

FACTORS CONTRIBUTING TO UNDER ACHIEVEMENT OF ZAMBIAN FEMALE STUDENTS IN O-LEVEL PHYSICS EXAMINATIONS. A CASE OF SELECTED HIGH SCHOOLS IN CENTRAL PROVINCE.

BY

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A Thesis submitted to the University of Zambia in fulfillment of the requirement for the award of the degree of Masters of Education in Science Education.

UNIVERSITY OF ZAMBIA

(2011)

DECLARATION

I Victoria Maguswi do hereby declare that this piece of work is my own and that all the work of other people has been duly acknowledged and that this work has not been previously presented at this university and indeed any other university for similar purposes.

Sign.....

Date.....

APPROVAL

This dissertation of Victoria Maguswi is approved as fulfilling part of the requirements for the award of the degree of Master of Education in Science Education by the University of Zambia

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ABSTRACT

This study is aimed at investigating factors inhibiting good performance in female learners at O-Level Physics examinations. The study also looked at views held by school administrators on failure rate and measures they would put in place to improve performance. The study included ten head teachers, ten heads of science departments and forty teachers of Physics from ten selected high schools in Central province. Only schools which offer O-level Physics were considered and these are Caritas, Kalonga, Highridge, Kabwe, Stephen Luwisha, Bwacha, Jasmine, St. Paul's, and Mpunde.

Each year as the ministry of education announces it is observed that Physics records the highest failure rates of each examination.

It is hoped that this study would provide vital information for policy makers, school administrators and teachers of physics on how they would administer the physics course and the final examinations. It is also hoped that it will lay a background for any researcher wishing to investigate further.

The findings reveals about the poor performance in Physics:-

- Inadequate funding
- Low teacher morale
- Heavy teaching loads
- Lack of support from school managers
- Lack of qualified staff
- Lack of text books equipment and apparatus
- Lack of knowledge in e-learning
- Lack of parental guidance

In an attempt to improve performance the following measures were put in place in the schools visited.

- Remedial work was given to learners
- In house workshops for teachers of physics were funded by the school administration
- Organize quiz competition in physics
- Awarding the most improving and deserving learner in physics
- Recruit well qualified physics learner
- Sponsor fully female learners

The recommendations of the study included the view that teachers of science be paid more than other subjects; there should be provision of equipment and apparatus needed for physics lessons and examinations; administrators should fund the C.P.Ds that would equip teachers. Both the teachers and learners must be highly motivated.

DEDICATION

This work is dedicated to late Doctor Harry Maguswi, Mr and Mrs Kenneth Maguswi for making me realize that education was the only to develop one self.

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OPERATIONAL DEFINITION OF TERM

For the purpose of this research study, the following definitions of terms are used

1. **Perception of physics and science;** This refers to an individual's particular way of understanding or thinking about physics or science.
2. **Learners;** This refers to high school pupils in grade 12.
3. **Attitudes;** This refers to particular behaviors' towards physics or science and the learning of it.
4. **Value of physics:** The importance or usefulness of physics in an individual's life.
5. **Impact:** This refers to the intended or unintended negative and/ or positive effects of transition on the academic performance of pupils.
6. **Performance:** This refers to the marks and grades obtained by the female pupils at grade 12 school certificate examination.
7. **Respondent:** This refer to a randomly selected pupils taking part in the research
8. **Personal Adjustment:** This refers to the pupils' capacity to experience intrapersonal growth in form of sense of purpose, good sense of judgement, self esteem, emotional intelligence and stress management.

9. **Academic adjustment:** This refers to the pupil's ability to adequately cope with demands of the high school amount of subject and class tasks.
10. **SMASTE(SBCPD):** Refers to the current school based continuous Professional Development.
11. **Science:** Refers to physics and chemistry, taught separately but jointly graded as one subject.
12. **Physics:** Refers to pure or o-level physics taught as a separate subject.
13. **Form IV and form V:** Refers to grade 11 and 12 currently.
14. **TED:** Teacher Education Department.
15. **SMASTE:** Strengthening of mathematics, science and technology.
16. **VVOB;** Flemish office for international cooperation and technical assistance
17. **FAWEZA SMT:** FAWEZA strengthening mathematics, science and technology in Zambia
18. **MOE:** Ministry of Education
19. **ECZ:** Examination Council of Zambia
20. **C.D.C:** Curriculum Development
21. **HOD:** Head of Department
22. **Female students:** Girls learners as well as breastfeeding girl learners.

