THE PERFORMANCE OF FEMALE PUPILS IN PHYSICAL SCIENCE AT SERENJE TECHNICAL HIGH SCHOOL ACADEMIC PRODUCTION UNIT (APU).

BY

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UNZA **2011**

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APPROVAL

This research report by Kaunda Mwaba is approved as partial fulfillment of the requirement for the award of Degree in Adult Education of the University of Zambia.

Signed _____ **Date _____**

Supervisor.

DECLARATION

I Kaunda Mwaba, do solemnly declare that this research work represents my own work which has not been submitted for any degree at this or another university.

Signature _____ Date _____-

DEDICATION

To my parents Mr. and Mrs Kaunda, grandmother Diana Kombe and all the family members who supported me, this is for you.

ACKNOWLEDGEMENTS

My sincere thanks go to Dr. E. Mbozi, my course lecturer, who equipped me with the knowledge in research that I applied in undertaking this study. Great tribute goes to Mr. Mwansa. P. K my supervisor who spent his valuable time guiding me in the process of pursuing my research.

Most sincere thanks go to the members of staff at serenje technical high school for their cooperation during the time of collecting data.

Lastly, I would like to thank Miss Njobvu Innocensia, Miss Marunge Elbether and Mr. Kasaro Mbumwayi for typing and printing my work.

ABSTRACT

This research paper contains a study carried out at serenje technical high school in the performance of female pupils in physical science academic production unit (APU).

The researcher used question and an observation schedule to collect data from teachers and pupils in order to arrive at the findings.

Part of the data was converted into table forms and graphs while part of it was analysed qualitatively and quantitatively.

Results indicate that, female pupils can perform better in physical science subjects if only they are encouraged by teachers and parents.

CHAPTER ONE

1.0 Introduction

This section presents the background of the study as well as the statement of the problem, purpose of the study, specific objectives of the study, research questions for guiding the study, significance of the study, limitations of the study and definitions of the research terms are presented.

1.1 Background

Serenje Boys Technical High School (SEBOTEC) is in Serenje district, Central Province and located along the Great North Road about 2.58 Kilometers (KM) from kabwe Town the provincial capital of Central Province. The district has population of about 132,836 people (Central Statistical Office, 2000). The school was established in 1963 as a Boys Secondary school.

Upon the establishment of the school, the population was very small for Serenje district. However, population increase brought about a demand in education. Hence, the school administration decided to introduce the Academic Production Unit (APU) in 1995 which brought girls / female adults on board.

Driver (1986) defines science as, "the study of the structure and behavior of the physical and natural worlds and society especially through observation and experiments." Science instruction has always been part of the curriculum since the inception of the formal education in Zambia. Science learning starts from home, primary, secondary, colleges and Universities. The term Science incorporates many other branches such as pure science, physical science, social science, biological science includes biology sciences and many others. Pure science includes physics and chemistry which biological science includes biology and agriculture sciences. However in this research my main concern will be specifically focus on sciences subject which is a combination of physics and chemistry (5124) the science which is offered at Serenje High School.

Despite science being one of the most popular subjects learnt on the school curriculum, science learning is subjected to a number of teaching and learning difficulties such as the nature of science laboratories which lacks materials, equipment and apparatus. As a result, this makes teaching and learning of science very difficult hindering the pupils performance especially the female and eventually bring about backwardness and low participation of them in the science subject or related field. Most females underperform because of lack of laboratories, inadequate equipment, apparatus and materials hence they face difficulties in trying to relate what they learn theoretically to a real life situation on the ground.

For effective learning to take place, pupils should be exposed to phenomena that can be observed, structured and followed. For this to be achieved every secondary school should have adequate laboratory facilities and chemical (Yandila, 1992:22).

The learning of science subject can also be hindered by lack of suitable science books in the school libraries. Dodson (1980:12) states that, "there is a chronic shortage of suitable books for the average readers, which are closely linked with the topic found in elementary science course."

Driver (1986:33) mentions that, "the learning of science is made to be more difficult by the misconceptions suggesting that there are amazing, tenacious and resistant to any change or extinctions."

Also the background is another factor that has affected learning of science subject in the sense that most of the pupils at grade 10 are coming from poor science background, this may be due to poor infrastructure such as science laboratories.

Academic performance in science is one key measure of school success because better performance opens doors to higher education and to well paying jobs such as doctors. For girls to have the opportunities as boys in education and in the labour market, it is important to be equally prepared academically in science. Stiped etal (1991:369) noted that "Science equip pupils with a uniquely powerful set of tools to understand and change the world. These tools include logical reasoning problem – solving skills and the ability

to think in abstract ways." Girls like boys need these skills in order to fit in the labour market.

A number of studies have been conducted in many parts of the world to assess the performance of girls in science. Findings in most of these studies have been that the performance of girls has not been impressive. Quite a number of studies have been done in Zambia to find out the performance of girls in various subjects and like many studies done elsewhere the performance has not been good in science. It is for this reason that this study will look at the performance of girls in science at Serenje Technical High School Academic Production unit (APU) section to find out whether the same factors will affect the learning of sciences at the mentioned school.

1.2 Statement of a problem

There have been a number of views expressed on the performance of girls in science. For instance, parents and teachers have different reasons for poor performance of girls in science. This study therefore, endeavoured to ascertain the performance of girls in physical science subjects.

1.3 Purpose of Study

The purpose of the study will be to investigate the low performance of female pupils in physical science at Serenje Technical High School APU.

1.4 Specific objectives of study

The objectives of the study are to:

(i) establish the reasons for low performance of female pupils in science subjects.
(ii) determine the difficulties faced by female pupils in the learning of science at Serenje Technical High School.
(iii) determine factors that affect/ performance of girls in science at grade 12.

(iv) find out the performance of females pupils in science subjects at Serenje Technical High School APU.

1.5 Research Questions

(i) What were the causes of low performance of females in science subjects?

(ii) What difficulties do female pupils face in the learning of science subjects?

(iii) What factors affect girls' performance in science subjects at grade 12?

(iv) How was the performance of female pupils at Serenje Technical High School?

1.6 Significance of the study

The importance of this study is that it may provide information on the low performance of female pupils in the science subjects. The research may provide information on difficulties female pupils face in learning science subjects. It may further provide information on how female pupils can improve their performance. Furthermore, the planners and policy makers may use findings to improve girls' low performance and draw up policies that may be girl friendly.

1.7 Limitation of the study

Due to limited resources, time and transport to cover all schools, the study may confine to Serenje Technical High School.

1.8 Definition of Terms

In order to facilitate communication, the definitions of terms and abbreviations pertinent to the study are presented below.

Science: The organized knowledge obtained by observations and testing of facts about the physical world (Driver, 1986).

Scientific Phenomena: scientific concepts (Lewis, 1972).

Demonstration: Act of showing something by giving evidence or proof to pupils (Hornby, 1996).

Misconception: Misunderstanding of natural phenomena in science topics (Driver, 1986).

Mental models: The existing ideas in a pupil which is scientifically untrue(Driver, 1986).

Curriculum: Different subjects taught in school (Mulenga, 2008).

Attitudes: A state of readiness and tendency to act or react in a certain manner when confronted with certain stimuli (Bilton, 1987: 105).

Self – Fulfilling prophecy: Is a prediction that directly or indirectly causes itself to become true, by the very terms of the prophecy itself, due to positive feed back between belief and behavior (Changala, 2006).

Performance: actual accomplishments as distinguished from potential ability (Brenner, 2001).

Self – concept: Is a person's way of perceiving him/ herself and maybe either positive or negative (Mamwenda, 1995: 363)

Self – esteem: Refers to how one thinks of oneself (Changala, 2006:13).

Abbreviations

MOE: Ministry of education

CDC: Curriculum Development centre.

KM: Kilometre

SABOTECH: Serenje Boys Technical High School

APU: Academic Production unit

FAWEZA: Forum for African Women Education in Zambia.

