



Investigating Unequal Gender Enrollment into Technical Courses in TVET Institutions

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ABSTRACT: This study aims to investigate unequal gender enrollment of students into technical courses in TVET institutions. The study adopts a quantitative and qualitative mixed-method approach to research design. The study population is Federal Polytechnic Nekede Owerri which is a TVET Institution. Existing records were examined and analyzed to determine if there has been equal or balanced gender enrolment during the admission of students (Male and Female) into technical courses in the institution. Analysis of the existing admission records from the Federal Polytechnic Nekede Owerri in three consecutive academic sessions shows that there is a gender imbalance in the admission of students into technical courses in TVET institutions. A target population The technical courses used as a yardstick for unequal gender enrollment are Architecture, Building Technology, Civil Engineering, Electrical & Electronics Engineering, Mechanical Engineering, and Mechatronics Engineering. Admission/Enrollment data from the MIS Unit of Federal Polytechnic Nekede Owerri were collected. Also, members of female focus groups such as Women In Technical Education (WITED) were interviewed. Data collected was analyzed using regression to identify the significant differences between male and female enrollment. The researchers found that gender enrollment into the technical courses has a significant gap with the male-dominating significantly. Therefore, the study recommends that TVET institutions should implement gender-sensitive admission policies. Also, TVET institutions should establish collaborations and partnerships with industry to provide female students with practical experience and give them preference for job opportunities. Career Guidance and Counselling services should be provided to female students at the secondary school level to encourage them to pursue technical courses.

KEYWORDS: Enrollment, Female, Gender, Male, Technical Courses, TVET

I. INTRODUCTION

The goal of technical and vocational education and training, or TVET, is to give everyone the same chances to learn new skills and information, regardless of their background, gender, or financial situation. However, disparity still exists in TVET education and takes many different forms, such as inequality in enrollment rates based on gender (men predominate in traditionally technical fields, while women are disproportionately enrolled in lower-status programs), socioeconomic Disparity (students from underprivileged families have difficulty enrolling in TVET programs, which keeps them stuck in a cycle of poverty), Alao, racial, and ethnic discrimination (minority groups may confront bias in admission, instruction, and career possibilities), disability Inequality (inadequate assistance and infrastructure for students with disabilities, restricting their participation and success), geographic disparity (an uneven allocation of TVET resources and institutions that prioritizes urbanization over ruralization). The potential of TVET education is undermined by these disparities.

Institutions involved in Technical and Vocational Education and Training (TVET) provide people with the knowledge and skills they need to improve their employability and support the economic development of their country. However, the unequal enrollment of males and females in technical courses remains a serious challenge in TVET institutions across the globe, including Nigeria. The aforementioned discrepancy prompts inquiries on the fundamental elements impacting students' selection of courses and the possible ramifications for people, the community, and the financial system.

II. STATEMENT OF PROBLEM

The study seeks to address the following problems:

1. Low involvement and underrepresentation of women in traditionally technical fields, such as engineering, technology, and skilled trades, limiting their career opportunities and economic potential.
2. Females discouragement from pursuing technical courses and males discouragement from pursuing non-technical fields.



3. Limited career alternatives for females, occupational segregation, and gender-based labor market disadvantages.
4. Underrepresentation of women in technical disciplines, which impedes economic development and progress.
5. The uneven representation of genders in TVET enrollment

III. AIM AND OBJECTIVES OF THE STUDY

The objectives of this study are to:

1. Determine the degree of gender disparity in technical course enrollment in a TVET institution.
2. Analyze the institutional, societal, and economic elements that influence uneven gender enrolment.
3. Examine the effects of differential enrollment by gender on the academic standing, career choices, and employment prospects of female students.
4. Examine tactics and initiatives that can advance gender parity and boost the number of female students enrolled in technical programs.
5. Provide suggestions on how to resolve disproportionate gender enrollment and advance gender inclusion in TVET education for legislators, educators, and business leaders.

IV. SIGNIFICANCE OF THE STUDY

This study is highly beneficial to all key players in TVET education. Therefore, the study recommends strategies that will encourage gender equality in TVET education and the workforce can be informed by an understanding of the factors that contribute to unequal gender enrollment. The study will reduce skill gaps by finding the obstacles preventing women from pursuing technical careers. The study will empower women by increasing the number of women enrolled in technical programs which can improve their social standing, job prospects, and economic empowerment. The study will enhance TVET Programs to be more inclusive and sensitive to the requirements of both genders. The study will offer recommendations based on facts to industry, educators, and legislators which will form practices and policies.

