

GENDER AND SCIENCE EDUCATION IN NIGERIA**Jacinta A. Opara, PhD**

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Abstract: *The roles of science, technology and Mathematic (STM) in improving the quality of life and the formation of modern society cannot be overemphasized. These three disciplines cannot be independent of each other. In Nigeria and most developing countries of the world, women are under-represented in Science, Technology and Mathematics (STM) mainly due to gender stereotyping of STM as male domains. The paper examined the position of women in the country and their efforts in production and reproduction, healthcare provision, energy production/supply/consumption and conservation, agriculture and food processing and industrialisation. Women do science in their everyday activity. It is imperative that women are good source of science education and can be used as a resource person in teaching science education for sustainable development.*

INTRODUCTION

Ukeje (1997) remarked that without Mathematics, there is no science, without science, there is no modern technology, and without modern technology, there is no society. In realization of these roles, various governments have sought for and implemented policies aimed at encouraging the younger generation to take up studies in science, technology and mathematics related causes especially at the tertiary level of education. Such effort led to the 60:40 percent admissions ratio of sciences to arts in Nigerian Universities, establishment of federal and state Universities of Science and technology as well as various monotechnics and Polytechnics across Nigeria. Educational researchers, curriculum planners, developers and implementing agencies have also put in concerted efforts towards restructuring science teaching with the overall goal of improving students learning. Researchers in education, for instance, advocate for such modern methods of teaching science, technology and Mathematics as the constructivist based approach, concept mapping, analogy, uses of advance organizers, cooperative learning etc. in addition to the traditional methods of teaching such as lecture and discussion methods.

Despite these efforts towards improving the teaching and learning of STM in our schools for the benefit of all Nigerian Citizens, the level of participation and active involvement of the female gender has not been the same with their male counterparts. In Africa it is still rare to find Women in corresponding number with males in scientific fields. This situation is not

favourable if Nigeria shall realize her vision of ranking among the top twenty economics of the world by the year 2020. this study looks at the causes of gender inequality in science, technology and mathematics education, the need for and ways of breaking the gender barriers in STM.

Science according to Onah (2003) is the bedrock upon which any nation can be built. It is a body of knowledge itself, of the type that can be rationally explained and reliably applied. To this, Pember and Humbe (2009) described science education as a process of teaching or training especially in school to improve one's knowledge about environment and to develop one's skill of systematic inquiry as well as natural attitudinal characteristics. He added that science education courses are designed to produce capable scientists who contribute meaningfully to academic excellence of the society to raise the economic level and sustainability of the nation.

Nigerian women play vital roles in science education to attain sustainable development. A better education in science for the child which means better things for the society by helping children develop into more responsible citizens who will help to build a strong economy, contribute to the healthier environment, and bring about a brighter future for everyone. The more science-literate women are, the stronger their society can be.

Women interact more with nature and environment as farmers, food producers, teachers to young ones, cultural, health providers, guidance, energy production, supply and consumption, such as wood as fuel and water. However, their knowledge is rarely recognised, much less of tapped or utilized by the development planners, scientist or field workers. In most cases, development plans devalue and undermine women's knowledge and experience Abraha (1991). According to Kagoda (2001), all these are as a result of misconception of women as a resource and source of science education.

GENDER INEQUALITY IN SCIENCE EDUCATION

Gender disparity in STM has been an issue of concern for over a decade. For instance, at the 1995 forth world conference for Women held in Beijing, a broad platform of action (BPFA) was set out concerning the girl child. The major issue of concern was why girls and Women are under-represented in relation to their male counterparts in science and technology. This forum drawing baseline statistics from 1990, noted that 130 million children worldwide had no access to primary education, of which 81 million representing (%) were girls. The implication of this is that fewer girls have access to secondary education since the later is fed by the former in terms of supply of candidates. Hence this forum according to Randell and Gergel (2009) centered their discussions on the urgent need to do the followings:-

- (a) Increase girls access to Primary and secondary education.
- (b) Alter representations of girls and women in the curriculum
- (c) Increase the number of female teachers worldwide.

Also at the Dakar world Educational forum held in 2000, a framework of action to achieve education for all (EFA) by 2015 was discussed. Among the specific agenda were gender disparity in school participation and equality between boys and girls in opportunities. Specifically the forum focused mainly on strategies for achieving EFA and removing the gender disparities and inequalities in education respectively.