CHAPTER TWO

2.0 Literature Review

2.1 Introduction

For somewhat similar reason, the study of science is important in the Zambian context especially in high schools. For example, a good background in science will present opportunities in the selection of fields of study in colleges and Universities. The academic performance in science at grade 12 has a bearing as a student progress to tertiary level. The difficulties of many pupils in science is traced back to the way they were introduced to these areas in primary school. For proficiency in science at the high school levels a good background in science is indispensable. Academic performance in science is a key measure of school success in the sense that high school performance opens doors to different stages of education to well paying jobs.

The value of science has also been emphasized by the large number of people who use it in connection with their work. These stress the great values of the practical aspect of the subjects such as agriculture, shopping and medicine. Science is present anywhere in the modern civilization and the efficiency of the industrial of scientific research is even more based on background of the industrial working in any scientific or technological environment. For this reason without knowledge in science, it is impossible to stay in the top of scientific and technological progress. It is the value of something that builds perceptions and attitudes towards the subject (Lewis, 1972).

In Zambia, science is a subject in which girls have performed poor and many do not want to continue learning it at higher grade level. This poor performance in science has led to a situation where by very few girls take up science in higher grades. Despite government and other stakeholders attempts to improve girls' performance in science has been recorded.

Research will be done to find out the academic performance of girls in science and significantly interesting results will be found in these studies. Different factors have been considered in these researches that have contributed to academic performance of girls. Although findings vary in the literature on the performance of girls in science among primary and secondary school pupils,

several conclusions have been made. Most reviews of the literature have concluded that there are factors that affect girls in science, achievement at some point in their schooling.

The performance and participation of females at Serenje High School is low us shown in the examination results. In 2010 examination results, 21 girls were entered and 19 sat for Science (5124) final examination. Out of the 19, from grade one to grade six what was recorded was 0% between grade seven and eight only 8 girls and 11 got nine. This gives a pass percentage of 28. The implication to this is that no female from this intake could have place at tertiary education level in the field of science.

2.2 Difficulties Girls Face In Science Subject

2.2.1 Lack of Resource Books

The availability of science books in the school libraries that is among the most requested books are those dealing with science related topics such as engineering, Mechanic, Rockets and many other advanced sciences. There is a chronic shortage of these books for the average reader that are closely linked with the kind of topics almost anniversary science courses (Dobson, 1980). The situation is that the females are not given an equal opportunity to use the library facilities as compared to the boys.

2.2.2 Lack of Skilled Man Power

Skills of teaching revealed that, bad teaching bring about backwardness. As a result of these bad teaching skills, a child fails to master basic skills in science and this failure hold back pupil's progress. Teaching does not take place unless the pupils are learning. All what the teacher knows is what they intend to teach but many are ignorant of what their pupils are learning. This is because pupils in particular girls, they are unable to answer questions since they could not understand what the teacher was explaining (Derville, 1990).

The issue of teaching reveals that teachers who have themselves limited general education tend to have insufficient knowledge of what they have to teach to make it stimulating to pupils. Their lack of knowledge causes them to teach incorrect facts. Some teachers use informal and mechanical methods of teaching that children are put off on learning and develop attitude of

hostile towards certain subjects including science subject in particular, hence the poor performance of girls in science subjects (Farrant, 1991).

Most methods of teaching applied by teachers have either been positive or negative results. Most teachers apply lecture method in a normal classroom lesson, they feel comfortable with the reading of lecture notes with little interaction from pupils, (Yandila, 1992). They consider any activity by the pupils, which seems to protecting them from delivering their lecture disruptive. This method of teaching tends to hide teachers ignorance or lack of understanding of subject matter since pupils do not have an opportunity of challenging their teachers.

2.2.3 Lack of Teaching Materials and apparatus in the Laboratories.

Farrant (1991: 128) observed that, "The teaching of science can be affected by the unavailability of resources in the school laboratories." The design of school and limited resources allocated to many of them compel teachers to use teaching methods which are much less effective than those that could be used if resources and materials were available in the laboratories. The implication is that girls are the ones that are affected in most cases because they cannot easily mix with the boys.

Lack of teaching materials and apparatus in science laboratory in science laboratory affect the learning of science in schools. Yandila (1992) in his study on the nature of secondary schools in Botswana revealed that in most schools required teaching materials and apparatus to experiment were lacking. In a similar view, Serenje High School girls have no access to the school laboratories and this affects them negatively.

2.2.4 Science Language

In most cases science lesson fail due to the science language. There is a danger that any specialist group like scientists may develop their own kind of Maudlin English which acts as a barrier rather than a means of communication. Most advanced books on science are too difficult to read because they contain complicated words and ideas expressed in what is known as specialized vocabulary. Many of these science books written for school children are too difficult for them to

read. The science teachers are at times at fault, because they communicate to pupils at a high level. This makes the learning of science too difficult to follow the inherent of the subject matter.

The effect of language on the learning of science observed that the hypothetical mode of language is a simple turning if one is used to it. This is a standard chatter when one thinks about scientific domain, but it is not the form languages that come easily to children (Lewis, 1972: 43).

Teachers sometimes forget how difficult it is to understand abstract concepts, labeled with these names and the wealth of meaning and the experiences they carry, for them it is not yet possessed by the pupils. Some words that pupils meet are coined, for example radioactive, electromagnetic and many more such concepts. The pupils find it difficult to understand the first kind and then they do for the second time. They will not use a word correctly, unless those pupils are well drilled.

The concepts that teachers expect pupils to grasp are quite difficult. Other difficulties associated with concepts is that the teachers introduce a concept too soon hence pupils ceases to think about them. With pupils thy accept what they know is all there to know and understand human propensity for ignoring unwelcome facts of any experiences. The pupils feel the four (4) periods allocated for science subject is not enough, hence psychologically their failure.

2.2.5 Beliefs and Misconceptions

The pupils in particular the females, learning is affected by belief systems. From the earliest days of its use, a child develops beliefs about the things in the surroundings by the time the child receives formal education in schools, it has already constructed a set of beliefs about the natural phenomena. In some cases, these beliefs are strongly held and may differ from the concept theories which science teaching aims to communicate. In developing science teaching materials with attention paid to the ideas which children themselves bring to the learning task, yet this may have a significant influence in what children can and do learn from their science lesson. He commented on the importance of considering what he called children's misconceptions, suggesting that there are amazing tenacious and resistant to any change or extinction and learning without misconceptions may well prove to be the most determined single factor in the acquisition and the retention of subject matter (Driver, 1986).

These ideas may influence the observation which pupils can make in their experiments also affects their explanations they give. Pupils can also persist in a range of situations as well as be resistant to change. When some on understands what pupils do spontaneously, one will not be able to demonstrate the limited of this approach to them.

2.2.6 Girls' Attitude

Girls have a negative attitude towards science subject in the sense that they think it is difficult and they regard it a subject for boys. There are instances when pupils dislike learning science subjects because of lack of skills in teachers which results in teachers using poor teaching methods. In addition, some teachers especially female teachers have a negative attitude towards girls and some do not give home work.

Girls do not have as much access to schools as boys, as they are generally confined to household chores. Even the retention of the few girls in school (when they have access) is limited compared to that of boys. Kelly (1994: 54) states that, "the ideals and almost only role that is envisaged for a girl is that she becomes a wife and mother. She is expected to devote herself from an easily age, to chores and children so as to prepare herself for this role. Many regard schooling as little more than a tolerable interlude in this preparation for life and one that has little or no relevance once the girl reaches puberty." The low levels among women have a bearing on the girls' future economic opportunities. Women lack such opportunities and thus they end up, in many cases depending on men for their survival.

Attitudes play an essential role in determining learner behavior towards learning any subjects. Opperhim (1979:105) defines attitudes as, "a state of readiness and a tendency to act or react in a certain manner when confronted with certain stimuli."