V. SCOPE OF THE STUDY

The study was conducted for six(6) technical departments at Federal Polytechnic Nekede Owerri in Nigeria involving high technical courses in the two most important TVET schools in the Institution.

VI. REVIEW OF RELATED LITERATURE

Most economists concur that education and development have a strong, positive relationship. The benefits of education for women extend beyond themselves to include everyone they care for, making this relationship even more evident. There is still a low percentage of female students enrolled in STEM (science, technology, engineering, and mathematics) courses in Kenya's Technical, Vocational, and Education Training (TVET) subsector, despite ten years of progress in improving access, equity, retention, quality, completion rates, and gender parity in education and training. This desk review article aims to determine the current state of female involvement in Technical and Vocational Education and Training (TVET) and the variables that support the status quo. The report suggests that girls and boys should be given fair and equal opportunities to participate in TVET education [4]

The importance of gender equality and female participation in TVET in universities is that it ensures that all individuals participate in the labor market and contribute to economic growth and that it helps address skills shortages and mismatches in the labor market by diversifying the pool of skilled workers among others. The challenges that impede female participation and gender equality in TVET in universities are deep-rooted gender stereotypes, religious inclination, institutional barriers, and societal norms and cultural beliefs, among others. The strategies for increasing female participation and gender equality in TVET in universities are incorporating gender-sensitive content and teaching methods into TVET courses challenging traditional gender stereotypes and biases, provision of access to career counseling, among others. The study concluded that promoting gender equality in TVET programs is essential for achieving inclusive and sustainable development in Delta State, Nigeria, and beyond, hence, it was recommended among others that universities should develop and implement gender-sensitive policies and guidelines that promote equal access and opportunities for all students in TVET programs [1].

There are several impediments to the implementation of sustainable gender equity interventions including inadequate funding for the activities geared towards enhancing gender equity, lack of gender awareness among students, staff, and institution managers, negative attitudes toward gender issues, and lack of clear gender policy guidelines [3]

The impact of gender issues on education and national development has come to the attention of people all around the world more recently. The progress of women's position in Nigeria is still far from satisfactory, despite the benefits that women have been shown to have on their social and economic growth as well as the constitutional promise that all people have equal rights under the law. In the quest for sustainable development, one of the main international objectives is the eradication of gender inequality in education at all levels [5]

VII. METHODOLOGY

The study examined the effects of gender inequalities that exist in the School of Engineering Technology and School of Environmental Design Technology which housed the departments of Civil Engineering, Electrical & Electronics Engineering, Mechanical Engineering, Mechatronics Engineering, Architecture, and Building Technology, at the Federal Polytechnic Nekede Owerri. Existing data from the Management and Information System (MIS) unit of the Polytechnic for both Higher National Diploma and National Diploma admissions for 2019/2020, 2020/2021, and 2021/2022 academic sessions were accessed. The existing data was analyzed using descriptive statistics (bar chart)

VIII. FINDINGS

Table 1: 2019/2020 Male versus Female Admission into Technical Courses at Federal Polytechnic Nekede Owerri

Technical Courses	2019/2020			
	ND		HND	
	Male	Female	Male	Female
Mechanical Engineering	65	3	89	7
Electrical & Electronic Engineering	121	5	107	4
Civil Engineering	61	4	58	6
Architecture	41	9	39	5
Building Technology	25	8	57	2
Mechatronics Engineering	32	6	15	3

Source: MIS Unit of Federal Polytechnic Nekede Owerri

Table 2: 2020/2021 Male versus Female Admission into Technical Courses at Federal Polytechnic Nekede Owerri

Technical Courses	2020/2021			
	ND		HND	
	Male	Female	Male	Female
Mechanical Engineering	56	0	65	10
Electrical & Electronic Engineering	82	4	60	6
Civil Engineering	54	2	52	4
Architecture	20	3	10	0
Building Technology	21	1	20	2
Mechatronics Engineering	15	1	22	1

