

Gender-Based Barriers to Enrollment in Building Technology Education: A Study of Students' Experiences in Hassan Usman Katsina Polytechnic

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Abstract

The study examined the influence of gender-based barriers to female enrolment in building technology education in Hassan Usman Katsina Polytechnic. There were two specific objectives, two research questions and two null hypotheses for the study. A descriptive survey research design was adopted for the study. The population for the study comprised of all female students from seven colleges in Hassan Usman Katsina Polytechnic. A purposive sampling technique was used to proportionately select one hundred and twelve (112) respondents for the study. The instrument for data collection was a structured questionnaire consisting of 27 items and it was validated by three experts. A reliability coefficient of 0.813 was obtained using Cronbach Alpha. Data collected was analyzed using mean and standard deviation while simple linear regression was used to test the null hypotheses. For taking decision, any item with a mean value of 3.50 and above was considered agreed while any item with a mean value of less than 3.50 was considered disagreed. For the test of null hypothesis, a hypothesis with a P - value < 0.05 significance level was considered accepted while any hypothesis with a P - value > 0.05 significance level was considered rejected. The findings revealed that gender-based barriers and sensitive tasks had significant effect on female enrolment and participation in building technology education. The study therefore recommended that parent should as much as possible be educated to attach equal weights to the education of both male and female children. Moreover, Public enlightenment strategies should be employed to increase female enrolment in Engineering and other Technology related courses, particularly building technology and civil engineering programs.

Keywords: Building Technology Education, Enrolment, Gender-Based Barriers, Sensitive Tasks

Introduction

Technical education means and refers to the integral educational programs of engineering related disciplines that broadly indulged the students in practical skills acquisition, attitudes and theoretical knowledge of technologies related to occupations in various sector of the economy. It covers human abilities to shape and change the physical world to meet the societal needs, by manipulating materials and tools with technique. Undeniably, it is a pathway for a nation to realize its potentials by improving technical abilities and vocational skills necessary for industrial, agricultural and economic development. The main objective of technical education is to provide trained manpower in the industries and other businesses particularly at the craft, advanced craft and technical level. It is also to provide technical knowledge and vocational skills necessary for agriculture, commercial activities and to impart the necessary skills into individuals in order to make them independent and self-reliant. In pursuance of this, Federal Government of Nigeria FGN (2016) declared a

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policy to encourage men and women equally, of all ethnic, racial and economic background to acquire skills in science, technology and mathematics and to have equal opportunity in education, training and employment in scientific and technological disciplines and thereby promoting scientific literacy and technology. The expectation is that, students are provided with experiences predisposing towards acquisition of technical process skills needed for the translation of ideas into a practical method. Technical education is concerned with the development of technological skills and general knowledge which is usually focuses on practical skills that provides an opportunity for students to learn about the technological subjects. Wilson (2023) viewed technical education as an aspect of educational system involving instruction in mathematics, science, technological concepts, directed towards the understanding and ability to apply technological methods in various areas of accomplishments. It is also seen as a study of technology which provides an opportunity for students to learn about the practical skills and knowledge related to technologies that are needed to solve problems and extend human potential (Afu, Gbobo, Ukofia & Itakure, 2017).

Building Technology Education as an aspect of Technical and Vocational Education, is one of the academic programs in Polytechnic, College of Education (Technical) or University in Nigeria. Udeani (2022) asserted that Building technology education prepares students irrespective of their gender to possess hands-on skills and experience to contribute within their society and become self-dependent or self-employed. It is a course of study aimed at producing technicians that are capable of performing basic practices of building technology in both private and public sectors. The study of building technology education enables students to acquire academic, vocational and pedagogical knowledge and skills that would enable them perform well in the industry and in the field of education. National Board for Technical Education NBTE (2021) reiterated that the study of building technology education emphasizes on acquisition of appropriate skills and the development of mental, physical and social abilities and competencies as equipment for the individual to live and contribute to the development of the society. In line with this, Amaewhule (2020) opined that to prepare students to contribute in a contemporary society requires that graduates of building technology education should in addition to workplace skills, inculcate a broad set of higher order thinking skills such as decision-making and problem-solving as well as flexibility, creative thinking and ability to work in a team which would make them adaptable to the dynamic society. A complete education of students of building technology education in the contemporary society therefore must focus on competencies as well as mental skills that will enable them be responsible and be effective problem solvers.