DELINEATION AND LIMITATION OF THE RESEARCH

The research did not include respondents outside central province high schools. Central Province is made up of six district i.e Kabwe, Mkushi, Serenje Chibombo Kapirimposhi and Mumbwa.

CHAPTER ONE

1.0 INTRODUCTION

Zambian curriculum dating as back as early 1960s had incorporated sciences in the education system. These sciences comprised of general science at junior secondary and physics, biology, chemistry at senior level. The sciences in general were looked upon as very difficult and designed to be handled by men. With such a perceptive it was viewed that females were weak and would not manage to achieve very good grades in sciences especially in physics (Adetunde, 2008).

It has been observed that in current higher institutions in Zambia today physics has become one of the most desired passed subject second to mathematics. One with good passing grades in physics is viewed as one who can easily adapt to the changes in the dynamic world. According to Lemmer (2000). “Mathematics, science and technology are strongly influenced by the global context and in that proficiency in these disciplines is a pre-requisite to economic success.”

A mention that one has studied physics at the University of Zambia sends different messages to many and causes people to raise their eyebrows to that person, an indication that a person is not normal. As the current situation is in Zambia now only 4 (four) females have satisfactory completed physics courses at the University of Zambia. One in the school of Natural Science who is now a lecture and a role model in the department and three from the school of education with Physics as their teaching subject. Currently one is pursuing physics at UNZA in the school of Education.

Physics being one of the sciences taught in Zambian senior secondary schools is not compulsory. Meaning a school may decide to offer physics or not. Physics in Zambia has been taught since independence in 1964. In early 1980s Physics was taught to only form IV and form V as the curriculum demanded. By mid 1980s the curriculum changed from 2 years high school to 3 years. This allowed more time for learners to prepare for physics and the number sitting for the exams gradually increased. The number has not continued to increase as noted from ECZ reports (ECZ 2001) “There has been a gradual decrease in the number of centres offering physics.” Those that are still offering physics, grades obtained by learners at the end of high school are not

encouraging because they are mostly very weak. The grades boarder mostly in credits, satisfactory and unsatisfactory, very few score merits and distinctions.

Worldwide few girls generally study physics than boys (Barnby and Defty, 2006, Greenberg 2006), because physics has being stigmatized as a subject that causes underachievement. Physics is the least popular science in the world to the girls compared to boys.

Every year as results are being announced by the minister of Education in Zambia, a differential margin in performance between boys and girls in noted. Analysing results at school level in different provinces indicates that girls performance in physics are lower than boys dues to their negative attitudes towards physics. The govt has indicated concerns in the educational policy document over the poor performance of learners in sciences. It has also incorporated other stakeholders with the same concerns so that the country attains it version of having a lot of females take up jobs referred to as men's job in the technology industry. Other stakeholders are TED, SMASTE, VVOB and FAWEZA SMT. So far no studies have been conducted to determine why most girls tend to perform poorly in physics at O-level examinations and yet accorded same opportunities and facilities as boys.

1.1 STATEMENT OF A PROBLEM

Female learners at O-level certificate in Zambia are all subjected to the same learning and testing conditions in physics as the boys. After final assessment at school certificate it is observed that the percentage of boys scoring better grades in the subject is higher than the girls despite being accorded equal opportunities. This investigation is being set up to determine factors leading to low passing percentage in the female learners. The problem merits investigation as 30% of all work man ship has been awarded to the girl child by the government and that they are supported to perform competitively against the boy child.

1.2 AIM OF STUDY

This study aimed at exploring factors that have lead to poor performance for female learners at O-level physics it attempted to identify the kinds of perceptions and attitudes learners have towards physics.

1.3 OBJECTIVES OF THE STUDY

1. To find out perceptions female learners have of physics.
2. To establish the kind of attitudes learners have towards physics.
3. To find out the factors which affect academic performance in females at o-level Physics examinations
4. To compare female performance in Physics at O-level in co-education and single sex school (grant aided).

1.3 RESEARCHER QUESTION

1. What are Zambian learners perception of Physics
2. What are Zambian learner attitudes towards physics.
3. Is there a difference in performance in physics between girls and boys in high and secondary school at O-level
4. What factors affect good performance of females in Physics in high and secondary school at O-level.

