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CHAPTER 21

MENTORING: A PANACEA FOR REDUCING THE SCIENCE GENDER GAP

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21.1 INTRODUCTION

The continuous existence of a gap in the enrolment and performance in science between males and females result in a greater proportion of the nation's population of women, not taking part in science and technology. Attaining set goals for sustainable development may become an uphill task. According to Scholtz (2012), a discussion about sustainable development is not complete without a conversation on gender equality.

In Nigeria, gender imbalance in enrolment and performance in science and technology subjects and courses has been documented (Kehinde 2001, Danjuma 2010 and Egun & Tibi 2010). This has made the science and technology fields to be male dominated especially at the professional levels. Ezirim (2006) opined that the resultant effect of

having less girls participating in technical and scientific culture has equally led to their considering scientific activities as being magical or mystical rather than give rational interpretation to them. Sieber (1992) cited in Ezirim (2006) stated that studies on women attrition from sciences show that a higher percentage of women leave during their undergraduate years despite the fact that girls show more interest in science than boys earlier in their academic ladder. This results in a gender gap in science and technology especially at the professional cadre.

Various strategies have been suggested and adopted to close the gender gap in science. Strategies like funding and scholarship grants have been made available to female scientists to overcome the gender gap in terms of number of professional scientists and

technologists. Attractive as this appears, the desired impact is yet to be felt as men still outnumber women at the top of the ladder. Some other strategies need be explored. This is why this chapter tries to explain the benefits of the stepwise approach of mentoring women to tackle the science project no matter the call for home activities. The chapter will highlight the role which mentoring could play to reduce the gender gap in science.

21.2 ORIGIN AND EXTENT OF GENDER GAP IN SCIENCE

Girls' alienation from science is reported to begin early in life when girls and boys start having views about what constitutes men's work and women's work (Ezirim 2006). The National Policy on Education by NERDC (2004) lists the non vocational electives at the senior secondary school to include Biology, Chemistry, Physics, Health Education, Physical Education and Further Mathematics. The above are science based subjects which students at this level are expected to select at least one. Enrolment in the sciences except biology has always been skewed in favour of males from the secondary school level according to findings of Nnaka and Anaekwe (2004) and

Uwadie (2006). Male students were also found to perform better than their female counterparts at this level.

At the tertiary level of education, there has been a witnessed increase in female matriculating students than males. This has however not reflected in STEM courses. More female students take to non-STEM courses while males dominate the science and technology courses (Igbemi 2001). Studies have shown considerable improvement in enrolment in the sciences and technology courses between 1991 and 2001 (Idris and Ayeni 2001). However, female representation in mathematical courses did not show equal significant increase (Mathew, Oyedele and Eule 2002). Beyond this, statistics has shown that in the United States, 21% of women scientists now receive professors and merely 5% of full engineering professors (Pappas 2013). The case is worse in Nigeria as women have not attained up to 30% of doctorate in science neither can we boast of up to 5% of full professors in science and technology (Igbemi 2001). The gap is wide at the lower cadre, and wider at the top level.

21.3 REASONS FOR GENDER GAP IN SCIENCE

Many reasons have been given for the low representation of women in STEM fields. Gender stereotypes impact in secondary schools and tertiary institutions has been identified as one of the reason. Girls tend to choose biology as one of their sciences even when they are given an option of choosing Biology (Akpan 2011). This also influences their choice of courses at the tertiary level as more female students are found in the health sciences than in the Physical sciences. Another plausible reason presented by Pappas (2013) is that women have a clash of interest between career and child bearing. It is true that the gestation period and weaning almost push women in-doors to cater for the newborn. This involves a distraction from the career project.

Even at secondary schools, teenage pregnancies deny girls the opportunities to concentrate in academic work whereas the male students they may have been involved with are not withdrawn from school. This adversely affects academic performance of girls especially in Sciences and Mathematics perceived to be tough.

Pappas (2013) reports that gender equality; a cultural factor influences mathematics aptitude of male and female students. It was found that the lower the gender equality in a nation, the larger the mathematics aptitude gap. Most of the causes of gender imbalance in STEM fields are social-psychological related since there has been no established difference in aptitude of humans based on gender. People only perceive the male gender to be better suited to particular careers or areas of study than females. This is based on the social role theory that states that men are expected to display agency qualities and women to display communal qualities (Ritzer2011). This tends to course discrimination when selecting people for specific careers especially in science and for bias against women by leaders at the top. This bias tends to cause what physicist would call an energy gap or potential barrier which requires an exceptional (extra energy) effort by women to cross to the top. Consider a woman appearing in front of a panel of all men to defend a PhD thesis in pure and applied sciences; there is likely to be an intentional gender bias which may work against the woman.