Source: MIS Unit of Federal Polytechnic Nekede Owerri

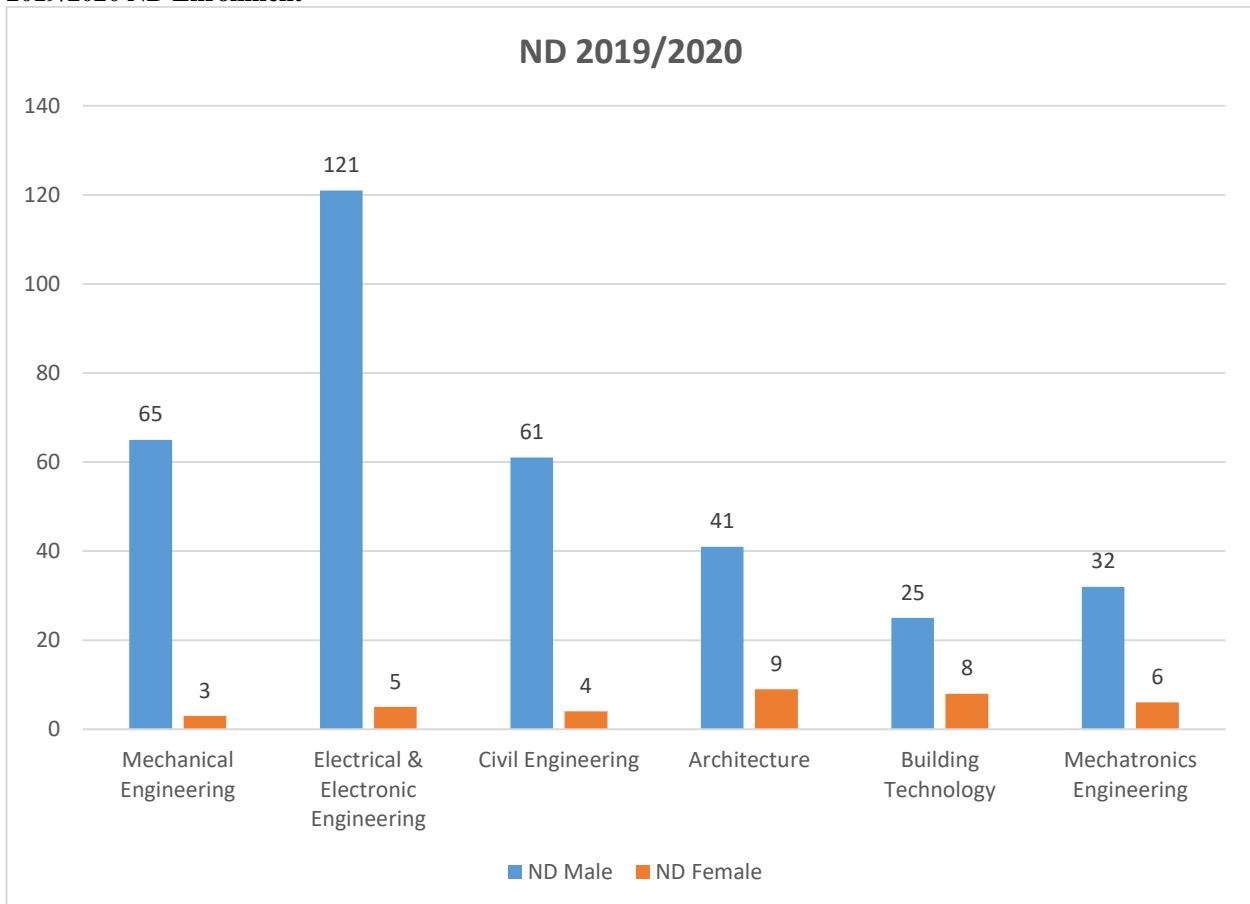
Table 3: 2021/2022 Male versus Female Admission into Technical Courses at Federal Polytechnic Nekede Owerri

Technical Courses	2021/2022			
	ND		HND	
	Male	Female	Male	Female
Mechanical Engineering	67	0	90	2
Electrical & Electronic Engineering	91	2	93	2
Civil Engineering	72	4	77	8
Architecture	41	4	26	3
Building Technology	20	2	20	1
Mechatronics Engineering	10	8	58	2

