoola, S., Akanbi, C.O., Atayero, A.A. (2019). Gender disparity in admissions into tertiary institutions: Empirical evidence from Nigerian data (2010–2015). *Data in Brief*. 22(2019) 920–933
- Opatoyinbo, O. O. & Babatunte, O. A. (2016). Comparative Analysis of Gender Disparity Enrolment in Surveying Training in Tertiary Institutions. *Nigeria. FIG Working Week*. Recovery from Disaster, Christchurch, New Zealand.
- Opatoyinbo, O. O., Bartholomew, P. N. & Mado-Alabi, C.A. (2015). An Assessment of Female Enrolment in Nigeria's Technical Education System. A paper presented at Commonwealth Association of Polytechnics in Africa (CAPA) Conference in Golden Bean Hotel, Kumasi, Ghana. 7th – 11th December, 2015
- Schultz, T.P (2002). Why Governments should invest more to educate women. *World Development*. 30 (2): 207-225
- UNESCO Institute of Statistics (UIS) Fact Sheet. (2010). No. 4 Gender Parity in Primary and Secondary Education.
- UNESCO (1995). World Education Report, UNESCO, Paris. www.yabatech.edu.ng