# PERCEIVED FACTORS LEADING TO POOR PERFORMANCE AMONGST PUPILS LEARNING SCIENCE IN SELECTED SECONDARY SCHOOLS IN MWANDI DISTRICT, ZAMBIA

**BY**

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## DECLARATION

I, **Ndala Kelvin**, do solemnly declare that this dissertation represents my own work. It has not previously been submitted for a degree or any award at the University of Zambia or any other institution. All published work or materials from other sources incorporated in this dissertation have been specifically acknowledged and references thereby given.

Signature (candidate)……. Date……...

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## CERTIFICATE OF APPROVAL

This dissertation by **Ndala Kelvin** is hereby approved as a partial fulfillment of the requirements for the award of the Degree of Master of Education in Sociology of Education at the University of Zambia.

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## ABSTRACT

This study investigated the perceived factors leading to poor performance amongst pupils learning Science in Zambia, a case of Avocado Day Secondary School, Banana Boarding Secondary School and Coconut Day Secondary School in Mwandi District of Western Province. The study used a descriptive research design whereby a total of 45 pupils from the three schools were selected. These pupils were from Grade 10, 11 and 12 classes. Nine teachers from the three schools and three parents from each community surrounding the schools were also selected. Non-probability sampling method which was purposive sampling was used to select participants for the study. Data collection was achieved through the use of semi-structured interviews with parents, focus group discussions with pupils and key informant interviews with teachers. Thematic analysis was used to analyse data.

The main findings of this study showed that the common reasons that contribute to poor performance are negative attitude towards Science among pupils and lack of resources such as textbooks and well-equipped laboratories, admission of weak students to Grade Eight entry, inadequate teaching and learning materials. It is recommended that the government must ensure that the schools are well equipped with necessary materials. The teachers should use modern methods of teaching Science in order to motivate the students and sustain their interest in the subject.



**Keywords:** Science, Poor performance, Factors, Environment.

## DEDICATION

I dedicate this work to my lovely children, Kelvin and his sister Mutinta for their patience, trust and understanding when I did not attend to their needs as a father due to pressure of work.

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## LIST OF ACRONYMS

| | |
|---|---|
| **AIDS** | Acquired Immune Deficiency Syndrome |
| **BRE** | Barotse Royal Establishment |
| **COVID** | Corona Virus Disease |
| **ECZ** | Examinations Council of Zambia |
| **ESM** | Effective School Model |
| **FAWE** | Forum for African Women Educationists |
| **HIV** | Human Immunodeficiency Virus |
| **MOGE** | Ministry of General Education |
| **OVC** | Orphans and Vulnerable Children |
| **PEO** | Provincial Educational Officer |
| **PTC** | Parents Teachers Committee |
| **SCT** | Social Cognitive Theory |
| **UNZA** | University of Zambia |
| **USNR** | United States National Research |

# CHAPTER ONE

# INTRODUCTION

## 1.1 Introduction

This chapter presents the background to the study, statement of the problem, purpose of the study, research objectives, research questions, and significance of the study, delimitations, limitations and operational definition of terms. The study investigated the perceived factors that contribute to the poor performance of pupils in science education in Mwandi District of Western Province in Zambia.

## 1.2 Background to the Study

High rate of under-achievement in Science at high school level is a cause of great concern across the globe (Fonseca & Conboy, 2006). As a result, some nations, including the United States of America and Zanzibar, for example, have already started urging all citizens with special emphasis on schools, parents, industry, government and science communities to make a concerted effort against poor performance in science subjects in high schools to ensure that future results would be more encouraging (Yussuf, 2007:1). It is disturbing to note that corresponding trends of low achievements in science have also been recorded in Zambia (ECZ, 2015).

The striking and central feature emerging from all these nations and others, indicate that under achievement in Science at high school level continues to be a major global challenge (Kanyongo, Schreiber & Brown, 2007:37-43). It is, therefore, imperative to address this challenge for sustainable development because each country's wealth and economic development are highly dependent on Science (Muwanga-Zake, 2008:1-2). Although there are substantial global efforts to increase and improve the scientific literacy and the scientific workforce (Muwanga-Zake, 2008: 1), it has, however, been recently realised that the Science Education Systems are churning out

less science graduates at all levels than the global economy requires (Cameroon, 2009:15-16, Einhorn, 2008:2). It may, therefore, be logical to argue that the aforementioned decline in science graduates reflects a worldwide inability to succeed in Science at secondary school level (Fonseca & Conboy, 2006:82). Presumably, this as a result, could be a reason which has led to catastrophic skill shortages in science related fields, particularly in developing countries of Africa like South Africa due to its social and economic problems (South Africa, 2008:1, Madibeng, 2006:1-2).

