CHAPTER FIFTEEN

GENDER ISSUES IN THE PARTICIPATION OF STUDENTS IN SCIENCE AND TECHNOLOGY

BANJOKO, S.O. AND BANJOKO , O.O. (MRS.)

Abstract

Many studies have been carried out on the performance of female and male students in the secondary schools. The outcomes of such studies are inconclusive. although most of these results have shown that males generally performed better than females. Many reasons were advanced for this like generic and socio-cultural deficit. This paper also attempted to find out the factors responsible for the obvious low participation of females in science and technology. The finding indicated that, socio-cultural factors rather than generic factor is the most likely factor responsible for the low participation.

Introduction

Science is an enterprise which developing nations must embark upon in order to develop their much desired technology for self-sufficiency. Africans in this century look forward to science and technology to bring about industrialization and physical transformation, as such exist in Europe and America. Science and technology is therefore receiving an ever-increasing attention in educational sectors all over the world particularly in Nigeria. To meet with the yearning of the nation, more efforts are required to revitalize people's interest in the study of science and technology and this must include both male and females. When one considers the population ration of male and female in the society, the need to incorporate women becomes very necessary.

Aghegisi (1991) observed that the Nigerian society stands to lose if women continue to be drafted into soft courses and careers while the country continues to suffer acute shortage of skilled and technical manpower. It is in realization of the kind of notion expressed above that is now propelling the government to start to take positive steps towards the incorporation of women into science and technological education.

This propaganda for woman education is seen in the National Policy on Education, which stressed the need for equal education opportunities for everybody, women inclusive. In the same way, the Federal Government

made special reference to women in the bid to foster technical education in Nigeria. The government has declared that, "more effort will be made to encourage women to enter wider areas of technical education. Technical institutions which do not have facilities for women will be encouraged to do so" (Radio Nigeria, 1991).

It is now widely accepted that for a rapid development to take place, the whole populace irrespective of gender has to be involved in science and technological education. Currently, there is an obviously low participation of females in science and technology.

The Problem

From the difference studies, the writer is of the opinion that one cannot categorically state if there is any significant difference between female and male participation since the results obtained were inconclusive.

Questions that may be asked include:

i. Are women biologically deficient in studying science and technology?

ii. Is the recorded low participation as a result of socio-cultural factors?

Participation of Females in Science and Technology

In spite of Government's efforts at directing attention to science and technology, there is still an obviously low participation of the Nigerian girls in science and technology. Unfortunately in Africa, Nigeria inclusive a woman is still pictured with the image of a person half-dressed with a baby on her back and a log of wood or a basin upon her head (Olurin, 1993). This is the cultural position to which a woman has been relegated.

Moreover, a woman is regarded as a minor to man, she has to be seen and not heard and the traditional attitude about every aspect of a woman's life points to her as being inferior (Abdullahi, 1989).

Balogun (1993) stated that even in advance countries of the world, female participation in science has been generally low, and that until recently women played the role of back–benchers as far as Science, Technology and Mathematics (STM) education is concerned.

Okeke (1987) noted that even in the United States of America, only 9% of females are in employment as scientists. The situation at home is not better.

Many studies have been carried out to determine the participation rate of females in science and technology. Yoloye (1990) showed that female enrolment in engineering technology courses in Nigerian tertiary institutions is generally low. Diverse reasons were however, proposed for the observed low participation.

Yoloye (1993) identified five major factors as possible causes for low female participation:

i. Inadequate opportunity for women
ii. Achievement of women
iii. Interest of women in science and technology
iv. Unfavourable attitude of women to the learning of science and technology, as well as the unfavourable attitude of the society to women learning science and technology.
v. Inadequate knowledge by women of the nature of science and technology.

Danmole (1993) in quoting Kahie (1983) enumerated some other factors, which accounted for the low female participation as social factors (role models, sex stereotyping pattern), educational factors (parent – teacher expectation, classroom and extra curricular activities), and personal factors.

Omosewo (1993) highlighted some other factors, such as:

i. Differences in the performance of male and female secondary school students.
ii. Many jobs are gender–typed.
iii. Males had more favourable attitude towards integrated science than females.
iv. More boys that girls tend to opt for all the basic sciences at school certificate 'O' level Examination because boys are more generally disposed to science and mathematics than girls (Balogun, 1985).

Achievement of Females in Science and Technology

As a way of explaining the occurrence of female low participation in science/technology, many studies have been carried out to find whether the low participation is as a result of the poor achievement of females in science and technology.

Inomiesa (1988), revealed that there was no significant difference in the mean performance of primary six pupils. He therefore concluded that the females were as competent as most males.

Daramola (1993) in his study recorded no significant difference in the performance of males and females at junior secondary school level.

Oriafor (1986) found out that there was no significant difference in the performance of male and female secondary school students.

Ivowi (1983) reported that gender was an insignificant factor in determining the understanding of physics. This was also supported by Harding (1999). Sofolohan (1992), in Omosewo (1983), also corroborated the above findings, saying that sex plays no significant factor in achievement in science.

Bajah (1980) and Kahle (1983) reported differences in the performance of boys and girls in science, especially at the secondary school level.

Shogunle (1999) discovered that there was no significant difference in the performance of male and female students in Biology at the Colleges of Education.

Balogun (1993) reported that three models have been put forward to explain the differences in the performance of female and male students. These are the genetic deficit model, the cultural deficit model and the bi-cultural model. The genetic deficit model implies that females do not have the same intellectual abilities as males. Results of many studies have negated this model. Many findings showed that females are not necessarily always inferior to males in achievement in Science, Technology and Mathematics (STM) (Kelly, 1980: Balogun, 1981).

