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TRAINING SCIENCE TEACHERS FOR GENDER RESPONSIVE CURRICULUM IMPLEMENTATION

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Abstract

The low representation of women and girls in certain science and technology fields and careers has become a cause for concern. For this reason and more, there have been calls for gender equity in the classroom. The result is a search for and recommendation that gender responsive pedagogies (GRP) be adopted by teachers and school managers in order to create equitable learning environments and classroom opportunities suitable for learning and participation by both gender. As apt as this recommendation is, teachers' skills, knowledge and attitude toward its implementation stands as major obstacles to its success. Noteworthy is the fact that teachers come from an already gendered society where cultural and religious issues about gender are prevalent. This paper looks at training teachers through innovative curricula reforms in teacher education institutions towards production of professionally competent teachers for the implementation of the programme. Apart from institutional efforts at the preservice level, other training platforms are also recommended for teachers' knowledge, skills and attitude enhancement towards appropriate implementation of gender responsive pedagogy.

Key words: *Gender Responsive pedagogy; Teacher Education; Curriculum innovation; training teachers.*

Introduction

Efforts to mainstream gender in all aspects of policy, implementation and even living have been on for quite some time now. Several governments have gradually started to key into the idea of gender equality by deliberately avoiding overt gender disparities in their activities. However, homes and schools are still replete with gender issues. The expectation is that where the home fails in its informal role of fostering equity in gender, the school should come to the rescue through the professional activities of trained teachers. The importance of this is obvious. The school is the cradle of a child's development of self concept, self-worth and ambitions. Howe (1997) had pointed out the significance of the way and manner teachers conduct classroom events during teaching on stereotyping and division along gender lines. Obasi and Obih (2016) and Moemeke, Chenube and Omumu (2017) have also recognized the impact of teachers' attitude in encouraging or discouraging learners educational attainment while Krupnick (2008) has pointed at the implication of the teachers' actions on students' development of self-esteem, self-concept and self-confidence. From the angle of communication, Smith (1995) had stated that teachers' expressiveness through words, gestures and looks(eye contact) influence the health, interest and motivation to learn even difficult concepts. It therefore means that the teachers' ability, understanding, professional knowledge and training have roles to play in determining how much of gender equity and equality is maintained, enhanced and encouraged in the classroom. Without developing teachers' competencies in implementing gender equity as part of everyday curriculum strategies in the classroom, policies, advocacies and affirmative actions are bound to fail.

This paper therefore focuses on the fundamental issue of preparing teachers for gender responsive curriculum implementation at all levels of education by teacher education institutions to enable them acquire skills and competencies necessary as practitioners. If teachers must be expected to utilize and implement gender equality-enhancing pedagogy, they must be equipped with the knowledge, skills, attitudes and competencies for doing so otherwise it will be fool hard to blame their inaction. Hence, Neimanis, (2001) had included teacher competence development in policy implementation as one of the areas that require gender mainstreaming.

Gender issues in Science Education

The effect of gender on science achievement or performance in science has been a subject of study for decades. The under representation of girls and women in science related professions and courses have sometimes been attributed to low performance of girls in science and mathematics(Young & Fraser,2006). Some studies Young,(1991) have tried to find a link between school type and gender achievement in science. Some other socio-educational factors such as home background and school environment have also been investigation. The issue

remains that there is no clear evidence that girls are biologically predisposed to perform lower than boys in science. What is more evident in the studies referred to is that socio-educational factors like home back-grounds, parents educational status, nature of school and the teacher characteristics independently or collectively affect performance differences found among the gender(Young & Fraser,2006).Also of great importance in determining girls educational career decisions and steady growth is societal expectations and role assignment. The general notion of assigning masculinity to science and mathematics and femininity to languages and domestic science are well known. Females who venture into these domains which society have socially gendered either underachieve, become frustrated or depart from science professions midway in their career.

Pittman (2010) in a study of gendered racism against women of colour noted that they suffer a great challenge in their classroom interactions with students in terms of their authority, teaching competency and scholarly expertise as well as subtle and not so subtle threats to their persons and careers. This has implications for both learning outcomes achievable by the students and even faculty retention more so when evidence exist in literature (Milen,2003 and Guin et.al,2002) that diversity in all indices foster positive learning outcomes.