Science appears to be unpopular as a high school subject (Bank: 1976). Many girls in secondary school seem to have unfavourable attitudes towards science as they grow. This negative attitude sometimes begins in lower grades as their foundation in mathematics is usually poor. According to Alken (1976), this attitude explains the gender difference in mathematics achievements that was found top favour males in many studies. Zekele (2000) observed that girls' poor science achievements and attitudes were prominent at the 7^{th}, 9^{th}, 10^{th} and 11^{th} grade levels. Zekele's finding generally suggested that these negative attitudes at these grade levels contributed greatly

to their performance in science. Therefore, it implies that science achievement and attitude towards science influence each other positively.

Science is not easy to learn for most people as it is also true that science becomes harder from lower to higher grades. As a result of this and perhaps other factors, girls attitudes towards science become increasingly less favourable as they progress to higher grades. Girls have positive attitudes towards science. This means that students would exert increasingly less effort in learning or studying the subject, the result being that their science achievement would become lower. Swetman (1995) noted that girls positive attitude towards science decline as they grow older. Initially girls have more positive attitude towards science than boys do but as they continue in school, girls attitude become more negative. Thus, the influence of attitude on science achievement may be expected to increase from lower grade to higher grades. The results of Zekele (2002) research further suggested that there existed other variables, besides students' attitude. Other effective variables such as peer-grove expectations were found to affect girls' attitude towards science and other achievement. From the results both females and males (in grade 8 to 12) thought males do better in science.

The importance of attitude in the learning of science is further emphasized by Harlen (1993:39) who argued that, "pupils' attitudes affect the willingness of individuals to take part in certain activities, and the way in which they respond to persons, objects or situations." This shows that learners will only understand or be ready to learn. Girls' attitudes to science serve as a predictor of their performance in science.

A further longitudinal study of the 13 years old group found that from ages 13 to 17 girls showed more and deeper declines in their attitudes toward science (Sherman:1980). In grade 7 the only significant sex- related difference in attitude was girls' stronger denial that science was a male domain. From seventh grade upwards, girls were significantly less confident of themselves as learners of science. They regarded science as more useful, and they continued to regard it as more as a male domain. A large study in England was also conducted by peace and surgeon (1980) who assessed attitudes towards science among approximate 21 boys and girls aged 13 to 17 they indicated that, in general, many of the same patterns of attitude that have been reported in countries like United states can be found in England. For example, where as positive

attitude towards mathematics generally declined among all pupils, the drop was more dramatic in the case of girls.

From these and similar studies stallings et al noted that one of the most significant factor that affected girls performance was the lower estimation of their own ability. They also observed that there is some indication that a girl's relative failure in science is related to their acceptance to regard science as part masculine intellectual domain.

2.2.7 Teachers and parents attitudes

Teachers may contribute to girls' poor performance in science by giving them less attention or a lower quality of attention during class. Girls' towards science is greatly affected by teachers' attitudes. Girls internalize their teachers' and parents negative expectations which become self-fulfilling prophecies. Because girls believe that they cannot achieve in science, they do not achieve in Mathematics. Jenipher (1995:97) states that, "girls poor performance reinforces parents and teachers negative attitudes, expectations and feeds the cycle of negative expectations and lack of achievement." The research concluded that parents and teachers beliefs about the girls could be detrimental to girls belief about mathematics and their performance in science. A number of reasons have been given for this kind of performance of girls (Schwartz and Wendy, 1992).

Furthermore, teachers must consider girls mental and physical development and the effect of their own attitudes and behaviours on girls' performance in science. When girls begin to mature, they focus more on other activities and less on their intellectual abilities. As a result self esteem decreases, their performance affected and therefore teachers should build positive attitudes towards girls.

2.2.8 Traditional Practices

Some cultural norms and beliefs are some of the factors that do contribute to the prevailing poor performance of girls in science. The work that girls do at home before and after school is important because the amount of work given to them would have a bearing on their level of concentration and late coming. According to FAWEZA (1997), there is prevailing cultural

expectations, norms and traditional attitudes that restrict girls achieve mobility and opportunity. Like wise, the amount of time girls are required to spend on domestic tasks and other productive activities reduces the time and energy they have to spend in school and on school work, thereby affecting their attendance and performance. Notably, household chores are mostly associated with girls and this has been attributed to girls' poor performance in school. The impact of work on pupils was examined by MOE (2006) in which it was found that there was no relationship between the frequencies of work done at home before and after school. The findings indicate that household chores to girls before going to school does not affect learning achievement but giving work to girls after school lowers their learning achievement.

In a research conducted by Fennema and Sherman (1978), pupils were asked not only about their perception of mathematics as useful, but the extent to which they saw their parents as supportive of their science and also the extent to which they believed that science was a male domain. They found out that from grade 8 to 11, boys showed a consistently greater degree of self-confidence in their ability to learn science than did girls were significantly less self-confident in their signs of poorer performance tended to confirm the influence of the variable of self-confidence on performance.

Another cause that has been cited to be the cause of girls' poor performance in science is the cultural gender stereo type that society deems, science and mechanical activities are the provinces of males, where literature, languages and social sciences are the province of females. Teachers and parents believe that boys perform better in science than girls. These judgments are reflected in the amount of effort expended by girls in science. It is not surprising, therefore, that adolescent girls pursue science studies to a lesser extent and are not successful. The salience of the feminine or masculine role varies with individuals so that the value of any task reflects not only society's judgment of sexual appropriate but also the reaction of the individuals towards such judgments.

Pohly and Mueiler (1971) in their research found that labeling tasks as masculine or feminine influence the importance attached to success on the tasks and the expectance of success for both boys and girls. They also found that the expectance and performance of boys were influenced more strongly and consistently than were girls. This also was confirmed by Dwyer (1974) in a study of children from grade 2 to 12. Dwyer reported that the extent to which interests and

activities were labeled as masculine or feminine contributed significant variance arithmetic scores of girls.

Research carried out in Ethiopia showed that girls lower performance in science was observed as early as the eight grade. The findings suggested that eighth grade girls' lower performances in science was not attributable to their attitudes towards the subject. This was more so because girls appeared to have a favourable attitude towards science at the eighth grade level. An explanation for this find lay in the local culture which generally discouraged the education of girls (Seyoun, 1986). He further noted that girls' lower performance in science was related to their life style. Most girls in the rural areas were responsible for household chores such as cooking, taking of young siblings or helping their over-burdened mother. This left them very little time to study both at school and home. The explanation was supported by a cross-national study which disclosed that time spent as home work was an important predictor of science achievement and most girls were denied of such time at their homes due to the chores they had to carry out studies in Hawaii have suggested social-cultural reasons why hawii girls are higher achievers (Bartos and Kalish 1961; Kituno, 1962 and smith 1976, Brenner (1984) found that girls performed well in culturally compatible curriculum for children of Hawaiian descent. These findings tentatively indicated that the interaction between curriculum and ethnicity may have affected girls' achievement motivation. Research in several countries show that societies define mathematics as a male subject and expect better performance in that field from boys than girls (Warwick and Jatol; 1994) they also noted that believed that girls have less skills with numbers, teacher use classroom practices in mathematics that do not help female students. Therefore, girls see little uselessness for science in their lives.

The school culture and curriculum is not very friendly for girls (Kelly, 1999). The culture is biased to girls. For example, most of text books have pictures which are not gender sensitive as a boy is portrayed as story, brave, aggressive and adventuresome while a girl is perceived as attention seeking disposition in boys, docile, obedient, subordinate, respectful and caring. Much of the young girls' life is spent in the variety of the home while much o the boy time is spent in moving about. The girls also feel they cannot perform better than boys in their academic work because boys are given leadership roles and challenging tasks in school.

These activities take more time and are more tiring than those entrusted to the boy. They enforce the girl's self image of herself as one who is supposed to serve males and adults. This socialization process transmits values and attributes that cast women and girls in subordinates roles, defining them primarily as child-bearers and child-keepers.