Several studies have shown that there has been substantial increase in female' enrolment and participation in various educational disciplines among Nigerian higher education students. Although, Nigerian female are not getting much needed considerations to compete with their male counterparts in different technical education courses. This is evidenced by extreme low enrolment and participation of the female folks in courses such as Automobile technology, Building technology, Electrical/Electronic technology education, etc, resulting to one or no female student in a class. Hassan (2018) believed that this disparity in enrolment may create unfriendly situation for female students and they may find it difficult to get supported and subsequently feel isolated. In other hand, researchers such as Mark (2017) and Johnson (2016) suggested that low female enrolment in itself is a barrier to female education: hence, on the basis of gender, Federal Government of Nigeria FGN (2016) declared that no person will be excluded from participation or be subjected to discrimination or denied by any means, the benefits of any educational program. This assertion demonstrated the need for protection against discrimination specifically based on gender in educational

institutions. It is also highlighted the need for schools to provide enabling environment for female folks to enroll themselves in any level of educational activity, including technical and vocational education courses. Ayonmike (2014) opined that this affirmation has not been enough to eliminate the stereotype assumptions that technical education courses is for males only. Similarly, despite the changes in successive governments' policy in recent years, it is important to acknowledge that there is still existed low enrolment of female folks in educational institutions offering Technical education courses. For instance, at Hassan Usman Katsina Polytechnic, females' enrolment and participation in building technology education is below expectation. The unwanted trend provided a significant advantage to male folks who have dominated the program. Undoubtedly, this poor enrolment was as a result of negative gender stereotype barriers driven by religious, ethnic, traditional attitudes and norms which were among the subtle barriers that exposed female students to a lower level enrolment and participation in building technology education (Olaitan, 2022). The infamous trends according to Yakubu (2016) have dwindled the Federal Government of Nigeria declaration of equal opportunity for all citizens in education, training and employment in scientific and technological disciplines. It is against this gap, the present study tries to investigate the gender-based barriers to enrolment in building technology education in Hassan Usman Katsina Polytechnic. Subsequently, the study explore the students' experiences and core constraints leading to the female students' low level enrolment and participation in building technology education.

Statement of the Problem

The Enrolment of female in building technology education program in Nigeria's higher institutions is very low when compared to enrolment in other educational program. Despite successive governments' efforts directed at improving Technical Education at all levels to make it attractive and sellable, gender gap still exist. In Katsina state, the education of female children did not receive significant attention, this has led to the second class status assigned to them in the society. Females are relegated to mere agents of domestic engagements, with considerable reproductive roles. This apathy arising from gender influence has affected technical education program particularly building technology education in Hassan Usman Katsina Polytechnic. A closer look at the gross enrollment in the department of technical education between 2020 and 2024 showed gender disparity among students in favors of male students. As a result, the male students have dominated the program and its allied disciplines. However, the National Population Census (2025) projected figures shows that Katsina State has a sex composition almost fifty-fifty (50:50) for males and females, but the educational pendulum tends to swings to the male gender only. This gender-based disparity in enrolment is a source of concern to government, educators and the society at large. Therefore, this study is set out to determine gender-based barriers to female students' enrolment in building Technology Education in Hassan Usman Katsina Polytechnic.

Purpose of the Study

The purpose of this study was to explore the gender-based barriers to enrolment in building technology education in Hassan Usman Katsina Polytechnic. Specifically, the study sought to:

1. Examine the influence of gender on female students' enrolment in Building Technology Education in Hassan Usman Katsina Polytechnic

2. Examine the sensitive tasks that affect female students' participation in Building Technology Education in Hassan Usman Katsina Polytechnic

Research Questions

The following research questions were formulated to guide the study

1. What are the influence of gender on female students' enrolment in Building Technology Education in Hassan Usman Katsina Polytechnic?
2. What are the sensitive tasks that affect female students' participation in Building Technology Education in Hassan Usman Katsina Polytechnic?

Research Hypotheses

The following null hypothesis were formulated and was tested at 0.05 level of significant.

Ho₁: There is no significant difference between mean responses of students on the influence of gender on female students' enrolment in Building Technology Education in Hassan Usman Katsina Polytechnic.

Ho₂: There is no significant difference between mean responses of students on the sensitive tasks that affect females' participation in Building Technology Education in Hassan Usman Katsina Polytechnic.