The most common problem linked to learners' poor performance in Science in most developed countries are mainly shortage of qualified science educators (Ruby, 2006:1007). Studies have associated shortage of qualified educators with lack of thorough preparation for lessons and reduced coverage of content (Ruby, 2006:1008-1009). In contrast, most developing countries including South Africa, have a host of factors ranging from lack of adequate science resources and facilities such as apparatus and laboratories respectively, shortage of trained and qualified science educators, large science classes, limited proficiency in medium of instruction and outdated teaching methods are the central findings (Howe, 2003:4-5).

In Zambia, the mounting toll of failure in Science persists to be an eyesore and a major concern at Grade Twelve level especially in rural public high schools (Chileya, 2016). It worries to note that underachievement in Science in these schools is skyrocketing in an era when the ability to apply science is mushrooming and spreading out at an exponential rate to the daily lives and worldwide events. Subsequently, it may then imply that the underlying reasons for underachievement among learners in Science particularly in public schools of Zambia, have not yet been sufficiently researched or appropriately treated.

The state of science education for learners in most schools in Zambia is at crossroads. As the third decade of the 21st century sets in, we are faced with enormous scientific challenges that the youths

of today will have to confront. Some of these issues include the spread of Corona Virus (Covid-19) and HIV/AIDS pandemics, global climate change, world hunger, space exploration, and the development and implementation of alternative sources of energy. Even when the need for scientific advances is at its peak, adolescents learning Science in schools are seen to be facing critical challenges, (Eric and Gale, 2010). A number of studies have been carried out to establish what it takes for acceptable good performance in science education and academic achievement as well as proficiency. Edmonds (1981) a leading researcher in school reform during the 1970s, whose work is still highly respected by education leaders initiated what is now known as the Effective Schools Model (ESM). Edmonds' (1981) research noted the following characteristics of successful schools: strong administrative leadership, focus on basic skills, high expectations for pupil success, frequent monitoring of pupil performance, and safe and orderly schools. Other similar characteristics identified by Sheerens and Bosker (1997) included the following: monitoring of pupil progress, focus on achievement, parental involvement, creating a safe and orderly climate, focused curriculum, strong leadership, cooperative working environment and time on task.

Furthermore, Kundu and Tutoo (2000) believed that home background is the most significant primary factor which influences and shapes children's attitudes, personalities and behaviour patterns that lead to good performance in schools. These results were generally looking at the overall performance of pupils in this case. However, the study at hand was interested in science education that was Physics and Chemistry. A study conducted by King'aru, (2014) in some selected schools in Kawe District of Tanzania revealed that attitudes of children and their home background positively or negatively influenced their performance in schools. He further pointed out that the home and the school should be accepted as partners in the improvement of pupils'

performance. Despite the above studies, none considered science education only, instead they tackled general performance in other non-science subjects and they took place in different countries, though in Africa. This study was specific and focused on Science (Coded: 5124) that is Physics and Chemistry and determined the perceived factors leading to poor performance in these subjects.

In Zambia, the science education examinations are intended to assess pupil's competences in interpreting scientific phenomena. Although science education is supposedly the easiest of the science disciplines, research on student learning has shown that even high achieving science students in elite institutions taught by universally admired academics fail to build a scientifically conceptual and contextual foundation in Science. The implication is that very few pupils will go on and study science related courses at college and university levels. The Ministry of General Education has taken a number of steps in order to improve the situation by trying to upgrade diploma holders teaching Science in secondary schools to degree level by introducing the fast-track teacher training programme (ECZ, 2019).

The performance of candidates in science education examination and test papers in Mwandi has not been good, as can be seen in the figure below.