1.4 SIGNIFICANCE OF STUDY

At the time when government is promoting 30% of women in high decision making positions, creates a number of reasons why this study was significance. Firstly, findings of this study will help in improving the teaching of physics and would provide a ground for further research. It would also help science educators inculcate positive perceptions altitudes towards the learning of physics. Thirdly, Findings will help MOE and CDC, in policy making and designing a curriculum that promotes positive attitude and perception. Curriculum designed should create a conducive environment that would provide best results for girls in physics and o-level. Fourthly,

findings of the study are likely to influence the teachers of science to impact positive perceptions and attitudes of physics and science in the learner. Lastly the questionnaire used in the study may also serve as a measure for pupils' perceptions and attitudes towards physics including other subjects or disciplines.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

This chapter discusses factors that are leading to underachievement in female learners at O-level physics.

2.2 IMPORTANCE OF PHYSICS

According to Till (1971) reliance on science and technology is immeasurable. ‘Literacy in science is essentially for every man and woman who hopes to function efficiently in our twentieth century society. It will enable 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 vein physics 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 changes one’s life. For example in the lives of Bill Gates inventing the computers and Ben Carson with the surgery on Siamese twins.

Kostyuk (2004). Physics is the theoretical foundation of engineering. The importance of physics isn’t limited to the hard science. “Increasingly, physicists are turning their talents to molecular biology, biochemistry biology itself and medicine.

According to Reif (1985) Physics 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. Physics Education must lay a sound foundation for more advanced work in the field of science and technology. This implies that physics education equips a person with ideas to invent equipments like cellphones, internet, lasers and computers. It also equips a person for work in many different and interesting government labs, on college campuses, and in the astronaut corps.

2.3 VALUE OF PHYSICS TO A FEMALE STUDENT

According to Till (1971), the knowledge of science and physics is a unique facet and its understanding fosters man's appreciation of nature and its characteristics. IUPAP describes value of physics to the student as inspiring and expands the frontless of knowledge about nature. It also generates fundamental knowledge essential in future technological advances that continue to drive economic engines of the world. Physics provides personnel needed to carry out scientific researches and discoveries hence contribute to technological infrastructure. In that physics is important in the education of chemists, engineers and computer scientists. It extends understanding of other disciplines, such as the earth, agricultural, environmental sciences, astrophysics and cosmology that have been found valuable by all the people of the world.

Physics improves the quality of life by providing the basic understanding necessary for developing new instrumentation and techniques for medical applications, such as biomedical sciences, computer tomography, ultrasonic imaging and laser surgery.

According to Russell and Petries (1992) factors which affect learner's academic performance are basically three i.e. personality, social and academic adjustments..

2.4.1 PERSONAL ADJUSTMENT

As the girls are meeting the challenge of being in high school, are faced with excitement, curiosity and enthusiasm to excel in life and in science. This feeling needs to be natured well by those that surround her implying the parents and the teachers. If not well handled by parents and teachers, the feeling develops into stress. De meuse (1985) found out that stress was negatively correlated with academic performance. Stress can be generated from teacher's attitude towards the girl child in the learning of science. Judith Whyte (1986) says teacher attitudes are 'Girls just can't do maths and the abstracts in physics are way beyond them.' Oberg (1960) identifies the results from such statements as generating in females a feeling of inadequacy, frustration and anxiety. A strong link notes between stress and emotional depression and low performance in academic work (Bell1995; Dubois and Felner, 1992). Once emotions depresses a female will fail

to resolve personal challenges and this leads to underachievement at O-level physics examinations.

Most females lack self concept because of having a belief in cultural determinism. Judith Whyte (1986) says ‘teachers seemed to accept girls less interest in physical science and technology as a fact of life’. According to Adetunde (2008) “A rural man thinks that the female’s main office is the kitchen has contributed greatly to the low education levels of females in the countries”. Cultural beliefs indoctrinate the females that they fail to possess self-concept and strive to achieve very high scores at o-level physics examinations comparing boys work load at home with girls it is observed that the girls tend to play ‘mother’ hence have a lot of house chores to do. This creates very little times for them to reflect on what they have learnt in school at the end of each day.

2.4.2 SOCIAL ADJUSTMENT

There happens to be a lot of social problems that influences negatively on the performance of females in school. According to junior civics grade 8 society views a female as having a place in the kitchen and that they should perform all house chores The school on the other hand believe the girls are not good in mathematics and science but only in Home Economics, English and Religious Education History and Zambian Languages. With such a perception women feel they are weak while men are strong and dynamic.

