

Girl Child Attitude towards the Study of Science and Technical Education in Bauchi Local Government of Bauchi State, Nigeria

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Abstract:-Science and technical education is a discipline of concern for decades and has gained a lot of misconceptions and attitudes across gender which leads to gender disparity and low participation of women in science and technology. The objective of this study was to explore the attitude of Girl Child towards the study of Science and Technical Education in Bauchi Local Government, Bauchi State, Nigeria. Attitude Assessment Questionnaire (AAQ) was used to conduct a cross-sectional survey among Girl Child in senior secondary schools. The questionnaire comprised of 23 items with modified four-point Likert scale and response mode of Very High Extent (VHE), High Extent (HE), Low Extent (LE) and Very Low Extent (VLE) respectively. The results show that home and school have positive influence on the attitude of girl child while societal and personal factors were of adverse effects on their attitude. It is concluded that girl child attitude towards science and technical education is a multi-factorial parameter and it changes in relation to the extent of the factors.

I. BACKGROUND TO THE STUDY

Attitude towards science has gained a lot of attention in the realm of science education especially from the perspective of teacher, learners and development partners (George, 2006). It has been a common experience that some students discover science to be a very difficult and boring subject and interest of such students' declines as they budge to the advanced grade of study. Previous studies have shown that, highest level of a positive attitude towards science manifests among female students before the age of eleven which declines appreciably within the ages of fifteen to eighteen years in most circumstance (Barmby, Kind & Jones, 2008; Simon, 2000). Students, particularly at the secondary level, perceive science irrelevant to life. They feel that advancement in science has generated social and environmental problems; science is difficult and is about things not people (Bennett, 2001). For these reasons many students do not want to continue studying science (Kind, Jones & Barmby, 2007).

Although there has been a lot of concern expressed by science and technical educators, globally, on the need for more female participation in science and technology there still is a somewhat silent but prevalent notion that science, especially the physical sciences is male domain. Low participation of

females in the sciences cuts across every level of education despite the vitality of science to national development (Ekine & Abay, 2013). Nigeria, like other African nations has a dire need to rise up to ensure equality in participation of both its male and female citizens in science and technical education (Bennett, 2001). The Nigerian government has in recent years focused attention on strengthening national capacity in science and technology, a key recommendation and objective of its Vision 20:20 plans for economic transformation (Ndirika and Agommuoh, 2017). This effort has not fully recognized the importance of gender equity in science and technical education and no pronounce advocacy was initiated towards provision of realistic national policy on this regards

In the United Nations Millennium Declaration, member countries avowed to promote gender equality and the empowerment of women, as effective ways to combat poverty, hunger and disease and to stimulate development that is truly sustainable (UN Resolution, 2000). Although progress is being made to increase women's participation in many fields, UNESCO figures reveal that women make up a minority of the world's science researchers. In 121 countries with available data, women make up 29 percent of science researchers (UNESCO Institute of Statistics, in Ekine and Abay, 2013). Throughout the world, women continue to be significantly underrepresented in every sector of science, technology, engineering and mathematics (STEM). Men outnumber women as students, educators, researchers, and workers in these fields (Rathgeber, 2002). While the number of women enrolling in higher education is increasing rapidly in many countries and in some has surpassed male enrollment, men significantly outnumber women in science and engineering disciplines (UNESCO, 2010).

The National Policy on Education in Nigeria also emphasizes equal educational opportunities to citizens irrespective of their gender, religion, social class and ethnic affiliation. It emphasizes the study of science and technology by prescribing, emphasizing admission ratio to be 60% for science and technology and 40% for liberal arts in Nigerian universities (FGN, 2004). This is to comply with the requirements of gender equity i.e. to remove impression on gender sensitive professions that limit females to some certain

vocations. Researchers have revealed that there is still low participation of females in science and technology education, compared to male students. Rathgeber (1995) authenticated the fact that fewer women specialize in engineering and technology. These are issues that are often neglected but which require serious attention, to enhance rapid development and higher standard of living. The issue of scientific and technological educational development of Nigeria requires the input of both genders, and there is a need to enhance science education at all levels of education i.e. primary, secondary and tertiary level (Josiah and Archy, 2001).

Nigeria is a country that is highly endowed with human resources, neglect or gender disparity in science and technology education will certainly result to partial use of the resources available (Akilaiya and Ogbene 2000). It has been established by different researchers that gender disparity exists in the Nigerian Educational sector in the last two decades. Okeke (1987), in a research work, identified the factors responsible for few women participation in science in Nigeria to be due to the expected role of women in the home, school and individual communities. This, according to Agholor (1994) plays an important role in determining the choice of careers. The culture of regarding the men as the bread winner for the family hinder easy participation that women would have enjoyed, as they are expected to manage the home front i.e. to keep the home, cook for the family and bear children while men are occupied with the various economic activities (Akilaiya and Ogbene 2000). Women activities are believed not to require any formal school education to accomplish, and societal attitudes towards female participation in some professions including science and technology hinder women from show casing their in-built abilities and this draws the hands of the clock of development backwards (Agholor, 1994).

