

PROBLEMS FACED BY GIRLS IN STUDYING SCIENCE AND TECHNOLOGY SUBJECTS IN DELTA STATE.

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ABSTRACT

The study investigated why girls in secondary schools find it difficult to study Science and Technology subjects. It determined strategies for increasing females' interest in the study of Science and Technology. Three research questions were posed and one hypothesis considered. A sample of 300 female from Girls and Mixed Schools in Government owned schools in Delta State were involved in the study. Data were collected using questionnaire. Analysis of the data was by simple percentage, means and Z-score. Findings from the study revealed that girls are afraid of Science and Technology subjects because of home orientation, calculations in Mathematics and Science, and low achievement in the subjects. It was found that the response of girls on strategies to adopt is not influenced by the level of their parents' education. Implications of these findings were highlighted and recommendations made based on the findings of the study.

INTRODUCTION

Women education is important for the development of Science and Technology worldwide. Their education touches on a fundamental issue of gender disparity, which is both ancient and global. Traditionally, some careers have been stereotyped as "men's occupations" while others are for females. This sexist stereotyping prevents full participation of all groups in science and technology programmes. For example, Engineering, Architecture, Science and Technology have been dominated by males. The trend is that females are usually predominant in occupational programmes like Business, Health and Home Economics related occupations. The result is that women think of themselves and are seen as emotional, weak and supportive. So, they study courses that will prepare them to be consumers, followers and caregivers. On the other hand, men offer courses that will prepare them to be leaders and wage earners because the society expects them to be strong and assertive.

Women ought to share in scientific and technological pursuit to be able to contribute and benefit from advancement in Science and Engineering. The persistence of sex segregation in each field caused inequitable balance of the sexes especially in science and technology programme. Martins (1978) cautioned that sex-role stereotyping gives both sexes unfair and inaccurate ideas about themselves. He established his points as follows:

"Sex-role stereotyping deprives boys and girls of the freedom to find their own places in society according to their capabilities by casting them into an apparently inflexible world. It limits their chances of becoming the men and women they are capable of becoming because it engenders masculine and feminine patters of behaviour that do not reflect reality"

In a developed country like USA, laws were enacted to prohibit the discrimination in entering specific professions and in securing employment on the bases of race, sex, religion or national origin (Sorensen, 1974). One of the broad goals of secondary education in Nigeria is to provide all primary school leavers with the opportunity for education of a higher level, irrespective of sex, social status, religion or ethnic background (Federal Republic of Nigeria, 1998). These developments are based on research findings that it is a false reasoning or argument for having certain attributes like intelligence, perseverance and courage associated with a particular gender (Unachukwu, 2000; Okeke, 1988). According to the human development report of UNDP (1998), gender disparity in access to economic and political opportunities are obvious in Nigeria in view of the patriarchal ordering of social relations and the resultant male domination. As a result, women are often confined to the domestic sphere and women's economic activities are often under-valued in that such economic activities attract less reward in comparison to men's.

It is well known that the technological advancement of any nation depends on knowledge of Science and Technology of her people. The issue of low participation and poor achievement of girls in science and technology fields has been a source of concern to Nigerian scientists (Ajeyalemi, 1990; Azikiwe, 1990; Alele, 1987). The system of education in Nigeria has made Science, Mathematics and Technology core courses in the secondary school curriculum (Federal Republic of Nigeria, 1998:18). At the Junior Secondary School level, Introductory Technology and Integrated Science are compulsory

subjects for all students. This is to ensure that girls as well as boys do not avoid the subjects. In order to get females into Science and Technology courses at the Universities and Colleges of Technology, they must have the needed pre-requisites from the secondary schools. It is important, therefore, to examine the factors that discourage girls in studying Science and Technology subjects at the secondary school. The study will assist the Government, administrators and guidance counsellors to motivate girls to show interest in Science and Technology.