Source: MIS Unit of Federal Polytechnic Nekede Owerri

IX. DISCUSSION OF FINDINGS

2019/2020 ND Enrollment



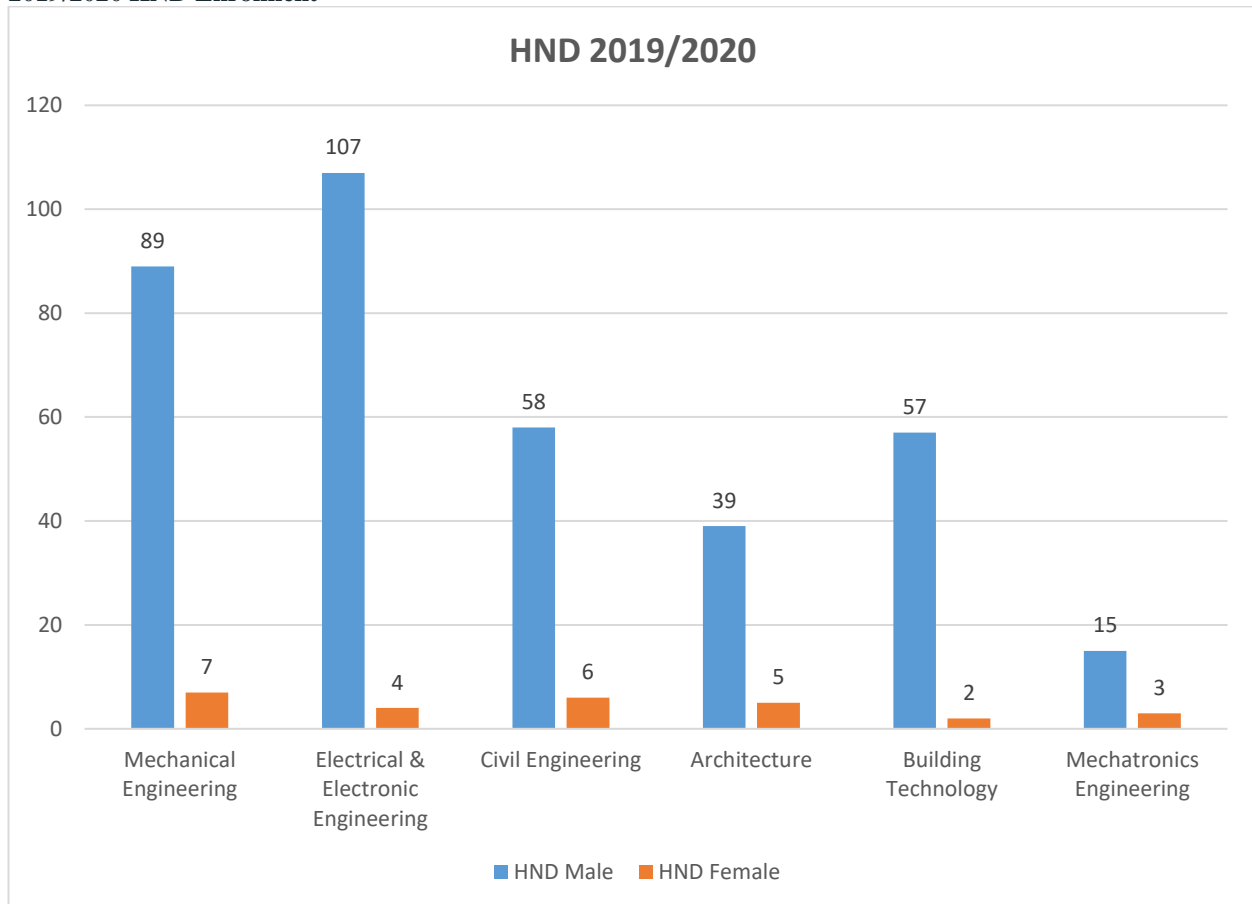
In the 2019/2020 National Diploma admission, Mechanical Engineering had a high male enrollment (65) compared to female (3), Electrical & Electronic Engineering had the highest male enrollment (121) and a relatively low female enrollment (5). Architecture has a relatively lower male enrollment (41) compared to other courses, but a higher female



