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Factors Contributing To Under Achievements of Female Students in O-Level Chemistry Examinations: A Case at Bright Future Secondary School in Mansa District - Luapula Province

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Abstract- This study investigates the factors contributing to the underachievement of female students in O-Level Chemistry examinations at Bright Future Secondary School in Mansa District, Luapula Province. The research aims to understand the academic, social, and psychological barriers that hinder female students' performance in this critical science subject. A qualitative case study design was adopted, incorporating interviews, focus group discussions, and classroom observations to gather data from students, teachers, and school administrators. Findings revealed that low self-confidence, gender stereotypes, limited access to learning materials, and teacher bias significantly affect the performance of female students in Chemistry. Additionally, socio-cultural expectations and household responsibilities further constrain their study time and focus. The study concludes that improving female students' achievement in Chemistry requires targeted interventions such as gender-sensitive teaching strategies, mentorship programs, increased resource allocation, and community sensitization. It recommends that educational stakeholders prioritize inclusive science education policies to bridge the gender gap in science performance.

Keywords- Female underachievement, O-Level Chemistry, Gender stereotypes, Academic performance, Science education.

I. Introduction

This inquiry will attempt to find out the factors that hold back female learners from achieving the expected performance during the O-Level Chemistry examinations regardless of being accorded the same opportunities as their male learner's counterpart.

It is a matter for regret that despite the utility value of Chemistry and its involvement in the science related courses that give prominence to a nation, learners' performance in Chemistry in the senior secondary school remains at a very low ebb. This situation is causing a lot of concern to Chemistry educators.

II. LITERATURE REVIEW

Importance of Chemistry

According to Till (1971:309) reliance on Chemistry and technology is vast. 'Literacy in Chemistry is essentially for every man and woman who hopes to function

efficiently in our 20th century society. It will aid the individual in a rapidly changing environment to make intelligent choices about his/her personal well-being. It will provide him/her with a basis for judging and taking action on issues related to science that affects every citizen" In this strain Chemistry is very crucial in understanding the world around us, the world in us and world beyond us. It challenges our imaginations with concepts that lead to great discoveries that change one's life. With reference to modern examples, on lives of Bill Gates inventing the computers and Ben Carson with the surgery on Siamese twins.

Kostyuk (2004); Chemistry is the theoretical foundation of engineering. The importance of Chemistry is not limited to the hard science. "Increasingly, physicists are turning their talents to molecular biology, biochemistry, biology itself and medicine.

According to Reif (1985:148), "Chemistry education in a school has several functions to perform. It must give the student a systematic training in careful observation, in experiment, and in the estimation for the relative value of results. It must provide, for all pupils knowledge of the material world and of the forces of nature at the same time for the small proportion of pupils who would later become scientists or those who would become technicians. Chemistry education must lay a sound foundation for more advanced work in the field of science and technology". This implies that Chemistry education equips a person with ideas to invent gears like cellphones, internet, lasers and computers. It also prepares a person for work in many different and interesting government laboratories (labs), on college campuses, and in the astronaut corps.

III. METHODOLOGY

Research Design
The research design that was used is descriptive that is both qualitative and quantitative methods. According to Kombo and Tromp (2006; 9), "Qualitative research seeks to describe and analyze the culture and behavior of human and their groups from the point of view of those being studied. Qualitative research relies on a research strategy that is flexible and interactive".

Study Population
The population includes the head teacher, deputy teacher, natural science HOD, Chemistry teachers and learners taking Chemistry at BRIGHT FUTURE Secondary School MANSA District in Luapula province.

Study Sample
The study sample consisted of 60learners, 4 teachers from the school. The school sample selected was based on the following motives. Initially, it would be easily accessible. Secondary, the cost would be fairly low and finally, less time would be spend in conducting fieldwork.

Research Instruments
A questionnaire consists of 15 objective questions and six structured questions for the teachers of Chemistry were administered. Equally for the learners 31 questions was in the questionnaire and each question had five points rating scale of strongly agree, agree, neutral, disagree, and strongly disagree. These peculiar questions were only to be in a questionnaire for learners of Chemistry. The questionnaire for school manager and HOD had three structured and 18 objectives questions.

Data Analysis Procedure
Quantitative data was analyzed using percentages derived from analysis of the data collected. Tables were used to generate graphs that represent statistical information. Interview data were analyzed qualitatively by coding the questions in the interview. The data being collected was then examined side by side with those subsequent interviews.

IV. RESULTS OF THE INQUIRY

Introduction
This chapter grants findings of the research on factors that contribute to poor achievement of female learners in O-Level Chemistry examinations. The arrangement of the findings was done in divisions of the qualifications of teaching subject, teaching staff and gender, also structured questions.