2.2.9 Classroom Interaction

A number of educational researchers have shown that in mixed-sex classrooms girls take less part in discussion and attention from the teachers. At classroom level, researchers have mainly investigated the nature of classroom interaction to try and find causes of low motivation, poor participation and performance of girls in science studies done in the West on classroom interaction reported that girls' participation in classroom activities tends to be poor. Spender (1992) reviewing research on the subject cited several studies which reported that girls talked less, answered, asked fewer questions during science lessons. However, Croll (1985) observed that although most studies support the conclusion that boys receive more attention from teachers than girls, the result have not been uniform, particularly with regard to the magnitude of the differences observed. An American researcher concluded that the difference between boys and girls with regard from teachers were smaller than earlier studies suggested.

A number of studies of classroom interaction in education have shown that in mixed-sex classroom girls compared to single-sex classrooms received less attention from teachers and a prominent part in discussion and this affected their performance negatively. Although most studies supported the conclusion, the results were not uniform. American research conducted by good, etal (1980) said that teachers gave girls little attention in class. They also noted that teacher interaction had a strong bearing towards girls' needed support from their teachers to encourage them to use the time they need to understand concepts and to formulate their own foundations of science thinking. This was actually missing in many classrooms.

Different British studies have also presented different estimates of the degree of imbalance in the levels of teachers attention to girls. A study of the extent to which boys verses girls call of answers to questions which teachers pose to the class, studies concluded that boys called out answers more frequently than girls (Kleinfield;1998). The report further reported that teacher's typical reaction to boys was to listen to the comment, while girls were usually told to raise up

their hands if they wanted to speak. Spender (1982) claimed that sometimes even when teachers are trying to equalize attention, girls get only over a third of their time teachers spend with pupils in terms of attention they receive from teachers. Spender further found that girls especially in junior secondary years were reluctant to express their view points in class as they were not recognized by teachers. Gavin and Reis (2004) observed that, if girls are to perform well in science, teachers should create classroom environment that will help girls develop science abilities and this environment should mature, create thinking and encourage risk taking among girls.

In Zambia, studies investigating the performance of girls have attributed poor interaction from teachers, among other things to biased learning materials, biased curriculum and poor teacher qualification and parental expectation of the girl child.

There are certain behavioural patterns that characterized girls approach to science. One is their tendency to keep to specific methods that have been approved by their teachers. There is also apparent blindness to the real world significance of some of the science problems. Woods (2005) noted that there is girls' consistent failure to follow a problem through to its conclusion. That is, when problems involve a number of steps for their solution, girls are more likely to stop at the first stage. All these types of behavior have relevant to number applications or problem solving and may offer some explanation for girls' poor performance.

CHAPTER THREE

3.0 Methodology

3.1 Introduction

This chapter presents methodology that was employed in conducting the research design, population, sample size, sampling procedure, data collection instrument, data analysis, ethical consideration research schedule and Time line. The proposed budget was reflected.

3.2 Research Design

The research study used both qualitative and quantitative designs. This is referred to as mixed design method. The mixed design was preferred because it provided a systematic means of collecting and presenting data. Besides, the study involved beliefs, perceptions, attitudes and behaviorus that needed to be described. In addition, it was less costly and less time consuming considering the time that was available for this study.

3.3 Population

The research targeted 60 female APU pupils of which 35 were grade 11 and 25 were grade 12 at Serenje High School.

3.4 Sample Size

The sample size was 35 for grade 11 and 25 for grade 12, only 6o girls were picked at random from the senior classes. The randomly picked girls were orally interviewed and some responded to questionnaires. Besides those two sciences teachers and the APU supervisors were also interviewed orally.

3.5 Sampling procedure and techniques

The sample of the study was selected using two sampling techniques i.e simple random sampling and judgement.

The classes of grade 11 and 12 girls' pupils from the school were selected by simple random sampling. In a simple random sampling, each individual case in the population (theoretically) has an equal chance to be selected for the sample.

3.6 Data Collection Instruments

The study used questionnaires, interview guides and science lessons observations to collect information. The interview guides were used to collect qualitative data while questionnaires and lesson observations was for quantitative data. In addition, an informal discussion list was used to gather more information for analysis.

3.7 Data Analysis

The data collected was analysed using graphs and tables. This helped to make the information comprehensive for the reader. Furthermore, data was analysed qualitatively using themes.

3.8 Ethical considerations

The research was sensitive to issues such as seeking authority from the head teacher in advance. The information gathered from the participants/respondents was treated with confidentiality. The researcher avoided questions which might cause psychological harm to the participants / respondents.

CHAPTER FOUR

4.0 Presentation of Findings

4.1 Introduction

This chapter presents the findings of the study. The findings are presented under the following sub headings; general performance of girls in science, performance of girls in science test results, teachers and parents attitudes, cultural factors, attitudes of girls towards science, class room interaction, shortage of materials and apparatus in the school laboratory, shortage of skilled manpower, girls preference of other subjects to science, science is for boys and not for girls, boys jeer girls when they fail to solve science and teachers do not teach well in science. The findings presented in this chapter are responses from both pupils and teachers. Responses from the focus group discussions and data from the analysis of the school records such as class registers and report forms and final examination results are also presented.

4.2 General Performance of Girls in Sciences

Evaluation of the pupils performance in science was assessed by looking at the last years (2010) performance where 21 girls where registered to sit for grade 12 exams in sciences 5124 and only 19 sat for the exam, out of the 19, from grade one to grade six the pass percentage was 0%, between grades seven and eight only 68 girls and 11 got grade nine and this gives the pass percentage to 38%. In terms of qualitative pass percentage was 0 while quantitative pass percentage was 38.

Table 1. General Performance of Girls In Science Final Exam 2010.

School	Registered	No. sat	Results		
			1 -6	7 -8	9
Serenje High School	21	19	0	8	11
	21	19	0	8	11

From the above results out of the 19 girls who sat for the science final examination, eight (8) passed while 11 failed. This passing is in quantitative which was 38% whole quantitative pass rate was 0%

4.3 Performance of Girls in Science Test Results

Table 2

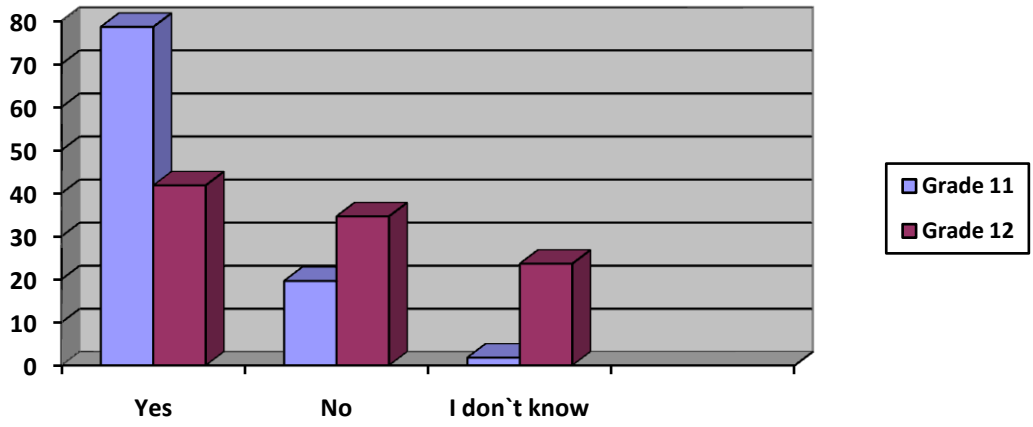
Class/ grade	qualitative	quantitative	unsatisfactory	Total
11	03	25	13	41
12	01	09	09	19
Total	04	34	22	60

The performance of girls in science test results was extremely poor. From the above result out of the 60 respondents for grade 11 only 3 managed to pass the test out of 41 girls while for grade 12 only 1 managed to pass the test out of 19 girls and pass here means the qualitative passing and not just a mere pass.

4.4 Teachers and parents attitudes

Respondent were asked if teacher's attitude affect girls performance in science in both grade 11 and grade 12 at Serenje High School APU-section. Results are presented in Fig 4.2.2.