21.4 IMPACT OF GENDER GAP IN SCIENCE

UNESCO in 2012 organized a workshop in partnership with L'Oreal Corporate Foundation with the aim of promoting women in science in Africa. The reason for this was that Africa has a larger population of women which if properly managed would be of immense benefit to the continent. World Bank (2004) has made two fold recommendations for economic development of a country as:

- (1) Making the market work for the women
- (2) Empowering the women in the market.

The market nowadays employs high-tech methods and strategies. Besides, science and technology today provide so much income with less labour than trade and agriculture. With male dominance of STEM and the leadership positions therein, the income to women will not be comparable with their male counterparts. Encouraging women in science and technology, apart from narrowing the gender gap will impact greatly on the society by reducing poverty and social vices.

21.5 MENTORING AS A PANACEA TO CLOSE THE GENDER GAP IN STEM

Various strategies have been suggested to reduce the gender gap in Africa. One of such as suggested by the recipient of UNESCO award of African Women in Science 2013, Prof Francisca Okeke, is mentoring (Uba and Onwuachumba 2013).

Mentoring according to Meiss (2010) is the process of sharing knowledge or experience by a mentor with a protégé, or mentee. The mentor usually has no direct supervisory role with the mentee, and the mentee is often given the choice of selecting his/her own mentor. The mentee usually sets his/her own goals, and the mentor then becomes a confidant, teacher and advisor in assisting in the accomplishment of those goals. The focus for the mentee is generally on personal and career development. It also refers to a professional relationship in which an experienced person assists another in developing specific skills and knowledge that will enhance the less experienced person's professional and personal growth. Mentoring requires that someone who is a specialist in certain field identifies another person less experienced in the area and provides the necessary and

desired experience. Mentoring according to Duguryil, Katnyon and Duguryil (2007) has two main models, namely: Developmental Mentoring and Sponsorship Mentoring. In developmental mentoring, the specialist or mentor shares professional and personal skills and experiences with the mentee who is not yet experienced in the area so as to engender growth and progress of the mentee in a given field. Sponsorship Mentoring can be done through the attachment of a mentee to another professional during a training programme. Student teachers on teaching practice and medical students on internship are usually exposed to this model of mentoring.

Mentoring women in science by women professionals promises to be the way out of the problem since the latter identify the problems and booby traps they passed through on their way to the top and tell the former to be wary. Such problems tend to become the pitfalls for other women who fall out through the science "leaking pipeline" at every stage. The mentor should therefore understand her functions to include:

1. teaching the mentee about a specific issue

2. coaching the mentee particular skills
3. facilitating the growth and progress of the mentee by sharing resources and networks
4. challenging the mentee to move beyond her comfort zone
5. creating a safe learning environment for taking risks
6. focusing on the mentee's full development

Mentoring, like counseling, could be initiated by the mentee who has identified her weaknesses but like coaching can be done by causing the mentee to look in the direction of the mentor for a guide on how to improve upon areas which she may not have identified as weakness.

Since the gender gap in science starts at the secondary school where more girls than boy shy away from physics chemistry and mathematics, mentoring should also start at this level. There are many female chemistry, physics and mathematics teachers who can be saddled with identification of female students with high positive attitude towards the sciences. They are therefore targeted, mentored and monitored for better performance. This when implemented

is bound to increase enrolment and performance of females in pure and applied sciences at the secondary school level with the attendant improvement in intake at the tertiary level.

At the tertiary level, all female lecturers and researchers of science should be saddled with the responsibility of identifying female undergraduates who would be able to weather the storm if given a little pep. They are expected to use themselves as role models to mentor the upcoming female scientists to greatness.

Female professors should have the post doctoral female students as their mentees who should be guided through to professional status. This ensures that the upcoming women overcome gender biases, family and child rearing setbacks to aspire to the peak of their STEM careers.

21.6 CONCLUSION

Gender gap in science exists despite the efforts at closing it. This gap increases with increase in gender inequality. It is more pronounced in African countries where social psychological problems like stereotypes and gender discrimination appear to be a culture.

The gap starts at the secondary school level due to stereotype factor and widens as the academic level rises. Since some women, no matter how few have, braced the challenges and have come to the top, they are expected to point the light to other willing and able women to rise to the occasion. At every level of education, women scientists are available. They are to be conscripted into the legion of mentors right from the secondary school until post doctoral level. Mentors have the duty of accepting the stress inherent if the role of women in eradicating poverty in the 21st century is to be achieved. The few mentors at each level can carry more mentees and within a decade, the gap will be squeezed if not fully closed.

REVISION QUESTIONS

1. State the origin and extent of gender gap in science.
2. Explain reasons for gender gap in science.
3. What are the impact of gender gap in science?

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