2.4.2.1 Poverty: (Adetunde, 2008): Coming from a home that is financially challenged a female tends not to concentrate on her studies but on how to overcome the challenge immediately. Physics learning becomes of less value as she looks to other avenue like prostitution, doing contractual jobs, teenage pregnancy or marry early in order to overcome the immediate challenge.

2.4.2.2 Lack of parental care (Adetunde, 2008): With the growing HIV/AIDS pandemic, most girls become guardians to their siblings at an early age. This causes females to lose interest in school as they assume the roles of a mother. Lack of parental care brings about lack of mentors to motivate the girls child to excel highly in physics.

In cases where parents are there but leave very far from the school, the girls have rented houses near school in order to attend the school. They become vulnerable to so many vices hence lose concentration on lessons.

2.4.2.3 Ignorance of parents (Adetunde, 2008): Level of education and achievements for parents during their school days impacts positively or negatively to the girl child. As some parents would have failed science at school, they do not encourage the girls to put in a lot of effort in learning science. Many are times such parents tell their children of their underachievement in physics at school and bemoan that their offspring's would equally not perform to expected level. At the same time parents to these females do not understand the importance of learning physics in relation to every day's life so they do not urge girls to work hard in physics in order to find better jobs.

2.4.3 ACADEMIC ADJUSTMENT

According to Bandura (1977) academic self efficacy refers to the belief a learner has on her ability to successfully perform given learning tasks or behaviour. In academic adjustment school environment plays a vital role in the academic performance of females. A female always want to be identified with nice things and nice surroundings. Being a school which has good infrastructure enhances motivation in the learner. The school environment includes well stocked science laboratories, adequate and well qualified teachers who takes a kin interest in the performance of females in their science classes. Other than teachers', availability of text books to be used in class and after classes (Adetunde).

2.5 PERCEPTIONS AND ATTITUDES

In addition to personality, social academic factor, perception of both the learner and the teacher in the learning of physics is an importance factor. The attitude of the learners and the teachers towards science may inhibits high achievement in physics.

2.5.1 Perceptions of Teachers

Perception of physics by teachers has not changed much from generation to generation and this due to factors like cultural changes and social settings. Most teachers still believe that girls can perform as good as boys in physics.

2.5.2 Perception of female learners

Female learners feel the society, the education system and the technology world has provided them with a subject that would better their lives at the same time hasn't provided a way to cope with the subject. The learners have a positive perception of studying physics and pursuing it at higher levels.

2.5.3 Attitude of learners.

Ooperheim (1979) defines attitude as 'a state of readiness and a tendency to act or react in certain manner when confronted with a certain stimuli.' Furthermore, Baron and Byre (2004) states that "attitudes seem to operate as schemes mental frameworks that help us to interpret and process many kind of information. Moreover, the strongly colour our perceptions thoughts about the issues person, subject or group to which they refer.' From the definition one is made to understand that one's attitude is observed through speeches and behaviour when confronted with problems in science. It is also when one exhibits readiness to tackle problems in physics with a positive mind. The readiness to respond to stimuli embedded is in ones willingness to learn new concepts in science. Harlen (1977) states that "pupils' attitude affect the willingness of an individual to take part in certain activities and the way in which they respond to person, objects, or situation." This means that the learner will be ready and willing to learn physics if their perception of it is positive. When attitudes are positive they will not only affect what is being taught but also the effort being employed in the tackling tasks given which would enhance success in life. Perceptions, bread attitudes in a learner could be positive or negative in relation to the needs of society and the values being up held by society.

2.5.4 Attitudes of teachers

Attitudes and approaches of teachers in the learning of physics play a vital role in the learner. Judith Whyte (1986) says that 'teachers seemed to accept girls being lesser interested in physical

science and technology as a fact of life.” There seems to be traditional belief in teachers that mathematics and science subjects are male preserve. Since it is observed that teachers have low expectations of females ability to excel in science, they would not inculcate positive attitudes towards learning of physics in females. Judith Whyte (1986) “ Girls just can’t do maths and abstracts in physics are way beyond them”. On examination of the statement there is very little hard evidence for such a theory; it only that the teachers have a belief that such discipline call for struggle and determination for a female to cope with. With such an attitude the teachers would be found in away discouraging females in pursuing science and paying little attention to their search for information.

