



# Strategies for Improving Gender Equity in Mechanical Engineering Craft Practice Trade for Enhanced Female Enrolment in Government Technical Colleges Enugu State

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## Abstract

The study explored strategies for improving gender equity in Mechanical Engineering craft practice in Government Technical colleges Enugu State. The population consisted of teachers and students of Government Technical College in Enugu and Government Technical College in Nsukka both in Enugu State. Three research questions and three hypotheses were formulated to guide the study. The research design adopted was the descriptive survey design. Population for the study includes 27 teachers from government technical college Enugu and 13 teachers from government technical college Nsukka with 60 students from Government Technical College Enugu and 40 students from Government Technical College Nsukka making it a total of 100 teachers from both schools and 100 students from both schools were selected using purposive sampling technique. A validated questionnaire consisting of 16 items with high level of reliability answerable on a 4-point rating scale was used to answer all research questions while t-test was used to test the hypotheses. The findings, among others showed that educating parents on their role in the career choice decision of their children and gender main streaming are strategic on their roles in the gender equity in mechanical technology education. Provisions of scholarship and increased job opportunities for female graduates among others were recommended.

**Keywords:** Mechanical Engineering Craft Practice Trade; Gender Equity; Career Choice; Gender Main Streaming

## Introduction

Gender equity in education has been a fundamental concern at global and national levels. In this study, gender equity denotes fairness in students' enrolment, participation and allocation of resources in the mechanical engineering craft practice trade. The priority of every nation today is the production and maximization of manpower, which are veritable tools for job and wealth creation, economic development, emancipation, and sustainability (Iloma & Amadike, 2013). The provision for gender equity in education is often regarded as the hub of any meaningful development (Egun & Tibi, 2014). It is in recognition of this that the Nigerian philosophy of education, as defined in the National Policy on Education of the Federal Republic of Nigeria (2013), emphasizes the development of the individual into a sound and effective citizen and the provision of equal opportunities for all genders. Women are critical agents for a sustainable future, and society must fully recognize and use their potential. Gender equity and women's empowerment constitute key ingredients for a sustainable future and economic development of any nation. Sound vocational and technical programmes that guarantee gender equity are needed more than ever because of the changing and challenging world occupation (United Nations, 2014). Thus, cultivating individual talents remains an inescapable responsibility of education in a democracy because national welfare demands trained talents of every type. This provision tends to catalyze and promote gender equity, which seems elusive in technical and vocational education.

It is imperative to note that reliability and sustainability in the mechanical sector depend to a large extent on the availability of trained and competent manpower of all genders, which is a great asset to any nation. Functional training institutions that guarantee gender equity in enrollment and participation are

essential in meeting these demands. Hence, the establishment of a variety of formal technical institutions, such as technical colleges, polytechnics, colleges of education, and universities, by the government and the private sector would provide opportunities for both genders to participate equally (Bauer, 2013).

Technical education is that aspect of education that leads to the acquisition of practical and applied skills as well as basic scientific knowledge according to the Vocational and technical education definition of VTE. It is a planned programme of courses (metalwork trade, technical drawing, applied mechanics, mechanical, automobile trade) and learning experiences that begin with an exploration of career options and support basic academic and life skills. Its aims among others are the provision of vocational knowledge and technical skills necessary for agriculture, industrial, commercial and economic development (National Policy on Education, 2013). It is imperative to note that adequate skilled manpower in mechanical technology is essential in any economy as mechanical energy plays the most vital role in economic growth, progress, development, poverty eradication, and nation security.

Adaife and Hendrickson (2017) observed that female education has proved to be one of the best means of achieving development and economic growth that would sustain higher economic production, improved family and child nutrition because of their numerical war and poverty, hunger and diseases, educating women is one of the few silver bullets that can contribute to meaningful improvement in people's lives. Gender equity in mechanical engineering craft practice trade may have been induced by some factors like parental influence. According to Okebukola (2015), parents play a vital role in the occupational choice of their children. Many parents still believe that culturally, they have the right to play very significant role in the career choice, decision of their children and any child who thinks otherwise is regarded as disobedient and prodigal (Geogiol, 2019).

Reihana (2013) observed that women invisibility in the mechanical sector is partly due to parents' lack of awareness on their role in the career choice decision of their children. These conditions may have been influenced by cultural believes. Otto (2013) indicated that gender inequity arouses from cultural practices in the society emanating from deeply fixed prejudices, attitudes, beliefs, customs, behavioral decisions and procedures. Those practices which have created disparity have been reinforced with the beliefs that women as Gods creatures are weaker vessels with shallow brain and hence are expected to marry early, bear children to whom they should devote their time and attend to some domestic roles traditionally assigned to them, such as fetching water, cooking, cutting and fetching of firewood under the lordship of their husbands or parents (Njoku, 2013). Consequently, many parents trained their daughters to become good housewives and prevented them from venturing into courses believed to have tendency of exposing them to behave like their male counterparts. This has led to sex- stereotyped occupations of male over female occupations which is a culture that has reinforced the nation of female believing that it is a taboo to be a preserve of the male (Egun & Tibi, 2012). Thus, educating parents and creating awareness of their role in career choice decisions of their children could be strategic in promoting gender equity in mechanical engineering craft practice trade.