There has been concern over the low level of uptake of science by girls of post-16 years for nearly half century (Schibeci, 2011). Several researchers have indicated that part of the reason for this is that these girls are ‘turned off’ science at school when they are quite young. Most researchers agreed that the erosion of girls’ interest in science occurs between the ages of 9 and 14 (Hadden and Johnstone, 2005), even though they retain positive attitudes towards science generally and acknowledge its importance in everyday life. The problem of declining interest in science by girls is international (but not universal) and many reasons have been put forward to explain it, including the transition between primary and post-primary schooling, the content-driven nature of the science curriculum, the perceived difficulty of science and ineffective science teaching, as well as home related and social factors (Hadden and Johnstone, 2005).

Participation of women in science and technology is necessary. Nevertheless socialization and traditional roles assigned to the girls at birth will determine the extent of attitude and participation that girls will take in technology and science education, because the life of a person is influenced or

affected by socio-cultural forces. Geoffrey (2000) have identified a lot of contextual factors that influence the girl child attitude towards the study of science; these include individual interest, situational interest, teachers’ factor and home factor. In view of this fact, it becomes expedient to investigate some of the factors which could influence girl child attitude towards science, thus the present study has a major purpose to investigate the influence of home, school, societal and personal factors on girl child attitude towards science and technical education in Bauchi local government.

II. METHODOLOGY

This study was a cross-sectional survey in nature to establish the attitude of girl child towards the study of science in some selected schools in Bauchi local government area of Bauchi State. The population of this study was all female students in senior classes (SS1-SS3) of both public and private secondary schools in Bauchi local government area of Bauchi State. The sample size of this study was 200 participants. A multi-stage cluster sampling technique was used to select wards, schools and students. Of the 10 wards of Bauchi local government, 6 wards were conveniently chosen because of school distribution discrepancy. From within these wards, 10 secondary schools were selected randomly to represent the Local government area.

Attitude Assessment Questionnaire (AAQ) was the instrument for data collection. The questionnaire comprised of 22 items with modified four point Likert sub-scale. The response mode of this tool was of both positive and negative direction. The positive responses are indicated by the “Very High Extent (VHE) and High Extent (HE)” score while negative responses are indicated by the “Low Extent (LE) and Very Low Extent (VLE)” score. This questionnaire has four domains with sub-items on attitude parameter. The first domain assessed home factor under four items, the second was on school factors under five items, the third was a five item sub-scale domain on societal factors and the fourth assessed personal factor under eight items. A score of more than 50% in each domain determine the either way directional response in the particular domain (positive or negative). The questionnaire was attached to a pre-former which contained a space for indicating school name and four item socio-demographic variables. This questionnaire was validated for data collection on attitude assessment by group of experts in psychometric evaluation. It has well established contents and criterion validity on different gender and races. The questionnaire has been tested in test-retest and inter-rater reliability.

Prior to the collection of data, ethical approval was sought from the authorities of the selected school. Then, consent of the students was also sought prior to the distribution of the AAQ questionnaire by the researcher. Participants that declared consent were asked to respond to the questionnaires which were collected on the spot. The retrieved AAQ questionnaires were subjected to statistical analysis. Data collected through AAQ were analyzed using Statistical

Package for Social Sciences (SPSS 16.0). A data score sheet was developed beforehand to enter data at items level for individual participants. The subscale and total AAQ scores were then computed from the raw data. The data obtained were explored using descriptive analysis (frequency distribution table, mean and standard deviation) to analyze the factors influencing female participation in science

III. RESULTS

Table 1: Socio-demographic characteristics of the participants

Variables	n (%)
Age (years)	
14 - 16	141 (70.5%)
17 - 19	33 (16.5%)
20 - 22	21 (10.5%)
23 and above	5 (2.5%)
Total	200 (100%)
Tribe	
Hausa	146 (73%)
Fulani	32 (16%)
Yoruba	12 (6%)
Igbo	4 (2%)
Others	6 (3%)
Total	200 (100%)
Class	
SS1	103 (51.1%)
SS2	63 (31.5%)
SS3	34 (17%)
Total	200 (100%)
Major subject	
Science	132 (66%)
Arts	43 (21.5%)
Commerce	25 (12.5%)
Total	200 (100%)

Table 2: Responses of the extent of influence of home factors on female attitude towards the study of science

Home factor	Mean (SD)	Decision extent
1. Girls are assigned more domestic duties in the house than boys	3.29 (0.844)	VHE
2. Girls do not have adequate time to study in the house	2.56 (0.808)	HE
3. My parents advise me not to choose science class	1.22 (0.613)	VLE
4. I do not get enough support from my parent to read science in school	1.51 (0.576)	VLE