2.6 Values

It is the importance and usefulness of science in the future lives of females. Many are times when females fail to determine the usefulness of learning physics in their future life. The way females are brought up by parents are meant to believe they can still make it in life without physics as their parents never did physics in school or for those that did, it failed it and yet have excelled in life. Meanwhile the values the learner upholds in physics are of great importance for a learner to achieve highly in the dynamic world.

2.7 LANGUAGE

Another factor that contributes to formulation of perception towards physics is language during learning process. The unique scientific language has a great influence on the learners’ perceptions of physics. This is made worse with failure to interpret symbols when solving given problems. For insistence difference between “T’and’t’ in an equation is usually viewed the same.

Goldstein (1980) says that ‘All thought is dependent on language influences the manner in which the environment is perceived and understood,’ This means that the teacher needs to use a language which is able to communicate the intended scientific information correctly. It would in turn initiate a positive way to perceive physics learning.

On the other hand some text books use language that has belief in cultural determinism. This is where females are believed to be less interested in sciences. The language portrays that studying physics for females is more difficult than other subjects.

2.8 TEACHER

Apart from the pedagogical skills the teacher learnt in college the teacher fails to inculcate in the female learner critical thinking to make work in physics easier.

Fisher (1993) says” Critical thinking is the mode of thinking about any subject, content or problem-in which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking imposing intellectual standards upon themselves,”The teacher also fails to make the lessons more exciting in that they provoke creative thinking. logical thinking and meta-cognition. Logical thinking is a process using reasoning consistently to make conclusions. Where as a creative thinker is one who practices higher order thinking skills (Bloom’s Taxonomy) and uses his senses effectively to gather and assess relevant information. In meta-cognition the teacher needs to develop in the learner intelligent behaviour as a significant educational outcome.

2.9 GRAPHING AND SIGNIFICANT FIGURE

Lack of skills of plotting and interpreting of data presented creates problems in solving physics mathematics related problems. Having poor mathematics background makes most of the learners fail to solve problems using significant figures

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

This chapter looks at description of techniques to be employed during the collection, analyzing and interpretation of data. It further explains the procedure used to conduct the study.

3.2. Research Design:

This is a descriptive research design using both qualitative and quantitative methods. The atmosphere of the learner will be surveyed using the perceptions of the learners of physics education. The academic performance will be surveyed using the perceptions of the learners of physics education. The academic performance will be treated as the variable dependent on the factor faced by females in high schools.

3.3. Study Population:

10 school administrators, 10 HODs, 40 Teachers of physics and 400 learners of physics from the selected high and secondary schools in central province will constitute study population. The population also included learners from government schools, grant Aided schools, single sex as well as from co-education.

3.4. Study Sample

The study sample will consist of 40 pupils 8 teachers from Stephen Luwisha convent school. The respondents age will range from 16 to 20 years preferably.

3.5. Sampling Procedure

The size of the sample will comprise all the schools in central province that are offering pure physics.

3.6. Research Instruments

A questionnaire comprising of 15 objective questions for learners and 6 objective and structured questions for the teachers of physics. Each question will have five point rating

scale of strongly agree, agree, uncertain, disagree, and strongly disagree. These are peculiar to the questionnaires for learners of physics. 21 structured questions and objectives for the school managers and HODs.

The measuring instrument will be piloted in a grant aided school in central province to check its validity and reliability. A spread sheet for yearly exams (Between 2006 and 2009) has also been included.

In addition to questionnaires were discussions, observations, field notes, workshops and interviews for the respondents.

3.7. **Research Data collection Procedure**

I distributed the questionnaires to each respondent in the same premises. The respondents were talked to on the general nature of the research and advised on how to fill the questionnaire independently and appropriately. Constant check was done as the filling of the questionnaire was going on. The respondents given as much time as they needed to answer the questionnaires. A set of exam results for recent last four years would be collected from the school administration. The career and guidance teacher was asked to help in collecting the questionnaires from the respondents in each respective school.

3.8. **Data Collection**

Interviews schedules were be used to gather data from physics teachers, HOD and school managers. Discussion and observation were be used to gather reflection notes from the learners

3.9. **Data Analysis Procedure**

SPSS programme was be used to generate table frequencies and percentages derived from analysis of the data collected. Interpretation was be conducted to draw up conclusion.

3.10. **Ethical Concerns**

All participants were assured that information which they gave was treated with confidentiality. Names of participants were omitted and they were only identified by number and not by name, this helped in avoiding biased responses from them.