The danger in a gendered society is that great potentials of the stereotyped gender is either lost or underestimated and underutilized. Growing societies like that of African nations cannot afford to lose any facet of its human potentials to society structured role assignment. It is possible that potential scientists may have been lead astray by the erroneous impression of gendered profession roles.

Gender Responsive Pedagogy (GRP) in Science Teacher Education

Studies conducted and reported by UNESCO (2007, 2008) have shown that there is no parity in male and female teachers availability in schools especially in sub-Saharan African. The studies also drew link between unavailability of sufficient number of female teachers to serve girls as role models and mentors with the wide gender gap indicated by the low GPI(Gender Parity Index) in such countries. The studies showed that in countries where there are near equal male and female teachers, there is close parity in genders students enrolment.

Eccles and Blumenfeld (1985) after a study of teacher-student interactions in over 50 elementary and junior high school classrooms came to the conclusion that teachers play a passive but reinforcing role in the maintenance of sex-differentiated achievement patterns. Though the study could not trace the source of the sex-differentiated patterns to teachers, it reported that teacher do nothing to cause a change or provide the students with information that might result in a change. It is possible that this inability to cause a change is due to lack of knowhow and skills for doing so in their training and experiences. As contained

in UNGEI case study reports of the Forum for African Women Educationists (FAWE) after 21 years of research showed that:

1. Teaching-learning in schools were basically gender biased.
2. Teachers were unmindful of the negative effects of their abusive and negative language use;
3. Teachers used mainly traditional methods of teaching which do not promote equality between boys and girls.
4. Teachers use gender sensitive teaching materials (textbooks, charts etc) that accentuate gender stereotype.
5. Classroom set-ups create dynamics inimical to teaching and learning.
6. Class-groupings were according to abilities.
7. Schools have no adequate infrastructure and furniture, sanitary condition, water supply and toilets to cater for the needs of girls in their monthly flow.

These and many more were found to either keep girls away from school at specific times or enhance disparity in performance. The FAWE GRP model thus consists of three key elements as stated in the FAWE report. They are:

1. Gender assessment and policy analysis in the target institutions and countries.
2. Gender Responsive pedagogy (GRP) training of teachers targeting their knowledge, attitudes and practical skills; and
3. Gender Responsive pedagogy training of the school management team.

The second of these elements is the crux of this paper. The success of Implementing GRP rests on the knowledge and skills available to the teachers during their training and the consequent use of these skills in the classroom.

Training Targets of Teachers for GRP Implementation

For teachers at all levels to be adequately prepared to implement the GRP, there is need for training in GRP principles. This can be in the form of

1. In-service courses for short periods ranging from two to six month duration. This could be supported by workshops and seminars on effective implementation of GRP.
2. Use of mentorship groups in which individuals already trained in the implementation of GRP model disseminate and step down the training to contact groups and mentee teachers.
3. Pre-service curriculum innovation. This requires the development of and inclusion of courses in GRP into the curriculum of teacher training institutions at all levels.

The contents of the GRP curriculum should include:

1. Psychology of gender. This should teach specific psychological and biological features and peculiarities of both boys and girls, issues concerning their growth, development and maturation should also be treated.
2. Classroom set-up, organization and management for gender equality using the 21st century models.
3. Classroom interaction. Managing different interaction styles among gender in science. Avoiding dominance by any group or gender.
4. Gender friendly pedagogy and delivery methodologies. Writing lesson notes and plans that are gender friendly. How to select gender friendly methodologies eg group work, discussion, role play, debate, case studies, exploration, practical/ hands-on activities etc that will help boost participation of girls in science without jeopardizing that of boys.
5. Classroom language use for science teaching.
6. Conducting science activities within a gender equitable environment.
7. History of science and scientists of both gender.
8. Designing, improvising, sourcing, selecting and using gender friendly materials for science teaching.
9. Gender responsive science teacher skills such as use of reinforcement, motivation, questioning, and hands-on/activity, collaborative strategies etc that enhance participation.
10. Assessment techniques that are gender friendly and robust to cover all domains of learning of science.
11. Curbing/handling gendered excesses, discrimination and harassment.
12. Establishing and maintaining guidance and counseling services.
13. Mindset building and attitude growing strategies for science learning.

Appropriate integration of these areas into teacher education curriculum with emphasis on gender equity promotion should be the focus.