Fig 4.2.1 Teachers attitude affecting girls` performance in science

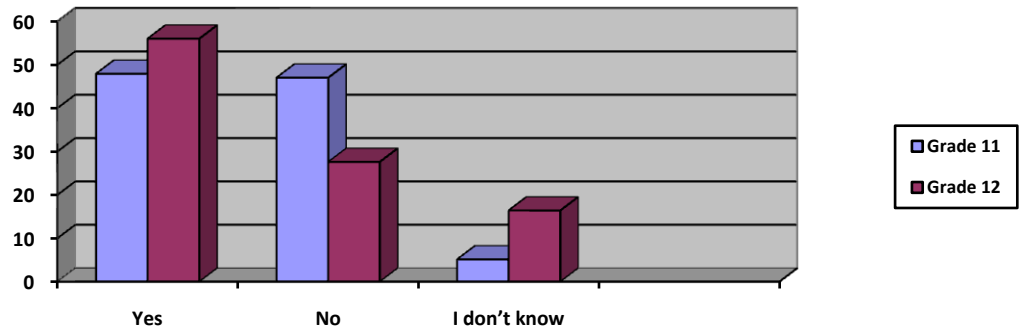


The teachers confirmed that the performance of girls in science was poor due to negative attitudes of some parents and teachers.

4.5 Cultural Factors

Respondents were asked if cultural beliefs such as girls spending most of their time doing home chores then doing homework in science have any effect on the performance of girls. Results are shown in figure 4.2.2

Figure 4.2.2



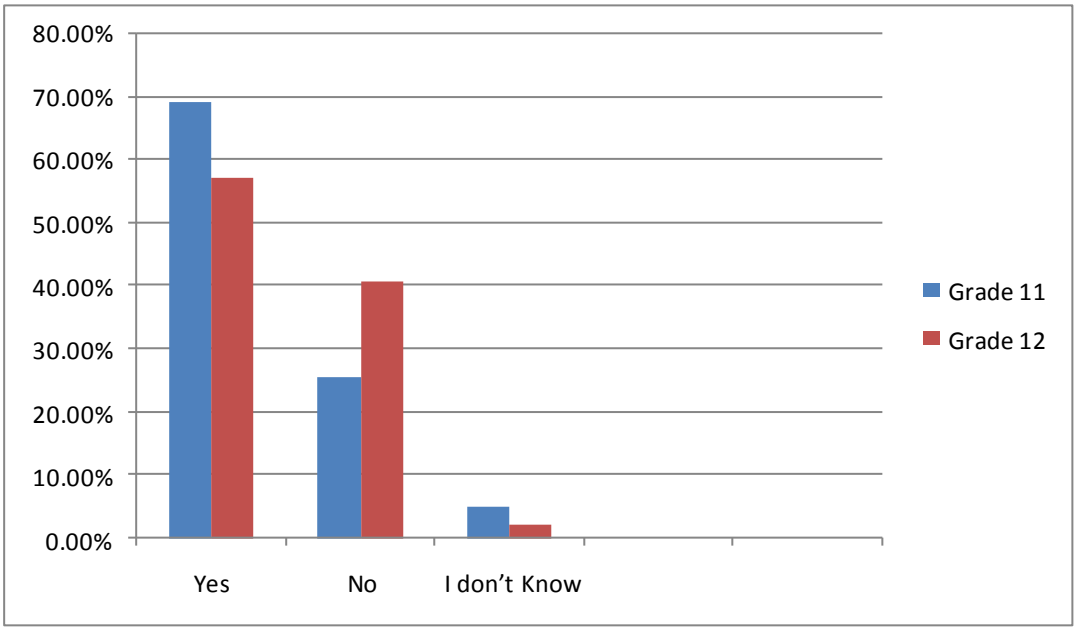
4.6 Attitudes of Girls towards science

In assessing girls` performance in science at grade 12 level, it is important to assess their attitude towards the subject. This section presents the assessment of both grade 11s and grade 12 girls towards science. The main issues assessed on are preferences for other subjects to science, science being considered as a subject for boys and for girl`s, boys mistreating girl`s when they fai to answer science questions in class and girl`s general attitude towards teachers` presentation of the science lesson.

4.7 Classroom interaction

Respondents from both grade 11 and 12 girls` at Serenje High School were asked if classroom interaction has any effect on the performance of girls` in sciences. Findings are presented below

Figure 4.2.3



In mixed sex classrooms girls participate less in discussion and lack attention from teachers.

4.8 Shortage of materials and apparatus in the school laboratory

The laboratories on the other hand are not adequate, as they have not enough materials and apparatus in the labs to be used when teaching science.

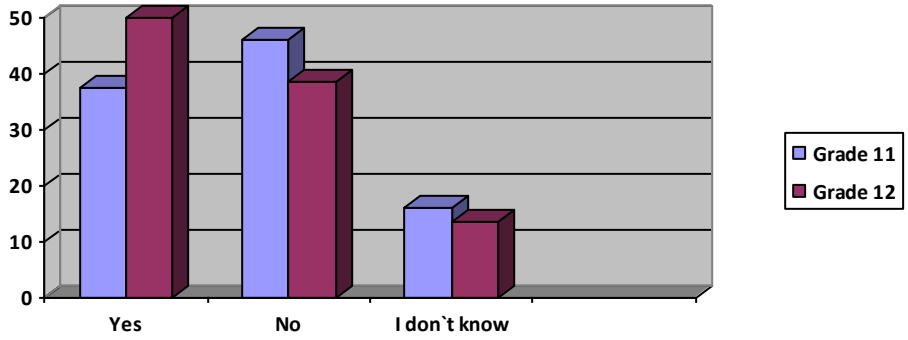
4.9 Shortage of skilled manpower

The other problem is that the teachers in the science department are not enough. The department has eight (8) in totals and in the physics section they are only three teaching the whole school of twenty- four classes for the internal and twelve for the Academic Programme Unit (APU) bring together a total number of thirty- six classes. As a result there were inadequate preparations of lessons by the teachers. Out of the eight (8), only one (1) was a University graduate and the rest were diploma holders and in the physics department in particular, there was no one with a degree. After an interview with them in trying to find out if any one of them would be going to do a degree in science and physics in particular the unfortunate is that no one was ready to study in that area.

4.10 Girls prefer other subjects to science

In assessing attitude of girls` towards science. Both grade 11s and grade 12 girls` were asked if they preferred other subjects to science. Results are presented in Fig 4.2.4

Figure 4.2.4

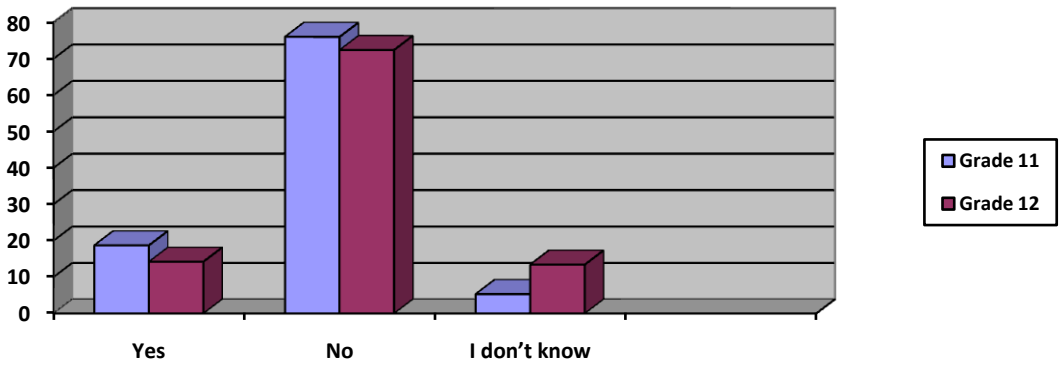


In figure 4.2.4, 37.6% of grade 11 respondents indicated that they preferred other subjects than science and 50% of the grade 12 respondents also indicated that they preferred other subjects to science.