Research Methodology

The study employed a descriptive survey research design. The population for the study comprised of all female students drawn from the seven colleges (i.e College of Science and Technology, College of Administration and Management Studies, College of Liberal Studies, College of Agriculture, College of Engineering, College of Environmental Studies and College of Vocational and Technical Education) in Hassan Usman Katsina Polytechnic. A purposive sampling technique was used to proportionately select one hundred and twelve 112 respondents for the study. The instrument for data collection was a structured questionnaire consisting of 27 items and it was designed based on the two research questions. The questionnaire was divided into two sections A and B. Section A gathered personal information of the respondents while section B gathered data about the gender-based barriers to female enrolment in building Technology Education in Hassan Usman Katsina Polytechnic. The questionnaire instrument was validated by three experts. The return rate of the questionnaire was 100%. A reliability coefficient of 0.813 was obtained using Cronbach Alpha. The data collected was analyzed using mean and standard deviation. Regression analysis (ANOVA) was employed for testing the null hypotheses using regression statistic at 0.05 level of significance. Four points rating scale of Strongly Agreed (SA), Agreed (A), Disagreed (DA) and Strongly Disagreed (SD) with a rating of 4,3,2,1 were used respectively. For taking decision, mean gain of 3.50 and above was considered to be agreed while a mean gain below 3.50 considered not agreed. For accepting the hypotheses, the computed *p*-value was compared with the significance level of 0.05 for testing the hypotheses. Any hypothesis with a *p*-value of less than 0.05 will be rejected while any hypothesis with a *p*-value greater than 0.05 will be accepted. Statistical Package for Social Science (SPSS) version 23 was used throughout the process.

Result and Analysis

Research Question 1:

What are the influence of gender-based barriers on female students' enrolment in Building Technology Education in Hassan Usman Katsina Polytechnic?

Table 1		Mean rating of the Responses on the Influence of Gender on Female students' Enrolment in Building Technology Education in Hassan Usman Katsina Polytechnic									
S/N	ITEMS	CST $\bar{X}_s$ N=38	CAMS $\bar{X}_s$ N=34	CLS $\bar{X}_s$ N=10	COA $\bar{X}_s$ N=14	COE $\bar{X}_s$ N=2	CES $\bar{X}_s$ N=2	CVTE $\bar{X}_s$ N=12	$\bar{X}_g$	σ	RMKS
1	High level of females involvement in domestic chores/assignments	4.12	4.50	4.00	4.50	4.14	4.50	4.76	4.42	0.85	Agreed
2	Low level of peer support to female students offering courses in Building Technology Education	3.84	4.50	4.38	4.25	4.09	4.50	4.64	4.33	0.74	Agreed
3	Poor societal outlook/psychology that sees the girl-child education as a waste of time and resources since they will not be able to practice their training after marriage	3.52	4.50	4.33	4.50	4.19	4.50	3.94	4.09	0.61	Agreed
4	Lack of a career guidance on development path for secondary school students	3.72	4.50	4.33	4.50	4.19	4.50	3.94	4.97	1.15	Agreed
5	Effects of cultural beliefs/customs toward the female child	4.12	4.50	4.38	4.75	4.66	4.00	4.34	4.34	0.71	Agreed
6	Absence of readily identifiable role models	4.60	4.00	4.00	5.00	4.61	4.00	4.33	4.36	0.83	Agreed
7	Influence of religious biases towards the female child	4.48	3.50	4.00	4.75	4.57	4.00	4.26	4.22	0.71	Agreed
8	The effect of Situational school conditions and environment	4.20	3.50	3.94	5.00	4.28	4.00	4.29	4.33	0.74	Agreed
9	Effect of parents perception and values on the female child education	4.04	4.00	3.88	4.75	4.71	4.00	4.24	4.23	0.72	Agreed
10	Effects of value orientation among the students studying Building Technology Education courses	4.08	4.00	3.88	4.25	3.90	3.50	4.46	4.26	0.71	Agreed
11	The effect of possible dusty sites/work environments on graduation. and the overall bulky nature of most building materials	3.92	3.50	3.94	4.75	4.52	3.50	4.43	4.50	0.92	Agreed
12	The effect of social barriers with the Society in Katsina state	3.92	4.00	4.50	4.50	4.04	3.00	4.62	4.21	0.70	Agreed
13	The effect of working mainly with generally bulky building materials	3.56	4.00	4.44	3.25	4.33	4.50	4.81	4.21	0.70	Agreed
14	The effect of the socio-cultural biases and background of the parents	4.72	4.00	4.33	3.25	4.80	3.00	4.11	4.12	0.63	Agreed
15	The effect of the socioeconomic status of parents	4.56	4.00	4.11	4.25	4.66	3.50	4.28	3.65	0.47	Agreed
	Gran Mean	4.09	4.06	4.15	4.35	4.38	3.93	4.38	4.23	0.60	

KEY: = Standard Deviation, N = 112, g = Grand mean, = Students,

The result of descriptive statistics documented in table 1 indicated that the mean values of all the items ranging between 3.65 and 4.97 with a standard deviation extending from 0.47 to 1.15 and a grand mean of 4.23 respectively. The results agreed that all the 15 items were perceived as the major influence of gender on female students' enrolment in Building Technology Education in Hassan Usman Katsina Polytechnic.