Gender mainstreaming could also be strategic in promoting gender equity in the mechanical engineering craft practice trade. Gender mainstreaming, according to Bauer (2013), is the process of assessing the implications for women and men of any planned action like legislation, policies or programmes in any area and at all levels. It is the strategy for making the concerns and experiences of women as well as men an integral part of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and social spheres so that men and women benefit equally and inequity is not perpetuated (Okoli, 2013). According to Hornby (2015), gender mainstreaming implies making a particular idea or opinion on gender equity acceptable to most people. Poor enrolment of females in mechanical engineering craft practice trade could mean poor planning and utilization of the strategies offered by gender mainstreaming

Furthermore, Okoli (2013) observed that despite the huge amount of money the government committed to free and compulsory basic education for all children of school age and the determination to promote gender equity in science and technology at all levels of education, gender disparity still exist especially in science and technology education. Several research reports indicated that gender gaps exist in science and technology and employment (Okeke 2012; Okoli 2013; Ezirim 2023). To remove the obstacles to women's representation, inclusion and advancement, government and non-governmental organizations need to take a data-driven approach. This starts with measuring the gender proportionality of hires, performance rating, promotions, key talent populations and leavers, and then using predictive analytics

to understand which measures will have the biggest impact in addressing any potential gaps. In addition to gathering and analyzing the workforce data, government and non-governmental organizations can proactively deploy surveys and other listening tools to identify and assess the biggest issues, the most pressing unmet needs, and the areas offering the greatest potential improvements for employees. A workplace where females feel that they belong, are included in decision-making, and are treated fairly is a workplace where females can thrive.

It is crucial to note that females constitute a very significant population of society, and if the educational exclusion of women, especially in the mechanical sector, remains unabated, society as a whole suffers as a significant number of its population is not contributing fully (Oduran & Okukpon, 2017). Consequently, a lack of employment windows, suffocation of small and medium-scale businesses, setbacks in entrepreneurship, and poor economic development become manifest. This is in line with the observation of Okoli (2013) that discrimination against female education significantly hampers the economic development of many poor countries. Thus, deliberate and strategic planning is essential to improve gender equity.

### **Purpose of the Study**

The main purpose of this study is to investigate the strategies for improving gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State. Specifically, the study sought to

1. Determine the strategies for educating parents on career choice decisions to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.
2. Determine the strategies to improve government and non-governmental organizations on how to facilitate gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.
3. Determine the strategies to improve gender mainstreaming in mechanical technology education for enhance female enrolment in Enugu State.

### **Research Questions**

The following research questions were raised to guide the study:

1. What are the parents related strategies for educating parents on career choice decision to improve gender equity in mechanical engineering craft practice trade for enhanced female enrolment in Government Technical Colleges in Enugu State?
2. What are the government and non-governmental strategies to improve gender equity in mechanical engineering craft practice trade for enhanced female enrolment in Government Technical Colleges in Enugu State?
3. What are the gender mainstreams to improve gender equity in mechanical engineering craft practice trade for enhanced female enrolment in Government Technical Colleges in Enugu State?

### **Hypotheses**

The following hypotheses formulated and tested at .05 level of significance guided the study.

1. There is no significant difference between the mean response scores of teachers and students on the parents related strategies for educating parents on career choice decision to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.
2. There is no significant difference on the mean response scores of teachers and students on the government and non-governmental strategies to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.
3. There is no significant difference on the mean response scores of teachers and students on the gender mainstream to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.

## Method

A descriptive survey research method was adopted for this study. A purposive sampling technique was used to draw a sample of 140 respondents consisting of 40 teachers and 100 students from Government Technical College Enugu and Government Technical College Nsukka, whose total population was 140. A structured questionnaire on gender equity consisting of 16 items was developed by the researcher. A four-point rating scale, survey format of Strongly Agree (4 points), Agree (3 points), Disagree (2 points) and Strongly Disagree (1 point) was used to elicit information from respondents. The instrument was validated by two experts from the Department of Technology and Vocational Education and one from Measurements and Evaluation, Department of Mathematics and Computer, Enugu State University of Science and Technology, Enugu. A total of 140 copies were administered and retrieved by the researcher. The reliability of the study was obtained using the Cronbach Alpha coefficient formula, which yielded 0.86, indicating that the instrument was reliable for the study. Research questions were analyzed using mean with standard deviation while hypotheses were tested at 0.05 level of significance using the t-test. Items with mean value of 2.50 and above were regarded as Agree (A) while those below 2.50 were regarded as Disagree (DA)

## Results

The results of the data analyzed are presented in the tables 1-3 in accordance with the research questions formulated.