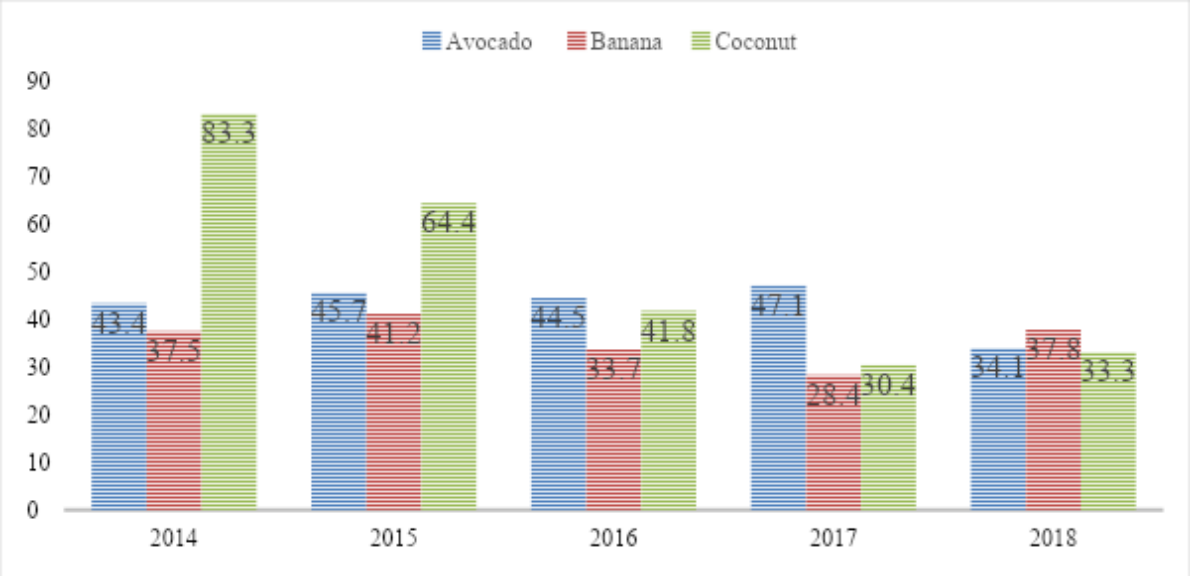


**Figure 1.1: Performance of Candidates in Science School Certificate in Mwandi District for the period 2014-2018, (PEO Mongu, 2019)**

The researcher was interested in looking at whether environmental factors from parents, pupils and teachers, technological factors and aspects of social cultural factors had an influence on the performance of pupils in science education in selected schools in Mwandi District of Western Province in Zambia.

### 1.3 Statement of the Problem

It has been observed that underachievement in Science in secondary schools appears to be a major global challenge (Fonseca and Conboy, 2006). Countries around the world have noted that it is imperative to address this challenge for sustainable development because each country's wealth and economic development directly correlates with the capacity of its scientific work force. The situation appears pathetic in the least developed countries of the world. It is disturbing to note that the corresponding trends of low achievement in Science by secondary school learners have also been reported in Zambia (ECZ, 2015). The most common problems linked to learners' poor

performance in science in developing countries including Zambia are mainly shortage of qualified science teachers, absence of basic science infrastructure and learning-teaching materials to support appropriate science education (Ruby, 2010). Chileya (2016) posits that the underachievement of learners in Zambian schools has continued unabated. The state of science education for learners in most rural secondary schools is worrisome as basic facilities which support science education seem to be absent. It is against this background that this study sets out to explore perceived factors leading to poor performance amongst pupils learning Science in selected secondary schools of Mwandi District, Zambia.

### 1.4 Purpose of the Study

The purpose of this study was to investigate perceived factors leading to poor performance amongst pupils learning Science in selected secondary schools of Mwandi District, Western Province.

### 1.5 Research Objectives

The following objectives guided the study

1. To explore the availability of teaching and learning materials of Science in secondary schools of Mwandi District.
2. To assess the teaching and learning environment of science education in selected secondary schools of Mwandi District.
3. To establish the difficulties pupils faced in learning science education in selected secondary schools of Mwandi District.

## 1.6 Research Questions

1. Do secondary schools in Mwandi District have the necessary teaching and learning materials of Science?
2. How is the teaching and learning environment for science education in secondary schools of Mwandi District?
3. What difficulties do pupils face in learning science education in selected secondary schools of Mwandi District?