CHAPTER FOUR

CHAPTER SIX

6.0 Introduction

This research was set out to investigate the factors contributing to under achievements of female students in O-level Physics examinations. A case of selected high schools in central province.

6.1 Conclusion

It was noted that female students in Zambia and world wide perform badly in O-Level Physics both in class exercises and at national examinations. This scenario is observed in the findings where teachers still follow traditional scope of sequence approach to curriculum (Haambokoma,2002) that has failed to produce learners that purport to be High Order thinkers and maintain problem solving abilities.

The study also revealed that all stakeholders contributes greatly to the under achievements in the female learners despite them having positive perception of physics. Female learners with the right foundation of science at primary and basic level they would develop positive perception and attitude in physics, this in turn would make them perform well in the subject.

The government failure to avail schools with well qualified physics teachers, well stocked and working laboratories, instructional materials and adequate funding to institutions made administering of physics courses and examination very difficult. With lack of good funding Head teachers found administrative work very difficult as resource allocated to the Natural Science department would not be sufficient for the experiments or hands-on activities during lessons. In cases where most of the requirements for the department were not available internal monitoring from school administration was almost

inexistence. The HOD's supervision were minimal making the teacher lazy to prepare adequately for their lessons.

The other demotivating factor for the teacher is that the teaching loads are very high as they are very few teachers. For example at Caritas Convent School in Kabwe they are only 3 teachers of science against 153 periods for science in school. The average periods person is 51. High teaching loads lead to teachers failing to handle JETS club effectively. JETS helps in linking physics and the learner.

With introduction of education for all those who have made a full certificate be in grade 10. The classes have swelled up to 60 to 70 per class. Rally classes are not easy to handle in physics with very limited equipment and apparatus. Such classes are demotivating to female learners that need much attention. As for the teacher fails to offer remedial work for the slow learners due to the size of the class and the number of period. Coupled with the above factors teachers felt that they are subjected to the same pay with other subject areas that were less demanding in preparation and presentation.

Lack of time in most cases made the teachers fail to innovate experiments that would substitute those that have no apparatus or equipment.

6.2 **Recommendations**

6.2.1 Teachers of physics should vary their methodologies of teaching to promote positive perception and attitude towards physics as it would inculcate interest in the learner.

6.2.2 Apart from deepen knowledge the physics teachers should be creative during the lesson initiate critical and logical thinking in the learner.

6.2.3 In addition to school based CPD workshops held every holiday, MOE should encourage the teachers to conduct mini lessons on new topics in physics during ZASE conferences.

6.2.4 The physics syllabus should be revised so that it is not too long to allow a lot of practice in class. For areas that are new in the syllabus let the government deliberately introduce short courses to equip teachers with the content on such topic.

6.2.5 Every physics teacher should be computer literate so that they can use e-learning. In this case it is inevitable that each school that is offering physics be connected to internet.

6.2.6 The government should organize facilitators to make videos of mock classes for topics that are difficult to teach. These videos can then be acquired by teachers and be used to enhance learning in class. For cases where experiments can not be done due to lack of apparatus, these videos should be able to demonstrate such experiments.

6.2.7 Since there is an educational radio programme which is helping learners, a similar programme should be initiated in physics on radio and on TV.

6.2.8 Teachers of science should be paid more than the teachers of other subjects.

6.2.9 Encourage more pupils with a strong inclination to science to take up physics.

6.2.10 Impart the necessary mathematical pre-requisites and co-requisites skills needed by the science teachers and learners.

6.2.11 Improve on staffing levels, preferably, deliberate posting of science teachers to schools with a deficit and retention and rewarding of the few available teachers based on performance.

6.2.12 there should be proper sensitization of the importance and beneficial aspects of physics to communities and to the female learners. Parents should encourage the female learners to take up physics as a stepping stone to becoming engineers, miners, and teachers of physics. Government should come up with a deliberate policy of investing in science and technology and start giving bursaries to female learners performing well in science starting from basic schools.

6.2.13 Basic school teachers handling grade 8 and 9 should be qualified enough to teach mathematics and environmental science.

6.2.14 Girls should be encouraged to be more assertive, forthcoming and to show more confidence in class.

6.2.15 Female staffing ratio should be improved so that more women can be used as science and technology teachers as well as role models.