Apparently, females are different from males but not deficient in abilities.

The second model which is the cultural deficit model relates to the prevailing structures and practices of the society as it is and how these limit the ability of females. Parochial systems tend to lead to inequality of gender and power.

In such systems, roles are indirectly prescribed for female and male. It has been suggested by some people that the unequal participation of female and male in Science, Technology and Mathematics (STM) is a reflection

of the pattern of domination and subordination between the female and male in our society. This model is supported by Yoloye (1993) who ascribed the low participation of females to historical, cultural, social and religious reasons.

In 1987, Anambra, Imo, and Akwa-Ibom States recorded 70.6% and 51.2% respectively while Sokoto, Katsina and Kano States recorded 18.1%, 16.5% and 12.8% in the female enrolment at the final year of secondary schools respectively. The only reason for the above is the socio-cultural and religious differences between the two sets of states.

The Bicultural model suggests that the gender problems derives from traditional stereotypes for roles and expectations, which transfer to sex stereotyping in participation in Science Technology and Mathematics (STM).

Some other studies reviewed have shown that sex had indirect causal relationship with achievement in science cognitive tasks and practical skills and a strong direct impact on pupil's attitude to science (Okebukola, 1984: Onocha, 1985). One may therefore wish to conclude that even though there may sometimes be differences in the female/male participation in sciences, the reason may not be the sex differences, but rather it may be sex-linked factors. Such factors have been identified to include gender role, expectations, socio-cultural hindrances etc.

From these studies, one may confidently state that females are not biologically deficient in studying Science and Technology. We can also state that the recorded low-participation of females in Science is as a result of socio-cultural factors and not of biological inferiority.

One may therefore suggest that the problem at hand is that of enlightenment of the society. The saying that "what a man can do, a woman can also do" is still very true and it cuts across all areas of our life, science, technology and mathematics inclusive.

Conclusion

In agreement with most of the studies already carried out, the low participation of females in science and technology is not as a result of genetic deficits, but rather as a result of socio-cultural deficit.

Recommendation

Participation and achievement are closely interwoven therefore intervention strategies have to address both issues. Such strategies include:

i. Government should embark on an enlightenment programme to educate the society on the need to educate the womenfolk. The Parent-Teachers Association (PTA) could be a suitable agent.
ii. Government should introduce legislations to promote equality of opportunities for the females and the male in education in Nigeria (Yoloye, 1993).
iii. Employers must consider the employment of females on equal basis with that of the males.
iv. The school curriculum and the school system must provide equal opportunity for both sexes.
v. Proper counseling should be given to girls particularly those interested in areas of science and technology.
vi. Women organizations especially the Association of Women in Science, Technology and Mathematics (NAWSTEMS) embark on a massive popularization of science and technology among the secondary school female students. Notable female scientists should also be used as models for the students.
vii. Men should also be educated that, being a female scientist does not make a woman any less capable, but rather, it makes her a better mother, better housewife and a better helpmate for the husband.

References

Abudullahi R. (1989): Science Education for Girls. A Psychological Overview in E.O. Omosewo, *Women in Science and Technology: Breaking down Old Barrier* presented to round Table Conference on Women in Science and Technology (1983).

Agheyisi, R.U. (1991): The Labour Market, *Implications of Women to Higher Education in Nigeria Women in Nigeria Today.* Seed Printers, London.

Bajah, S.T. (1980): Correlates of Students Extrinsic School Environmental Factors with Level of Attainment in Standard Test in Chemistry *Journal of STAN 18* (1).

Balogun, T.A. (1985): Interest in Science and Technology Education in Nigeria *Journal of STAN* 23 (1 &2) pg. 92-99.

Balogun, T.A. (1983): Gender Issues in the Teaching of Science and Technology Education (STM) presented to round Table Conference on Women in Science and Technology

Danmole, T.B. (1993): *Promoting Involvement of Women in Science and Technological Education in Nigeria Research Agenda and Proposals.*

Daramola, S.O. (1993): *The Influence of Location and Sex on the Knowledge of Basic Physics* possessed by entering form II students in Kwara State Secondary School. Journal of Stan 21 (2).

Federal Government of Nigeria (1981): *National Policy on Science and Technology*, Ibadan.

Federal Government of Nigeria (1986): *National Policy on Science and Technology*, Ibadan.

Federal Government of Nigeria: *Statistics in Education in Nigeria 1980-84 and 1985-89.*

Indomiesa E. (1989): Sex and School Location as Factors in Primary School Science Achievement. *Journal of STAN.*

Ivowi, U.M.O. (1983): Achievement Level in Understanding of Physics Concepts in Secondary Science *Journal of Research in Curriculum* (2) 23-24.

Kahle, J.B. (1983): The Disadvantage Majority. Science Education for Women AETS. *Outstanding Paper for 1983.*

Kelly, S. (1980): *Girls in Science: An International Studies of Sex Differences in School Science Achievement IEA Monography Series* No. 4 Almquist & Wiksell.

Odu, D.B (1983): *Proposal for Promoting the Involvement of Women in Science and Technology.* Paper Presented at a Round Table Conference on Women and Technology in Nigeria held at Ijebu-Ode.

Okeke, E. (1989): *Promoting Science and Technology and Mathematic Education among Girls and Women.* Review of Initiates.

Omosewo, E.O. (1993): Women Sciences and Technology, Breakdown Old Barriers. Unpublished.

Oraifo (1986): *An Evaluation of Female Students Achievement in Secondary School Science Implication for National Development.* Paper Presented at 27th Annual Conference of STAN.

Wozencraft, M. (1993): Sex Comparison of Certain Abilities *Journal of Educational Research* (vi) 21-27.