Research Question 2:

What are the Sensitive Tasks that Influence Female Students' Participation in Building Technology Education in Hassan Usman Katsina Polytechnic?

Table 1 Mean rating of the Responses on the Sensitive Tasks that Influence Female Students' participation in Building Technology Education in Hassan Usman Katsina Polytechnic?											
S/N	ITEMS	CST $\bar{X}_s$ N=38	CAMS $\bar{X}_s$ N=34	CLS $\bar{X}_s$ N=10	COA $\bar{X}_s$ N=14	COE $\bar{X}_s$ N=2	CES $\bar{X}_s$ N=2	CVTE $\bar{X}_s$ N=12	$\bar{X}_g$	σ	RMKS
16	Fear of carrying heavy/bulky building materials (e.g. blocks/bricks in the workshop)	3.72	4.00	4.38	3.25	4.16	5.00	4.53	4.33	0.82	Agreed
17	Fear of working with sharp tools in task like cutting, shaping and nailing	4.00	4.50	4.16	4.00	4.42	4.50	4.55	4.35	0.83	Agreed
18	Female students dislike to perform any tasks requiring physical energy	3.48	3.50	3.88	4.00	3.85	3.50	3.89	4.25	0.72	Agreed
19	Female students inert fear of muscular task like mixing of cement	4.36	3.50	4.00	5.00	4.33	3.00	4.15	3.96	0.61	Agreed
20	Most female students dislike working in workshop or construction site that will make them dirty	4.04	4.00	3.83	4.50	3.57	3.00	4.51	4.19	0.71	Agreed
21	Most female students are incapable of enduring persistent long periods at the workshops/sites	4.08	4.00	3.72	4.25	4.42	4.50	4.50	4.28	0.73	Agreed
22	Most female students are more interested in their appearance than male sex.	3.60	4.00	3.61	4.25	3.71	3.50	4.32	4.02	0.60	Agreed
23	Fear of discrimination for working in a male dominated occupation	3.44	4.50	3.66	4.50	4.66	4.50	4.44	3.95	0.56	Agreed
24	Fear of carrying items with their heads in the workshop or construction site	3.96	4.00	4.33	4.00	3.95	2.50	4.32	4.21	0.71	Agreed
25	Building Technology tasks are predominantly muscular in nature and therefore considered as men's occupation by the society.	4.12	4.00	4.33	4.00	3.95	2.50	4.32	4.24	0.72	Agreed
26	Many female students are incapable of performing muscular tasks common in Building Technology Education workshop..	4.00	3.50	3.83	4.00	4.52	4.00	4.12	4.05	0.61	Agreed
27	Several female students are afraid of having to withstand much pressure at work sites	3.84	4.50	4.00	3.25	4.60	2.50	4.02	3.98	0.62	Agreed
	Grand Mean	3.88	3.66	3.60	4.12	4.21	3.67	3.31	4.15	0.68	

KEY: = Standard Deviation, N = 112, g = Grand mean, = Students.

The result of descriptive statistics presented in table 2 indicated that the mean values of all the items ranging between 3.96 and 4.35 with a standard deviation spreading between 0.56 and 0.83 and a grand mean of 4.15 respectively. Therefore, this result agreed that all the 12 items were perceived as sensitive task that influence female students' participation in Building Technology Education in Hassan Usman Katsina Polytechnic.

Hypotheses Testing

Hypothesis One.

Ho₁: There is no significant difference between mean responses of students on the influence of gender on female students' enrolment in Building Technology Education in Hassan Usman Katsina Polytechnic.