At the United Nations summit held in 2000 in Romania, the Millennium development goals (MDGS) were established. A list of overarching goals was outlined, which developing Countries are to achieve by 2015. prominent in this list is goal 3a which is “to eliminate gender disparity in Primary and Secondary Education (by 2005) and at all levels by 2015” one of the indicators to measure the promotion of gender equality and empowerment of Women is the ratio of girls to boys at all levels of education. The foregoing instances are indicators to the fact that gender disparity exist in education, STM inclusive.

In Nigeria and most other African countries, the situation is not different as greater percentages of out-of-school children are female. Jaulmes and Njoku (2007) in a UNICEF document remarked that in sub-Saharan Africa, a large number of Young girls still do not attend school. They observed that out of 121 Million out-of-school children world wide, 65 Million (53.7 %) are girls and over 80% of these girls live in Saharan Africa.

In Nigeria particularly, girls access to education (especially in northern States) has remained low. As few as 20% of women in the North western and North eastern parts of the country are literate. More recent studies in this regard include Okeke (2001),(2007) Aguele and Agwagah (2007) and Nzewi (2010). The low enrolment, inclusion and participation of women in STM is not peculiar to Nigeria alone. The UNESCO Institute of statistics (UIS, 2010) also presented a global picture as follows:-

- Of the worlds total science researchers only 27 percent are women
- In Africa, guinea has the lowest percentage of female science researcher (5.8%) and also the lowest out of all the 118 countries included in the study. Only two African countries-lesotho (55.7%) and cape verde (52.3%) have achieved gender parity for science reseachers.
- In Asia and the pacific, Myanmar has the highest proportion of female science researcher (85.5%). But only five other countries in the region-georgia (52.7%) Azerbaijan (52%), the Philippines (52%), Kazakhstan (51.3%) and Thailand (50.3%) have achieved gender parity. Japan (13%), Bangladesh (14%), India (14.8%), Republic of Korea (14.9%) and Nepal (15%) are the most poorly represented.

From the above analyses, it is clearly visible that women are seriously under-represented in STM. A lot is therefore needed to be done to awaken girls and women to participate actively in science, technology and mathematics education.

The reasons for this call for gender parity in science, technology and mathematics education are obvious. If Nigeria, for instance, shall realize its vision of being placed among the twenty largest economies in the world and be able to consolidate its leadership role in Africa, and establish itself as a significant player in the global economic and political arena as entrenched in its concept for development (Nigerian vision 20; 2020), then there is need to break the gender barriers is STME. Also the demands of the millennium development goal (MDG's) and education for all (EFA) goals also point to the same need. But to be able to a appropriately deal with this issue, there is the need to examine the root cause of the disparity in science, technology and mathematic education (STME).

CAUSES OF MISCONCEPTION OF WOMEN

- i. **Marginalisation of Women:** The development policies which valued men more than women resulting in unequal access to property and education.
- ii. The cultural construct that distinguishes the roles, behaviours, mental and emotional characteristics favours male than female as developed and perceived by the society.
- iii. This traditional focus placed men as household heads, their experiences and commodity production which were not sufficient to understand women's work.
- iv. Women are labelled as being incompetent. The appropriateness of the type of things involved in rejects the trends of historical ideals of femininity.
- v. In schools, topics have a male bias whereas voluntary and domestic work performed predominantly by women is ignored.

WOMEN AS SOURCE OF SCIENCE EDUCATION

1. **Energy Production and Conservation:** Women provide woods for energy production, supply and consumptions as source of fuel. Electric service in Nigeria is epileptic and expensive that the major of its citizens cannot afford to use it. Women preserve economic trees and use mud, stones, refrigeration, cookers and other domestic appliances which are economic on energy to prepare and conserve energy (Rhoda, 1994). Women work to conserve the world's most exceptional ecosystems and endangered species, promote sustainable use of natural resources and reduce pollution and wasteful consumption with impressive results.
2. **Health Provision:** Women are providers of health to the family. They have knowledge of modern medical treatment in which they play important role in child survival and wellbeing (Rhoda, 1994). In Nigeria, it is not every family that can afford the cost of modern healthcare service. Women use their knowledge of medicinal plants to take care of health of the family. This they achieve through various experiments. They even go further using faith to heal diseases, power that transforms an evil doer into good person, power that makes individuals or communities to die for their faith as well as the used in

traditional birth attendants. Their contributions have been recognised that various researches are going on for traditional medicines and healers. Women know herbs to cure various diseases such as measles, vomiting, T.B., diarrhoea, whooping cough, malaria, skin diseases etc. Women make up the majority of nurses and midwives in the wealth sector. And also, they provide good sanitation in homes for a safety and healthy environment. Their knowledge, attitudes, values and skills are passed on to successive generations.