4.11 Science is for boys and not for Girls

Grade 11 girls and grade 12 girls of Serenje High School were asked as to whether they agreed or not with the notion that science is the subject for boys and not girls. Results are presented in

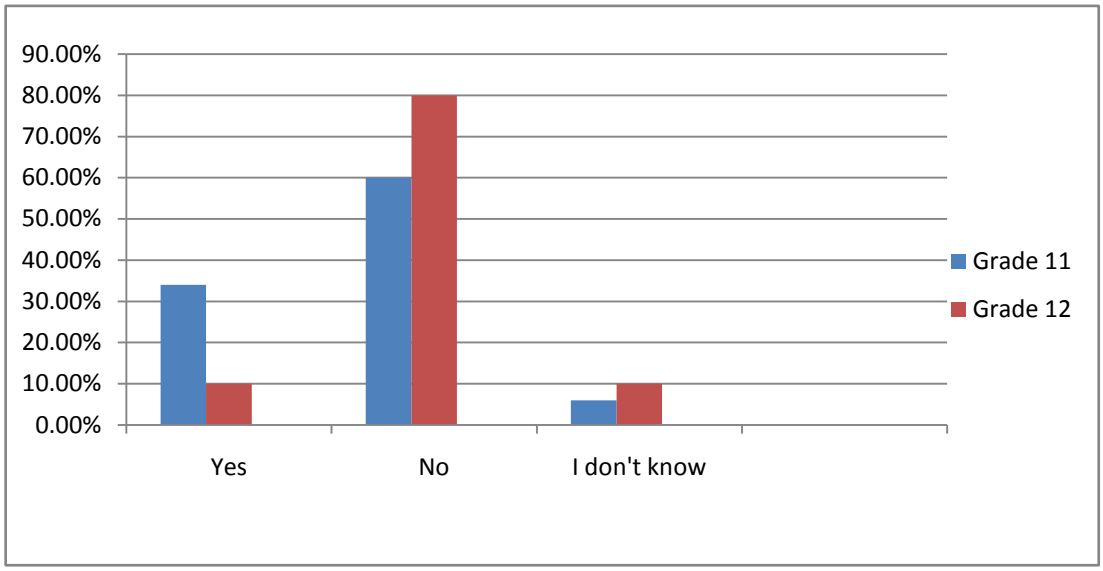
Figure 4.2.5.



4.12 Boys Jeer girls when they fail to solve science tasks

Respondents were asked if boys jeer girls in class or outside when girls fail to answer science questions in the classroom. Results are presented in Fig 4.2.6.

Figure 4.2.6

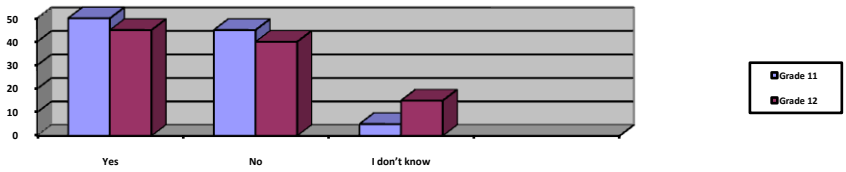


4.13 Lack of Skilled Teachers

After the lesson observation, it was discovered that most teachers do not follow good teaching methods or strategies, hence the teaching and learning of science, Physics in particular is hindered.

Grade 11 and 12 attitude towards teachers presentations of lessons in class were assessed regarding whether or not teachers do not teach well. Results are presented in Fig 4.2.7.

Figure 4.2.7 Teachers do not teach well in Science



CHAPTER FIVE

5.0 DISCUSSION OF FINDINGS, CONCLUSION AND RECOMMENDETIONS.

5.1 Discussion of Findings

5.1.1 Introduction

This chapter discuss the findings of the study. The discussion of the study covers the performance of girls at grade 11 and grade 12 twelve at Serenje High School. The factors contributing to poor performance of girls including their attitudes in both school settings were discussed. The results of this study raise several implications as far as education of girls in science is concerned.

5.1.2 Performance of Grade 11 girls and Grade 12 girls at Serenje High School in Science Subject

This study has revealed that girl`s from Serenje High School performance in science was poor. The reasons forwarded for this are the school is stocked with text books that have no relevant to the teaching of science at elementary level, less trained teachers, poor lack of apparatus and materials in labs, attitudes cultural issues and interactions.

During the 2010 final results the enrolled 21 candidates and out of this number only 19 sat for exams. Out of this number no girls passed in terms of qualitative results but in terms of quantitative they had a pass percentage of 38%.

Armstrong (1980) had provided evidence that suggests that girl`s poor performance in science is as a result of discrepancy in recall, combination and application of relevant knowledge to a problem. Girls, regard of them being grade 11 or grade 12 do not follow a problem through to its conclusion. The findings of this study seem to support this view. These results seem to support Armstrong (1980) findings.

In focus group discussion, teachers interviewed at Serenje High School cited English language as a major problem that affected girls performance in science. Most of them were not able to read. They indicated that no choice but to use LALA to ensure that pupils understood them.

It is reasonable to mention that most of the girls in rural areas in Serenje District are unable to read in the English language. With such a challenge, it can be assumed that many of them are

unable to find right answers and opt to pick any answer from the given options. One would therefore assume that the teaching of science concepts was not being adequately done as pupils at a certain stage are expected to read on their own. Equally this may also be caused by poor teaching of English language by teachers which is supposed to support girls in solving. On views if poor performance girls in science one grade 12 female teacher had this to say.....

“Girls are lazy to concentrate”

“Most girls are lazy in science as they do not want to think deeply”

From the available literature on self- concept (Wolf & Blix; 1981) pointed out that girls with a positive self- concept is more likely to have a positive attitude toward science, which is likely to lead to good performance. It can therefore be assumed that if some girls are lazy and do not want to think as the teachers pointed out, they end up having negative self- concept and this affects their performance.

5.1.3 Teachers and parents attitudes

This study has revealed that teachers may contribute to girls` problems in science by giving them less attention or a lower quality of attention during class. According to results (Fig 4.2.2)78.6% of the girls from grade 11 and 41.8% of girls from grade 12 at Serenje High schools-APU agreed that their performance was affected by teachers attitude while 19.6% of girls from grade 11 and 34.6% of the girls were from grade 12 at Serenje High school-APU section disagreed. This entails that teachers must be careful not to limitgirls’ potential in science by using gender-based practices. Especially during science instruction, teachers must be sure to call on girls for answers to questions, and to give them praise when appropriate.

Further, the research revealed that due to the fact that teachers in basic schools are trained, it can be assumed that they follow the methodology needed to teach science. Further due to constant in service program’s held in most of the grade 11 classes, teachers share challenges they face in teaching science and possible solutions are discussed.

The findings of study from the teachers are that teachers’ is a factor that affects the performance of girls in science. The teachers do not pay attention to girls’ problems in science. They

considered girls to be dull and that they lacked seriousness. One of the respondents explained that the teachers concentrated on the boys who were doing well in science. The girls were paid little attention when they needed assistance in the subject. It was also said that most teachers ignored girls in terms of questions in class. (Fox 2002: 17) says that "girls' poor performance reinforces parents and teacher's negative attitudes, expectations and lack of achievement". Therefore, the response of teachers agrees with Fox's observation that the attitude of teachers affects the performance of girls in science. The ideal situation is where teachers treated girls as learners who have the potential to pass science just like the boys.

The findings from the girls are that parents' attitudes affected their performance in science. The respondents explained that parents paid school fees for boys before girls. Girls would be sent back home hence, they remain behind and fail to catch up with other pupils. Kelly (1994) asserts that parents favour the education of boys than girls. This observation by Kelly is in line with this response from the girls. The performance of girls in science could have been good if only parents valued the education of girls.

5.1.4. Cultural Factors

Cultural factors were assessed whether or not they contributed to the poor performance of girls in grade 11 and grade 12 at Serenje High School-APU section. Results presented in Fig 4.2.4 have shown that 47.9% of girls from grade 11 and 27% were grade 12 girls. A minority of 5.1% and 18.4% from grade 12 girls did not have any idea.