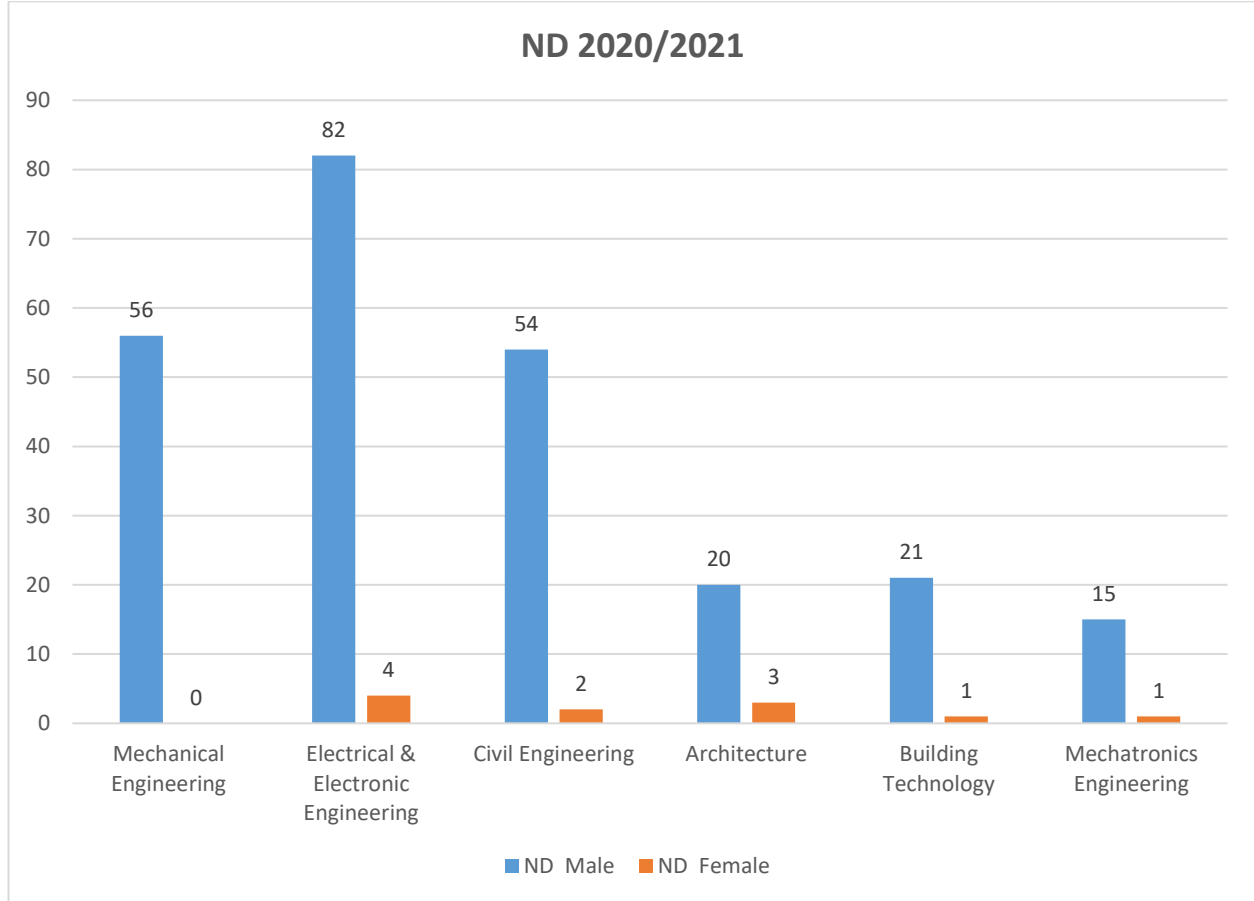
enrollment (9) compared to other courses. Building Technology has a low male enrollment (25) and a relatively higher female enrollment (8).

The chart shows the enrollment numbers for male and female students in six technical courses. The data reveals significant disparities in enrollment between males and females across the courses. Mechanical Engineering, Electrical & Electronic Engineering, and Civil Engineering have significantly higher male enrollment numbers than females. Female students are underrepresented in all courses, with the lowest numbers in Mechanical Engineering (3) and Electrical & Electronic Engineering (5). However, Architecture and Building Technology: have relatively higher female enrollment numbers compared to other courses. Mechatronics Engineering has a moderate male-female enrollment ratio.