Table 1: Mean response scores with standard deviations of teachers and students on the parents related strategies for educating parents on career choice decision to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.

S/N	STATEMENTS	Teachers				Students			
		N	$\bar{X}_1$	SD <sub>1</sub>	Decision	N	$\bar{X}_2$	SD <sub>2</sub>	Decision
1	Educating parents on how interest in career choice decision improves gender equity	40	3.65	0.72	A	100	3.53	0.76	A
2	Educating parents to encourage their daughters to take courses based on their abilities	40	3.47	0.81	A	100	3.55	0.85	A
3	Creating awareness on the disadvantages of parents imposing courses of study on their daughters	40	3.56	0.76	A	100	3.60	0.70	A
4	Ensuring academic materials needed by students are readily provided by their educated parents	40	3.37	0.91	A	100	3.46	0.76	A
	Grand $\bar{X}$ , SD		3.51	0.80			3.53	0.77	

Table 1 shows a grand mean of 3.51 and 3.53 for teachers and students respectively on the item of the instrument. This is greater than the cutoff point of 2.50. SD 0.80 and 0.77 for teachers and students respectively are both below a unit, indicating homogeneity in the scores, therefore the scores were not skewed. The respondents are therefore of the opinion that educating parents on career choice decisions improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.

## Hypotheses

H<sub>01</sub>: There is no significant difference between the mean responses of teachers and students on the parents related strategies for educating parents on career choice decision to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.

Table 2: t-test comparison of teachers and students on the parents related strategies for educating parents on career choice decision to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.

Respondents	N	X	SD	df	t-cal	t-crit	Decision
Teachers	40	3.51	0.80	138	1.00	1.960	NS
Students	100	3.53	0.77				

Table 2 shows a t-calculated value of 1.00 which is less than the critical value of 1.960. This implies that there is no significant difference in the opinion of teachers and students on the parents related strategies for educating parents on career choice decision to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State. The null hypotheses is therefore not rejected

Table 3: Mean response scores with standard deviations of teachers and students on the government and non-governmental strategies to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State

S/N	STATEMENTS	Teachers				Students			
		N	$\bar{X}_1$	SD <sub>1</sub>	Decision	N	$\bar{X}_2$	SD <sub>2</sub>	Decision
5	Creating mass employment for the female will enhance female enrolment.	40	3.60	0.71	A	100	3.63	0.71	A
6	Government organizations should encourage female enrollment in Technical Colleges.	40	3.60	0.71	A	100	3.63	0.76	A
7	Government /Non-governmental organizations should provide scholarships for the female students	40	3.50	0.76	A	100	3.67	0.55	A
8	Government /Non-governmental organizations need to provide employment opportunities for the female students on graduation.	40	3.50	0.76	A	100	3.67	0.55	A
9	Relevant laws should be enacted by government/non-governmental organizations to protect women at school	40	3.50	0.76	A	100	3.67	0.55	A
10	Laws should be enacted by government/non-governmental organizations to protect women at work.	40	3.50	0.76	A	100	3.67	0.55	A
11	Modification of the curriculum to give women learners sense of belonging improves gender equity	40	3.43	0.76	A	100	3.43	0.66	A
	Grand X, SD		3.52	0.75			3.62	0.62	

Table 3 shows a grand mean of 3.52 and 3.62 for teachers and students respectively on the item of the instrument. This is greater than the cutoff point of 2.50. SD 0.75 and 0.62 for teachers and students respectively are both below a unit, indicating homogeneity in the scores, therefore the scores were not skewed. The respondents are therefore of the opinion that government and non-governmental organization can improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.

H<sub>02</sub>: There is no significant difference in the mean responses of teachers and students on the government and non-governmental strategies to improve gender equity Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.

Table 4: t-test comparison of teachers and students on the government and non-governmental strategies to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.

Respondents	N	X	SD	df	t-cal	t-crit	Decision
Teachers	40	3.52	0.75	138	1.00	1.960	NS
Students	100	3.62	0.62				

Table 4 shows a t-calculated value of 1.00 which is less than t-critical value of 1.960. Hence, there is no significant difference on the opinion of teachers and students on the government and non-governmental strategies to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State. The null hypothesis is not rejected.

Table 5: Mean response scores with standard deviations of teachers and students on the gender mainstream to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.