Key: VHE = Very High Extent, HE = High Extent, VLE = Very Low Extent

Table 3: Responses of the participants on the extent of influence of school factors on female attitude towards the study of science

School factor	Mean (SD)	Decision extent
1. Science teachers do not encourage girls to aspire for science	2.73 (0.969)	VLE
2. Girls in science classes are usually intimidated by non-science teachers	1.76 (1.073)	HE
3. Science teachers ask boys questions more often than girls in the class	2.29 (0.750)	LE
4. I am not free to express my opinion in science class without fear of intimidation	1.88 (0.872)	VLE
5. Science teachers motivate boys than girls	2.00 (1.000)	LE

Key: VLE = Very Low Extent, HE = High Extent, LE = Low Extent

Table 4: Responses of the participants on the extent of influence of societal factors on female attitude towards the study of science

Societal factor	Mean (SD)	Decision extent
1. In my culture girls are regarded as incapable of aspiring for science	2.57 (0.870)	HE
2. In my society girls are brought up with the notion that science is for boys	2.15 (0.989)	LE
3. Women in science are seen as rebellious and too strong for men to marry	2.22 (1.129)	LE
4. Female model are seldom seen in science	2.63 (0.705)	HE
5. Women are not important scientist in my country	1.66 (0.794)	VLE

Key: HE = High Extent, LE = Low Extent, VLE = Very Low Extent

Table 5: Responses of the participants on the extent of influence of personal factors on female attitude towards the study of science

Personal factor	Mean (SD)	Decision extent
1. I see science as male subject	1.80 (1.005)	VLE
2. Girls feel discouraged and admit that science is for boys	2.29 (1.055)	LE
3. Girls believed they cannot study any science subject	1.39 (0.833)	VLE

4.	Girls are weaker and cannot study tough courses of science	1.68 (0.722)	VLE
5.	I think the only science subject a girl can do well is Biology	1.78 (1.601)	VLE
6.	I do not enjoy science class	0.13 (.988)	LE
7.	I think science education is generally difficult	2.13 (1.987)	HE
8.	Science education is for all	1.98 (2.771)	VHE

Key: VLE = Very Low Extent, LE = Low Extent, HE = High Extent, VHE = Very High Extent

IV. DISCUSSION

The socio-demographic characteristics of 200 participants that were enrolled in this descriptive study of girl child participation in the study of science showed a predominant age of 14 - 16 years (70.5 %). This implies that the participants are mostly within the appropriate age of their educational pursuing and coincided with their development stage. Therefore, it may infer that, any choice, decision or selection of preferred subject of endeavor arises from their instinctive determination. About 73% of the participants were native of Hausa language, with some Yoruba (16%) and Igbo (2%). This is not unlikely, because the major and dominant language and cultural heritage of indigenous Bauchi dwellers is that of Hausa. The participants were mostly in SSI (51.1%) which is the earliest stage of their carrier in either science or other fields of academic endeavor (Table 1).

The result from this study had shown that home factors, especially the aspect of girls not having enough time for study at home and having more domestic duties than boys influence their participation in science to a high extent and very high extent respectively. These findings clearly explore the influential role of home in academic and carrier successes of children. It is well known that, home serves as the first school for a child and is a fundamental agent of socialization which influences virtually all aspect of social and emotional activities of child. This result discovers that parental influences are seen as having little to do with female participation in science.

Home factors pose a great deal of influence on female participation in science especially with respect of time availability for home studies by female students. This is in line with the findings of Lewis and Lockheed, 2006 in Ekine and Abay (2013). This could probably be a major reason why many females shy away from the sciences due to the intensive study they involve. They may tend to opt for subjects that may not require a lot of time studying them. School factors are also revealed in this study as influential on female participation in

science. The study reveals a high extent of influence of school factor, especially the classroom intimidation faced by girls from non-science teachers in the classroom (item 2, Table 3). Moreover the mean responses to this effect from females in science class are higher than their counterparts.

Society is also shown in this study to exert an influence on female participation in science to a high extent especially with respect to gender stereotyping and scarcity of female models in science and technology in our society (Table 4). This finding aligns with that of Ekine and Abay (2013) who reported a similar observation as a reason for low female participation in science in our country. Many young girls may thus tend to view science as male subject and reserved for only exceptionally tough females. Personal factors were found not positively influence the female child participation in science. The result has indicated low to very low extent of personal factors influence in their participation.

V. CONCLUSION

This study has revealed that home, school, individuality and society are important determinants of girl child attitude and participation in science and technical education. Therefore, attitudinal reform and increase participation of female in science and technology is enhanced by the well balanced and controlled efforts of parents, teachers, larger community and dedication of students.

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