

**ASSESSMENT OF WOMEN PARTICIPATION IN SCIENCE AND
TECHNICAL EDUCATION (A CASE STUDY OF UMAR SHINKAFI
POLYTECHNIC, SOKOTO, SOKOTO STATE)**

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Abstract

An assessment of women in science and technical education in Nigeria was carried out to serve as an appraisal for their participation and representation irrespective of gender and creed. Science and technical education is the most powerful force for change in the world today, and women who hope to have a hand in shaping a better future must participate for the advancement. Socio-cultural antecedents over the years have been the dominated factor of women inadequate representation in the field of science and technical education. Three theories were used in the paper namely; labeling, conflict and feminist theories. All the theories considered women as a minority and venerable group that required global attention especially in the science and technical education. Feminist theory believed women are segregated and sidelined in the scheme of things especially in science and technical education while the advocate of the conflict theory believed that women have experience discrimination in education and this discrimination placed women in disadvantaged position in the stratified system and the labeling theory believed that women are brought up to believe that science and technical education is meant for boys because it is difficult and abstract while women are to go to arts and commercial subjects. Factors militating against women participation in science and technical education include socio-cultural beliefs, gender prejudice, religious constraint and lack of recognition; discrimination against female graduate of technical education among others. The paper therefore recommended organization of career convention/seminar and guidance and counseling talk in girl's school across Sokoto State and also government and well meaning Nigerians to establish Science and Technical schools for women/girls only.

Education is a veritable means of progress for individuals and nations. According to Okebukola (2012) education is a process of updating the knowledge and skills of individuals that will be useful to themselves and to their communities.

Education plays an important role in the socio-economic development of a nation. Often, governments commit huge investments to education projects and programme in order to realize its intended benefits. Notwithstanding improved

access to education, female participation in education in most developing countries is still characterized by disparities. Girls continue to constitute the majority of children out-of-school. Girls represent 55 per cent of all children who are out of school worldwide. (UNESCO, 2010).

Consequently, Science and Technical Education (STE) is used as a comprehensive term referring to those aspects of the educational process involving in addition to general education, the study of technologies, related sciences, and the acquisition of practical skills, attitudes understanding and knowledge relating to occupations in various sectors of economic and social life (UNESCO & ILO, 2002). According to Ibeneme (2007), Nigeria does not seem to accord Science and Technical Education the attention it deserves. Furthermore, Okeke (2005) opined that since the introduction of Science and Technical Education in Nigeria educational system, female participation in Science and Technical Education programmes has remained low. More so, Yakubu (2006) reported that the total enrollment figure of female into Science and Technical Education programmes in Nigeria as at year 2016 was less than three percent (3%).

Science and Technical education is very important for both men and women alike because it accelerates the pace of change in the world. They provide foundation for wealth and development, bringing immense improvement to the quality of life and people's ability to interpret the world. Science and Technical education provides knowledge, develops

skill and inculcates the attitudes that are necessary for future occupation (Okebukola, 2005). Participation of women in Science and Technical education is necessary. Nevertheless socialization and traditional roles assigned to the girls at birth will determine the level of participation that girls will take in Science and Technical education, because the life of a person is influenced or affected by socio-cultural forces. The goal of this paper therefore, is to assess women participation in Science and Technical education in Sokoto State.

Theoretical Framework

This paper is based on three theories which include feminist, conflict and labeling theories. Feminist theories believe that society is male dominated, in other words it is a patriarchy. They also believe that society is based on conflicts between the sexes. They equally believe that education being an agent of socialization helps to enforce patriarchy. Many feminist are of the opinion that women are being oppressed by male dominated society both in education and social life. They also argue that even the school curriculum is more based around traditionally male-dominated subjects. Heaton (1996) argued that hidden curriculum is a major source of gender socialization within the society. The basic assumption shared by feminists is that women are perfectly capable of building a successful career as men.

Conflict theorists contended that more powerful members of society maintain the most powerful positions in

society and the less powerful groups, often women, are allocated to lower ranks (Ballantide and Spade, 2012). The advocate of this theory have explained women experience discrimination in education and that is what placed them in disadvantage position in the stratified system.