S/N	STATEMENTS	Teachers				Students			
		N	X <sub>1</sub>	SD <sub>1</sub>	Decision	N	X <sub>2</sub>	SD <sub>2</sub>	Decision
12	Teaching methods that promote gender inclusiveness improves female enrolment	40	3.46	0.76	A	100	3.63	0.60	A
13	Teaching strategies that promote gender cooperation rather than competition improves gender equity	40	3.57	0.72	A	100	3.50	0.76	A
14	Eliminating/avoiding of behavior or utterances that are gender sensitive in the classrooms will improve gender equity	40	3.57	0.76	A	100	3.47	0.88	A
15	Avoiding of behaviours/utterances that are gender sensitive in the workplaces would improve gender equity.	40	3.57	0.76	A	100	3.47	0.88	A
16	Ensuring gender inclusive images, models, picture and textual materials encourages gender equity	40	3.60	0.91	A	100	3.66	0.69	A
	Grand X, SD		3.55	0.78			3.55	0.76	

Table 5 reveals that a grand mean of 3.55 and 3.55 for teachers and students respectively on the item of the instrument. SD 0.78 and 0.76 for teachers and students respectively are both below a unit, indicating homogeneity in the scores, therefore the scores were not skewed. This is greater than the cutoff point of 2.50. The respondents are therefore of the opinion that gender mainstreaming promotes equity in mechanical technology education for enhance female enrolment in Enugu State.

H<sub>03</sub>: There is no significant difference of teachers and students on gender mainstream to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State. The null hypothesis is not rejected.

Table 6: t-test comparison of teachers and students on gender mainstream to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.

Respondents	N	X	SD	Df	t-cal	t-crit	Decision
Teachers	40	3.55	0.78	138	1.00	1.960	NS
Students	100	3.55	0.76				

Table 6 shows a t-calculated value of 1.00 which is less than the t-critical value of 1.960. Hence, there is no significant difference of teachers and students on gender mainstream to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State. The null hypothesis is not rejected.

### **Discussion of Results**

The results showed that educating parents on career choice decisions is a basic strategy in enhancing female enrolment in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State as parents play vital roles in the career choice of their children. (Adelakun, Oviawe & Barfa, 2015), (UNDP, 2009) and (Agbara, Chagbe & Achi, 2018). The result equally shows that when parents are properly educated, they encourage their children to choose careers based on their interest and ability with adequate support given to the females who seek career in areas perceived to be for male to enable them excel. Egun and Tibi (2014), Okeke (2014) and Okebukola (2015) in their various studies acknowledged that parent's level of education affects gender equity in science and technology.

Furthermore, the results of the study showed that the reward of scholarship, provision of employment, protection of female who choose career in to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State by government and non-governmental organizations is an essential strategies in improving gender equity. Bauer (2013) affirmed that promoting gender in schools promotes gender equity.

The study equally showed that gender mainstreaming is a crucial strategy for promoting gender equity in to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State. It noted that teaching methods that promoted gender inclusiveness, teaching strategies that promotes gender cooperation rather than competition, elimination and avoidance of behavior or utterance that were gender sensitive in the classrooms and workplaces, as well as the use of gender-inclusive images, models, pictures and textual materials improves gender equity. This agreed with the findings of Okoli (2013) that teachers should mainstream gender in science and technology classroom by interacting equally with male and female students and as much as possible avoid the use of gender sensitive utterance.

Data on hypotheses one showed that there is no significant difference in the response scores of teachers and students on the parents related strategies for educating parents on career choice decision to improve gender equity in mechanical technology education for enhance female enrolment in Enugu State. This agreed with the findings of Okeke (2014) and Okebukola (2015).

Furthermore, findings from hypotheses two shows that there is no significant difference in the opinion of teachers and students on the government and non-governmental strategies to improve gender equity to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State. This agrees with the findings of Bauer (2013). The result of hypothesis three revealed that there is no significant difference in the opinion of teachers and students on gender mainstream to improve gender equity in mechanical technology education for enhance female enrolment in Enugu State. This is in line with the findings of Okoli (2013).

### **Conclusion**

It was therefore concluded that since parents played vital roles in the decision to choose their children's career choices, educating and orientating them became imperatively strategic. Functional government and non-governmental organizations could play strategic roles in facilitating gender equity to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State by awarding scholarships, increasing the employment opportunities for women and encouraging them at school and workplaces, etc. More so, gender mainstreaming processes were also strategic in improving gender equity in the Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.

## Recommendations

The following recommendations were made:

1. Provision of increased employment opportunities to female graduates to improve gender equity in Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.
2. Laws to protect women at school and work places should be enacted
3. The responsibilities of making career choices should be left to the individual and experts such as school counselor.
4. There should be provision of scholarship and incentives to female offering Mechanical Engineering Craft Practice Trade for enhanced female enrolment in Government Technical Colleges in Enugu State.

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