2019/2020 HND Enrolment

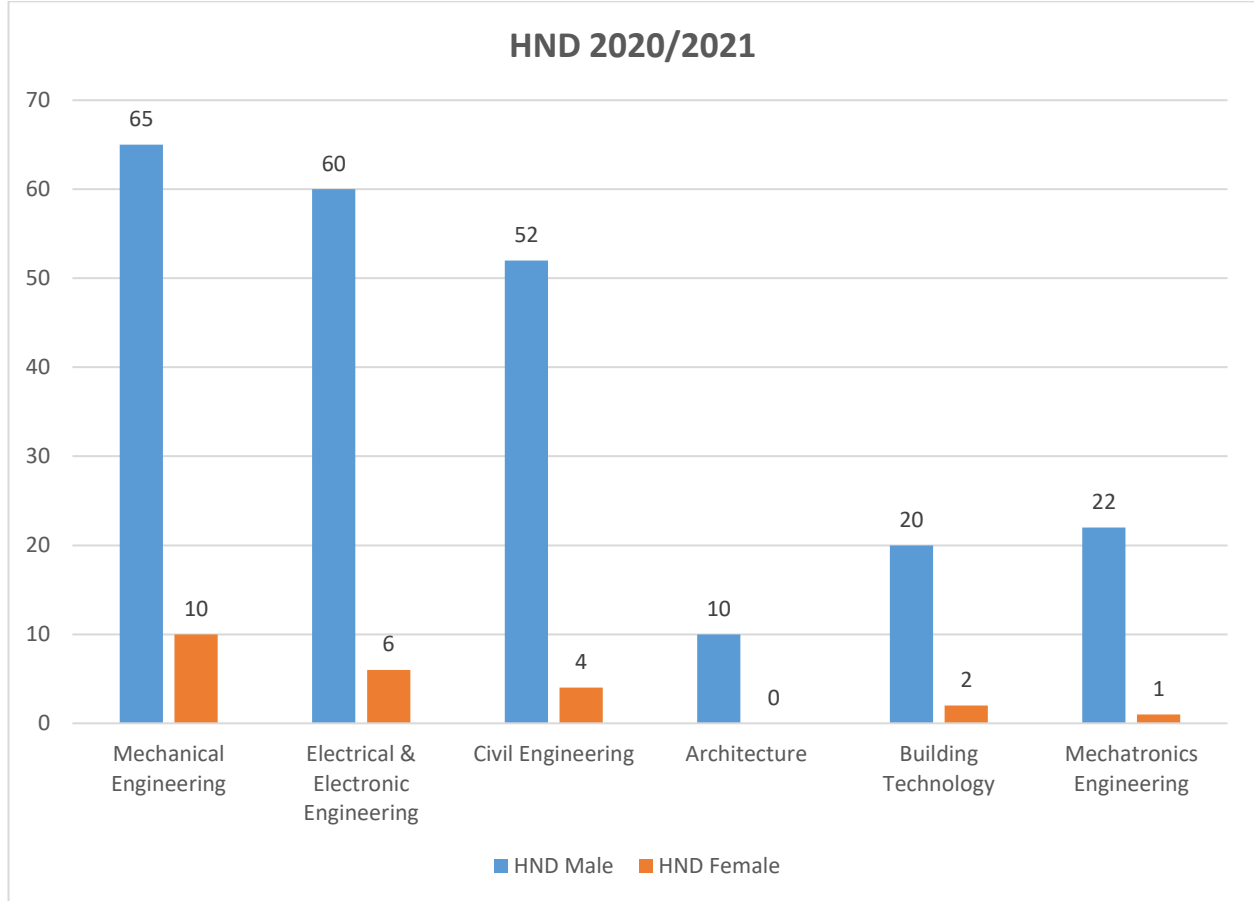


The Higher National Diploma (HND) admission in 2019/2020 chart shows the enrollment numbers for male and female students in six HND technical courses. The data reveals significant gender disparities in enrollment across the courses. All courses have significantly higher male enrollment numbers than females. Female students are underrepresented in all courses, with the lowest numbers in Building Technology (2) and Mechatronics Engineering (3). Electrical & Electronic Engineering has the highest male enrollment (107) and the largest male-female enrollment disparity (27:1 ratio). Mechanical Engineering has the second-highest male enrollment (89) and a significant male-female disparity (13:1 ratio).

2020/2021 ND Enrollment

The findings expose a striking gender disparity in the enrollment numbers of various engineering disciplines. The data shows a consistent trend of male dominance across most disciplines, with few female students enrolled. The most notable gender gap is observed in Mechanical Engineering, where no female students are enrolled. Though Electrical & Electronic Engineering has the largest enrollment number, it is also one of the widest gender gaps, with only 4 female students out of a total of 86. Civil Engineering is another discipline with a substantial gender gap, where male students outnumber female students by a ratio of 27:1.