Labeling theory which is closely related to the symbolic interactionism perspective had been concerned with the study of why people are labeled, and who labels them. Nnanchi (2008) maintained that gender differential treatment is extending to classroom lessons because interactions between participants in the schools and classroom give insight into the labeling process. Okeke (2005) attested to the fact that there is low enrollment of girls into science and technical education because most of them feel they are not capable of offering science and technical based subjects. The advocate of this theory believed that women are brought up to believe that science and technical education is meant for boys because it is difficult and abstract while women are to go to arts and commercial subjects. Consequently, many female have labeled themselves as weaker and with less confidence.

Women Participation in Science and Technical Education

Science and Technical education are crucial for a nation's scientific and technology advancement; however, in Nigeria there is low enrolment and participation of women in these fields. There is a general growing concern the

world over about the proportion of women in Science and Technical education (Badekale, 2003). As stated in the National Policy on Education (FRN, 2014), Science and Technical education is the aspect of education which leads to the acquisition of practical and applied skills as basic scientific knowledge.

A study by Blosser (2000) revealed that, girls and boys start off equal in mathematics and science performance in school, they appear to do equally well in both subject in elementary school. The same girls begin to lose interest in mathematics and science around the age of twelve, they then drop out of science and mathematics classes and thereby closing the doors on many career opportunities. Parents do not find it necessary investing in females in the name of education because females are not permanent members of the family of their birth as they would not remain in the family after marriage.

Although, gender gap exists between male and female participation in science and technical education programme, closing the gender gap in science and technical education is of critical importance, because failure to do so means the loss of vast human resources that could have contributed to national development and could further entrench gender inequality in society. Nigeria's ability to create, apply and diffuse scientific and technological knowledge is now a major determinant of its socioeconomic development and national competitiveness. This potential, however, cannot be fully realized without making

the best use of the entire population of a nation—including girls and women. There are millions of women and girls in Sokoto State, Nigeria (United Nations, 2015) their exclusion from the generation and application of scientific knowledge represents a tremendous waste of human potential.

Women in Sokoto especially in the rural areas undertake good percent of agricultural production activities and they carry the primary responsibility for providing water, sanitation and health care needs of their family and communities (UNESCO, 2010). Moreover, their exclusion from participation and high achievement in science and technical education means that they have limited access to jobs in these fields, which are among the fastest growing and highest paying employment. Studies have shown that a student's performance in science and mathematics is a strong indicator of later earnings (Claire and Jonathan, 2013).

However, closing the gender gap in female participation in science and technical education in Sokoto State is essential for ensuring that women as much as men benefit as citizens and contributors to their societies. Women should not be limited to being passive users of science and technology but instead should be active participants in scientific development, application and decision making, ensuring that science and technology initiatives are implemented to address the needs and preferences of both sexes (Aina, 2006).

The gender gap in science and technical education in Sokoto State must be effectively addressed to benefit both society and individuals. As women participate in science and technical education in Sokoto State, Nigeria in general will reap the benefits. However, educationalists must reexamine the pedagogy and practice of science and technical education in Sokoto State, giving the ongoing underrepresentation of girls and women in science. The table below presents the enrollment of girls in science and technical course at Umar Shinkafi Polytechnic, Sokoto

Enrollment of Female in Science and Technical Course in Umar Shinkafi Polytechnic, Sokoto

S/N	YEAR	Computer Science		Electrical Electronics		Civil Engineering		Science Lab. Tech.		Archi. Sci.	
		F	M	F	M	F	M	F	M	F	M
1	2012	23	47	3	47	1	45	30	34	0	20
2	2013	28	51	6	54	-	48	33	40	1	22
3	2014	32	56	5	55	2	44	36	48	3	21
4	2015	34	64	7	53	3	46	40	42	5	25
5	2016	39	68	9	54	4	49	45	34	7	30

Source: Registry, Umar Shinkafi Polytechnic, Sokoto

A close look at the above table revealed that there is low participation of women/girls in technical education as compared with science courses. This may be connected with some of the factors highlighted below as reason for low

participation of women in science and technical education in Sokoto State. However, there is improvement in the enrollment of females in technical education in Sokoto State although the percentage increment is very minute and not encouraging. Notwithstanding, the female low participation, there is positive hope that in future the number of women participating in science and technical education will increase meaningfully.