Factors contributing to the underachievement in O-level Chemistry examinations
Female learners lack experience in Chemistry owing to different teacher behavior towards males and females taking Chemistry. Males in high schools taking O-Level Chemistry are favored both with respect to the amount of time and of quality of interaction as compared to females taking the same subject. When performing experiments males usually dominate the experiment (laboratory activities), there treating females to be secretaries in recording data. Instead of interacting, all to have a feel of the experiment work.

Actions taken by Schools to motivate the teachers of Chemistry.
Some schools have accommodated these teachers in very good houses at a very economical house rent as a form of incentive. Some schools were offering an incentive in form of money monthly or termly to the teachers. During the in-house training (Continues Professional Development-CPD), administrators have provided refreshments as the group of teachers are enlightening each other on topics of concern or considering the new understanding.

Steps taken by the school to motivate the learner.
The learners were motivated by increasing school quizzes in Chemistry, study tours to Chemistry related environmental areas. Increasing the number of assessments, making the lessons more hands on and increase the laboratory work tests.

Fears on failure rate in Chemistry examinations.
Schools realised that the failure rate was a concern as the schools were trying to promote Chemistry education for female learners. Deficiency of good results in Chemistry would lead to the school leavers to find a challenge to find places in colleges and universities. Such failure in Chemistry is leading to fewer achievements in technology in this dynamic world.

V. SUMMARY, DISCUSSION

Introduction
This chapter deliberates the findings of the study and then proposals suggestions of how the research problem could be lessened. This is in line with chapter four which presented the research findings. All the research questions have been addressed in this chapter. Although the size of the sample was small compared to the number of school in the country, the analysis of this study harmonized with numerous findings documented by different researchers.

Discussion of findings
Approximately 90 % of the learners have positive attitudes towards Chemistry. On whether they were all interested to learn Chemistry, 80 % strongly agreed that they were interested to learn all they could in Chemistry. Despite being interested in learning Chemistry 40 % indicated that the mathematics in Chemistry made the subject difficult to cope with. 70 % agreed to non-practical lessons in Chemistry. Teachers agreed to the fact of non-practical lessons during Focus Discussion Groups (FDGs) and indicated that they were mostly using lecture method to teach. The lecture method promotes rote learning and memorizing contrary to constructivist approach which demands active participation of the learners. The teachers have clung to the copier kind of teaching Chemistry. In line with this it is vital that teacher educators to offer refresher courses to teachers of Chemistry in teaching strategies that will encourage the problem solving approach.

Factors that affect performance of females in Chemistry during O-level examinations
The research also revealed that teachers were performing poorly because there were inadequate teaching and learning materials. Other than learning materials the research also revealed that teachers of Chemistry suffer from huge teaching loads of nearly 29 periods per week. This undermines the efficiency of a teacher as one his left exhausted with less time to prepare for the next day's lesson plans.

V. CONCLUSION

The research exposed that female learners in Zambia perform badly in O-Level Chemistry both in class exercises and at national examinations. This development is observed in the findings where teachers still follow the old-style choice of sequence approach to curriculum (Haambokoma, 2002), that has failed to produce learners that claim to be high order thinkers and maintain problem solving abilities. Additionally it was noted that, the introduction of education for all those who obtained a full certificate at grade 9 to be enrolled into grade 10 dampened the interest in most

female learners of learning Chemistry, in that, the classes increased up to 60 - 80 learners per class.

Recommendations

- **Recommendation(s) for School Administrator**

The head teachers should ensure that learners selected at grade 10 for Chemistry classes should sit for the O-Level Chemistry examination. This will alleviate the issues of having fewer learners to sit for examinations compared with those expected.

Recommendation(s) for Chemistry teachers

The teaching fraternity is a dynamic one which demands teachers of Chemistry to vary their methodologies of teaching to encourage positive perception and attitude towards Chemistry as it would inculcate interest in the learner.

In this case it is inevitable that each school that is offering Chemistry be connected to internet.

Recommendation(s) for Ministry of General Education

MOGE should continue monitoring the policy that states that a learner must not be permitted to proceed to the next grade if their performance in English, Mathematics and Science is not meeting the required standard grades and make sure that all schools implement the policy.

Recommendation(s) for the Ministry of Finance and National Planning

Improve the existing infrastructure in school and restock the laboratories that the serve the intended purposes. The discrepancy in terms of science infrastructure, school managers' views, and head of science department's views on under achievement in Chemistry could be used as a point of reference for improvement. Policy makers need to ensure that national planners avail adequate resources to schools so that Chemistry teaching/learning receives the much attention it deserves.

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