An example for this finding probably lies in the cultural belief which generally encourages that a female is responsible for home chores. All the teachers interviewed agreed with the girls with the highest responses from both grade 11 girls and grade 12 girls at Serenje High school-APU section. They said that some girls went to school tired and some of them even slept in class. These results seem to support Seyoum (1986) findings that showed that girls' performance in science could be related to their life style where they are responsible for house chores to help their mothers who were over burdened. The variable on work at home and after school is important because the amount of work given to the girls after school would have a bearing on their level of work concentration on the homework. However, the findings may indicate that

giving home chores to girls before and after school lowers their learning achievement as they may be tired to write home work.

This is in line with Kelly (1999) who observed that girls are entrusted with a multiplicity of household chores and domestic tasks. This implies that girls are not given enough time to do their studies at home because they are expected to assist their mothers with cooking, sweeping and so forth.

5.1.5 Classroom Interaction

Factors affecting girl`s performance in grade 11 and grade 12 at Serenje High School are presented in the previous chapter. The results in (Fig 4.2.1.) show that classroom interaction affects girls` performance in science in both settings. The results revealed that 69.2% and 57% of girls` from grade 11 and grade 12 girls` at Serenje High School- APU agreed that their performance was affected by the level of interaction in classroom respectively. Those that considered interaction in classroom as not one of the factors affecting girls` performance for both grade 11 and grade 12 girls at Serenje High School were 25.6% and 40.8% respectively. A minority of respondents (5.2% grade 11 and grade 12 at Serenje High School- APU section was 2.1%) had no idea on the issues.

A number of studies of class room interaction in education have shown that mixed-sex classroom girls compared to single-sex received less attention from teachers and a prominent part in discussion and this affected their performance negatively. This is supported by Spender (1992) who reviewed in his research that girls talked less, answered and asked fewer questions during science lessons.

5.1.6. Attitudes of Girls towards science

Girls have a negative attitude towards science subjects in the sense that they think it is difficult and they regard it a subject for boys. There are instances when pupils dislike learning science subjects because of lack of skills in teachers which result in teachers using poor teaching methods. In addition, some teachers, especially female teachers have a negative attitude towards girls and some do not give home work.

The teachers lamented that girls in APU classes have negative attitude towards science. They said that girls do not care whether they perform better or fail science. The girls do not bother to ask teachers even when they have not understood anything.

5.1.7 Shortage of teaching materials and apparatus in the school laboratory

The responses from teachers revealed that there was lack of teaching materials. They further explained that they do not have text books to use in order to make teaching easier. In addition teachers said that it is difficult to teach pupils in the absence of teaching materials and apparatus in the laboratory.

Therefore, it is clear that lack of teaching materials resulted into girls' bad performance in science. Furthermore, the teachers explained that the school did not have textbooks for pupils.

It was difficult for the girls to study the subject due to lack of text books. They did not have study materials to prepare for the next lessons on their own.

5.1.8 Shortage of skilled man power

The other problem is that the teachers in the science department are not enough. The department has eight (8) in totals and in the Physics section there are only three teaching the whole school of twenty-four classes for the internal and twelve for the Academic Production Unit (APU) bring together a total of thirty-six (36) classes. As a result there are inadequate preparations of lessons by the teachers. Out of the eight (8) teachers, only one (1) was a university graduate and the rest were diploma holders and in the Physics section in particular, there was no one with a degree. After an interview with them in trying to find out if any one of them would be going to do a

degree in science and physics in particular the unfortunately was that no one was ready to study in that area.

5.1.9 Girls prefer other subjects to science

This study has revealed that girls prefer other subjects to science Fig 4.3.1 has shown that 37.6% girls from grade 11 and 50% of girls from grade 12 agreed that girls prefer other subjects to science. This entails that girls from both grade 11 and grade 12 have lower expectations for themselves in science and that girls believe they do not have science ability. When girls do poorly in science, they attribute their poor performance to their inability to do science.

Discussants in focus group discussions explained that girls' beliefs begin early in their education and persist into secondary school and probably beyond. Therefore, starting at the elementary school level, teachers need to encourage girls to have higher expectations for them in science and offer girls alternative, positive explanations of their science performance.

5.1.10 Science is for boys and not for girls

According to the findings of this study (Fig. 4.3.2.) 18.7% of girls from grade 11 and 14.2 % of girls from grade 12 agreed that science is a subject for boys and not for girls. However, majority of respondents from grade 11 76% grade 12 disagreed with the notion. This entails that girls in both grade 11 and grade 12 were aware that science is not just for boys but for girls too.

In focus group discussion, it was reported that grade 11 girls and grade 12s do not recognise the subjects that they must study in order to have specific careers. It was further reported in the focus group discussions with teachers that grade 11 girls have little career aspirations and their feelings about sex stereotypes in certain professional fields. They explained that students that society accepts many different careers for women and men.

Neither the girls from grade 11 nor those from grade 12 recognise the relationship between the study of science and their future career aspirations as girls never realise that their preferred future can course work in science. It seems prudent for science teachers to discuss with pupils the many professional fields that require science.

5.1.11 Boys Jeer girls when they fail to solve science tasks

This study has revealed that the negative attitude of girls from both grade 11 and grade 12 of Serenje High School-APU section may be as results of jeering perpetuated by boys when girls fail to provide answers to science questions. According to Fig 4.3.3, 60 % of girls from grade 11s and 80% of girls from grade 12 disagreed with the statement. Those that agreed were 34% from grade 11 and 10% were from grade 12 girls.

According to focus discussion with teachers, girls, and attitudes towards science to some extent are as a result of jeering from boys. This may call for gendering-the separation of boys and girls. They explained that this may lead to girls developing positive attitude for science. Further, focus group discussion revealed that separating boys and girls during science may improve girls' negative attitudes towards science.

5.1.12 Teachers do not teach well in science.

The results presented in Fig. 4.3.4 have shown that both groups of girls did display disagreement to the statement concerning teaching methods. Majority of respondents from both grade 11 girls (50%) and grade 12 (45%) at Serenje High School agreed that teachers do not teach well. They explained that teachers mostly point at boys than girls when they want pupils participation in learning. These results are similar to those of Sinyangwe and Chilangwa (1995) that the larger amount of teacher initiated interaction in science was directed towards boys. Girls were generally found to interact less with their teachers than the boys especially in the rural areas as boys were invited to answer question even when they do not raise their hand ignored.

In the focus group discussions with teachers it was revealed that various reasons lead to this and some of those given included that many girls were shy and not able to put up their hands and even sometimes pointed at were not able to give answers. These results seem to suggest that teachers point at both boys and girls as there are many class activities that even involve boys and girls together.

After lesson observations, it was also discovered that most teachers do not follow good teaching methods or strategies, hence the teaching and learning of science, physics in particular is hindered.

In these other five (5) lessons, learning did not take place due to the following reasons to be specific:

(a) Poor Introduction

- In some lessons introduction was not stimulating or interesting hence pupils lost confidence in the teacher.

(b) Poor Timing

- The timing was very poor in some lessons, if you just imagine a teacher spending 15-20 minutes on introduction only and it is a lesson of 80 minutes and for sure there was no lesson evaluation because the planned objectives of the lesson were no presented to the pupils.

(c) Notes Only

- The other teacher come in class and just gave the notes to the pupils, he just explained difficult terms of which pupils could not know of understand all the terms of the topic and his voice projection was very poor of which pupils at the back could not hear what the teacher was teaching.

(d) Poor class management

- On the other lesson in a grade 12 B class (APU) the teacher could not control the class, they were just giving chorus answers but the teacher was accepting, hence the shy pupils were behind.

I was surprised with one thing, some of these teachers who were involved in the three bad lessons, two (2) were qualified teachers of diploma holder in the field of science and the other one was a university graduate in the field of science (Biochemistry)

Poor laboratory state

The laboratories on the other hand are not adequate, as they have not enough materials and apparatus in the labs to be used when teaching science.

5.2 Conclusion

Learners with science problems do not live in a world of their own. They are therefore expected to follow exactly the same curriculum that other pupils learn as this guarantees meaningful interaction in society.