With the above subject in mind, three research questions and one null hypothesis were formulated as stated below:

Research Questions

1. Why do girls participate in Science and Technology subjects?
2. What factors discourage girls from studying Science and Technology at the Junior Secondary School?
3. How can the interest of girls be increased in Science and Technology?

Hypothesis

H₀: There is no significant difference ($p < 0.05$) between the ratings of girls from educated and non educated parents with regard to strategies for enhancing females interest in Science and Technology.

METHODOLOGY

Population and Sample

The population was made up of all Junior Secondary School students in Delta State. A sample of 300 female students from Girls and Mixed Schools in Government owned schools in Delta State were involved in the study. Cluster sampling technique was used to select six Local Government Areas (LGAs) in Delta State. The simple random sampling was used to select two schools from each of the Local Government Areas. The researcher sampled 25 female students from each of the schools.

Instrument

The instrument consisted of a 23 item questionnaire which sought information on the problems faced by female students in studying Science and Technology subjects. The questionnaire was divided into four parts. Section A contained information on age, sex, school and occupation of parents. Section B contains statements on female participation in Science and Technology. Section C contains factors discouraging girls from studying the subjects while Section D contains statements on strategies for enhancing females' interest. The respondents were requested to rate the items on a five-point rating scale of (1) strongly Agree (2) Agree (3) Undecided (4) Disagree and (5) Strongly Disagree. Four experts in Science and Technology education reviewed the items. The items were revised according to suggestions by the validators. The instrument was pilot-tested with 30 subjects to establish its reliability using Cronbach Alpha (α). A reliability coefficient of 0.69 was obtained.

Data Collection And Analyses

The distribution of the questionnaires and collection of data were carried out by the Science and Technology teachers in each school under the supervision of the researchers. 257 questionnaires were properly completed and returned for analysis. This represents 86 percent return. The data collected were analysed using simple percentages and Z score.

FINDINGS AND DISCUSSION

The results of the study have been organised in four tables as shown below. The tables show the percentage of students who responded to each item under each column in the rating scale. The following findings were made:

Table 1 shows that girls participate in Science and Technology because of parental influence, personal interest and because they are compulsory subjects. Table 2 shows that female students considered Science and Technology as male dominated courses. Besides they dislike Science subjects because they are associated with calculations. This is confirmed by their low performance in Science and Mathematics. Table 3 shows that female students agreed with all the strategies aimed at improving their interest in Science and Technology. Data presented in Table 4 did not show significant differences between the mean scores of female students from educated and non-educated parents on the identified strategies for increasing female participation in Science and Technology. Consequently, the null hypothesis was accepted.

Table 1 Participation of Girls in Science and Technology Subjects

S/N	Statement	SA	A	U	D	SD
1.	Science and Technology are compulsory.	44%	52%	4%	-	-
2.	My parents say I must do Science subjects.	20%	22%	6%	27%	25%
3.	My parents want me to do Technology subjects.	25%	27%	3%	35%	10%
4.	Many society's problems are best solved by the application of technology.	38%	42%	10%	2%	6%
5.	School Guidance Counsellor advised me to go for Science subject because I am good at it.	22%	30%	7%	21%	20%
6.	Science and Technology are Interesting to me.	42%	35%	-	11%	12%

Table 2 Factors Discouraging Girls from Studying Science and Technology

S/N	Statement	SA	A	U	D	SD
1.	Science and Technology professions like Engineering are best for male.	23%	18%	11%	17%	31%
2.	My parents cannot pay fees for Science and Technology practicals.	19%	17%	-	29%	35%
3.	Female Engineers and Architects are not as recognised as their male counterparts.	28%	29%	3%	16%	24%
4.	Men do not like to work for female supervisors.	31%	28%	9%	15%	17%
5.	As a Scientist, I will not have much time for my children when I am married	26%	27%	11%	23%	13%
6.	Science and Technology like Engineering will make me masculine and should be done by men.	28%	23%	4%	23%	22%
7.	There are too many calculations in Science and Technology subjects.	39%	35%	-	15%	11%
8.	Men are scared of getting married to ladies who are professionals in Science and Technology.	25%	27%	7%	29%	12%
9.	My performance is low in Mathematics.	41%	19%	2%	16%	22%
10.	My performance is low in Science subjects.	28%	24%	-	15%	33%
11.	My performance is low in Technology subjects.	16%	10%	-	40%	34%

Table 3 Strategies for Improving Females' Interest in Science and Technology.