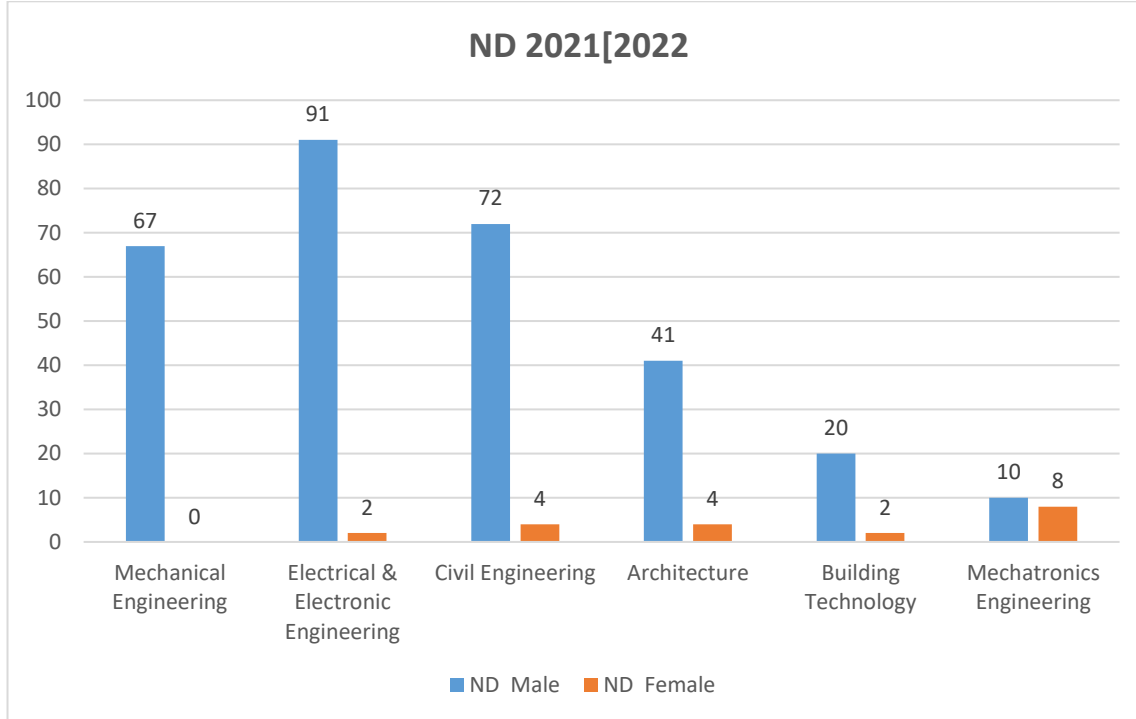
The courses with relatively smaller gender gaps are architecture, building technology, and mechatronics engineering. Although still male-dominated, Architecture has a relatively smaller gender gap, with 3 female students out of a total of 23. Building Technology has a smaller gender gap, with 1 female student out of a total of 22 while Mechatronics Engineering also has a relatively smaller gender gap, with 1 female student out of a total of 16.

2020/2021 HND Enrollment

Male students dominate enrollment in all disciplines, with significantly higher numbers than female students. Mechanical Engineering has the highest enrollment (65 male, 10 female), while Architecture has the lowest (10 male, 0 female). Mechanical Engineering has the highest female enrollment (10), while Architecture has no female students enrolled.

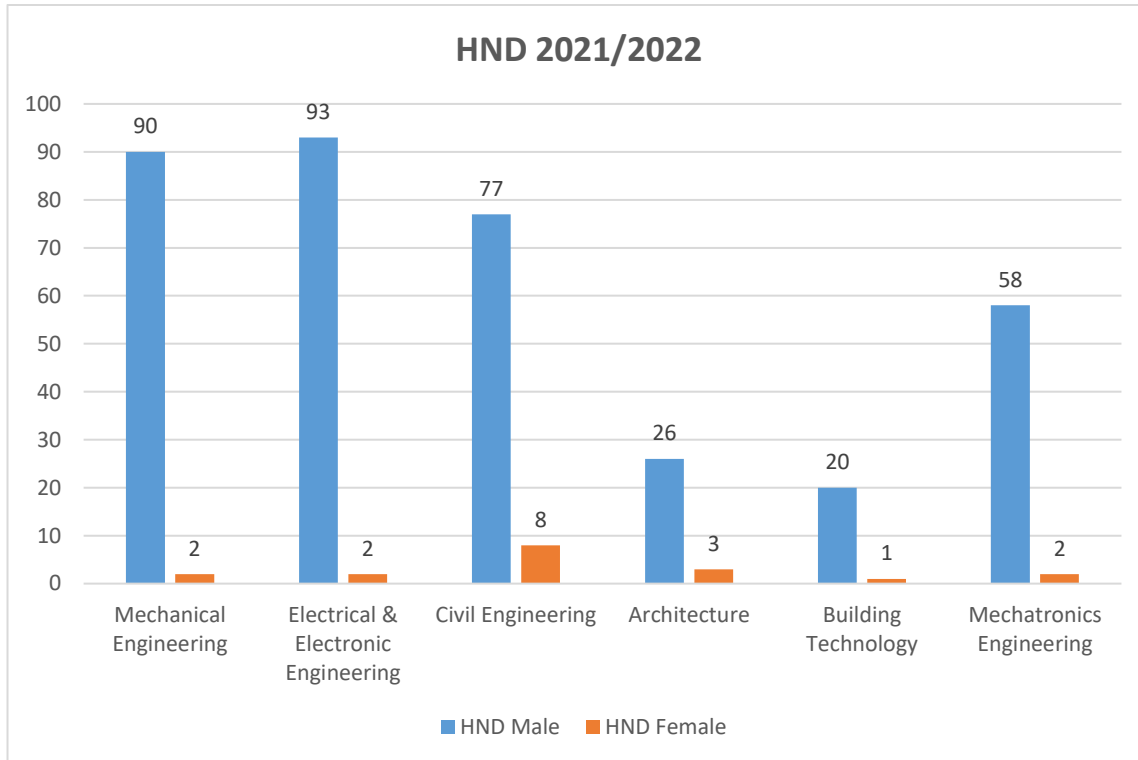
The specific differences by discipline show that Mechanical Engineering is 65 males vs. 10 females (6.5:1 ratio), Electrical & Electronic Engineering is 60 males vs. 6 females (10:1 ratio), Civil Engineering is 52 males vs. 4 females (13:1 ratio), Architecture is 10 male vs. 0 female (no female students), Building Technology is 20 males vs. 2 females (10:1 ratio) and Mechatronics Engineering is 22 males vs. 1 female (22:1 ratio).