The study has highlighted the barriers girls in grade 11 and 12 at Serenje Technical High School face in quest to improve their science performance at grade 12 level. Factors that work against girls from both grade 11 and 12 at APU include teachers, parents and society's impact on girls' such as attitudes and perceptions, achievement and performance and career interests and aspirations. Parents' and teachers' expectations for girls in science have an enormous impact on internalize their teachers' and parents' negative prophesies. Most girls believe that they cannot achieve in science and thus makes them perform badly. Their poor performance reinforces parents' and teachers' negative expectations and lack of achievement. Clearly, teachers' and parents' expectations for girls' performance in science must be raised if girls are to have the opportunity to achieve in science.

The study was aimed at assessing the performance of girls in science in grade 11 and 12. The study used both qualitative and quantitative methods of data collection and analysis and applied the attribution theory to the data collected. The study also reviewed the school documents such as registers and report forms as secondary source of data.

There are several factors that affect grade 12 girls' performance in science. These included interaction in class, teacher attitude and cultural issues also including the misconceptions, poor laboratories and shortage as skilled man power.

In addition, girls attitudes towards science was assessed and results have shown that girls' own attitudes towards science range from making science as a boys and not a girls subject. The preference of other subjects to science and teachers' poor presentation during physical science lessons is a contributing factor.

This study has, therefore, established that there is no major variance in performance among girls from grade 11 and 12 at Serenje Technical High School and that their performance in science has a long history ranging from gender unbalance to lack of career aspirations.

5.3 Recommendations

In as much as the teacher is supposed to address the academic needs of the female pupils there has been various short comings that have made it difficult for female learners to benefit in full from the provided learning opportunities. The following recommendations were made to address the factors that affect female pupils in physical science subjects in grade 11 and 12.

- The government through, the office of the District Education Board Secretaries (DEBS) should organize workers and seminars where teachers for physical science subjects can appraise their teaching methods so as to effectively address the needs of female pupils.
- The education planners should channel more funds towards the production of physical science materials adapted to sort female pupils for instance readers should have more girls pictures to concretize meaning.
- A variety of teaching and learning aids and strategies should be used in class to enable pupils acquire reading skills and enjoy reading, for example the use of cooperative learning and organization of reading tents where pupils compete to read books and are given a quiz at the end of the competition. The winning group/ team is rewarded to encourage the other team to work hard while the losing team is also encouraged to strive hard to challenge the winning team.
- Teachers should adhere to the use of total communication from initial grade when teaching because certain meanings in English are lost out or not understood by female pupils who are sometimes only exposed to spoken language.
- The teachers should work towards changing the negative attitudes of female pupils towards physical science subjects.
- The communities should be sensitized on the need for a girl child to find time to do home work and not just concentrate on household chores. The Ministry of Science and Technology should partner with the Ministry of Education in order to support the girl

child in the area of physical science subjects for examples, to give a full sponsorship to the girls.

- There should be an allowance of allocating more time to the lessons in order for them to assimilate what they are being taught.

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APPENDICES

APPENDIX II

A Questionnaire for female pupils

Dear respondent,

Iam a fourth year student currently studying for a Degree in Adult education at University of Zambia. I am carrying a research on the academic performance of female pupils in physical science subjects at Serenje Technical High School Academic Production Unit (APU). You have been randomly selected to participate in this research. The information you will provide is purely for academic use and will be treated with the highest degree of confidentiality. You are therefore required to be objective and truthful as you can be possibly in your responses.

Please do not write your name anywhere on the questionnaire.

Thank you

Instructions

Kindly tick ( ) your response to each given statement.

1. Teachers are not sensitive to problems girls face in learning science in your class.

(a) YES ☐

(b) NO ☐

2. Teacher point at boys to give answers during a science lesson in my class even if girls raise their hands

(a) YES ☐

(b) NO ☐

3. Teachers give equal attention to both boys and girls during science lesson

(a) YES ☐

(b) NO ☐

4. Girls spend most of their time doing home chores than homework in science at home.

(a) YES ☐

(b) NO ☐

5. Most girls fear science unlike other subjects.

(a) YES ☐

(b) NO ☐

6. Do you like science subject?

(a) YES ☐

(b) NO ☐

7. Is it true that girls perform better as compared to boys in science?

(a) YES ☐

(b) NO ☐

8. Is it true that girls perform better than boys in science?

(a) YES ☐

(b) NO ☐

9. Is there any difference between the performance of girls in grade 11 and grade 12 at Serenje High School?

(a) YES ☐

(b) NO ☐

10. Are you ill – treated by teachers during science lessons?

(a) YES ☐

(b) NO ☐

11. Is science a subject that should only be taken by boys?

(a) YES ☐

(b) NO ☐

12. Do your parents / guardians support you in your science learning at home?

(a) YES ☐

(b) NO ☐

13. Science is a difficult subject for me therefore I do not work hard.

(a) YES ☐

(b) NO ☐

14. Why do boys perform better in science than girls?

_____

_____

15. Do you have any suggestions to this problem?

_____

_____

_____

APPENDIX III

AN INTERVIEW GUIDE FOR SCIENCE TEACHERS

Dear respondent,

I am a fourth year student currently studying for a Degree in Adult education at University of Zambia. I am carrying a research on the academic performance of female pupils in physical science subjects at Serenje Technical High School Academic Production Unit (APU). You have been randomly selected t o participate in this research. The information you will provide is purely for academic use and will be treated with the highest degree of confidentiality. You are therefore required to be objective and truthful as you can be possibly in your responses.

Please do not write your name anywhere on the questionnaire.

Thank you

1. How many years have you been teaching at senior level?
2. What are the key problems that are associated with science that affect girls performance in sciences?
3. What factors at school level affects girls in the learning of sciences?
4. What factors at home contribute towards the performance of girls in science?
5. What do you think are the best ways of dealing with the problems of the performance of girls in science?
6. Do parents / guardians encourage girls in the study of science?
7. Do cultural beliefs affects girls performance in science?
8. Are there any specific areas in science which are difficult for girls?
9. Are there attitudes that affect girls' performance in science at grade 12 level?
10. How do you think girls should be helped to enhance performance in science?

APPENDIX IV

AN INTERVIEW GUIDE FOR THE APU SUPERVISOR

Dear respondent,

I am a fourth year student currently studying for a Degree in Adult education at University of Zambia in the academic performance of girls in science at grade 12 level Academic production Unit APU. You have been randomly selected t o participate in this research. The information you will provide is purely for academic use and will be treated with the highest degree of confidentiality. You are therefore required to be objective and truthful as you can be possibly in your responses.

Please do not write your name anywhere on the questionnaire.

Thank you

1. When did you come this school?
2. How long have you been the APU section supervisor?
3. How many teachers are teaching science at APU section?
4. How many of these teachers and teaching physics?
5. I understand that your section has not been doing well in physics for the past three (3) years. What do you think could have been the root cause for this?
6. How often do you meet the teachers who teach science in the APU – section to interview the result and to find the strategies to use in order to improve the results in the section?
7. After observing most of the lessons, I have noticed that pupils are not doing well in experiments in the labs. What could be the reasons to that?
8. How do you look at the effectiveness of science in particular physics in you section.

APPENDIX V

RESEARCH SCHEDULE AND TIMELINE

TIME ALLOCATION	ACTIVITY
September, 2010	Preparation and submission of research proposal
October, 2010	Developing of research instrument
17th November, 2010	Submission of research proposal
January, 2011	Data collection for research
February, 2011	Writing draft report
March – April, 2011	Writing final draft
May, 2011	Submission of final report

APPENDIX VI

PROPOSED BUDGET

ITEM	UNIT	RATE PER UNIT IN KWANCHA	COST
Preparation of research proposal	1 ream of paper	01 X K30,000	K30,000
Typing	60 pages	60 X K3000	K180,000
Printing	60 copies	60 X K500	K30, 000
Data analysis Transport	01	01 X100,000	K100,000 K400, 000
Preparation of final report	Typing and printing Binding	60 X K5000 3 X120,000	K300,000 K360,000
		Total	K1,400,000.00