S/N	Strategies	SA	A	U	D	SD
1.	Teachers should treat boys and girls equally during theory and practical classes.	36%	35%	2%	14%	13%
2.	Award scholarship to females who are good in Science and Technology.	41%	42%	-	8%	9%
3.	Teachers should encourage females to learn Science and Technology.	39%	42%	2%	9%	8%
4.	Show films and magazines of females who are successful in Science and Technology fields.	36%	37%	-	16%	11%
5.	There should be more women teachers of Science and Technology.	36%	36%	-	19%	9%
6.	Parents are the right people to encourage females to learn Science and Technology.	39%	40%	-	10%	11%

Table 4 Comparison of the Rating on Strategies for Increasing Female Participation in Science and Technology Between Females of Educated and Illiterate Parents.

S/N	Strategies	Group	N	X	SD	Z	Remarks
1.	Teachers should treat boys and girls equally during theory and practical classes.	E	123	3.67	1.42	0.11	NS
		I	134	3.65	1.40		
2.	Award scholarship to females who are good in Science and Technology	E	123	3.98	1.25	1.42	NS
		I	134	3.76	1.23		
3.	Teachers should encourage females to learn Science and Technology	E	123	3.95	1.23	1.49	NS
		I	134	3.92	1.02		
4.	Show films and magazines of females who are successful in Science and Technology fields.	E	123	3.75	1.21	1.22	NS
		I	134	3.73	1.42		
5.	There should be more women teachers of Science and Technology.	E	123	3.75	1.32	1.67	NS
		I	134	3.51	0.93		
6.	Parents are the right people to encourage females to learn Science and Technology.	E	123	3.62	1.33	-0.77	NS
		I	134	3.75	1.36		

Z Critical = 1.96 at the 0.05 level of significance
 N = Number of Subjects
 X = Means
 SD = Standard Deviation
 NS = Not Significant.

The main aim of this study were to investigate the problems faced by girls in studying Science and Technology subjects as well as consider possible ways through which the interest of female students could be enhanced. The result showed that the students could not cope with Science subjects because of the Mathematics involved. The finding is consistent with that of Garegae-Garekwe (1996) in which few girls enroll in scientific careers because Mathematics is a pre-requisite. Teachers have their part to play to apply appropriate methods to teach the concepts, principles, skills and facts of Science and Technology. Also, the students can be encouraged to like calculations by teaching the pre-requisites from first principle and using peer tutoring to help those who are deficient.

Females expressed fear of venturing into male dominated occupational programmes ranging from unemployment to marital problems. Osibodu (1988) remarked that the factors that influenced female perception of, and participation in Science, Technology and Mathematics include social class or structure of the society, geographical location, family structure and child rearing practices, pressure from parents, teachers and peer groups. Females are as competent and successful workers as males. Hence, prejudice in any form is unreasonable and unnatural. They can be encouraged in the form of positive measures to remove existing barriers that discourage girls from exploring new alternatives.

Female Science and Technology teachers will provide needed role models for girls, set non-sexist expectations for them and provide occupational information that will expose females to career opportunities.

The implications of these findings are that:

1. The identification of challenges facing females who study Science and Technology are to enable school administrators, guidance counsellors and teachers to have better understanding of how to assist female students.
2. Strategies recommended by female students are likely to help them overcome existing difficulties.

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