Hindrances to gender inclusive/GRP Implementation in the classroom

In spite of advocacy and policy trust about making science classroom gender inclusive as well as implement it through gender responsive pedagogic principles, there exist some impediments to its utilization and success. Kwank and Bever, (2017) expressed the view that some education officials tend to equate equal enrolment figures of boys and girls in school as sign that there are no gender disparity in science. That may be one of the indicators but there are other challenges that exist in science classrooms that fortify gender disparity. Unless these are painstakingly eliminated the gap may continue to exist. Some of them are:

1. Teachers are products of societies that are gendered: Teachers come to school already bearing notions about gender stereotypes either positively or negatively. This shows up as biases and attitudes which if not

- professionally tackled during training persist in their performance of teaching roles. It then means that those entrusted with the duty of eliminating gender disparity may actually be catalyzing inequity.
2. Lack of information and training of teachers in GRP implementation principles. Most teachers are not aware or lack relevant information and training on how to implement gender responsive teaching strategies. Several online tools on how to implement gender responsiveness in the classrooms remain unexplored by teachers.
 3. Poor teacher understanding of local gender dynamics and their social implications for interaction in the science classroom hinders deliberate implementation of gender inclusiveness in the science classroom.
 4. Lack of financial support for teachers' vision to create gender - inclusive science learning environment. There is therefore a disconnect between policy expectation and program-specific attempts to implement it by teachers. It is possible that this poor financial attention is due to the fact that gender inclusiveness is yet to gain the status of a performance indicator for standard assessment in education.
 5. The common misconception that greater emphasis on gender responsive teaching and environment will translate to neglect to boys in also a hindrance to implementation of gender-responsive pedagogy use. This misconception however due to poor understanding of the concept of gender as a social construct affecting both boys and girls
 6. The high importance attached to the male child as heir apparent in the African cultural context also affects the perception of gender friendly classroom implementation.

Future Directions

It is clear that if unattended to in the classroom, performance, enrolment and poor representation of women in science may persist. This means that one half of humanity and their great potentials in science and science related professions may be permanently alienated from effective science careers. Advocacy therefore should centre on innovating the curriculum of teacher education institution to include those aspects of training that are gender responsive related as earlier enumerated in this paper.

Workshops on reflective practices by teachers as a way of changing their mindset about previously held society accepted gender stereotypical views. This will enable teachers to key into gender responsive pedagogic practice and as such become true agents for creating gender friendly science classroom. During such workshops science teachers should also become acquainted with online sites where they can receive help in their practice. Self learning through online sites such as those listed below could be useful to teachers:

- i. United Nations Educational, Scientific and Cultural organization (UNESCO) Resource pack for Gender-Responsive STEM Education. It shows practical guides on impending GRP in STEM areas (<http://unesdoc.unesco.org> (images)).
- ii. United Nations girls' Education initiative (UNGEI) background paper on evidence around gender responsive teaching practices ([http://www.ungei.org/file working papers 2014](http://www.ungei.org/file%20working%20papers%202014)).
- iii. IREX developed "creating gender friendly learning environments" (<https://www.irex.org>): This site provides teachers and educators with practical strategic tools and resources for developing gender responsive learning environments.
- iv. Forum for African Women Educationalist (FAWE) developed Gender Responsive Pedagogy, A teacher's handbook. ([http://www.ungei.org/files/FAWE-GRP-English VERSION.PDF](http://www.ungei.org/files/FAWE-GRP-English%20VERSION.PDF)).

Campaigns on giving both gender equal voice both in school, home and society should be mounted. Teachers, families and communities should learn to listen to girls and boys experiences equally without bias.

Ministries of Education, School owners and school managers should invest in creating gender responsive school environments such as laboratories conducive for boys and girls in term of space, height of stools and benches and safety measures. Also the extent to which the school environment, the teachers' practice and the ambience of the school reflect gender friendliness should be used as indicators/measures of standards in Nigerian schools.

Conclusion

Well trained and effective teachers remain indisputably the most viable and vibrant agents of change. Without appropriate and targeted training, expectation may fail to manifest as outcomes of school. Certain changes in techniques, knowledge, application and psychological perception/mindset about gender and ways of achieving needed equity and balance must take curricula dimension otherwise teachers will continue to do things and act as they have always done irrespective of policy directions. In this way, the much advocated equity and gender friendly science classrooms may well be a mirage.

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