6.2.16 Education systems should teach science and technology from nursery upwards as much as possible making use of female teachers.

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APPENDIX 1

FACTORS CONTRIBUTING TO UNDER ACHIEVEMENTS OF FEMALE STUDENTS IN
O-LEVEL PHYSICS EXAMINATIONS: A CASE OF SELECTED SCHOOLS IN CENTRAL
PROVINCE

INTERVIEW SCHEDULE FOR HEAD TEACHERS

THE UNIVERSITY OF ZAMBIA

SCHOOL OF EDUCATION

DEPARTMENT OF MATHEMATICS AND SCIENCE

QUESTIONNAIRE NO. _____

IDENTIFICATION DATA (FOR OFFICIAL USE)

DISTRICT: _____

SCHOOL: _____

NAME OF INTERVIEWER: _____

SEX OF RESPONDENT: _____

TITLE OF RESPONDENT: _____

Q1. What is your highest qualification?

Diploma

Advanced diploma

Bachelors Degree

Masters Degree

Other (Specify) _____

Q2 What is your subject of specialization: _____

Q3 How long have you served as head teacher? _____

Q4 How long have you worked for this school? _____

Q5 How many teachers of physics do you have at your school? _____

One

Two

Three

Four

Five

Q6 Is it your first time to head a school which offers physics as a subject?

Yes

No

Q7 How was the Head of Science Department appointed?

Recommendation

Advertisement

Q8 Was the HOD of science given orientation/training after he/she was appointed?

Yes No I was not there

If the answer is Yes go to Q9

If the answer is No go to Q10

Q9 What kind of orientation was given?

(a) Administration and supervision

(b) General Management of department

(c) Specific instructions on Management of science department

(d) Other (Specify)_____

Q10 Who provides materials for use in the teaching of physics?

(a) Users fees

(b) School PTA/Board

(c) District Educational Board

(d) The Provincial Educational Office

(e) Ministry Headquarters

(f) Other (Specify)_____

Q11 How often are there materials provided?

- (a) Once per term
- (b) Twice per term
- (c) During the final examination preparation
- (d) During common mock and final examination preparation
- (e) Whenever needed

12. How are the pupils selected for O-level physics classes

.....
.....

13 a. Do you think the failure rate in physics Examinations is a source of concern for the schools?

- (i) Yes (ii) No

13 b. Give reasons for your choice of answers

.....
.....
.....

14. What do you think is the major cause of this underachievement in O-level physics examination for female student?

.....
.....
.....

15. Do you easily access physics teaching and learning materials for purchase

(i) Yes (ii) No

16. Do you find teaching of physics in your school expensive to manage?

(i) Yes (ii) No

17. How often does the department conduct cost associated lesson practicals in Physics?

- (i) Every lesson
- (ii) Once a week
- (iii) Once a month
- (iv) Once a term
- (v) Once a year
- (vi) Seldom

18. Have you had an experience of missing physics materials equipment and apparatus from the department

(i) Yes (ii) No

19. Comment on your choice of answer

.....

.....

.....

20. What has the school put in place to motivate the teacher of physics?

.....

.....

.....

21. What steps has the school taken to motivate pupils taking physics at O-level?

.....

.....

.....

Thank you for answering this questionnaire

APPENDIX II

FACTORS CONTRIBUTING TO UNDER ACHIEVEMENTS OF FEMALE STUDENTS IN
O-LEVEL PHYSICS EXAMINATIONS: A CASE OF SELECTED SCHOOLS IN CENTRAL
PROVINCE

INTERVIEW SCHEDULE FOR HEAD OF SCIENCE DEPARTMENT

THE UNIVERSITY OF ZAMBIA

DEPARTMENT OF MATHEMATICS AND SCIENCE

QUESTIONNAIRE NO. _____

DISTRICT: _____

SCHOOL: _____

NAME OF INTERVIEWER: _____

SEX OF RESPONDENT: _____

TITLE OF RESPONDENT: _____

Q1 How long have you been teaching?.....

Q2 How long have you worked at this school?.....

Q3 How long have you worked as Head of Department?.....

Q4. What is your highest educational qualification?.....

(a) Certificate

(b) Diploma

(c) Advanced diploma

(d) Degree

(e) Masters Degree

(f) Other (Specify) _____

Q5 What is your area of specialization?.....

Q6 How many teachers are there in your Department?

(a) One

(b) Two

(c) Three

(d) Four

(e) Five

(f) more than five

Q11 a Do you have physics Laboratories?