Table 3		Regression Analysis of Responses on the Influence of Gender on Females' Students' Enrolment in Building Technology Education in Hassan Usman Katsina Polytechnic.				
Model Summary						
Model		R	R Square	Adjusted R Square	Std. Error of the Estimate	
1		.099 ^a	.010	.001	.49551	

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.268	1	.268	1.092	.298 ^b
	Residual	27.009	110	.246		
	Total	27.277	111			

The result in Table 3 revealed that there was a statistically significant difference between mean responses of students as determined by regression analysis above $R^2 = (.010)$, $f = (1.092)$, $p = (.298)$. Since $p = (.298)$ value is greater than the alpha level of the significance ($p < .05$). The result shows that there was statistically significant influence of gender-based barriers on female students' enrolment in Building Technology Education. This analysis indicates that null hypothesis one was accepted. Therefore, the result support the prediction of hypothesis one that says there is no significant difference between mean responses of students on the influence of gender-based barriers on female students' enrolment in Building Technology Education in Hassan Usman Katsina Polytechnic

Hypothesis 2

Ho₂: There is no significant difference between mean responses of students on the sensitive tasks that affect females' participation in Building Technology Education in Hassan Usman Katsina Polytechnic.

Table 4

Regression Analysis of Responses on the Sensitive Tasks that affect Female students' Enrolment in Building Technology Education in Hassan Usman Katsina Polytechnic.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.081 ^a	.006	-.003	.49635

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.177	1	.177	.718	.399 ^b
	Residual	27.100	110	.246		
	Total	27.277	111			

The result in Table 4 revealed that $R^2 = (.006)$, $f = (.718)$, $p = (.399)$. Since $p = (.399)$ value is greater than the alpha level of the significance ($p < .05$). The result shows that there was statistically significant effect of sensitive tasks that affect females' participation in Building Technology Education in Hassan Usman Katsina Polytechnic. This analysis indicates that hypothesis two was accepted. Therefore, the result support the prediction of hypothesis two that says there is no significant difference between mean responses of students on the sensitive tasks that affect female students' participation in Building Technology Education in Hassan Usman Katsina Polytechnic.

Discussion of the Finding

Based on the findings with respect to the research question one which was supported by test of the corresponding null hypothesis one revealed that there was significant influence of gender-based barriers on female students' enrolment in Building Technology Education in Tertiary Institutions offering technical education program. The results coined with the findings of Ali Muntari (2009) which was focused on gender and social factors leading to the under participation of the female students in Engineering and other Technology Education courses at the university level. The study revealed that enrolment of female students in Engineering and other Technology Education courses at the university level is influenced by gender-based and social factors. In a related study, Afu et al, (2017) investigated the influence of gender on female students' enrolment and participation in Woodwork Technology Education in Federal College of Education (Technical) Gombe, Gombe State. The findings this study revealed that some gender-based factors such as high level of females' involvement in domestic chores/assignments, Low level of peer support to female students offering courses in Woodwork Technology Education, Lack of a career guidance and career development path for secondary school students.

The findings of research question two and the test of its corresponding null hypothesis indicated that sensitive tasks affect female students' participation in Building Technology Education. The findings was in consistent with the arguments in the existing literature, such as the study conducted by Ayonmike (2014) which revealed that female students dislike to perform any tasks requiring physical energy and their inert fear of muscular task

like mixing of cement, carrying heavy materials etc, play a great role on their unwilling attitude to enrolled themselves in Building Technology Education. Moreover, Johnson (2013) proved that sensitive tasks has a significant impact on female students' participation regarding their choice of career in Technical Education. The study affirmed that sensitive activities carried out in Building Technology workshop/Construction site were perceived to be among the subtle barriers that exposed female students to a lower level enrolment and participation in building technology education.

Conclusion

Acquainted with the apparent low level enrolment and participation of female students' in tertiary institutions offering Technical Education program, the study investigated the gender-based barriers that could be dwindling factors that barred female students to develop interest in choosing career path in Building Technology Education. Based on this assertion, it was concluded that factors such as effect of value orientation among the students, low level of pear support to female students' offering courses in building technology education were among the major gender-based social barriers affecting female enrolment in building technology education in tertiary institutions.

Recommendations

Based on the findings of the study, the following recommendations were made.

1. Parents should be educated to attach equal weights to the education of both male and female children. They should be sensitized on the need to enroll their female children in building technology education in tertiary institution offering technical education as a program of study. This could be done by raising their awareness of the link between low education level, poverty, mobility and poor health, which is gender neutral.
2. Public enlightenment strategies should be employed to increase the female gender enrolment in Engineering and other Technology related courses, particularly in building technology and civil engineering where female enrolment remains very low compared to the male counterpart.

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