## 1.7 Significance of the Study

This study is important in many ways; firstly, it would generate new knowledge and contribute to the body of knowledge in science education. Secondly, this study would generate information which could be used by various stakeholders such as the Ministry of General Education, non-governmental organisations, families as well as the Ministry of Higher Education by providing empirical findings for decision making regarding improvement in science education.

## 1.8 Delimitations of the Study

The study was restricted to three selected secondary schools in Mwandi District of Western Province which were purposively selected. Mwandi is a small town on the Zambezi River in the district of the same name of the Western Province in Zambia. The town is 120 km west of Livingstone, on the M10 Road to Sesheke. The district is part of the region known as Barotseland. The district is the seat of a parliamentary constituency of the same name.

## 1.9 Limitations of the Study

The study was qualitative and limited to the public secondary schools in Mwandi District where learners came from almost the same socioeconomic background and attended public schools with

almost similar resources and infrastructure. Learners were aware of the target of the study and could have responded in a favorable manner. Some students in these schools had no idea about practicals since they had never stepped or done any experiments in a science laboratory. When responding to questions, some had no definite answers since they had less practical experiences regarding the subject. Other limitations were that the study findings could not be generalised to the whole district since it was restricted to public secondary schools.

### 1.10 Operational Definitions of Terms

This section presents a brief description of the main concepts dealt with in the study.

Different scholars have defined the concepts in different ways. However, in this study they will mean as defined below;

**Factor:** A root cause analysis or phenomenon that affects the nature and / or the timing of a consequence.

**Good Performance:** Distinction or credit in Science examination

**Learner** is used here to mean individuals receiving instruction. In this study this term was used interchangeably with pupil or student.

**Learning:** process of acquiring new scientific understanding and knowledge.

**Motivation to Learning Science:** Refers to role models, socio-economic status, and household neighborhoods' social amenities/teacher relationship.

**Pass Rate:** The ratio of pupils who passed the examination against the total number of pupils who sat for the examination.

**Performance:** An act of performing, carrying into execution or action. It is that which is performed or accomplished or a thing done or carried through, an achievement, a deed; an act; especially an action of an elaborate or public character.

**Poor Performance:** Unsatisfactory results in science.

**Science:** Refers to Physics and Chemistry, taught separately but jointly graded as one subject.

**Teacher:** Is a person who is trained to educate and train a group of learners.

**Teaching Environment:** The physical location and cultures in which the learner/pupils interact from.

### 1.11 Theoretical Framework

The study employed the Social Cognitive Theory (SCT) framework. SCT refers to a psychological model of behaviour that emerged primarily from the work of Bandura (2001). Initially, it developed with an emphasis on the acquisition of social behaviors, SCT postulates that learning occurs in a social context and that much of what is learned is gained through observation. It has been applied extensively by those interested in understanding classroom motivation, learning, and achievement.

Social Cognitive Theory rests on several basic assumptions about learning and behaviour. One assumption concerns the view that personal behavioural and environmental factors influence one another in a bidirectional, reciprocal fashion. That is, a person's on-going functioning is a product of a continuous interaction between cognitive, behavioural, and contextual factors. For instance, classroom learning is shaped by factors within the academic environment, especially the reinforcements experienced by oneself and by others. This theory is related to this study because

learning is affected by students' own thoughts and self-beliefs and their interpretation of the classroom context, (Bandura, 2001; Zimmerman, 2000).

In line with this theory, teachers may enhance students' self-regulated learning by demonstrating problem solving techniques and thinking aloud (i.e., verbalisation of thoughts during problem solving). Showing students how to persist in the face of failure by changing strategies to find the one that works is a significant feature of modelling. Therefore, when teachers use cognitive modeling, they do not only demonstrate what to do but also how to think about the actions that need to be taken to complete the task at hand successfully (Dorn & Sofos, 2001). This verbalisation provides learners with the opportunity to observe the thinking patterns that lead to success (Schunk & Usher, 2012). On the other hand, Social Cognitive Theory propagates that learning is also achieved through observation. Therefore, it is important to note that science is a practical subject and it requires experimentations in order for the learners to observe. This is one significant area where this theory applies.