The overall trends show that male students outnumber female students in all disciplines. Technical courses (Mechanical, Electrical, Civil) have higher enrollment numbers. Architecture has a unique gender imbalance, with no female students enrolled.

2021/2022 ND Enrollment

Here, Mechanical Engineering has the highest male enrollment (67) and no female students enrolled. Electrical & Electronic Engineering has the highest total enrollment (93) and a substantial male-dominated enrollment. Mechatronics Engineering has a relatively balanced gender enrollment, with 10 male and 8 female students. Architecture and Building Technology have relatively small enrollments.

The course-specific gender gaps show that in Mechanical Engineering, the complete absence of female students enrolled raises concerns about gender representation. In Electrical & Electronic Engineering, a 45.5:1 male-to-female ratio indicates a significant gender gap. In Civil Engineering, an 18:1 ratio suggests a substantial gender disparity. In Architecture, a 10.25:1 ratio reveals a notable gender gap. In Building Technology, a 10:1 ratio indicates a significant gender gap, and in Mechatronics Engineering, a 1:25:1 ratio shows a relatively balanced gender enrollment.

2021/2022 HND Enrollment

Mechanical Engineering and Electrical & Electronic Engineering have the highest male enrollment (90 and 93, respectively) and very low female enrollment (2 each). Civil Engineering has a relatively higher female enrollment (8) compared to other disciplines. Architecture and Building Technology have relatively small enrollments while Mechatronics Engineering has a significant male-dominated enrollment.

Therefore, Mechanical Engineering and Electrical & Electronic Engineering are 45:1 and 46.5:1 male-to-female ratios, respectively, indicating extreme gender disparities. Civil Engineering has a 9.6:1 ratio which suggests a substantial gender disparity but with a relatively higher female enrollment compared to other disciplines. Architecture and Building Technology are 8.7:1 and 20:1 ratios, respectively, reveal notable gender gaps. Mechatronics Engineering: A 29:1 ratio indicates a significant gender disparity.

X. CONCLUSIONS AND RECOMMENDATIONS

This study investigated the unequal gender enrollment into technical courses in TVET institutions, revealing a persistent and significant gender disparity favoring male students. The findings indicate that male students dominate enrollment in mechanical engineering, electrical and electronic engineering, civil engineering, architecture, building technology, and mechatronics engineering. The results suggest that societal norms, stereotypes, and lack of encouragement may contribute to the underrepresentation of female students in technical courses. The study's findings are consistent with existing literature, highlighting the need for targeted interventions to address the gender imbalance.

The key findings indicate that male students outnumber female students in all technical courses. Mechanical Engineering has the widest gender gap, with no female students enrolled and Electrical & Electronic Engineering and Civil Engineering have substantial gender gaps.

By addressing the unequal gender enrollment in technical courses, TVET institutions can contribute to a more inclusive and diverse STEM workforce, ultimately promoting economic growth and social development.

The researchers made the following recommendations:



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1. Regulatory bodies for TVET education should Implement targeted outreach programs to encourage female students to pursue technical courses.
2. Female interest groups, professional organizations, and other stakeholders should establish mentorship programs to support female students in male-dominated courses.
3. There is a need to review curricula to ensure they are inclusive and appealing to both genders.
4. Different scholarship and support services programs should be established for female students to increase their participation in technical education.
5. TVET Stakeholders should collaborate with industries to provide female role models and internship opportunities.

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