3. **Agriculture and Food Processing:** Women through their agricultural and production activities contribute a great deal to the development of the nation. All women perform roles in the households and in the nation a large they are being described as "the hidden productive force in the countryside." Activities performed by women vary from place to place but generally, rural women participate in trading, food processing and agricultural works (Ezumah, 1988).
4. **Industrialisation:** Women make extensive organisation of economy for manufacturing. Enterprise development through crafts, arts, weaven etc as skilled and adaptable labour. Work performed predominantly by women is ignored.

WOMEN AS A RESOURCE OF SCIENCE EDUCATION

1. Teaching science to their children and others. The importance of women in educating the young ones cannot be over emphasized have the capacity to instil in them scientific knowledge, skills and attitude, Dr. Aggrey once said. When you educate a man, you educate an individual; but when you educate a woman you educate a family (castle, 1965). Women have extensive knowledge of natural sciences, such as living things plants & animals biology. They are conversant with physiology, Anatomy, genetics, ecology etc. They also have knowledge of balanced diet, knowledge of reproduction, understanding menstrual cycle and menopause, understanding and knowledge of sex determination, knowledge of heredity and variation etc. These aspects of life are very important to women in order to build and sustain family. Women accounts for fifty percent (50%) of the worlds human resources and yet they have been relegated to second place as far as education and literally are concerned (Phin, 1991). If they are well trained, the ground is ripe for them to impact and raise the socio-economic level of the nation.
2. They educate their customers on food and environmental issues based on their roles in agriculture. Though they are deprived from owning land by tradition, they buy land from men, based on their hard. Labour to feed and sustain the family. Women are primarily involved in socialization of the young ones.
3. Women as resources persons are better able to identify, descanted and inculcate the scientific knowledge and attributes to the children. To in still in them the scientific knowledge, practice, value and still. This could be done through the cultural modes and

folkways of the society which are more effectively done by women. It is believed the foundation of a family gives a place of importance to the mother. The prophet Muhammed (S.A.W) was quoted as having said “Paradise lies at the fact of mother’s”.

USING EDUCATION TO ATTAIN SUSTAINABLE DEVELOPMENT

1. Producing responsible citizen: To produce children who can think critically and have a healthy dose of scepticism can better make their own, informed decisions, which can make them more enlightened, of how things work such as chemical reactions, reproduction, or nutritional needs. This helps future parents to provide safe, healthy environments for their own children.
2. Contributing to global health: Women as providers of health services for future discoveries and inventions in the area of health that will improve the physical and mental health of individuals. A healthy nation means a productive nation.
3. Building a Strong Economy: The woman uses various tools, techniques and skills to produce materials. These are involved in different economic activities to complement household income and food security. This at times they provide to the young ones in form of apprenticeship. This will create a knowledge base of scientific activities in children. They will develop scientific skills, which can enrich their ability to explore all aspects of their environment and their experiences. Adikwu (2008) maintained that, if Nigeria must survive as a nation, we need science and technology used and managed by Nigeria.
4. Producing in native Research and Development: Fashioning appropriate modern advances to actualize the vision of science education.

Recommendations

- Government should provide women with resources towards the development of science education.
- Government should create enabling environment for necessary science research.
- Educating the women is highly imperative towards sustainable development and therefore needs to go beyond preparing her for traditional roles of mother and wife.
- Women’s active participation in all spheres of public and private life through a full support and equal share in economic, social, cultural, political decision making and development.
- Topics in schools that have gender bias should be revisited.
- Equality between women and men is a matter of human rights and a condition for social justice and is also a necessary and fundamental prerequisite for equality, development and peace.

Conclusion

Sustainable development in Nigeria can be actualised through science education. The provision and utilization of resources for effective teaching and learning of science is paramount. Hence providing this information will enhance the teachers and students perception towards gender and science education.

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