Factors Responsible for Low Participation of Women in Science and Technical Education

Edu and Edu (2012) observed that in the past, neither traditional nor western education in Nigeria encouraged or provide equal opportunities for women to enter the field of science and technical education in Nigeria. According to Nduka (2002), during the early period of the development of science and technical education in Nigeria, a technician was considered a male who could repair mechanical or electronic devices or products (mix chemicals, turn screws, nuts, and bolts). It was not conceivable at that time to think of a female as a technician, therefore, participation in these technical institution was strictly boys for industrial technical education courses and girls for the vocational Home Economics.

According to International Rescue Committee (IRC, 2009) interview conducted for students on the assessment of the primary factors contributing to low female participation in science and technical education, include lack of awareness about the benefit from science

and technical education, insufficient financial support, financial consideration, and concern about future job prospects. In same vein, Igbinedion and Ojeaga (2012), opined that, some of the factors affecting participation of female in science and technical education in Nigeria include; poor societal perception; poor entry level; poor societal attitude; lack of recognition; discrimination against female graduate of technical education and elitism. Furthermore, internationally various scholars and organizations have reported similar factors affecting female participation in education generally and technical and vocational education in particular. Notable among these literatures include that of Evans & King, (2003); Evans & Heinz, (2003) and UNESCO, (2010). These literatures reported amongst others that the factors affecting female participation in science and technical education programmes include: cultural factors, attitudinal factors, and situational factors and institutional factors.

However, in Nigeria the factors affecting female participation in science and technical education programmes include: relegation of women to the home; parental perceptions of cost/benefits of educating girls (this affects low income families particularly); patriarchy (female seclusion practices and early marriage); discriminatory labour market practices; masculine image of science and technical education projected in textbooks, media and popular assumptions; poor facilities, including teacher-supply, teacher quality and equipment; nature of science and technical education occupations which are

not easily combined with child-rearing and child-care; lack of role models and career counselling; social factors which operates inside and outside the classroom; lack of female technical education teachers and more widely absence of female role models; gender bias technical education curriculum; inappropriate assumptions made by male science and technical education teachers; peer pressure; early marriage; privacy of girls; and location, physical facilities and hours of instruction; direct cost; demand for female to care for siblings, homes and farms (Ayonmike, 2014).

In Sokoto State the factors affecting participation of females in science and technical education programmes include social cultural constraint, Gender constraint, religious constraint, female attitude towards technical education. Other factors are household factors (economic position, household size, and parents' education) and practices, biological composition (genetic deficit), psychological disposition (minds-sets, interests and attitudes); policy related factors (lack of goals and adequate monitoring of gender equality) and school related factors (school location, peer influence, facilities, role models, gender biased curriculum materials) (Tahir, 2016).

The Need for Women in Science and Technical Education

The Federal Republic of Nigeria (2014) in her National Policy on Education defined science and technical education as the aspect of education that

leads to acquisition of practical and applied skills as well as basic scientific knowledge. Going by the definition, women need science and technical education as a matter of necessity to effectively carryout their family, community, state and national responsibilities. UNESCO (2010) outlines the following reasons why women should be encouraged to participate in science and technical education.

- i. to enable women improve their family health;
- ii. to increase women's productive ability thus raising their families standard of living;
- iii. to improve women social and cultural status;
- iv. to enable women discharge their responsibilities effectively
- v. to develop women mentally, socially, physically, psychologically, technologically and economically.
- vi. to make women participate fully in the national building and development .

Adedeji (2007) stated that the world has become increasingly a technology place, and both developing and developed countries have become dependent on the efficient use and maintenance of science and technology, because of the important attached to science and technical education by both national and international community.

Science and Technical education are the most powerful forces for change in the world today, and women who hope to have a hand in building a better future must participate for their advancement. Socio-cultural antecedents over the years

have been a dominant factor of women inadequate representation in the field of Science and technical education. The few women who have courage to venture into Science and Technical education have debunked the notion of women having inferior brain. It is a scientific fact that the women are endowed like men with only slight differences which of course, are function of individuality and not gender (Keetion and Basking, 2005). To say the least, women have been buttered and oppressed to the extent that she lost herself and has joined the society in accepting that she is good for nothing but only for reproduction and domestic work.