(a) Yes

(b) No

Q11 b. How well are these Laboratories stocked?

(a) Well Stocked

(b) Fairly stocked

(c) Poorly stocked

(d) No stock is here

Q12 Is it possible to teach physics without materials and apparatus for practicals?

(a) Yes

(b) No

Q13 Are teaching and learning materials available for teachers use during lessons?

(a) Yes

(b) No

Q14 How do you replace worn out material and apparatus?

.....
.....

Q15 Do you have a person employed as laboratory assistance?

(a) Yes

(b) No

Q16 Do you conduct lessons observations to your physics teachers?

(a) Yes

(b) No

Q17 Do you think the performance in physics examinations in your school is a source of concern?

(a) Yes

(b) No

Q18. What factors contribute to the poor performance in Physics?

- 1
2.
3.

Q19. What measures have you put in place to help reduce failure rate in physics examinations in your school?

- 1
2.
3.

Q20. Does the geographical location of the school affect the supply of procurement of physics teaching and learning materials?

- 1
2.
3.

Q21. Give reasons to your answer in Q20

- 1
2.
3.

End of questionnaire

Thank you very much for your co-operation

APPENDIX III

FACTORS CONTRIBUTING TO UNDER ACHIEVEMENTS OF FEMALE STUDENTS IN
O-LEVEL PHYSICS EXAMINATIONS: A CASE OF SELECTED SCHOOLS IN CENTRAL
PROVINCE

Questionnaire for Teachers of physics

THE UNIVERSITY OF ZAMBIA

SCHOOL OF EDUCATION

DEPARTMENT OF MATHEMATICS AND SCIENCE

Questionnaire No.....

Dear Respondent:

The purpose of this Research is to determine the factors contributing to under achievements of females students in O-level physics Examinations. It is purely on academic exercise and please be as honest as possible. The information will be treated confidentially.

Please do not write your name.

Q1 District:.....

School

Sex of respondent: Male Female

Age:.....

Q2 How long have you served as a teacher?.....

Q3 What is your qualification?

Masters degree

Bachelors degree

Advanced Diploma

Diploma

Certificate

Q4 Tick () the courses you under took during teachers Training

SUBJECT	INITIAL TRAINING	2 ND TRAINING	3 RD TRAINING
Physics			
Chemistry			
Biology			
Mathematics			
Science			
Administration Management			

Q5 Are you a member of ZASE (Zambia Association for science Educators)?

Yes No

Q6 If answer in Q5 is No give reasons.

.....
.....
.....

Q7 Where are the physics apparatus, materials and equipment kept?

.....
.....

Q8 What is the source of the physics apparatus materials and equipment you use for physics lesson and practical lessons?

.....
.....

Q9 Is the performance in physics examinations in your school a source of concern?

Yes No

Q10 Suggest ways which could help to improve the poor performance in physics examination

.....
.....

Q11. What problems do you encounter while conducting physics lessons in the laboratory?

.....
.....

Q12. How many students are in your class?

60 – 70

50 - 60

40 – 50

30 – 40

Q13. Which of the following do you use to

- Cultivate pupils physics thinking habits?
 - Teach physics using a logical system
 - Design a series of questions and explain them step by step
 - Guide the students' experiments and discussion
- Teach them how to analyse physics questions.

Q14 Do you arouse students interest during your physics lesson

Yes No

Q15 Give reasons to your answer in Q14.

.....
.....

Q16 How do you usually make students concentrate their attention in class?

- Ask questions frequently.
- Demonstrate many experiments

- Remind students to pay more attention to what is being taught
- Have students do individual experiments

Q17. What is your attitude towards girls classroom discussion?

- Seldom carry them on for fear of classroom disorder
- Let them fully express their opinion's within the given time.
- First give them work, then correct their answers in the process of discussion
- Give work after discussion the answers in class.

Q18 What is your view on the performance of the girl in your physics class?

- Can not achieve highly because physics is abstract.
- Physics is difficult for them
- As low achieves because the are lazy.

Q19 What qualification is primary for a good secondary school physics teacher?

- Diploma physics knowledge
- Diploma physics knowledge, child psychology and pedagogical skills
- Degree physics knowledge
- Degree physics knowledge, child psychology and pedagogical skills

Q20 Have you published science article in the ZASE newsletters.?

Yes

No

Thank you very much for your participation