In this study, Social Cognitive Theory was chosen as the framework for two reasons. The first reason for choosing this theory is that it focuses on self-efficacy, outcome expectations and personal goal setting, (Zimmerman & Schunk, 2001; Johns, Schmader and Martens 2005). How students think and feel about themselves shapes their behaviour, especially when facing challenging circumstances (Bandura, 2001). Education systems are successful when they equip students with the ability to influence their own lives (Bandura, 2001). Self-beliefs have an impact on learning and performance on several levels: cognitive, motivational, affective and decision-making. They determine how well students motivate themselves and persevere in the face of difficulties, they influence students' emotional life, they affect the choices students make about coursework, and even educational and career paths, (Wigfield and Eccles, 2000). Outcome

expectations refer to beliefs about the consequences of choosing to pursue certain courses of action. Personal goals refer to intention to pursue an activity to bring about a specific outcome, (Bandura, 2001).

If learners are not given the necessary science learning experience, they will have low self-efficacy in science, (Cate, Gary, Rhymer, Katrina, 2003). These different experiences include feedback from teachers, policy influences on science education and attitudes towards science education, (FAWE, 2007). Learners with greater self-efficacy in science are more confident in their abilities to be successful in science when compared to their peers with lower self-efficacy. Self-efficacy has been proven useful for understanding girls' motivation and achievement in science.

The second reason is that SCT addresses environmental factors that may influence learners' performance in science like the socialisation process and the school environment, (Lent, Brown & Hackett, 1994). The theory addresses issues of environmental barriers that learners in this case may encounter and also takes into account how other social constraints impact opportunities and science learning experiences available, (Furner, Joseph, Berman, Barbara, 2003). Therefore, the Social Cognitive Theory was favored because it adequately enabled this study to interrogate myriad issues relating to the understanding of how specific factors influence the learning of science education in selected secondary schools in Mwandi District of Zambia.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

This chapter is a review of the various literature presented by global scholars on the perspective of the title of the study. This is for the sole purpose of giving clarity to what the research was all about. The literature to be reviewed is particularly linked to the objectives of this study and order of presentation is as such. The following are the various literature presented in relation to the title of this study. Material has been drawn from several sources, which are closely related to the theme and the objectives of the study.

## 2.2 Empirical Review

This section will highlight some studies done by others scholars with regard to the factors that lead to poor performance in learning science education at global, regional and country level. The essence of the empirical evidence is to have some knowledge and build on the existing knowledge available.

A study was conducted by Jolif (2018). It aimed at investigating factors that contributed to poor performance in science subjects among students in secondary schools in Busia County, Kenya. The study used the input-output relationship or education production function. The study employed a cross-section research design whereby a total number of 110 students from six schools in the county, 15 students from three schools outside the county and 45 teachers were involved. Data collection was achieved through use of questionnaires and structured interviews. The findings of the study showed that factors which affected science performance were negative attitude towards science subjects, unfavorable home environment and family background. Inadequate resources

such as textbooks, physical infrastructure and laboratories made learners lose interest in the subject hence poor performance. Schools that had inadequate infrastructural and human resources performed poorly. The study further revealed that availability of practical lessons classified and reinforced scientific concepts. It further discovered that learners' interest in science increased their manipulative skills and memory of the content. It makes the subject relevant, helps the learners to acquire skills, it promotes discipline and also assist them in solving problems. The study also contended that poor capital investment in terms of provision of science learning resources contributed to student low level of academic achievement. The study also revealed that poor learning environment was another key factor which caused poor performance of pupils in science education. In this regard, environment includes all the facilities and infrastructure available at the place where the school is located and all that can be found within the school surroundings. For the case of this study, the learning environment refers to the physical location, teaching delivery as well as approached to learning whereas the term infrastructure is used to refer to things such as classrooms, furniture, laboratory and the library (Siwel, 2008).

A study carried out in Malawi found that poor performance in science subjects was ascribed to lack of Science apparatus, lack of enough and quality textbooks, (teaching and learning resources) students' perception that science subjects are hard, (student' attitude towards science subjects) and too little time allocated to practical lessons (Dzama, 2012).

In a school environment, learning infrastructure includes; classrooms, laboratories and libraries. This infrastructure is very cardinal with regard to the pupils' academic performance.

Belinda (2010) conducted research on the impact of school infrastructure on student outcomes and behaviour in Georgia and established that academic achievement improved with improved

building conditions, lighting levels, air quality and temperatures. She further established a correlation between school class size and student achievements. Having large classes can affect a student's achievements.