However, the societal discrimination of women is a worldwide phenomenon but at a varying degree. An urgent problem for us today in Sokoto State and in Nigeria is how to empower our women to be able to take their rightful position in the scheme of events, which is the important key in making education available and affordable to all irrespective of sex. The situation in Sokoto State today calls for special attention to women participation in Science and Technical education because women have been systematically discouraged from undertaking training in science, technology and mathematics education as a result of the bias, and their perception of Science and Technical education as male affairs and discipline. This point was supported by Williams (2015), when she reiterated that there is a hidden curriculum, which makes women to conform to stereotype role expectation. She went further to state that teachers

creates the impression that Science and Technical education are difficult and that women cannot cope. The hidden curriculum of teacher expectation can be regarded as self-fulfilling prophecy of teachers against women. Similarly, Tahir (2016) opined that women constitute a very good percentage in Sokoto population, but the level of their participation in the socio-cultural, political and educational programmes is not proportionate to their number. As a result, all concern should endeavour to encourage women participation in science and technical education across Sokoto State.

Having see the need for women participation in science and technical education, it is now time in Sokoto State to put away all the negative thoughts, attitudes, beliefs and ill-practices against women and come together under an umbrella of justice and equity without fear or favour, to engage women in effective science and technical education training because education is the best instrument to empower women for community and nation building.

Consequences of Low Women Participation in Science and Technical Education

Women education appears to have become the critical index of the quality of meaningful contribution to national development in recent times. Nigeria in her quest to catch up with developed countries in the world cannot afford to ignore the strength of women education. Uche (2009) opined that education is one of the instruments by which individuals

are equipped to participate in the socio-economic and political life of a community and to make their contribution for the promotion of social change. He attributed the small number of women in tertiary institution to early marriage, pregnancy, financial constraint and traditional prejudices against women.

Stephen (2008) opined that schooling for female enhance the welfare of children because of the close link between mother and child. Educated women tend to have smaller families, and their children have a high probability of survival and are often healthier and better educated. Countries with higher female enrollment rates have shown higher level of economic productivity, lower fertility and maternal mortality rate and longer life expectancy. Tinam (2008) was of the view that women occupy an important position in the development process as mother and wife. Their welfare translates to the welfare of the whole society and their neglect and marginalization are a disaster for the nation. Human development requires the bringing up of women to the main stream of national affairs. This view was supported by Aina (2006) who noted that there is a consensus that Africa's development is in crises. According to her, this development crisis is manifested in Nigeria education, politics, economic etc and it is caused (among other factors) by non-participation of females actively in science and technical education programme. Participation of women in science and technical education facilitates women empowerment, however, when women are left to their fate, the whole

community suffers. Abenga (2004) stated that women involvement in science and technical education is so important to national building and development if development is to be real instead of theoretical in which case, women have to be develop side by side with men.

Conclusion

For any community or nation to witness meaningful development, there is the need for her citizens to engage and advance in science and technical education. Involvement in science and technical education is not a mens affair alone. There is the need to involve and encourage women to participate in science and technical education in Sokoto State and Nigeria in general as this would bring about nation building and development. This write-up revealed a low participation of women in science and technical education in Sokoto State. The low participation of women was due to many factors among which are religion, socio-cultural believes, insufficient financial support, concern about future job prospects. Others are poor societal attitude; lack of recognition; discrimination against female graduate of technical education and elitism. However, the position of this write-up is that, with the slight improvement in the enrollment of females in science and technical education in Sokoto State, it is hope that there would be increase in the number of women participating in science and technical education in the future.

Recommendations

In order the increase and maintain women participation in science and technical education, the following were recommended.

1. Merit award should be given to female student with outstanding performance in science and technical education so as to encourage more enrollments.
2. Curriculum planners should review the learning materials in science and technical education courses that act as obstacles to women enrollment.
3. Non-Governmental Organizations and Women Professional bodies should organize career conventions and guidance and counselling talk in girl's school across Sokoto State.
4. Government and private organizations and agencies should promote female employment in science and technical based career so as to uplift their morale.
5. Government and well meaning Nigerians should establish Science and Technical schools for women/girls only.

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