Gardner and Hill (1999) in their study on technology in education in Ontario maintained that one could not expect a high level of students' academic performance where school buildings were poorly located and substandard. They emphasised that well planned structures, clean, quiet, safe, comfortable and healthy environments were important components of successful teaching and learning. Gadner and Hills' study was connected to this study, as it also aimed at assessing the learning environment whether it was conducive or not for the learners. They said that school buildings had an impact on the mental development of a student. They also explained that schools that were properly built but attractive to look at motivated the children to stay in school and learn as well.

A study by the United States National Research Council (2011) showed that schools that rarely performed well in national examinations caused their students to be demotivated to work hard hence loss of hope in pursuing higher education. Students from schools that perform well in national examinations have their students motivated to work hard and often focus their energies on attaining good grades in school. This study is related to the current study because the study examined if teachers or parents motivated the pupils to study hard in science education.

Baker and Laura (1997) did a study on parent involvement in children's education. The reviewers identified several issues in the quality and rigor of the 108 empirical studies about engaging parents in their children's education. Using a true experimental design in which children were assigned

randomly to a programme group and a control group and be tested before and after the intervention to compare results.

The researches conducted by other scholars are related to this study because they all strongly suggest that parent involvement in their children's formal schooling is vital for their academic success. In particular, the cumulative knowledge of the studies reviewed suggest the importance of these types of involvement: A stimulating literacy and material environment, high expectations and moderate levels of parent support and supervision, monitoring of television viewing and homework completion, joint learning activities at home, emphasis on effort rather than ability and promoting of independence and self-reliance.

Furthermore, Clark (2002) conducted a research about the impact of family background, attitudes, and behaviors on student achievement. In this research it has been established that the expectations of parents and other adults are positively related to student performance in school. Although all groups of parents Clark studied placed a high value on education and had high hopes for their students, the amount of time children spent with adults varied. The results indicated that the combined effect of the quality of students out of school learning activities, the amount of time exposed to powerful learning activities, and parents' and teachers' standards for their children accounted for most of the variance in student achievement. Academic success is more likely to happen when students spend at least 15 hours per week with teachers doing high-quality learning activities. Students spend 8–15 hours a week in out-of-school learning which takes place in the rural area of Zambia, Mwandi District to be specific. When out-of-school activities are guided by adults with high standards for achievement, students are focused and engaged. When taking part in out-of-school learning activities, students know how to study, plan, and complete projects, when they have access to libraries and reference materials.

Furthermore, in a study conducted by Nyamba and Kizito (2012) to establish if students' preferences in Science affect their performance. Factor analysis of the instrument revealed that there were several factors for the differential choices. The major findings of the study showed that among many other reasons, poor performance in science subjects at ordinary level secondary schools included: age of learners, sex, ignorance, shortage of learning materials, gender bias by subject teachers, and lack of guidance to students on the future importance of science. Thus, the study made the following recommendations: being at an average age of 16 means their minds are still amative, so guidance and / or counseling becomes essential in most aspects, they should not be given too much freedom to opt on issues that can affect their future, It was also deemed necessary that, the government should make all subjects compulsory so as to avoid the possibility of losing some potential future scientists who might have dropped optional subjects, On the other hand, schools should be guaranteed enough teaching/learning facilities like books, laboratory tools and other facilities to make learning conducive.

Further, Aubusson and Watson (1999) maintained that importing of curriculum is likely to result in a curriculum that poorly fits the current educational environment in developing countries, particularly in Zambia. Communities in the rural parts of Zambia may be further isolated from their children's learning of Science since the curriculum may sound foreign to them as it tends to be oriented to urban life and experiences. They may be unable to link what their children learn in the schools with the experiences in their daily lives.

In Zambia, Chileya (2016) did a study on factors leading to poor academic performance of pupils in Junior Secondary School Leaving Examinations in selected day secondary schools in Mwense, Luapula Province in Zambia. The study aimed at establishing factors that lead to poor academic performance of pupils in Junior Secondary Leaving Examinations in selected day secondary

schools in Mwense District, Luapula Province. The findings of the study show the following as factors affecting poor academic performance of pupils in Junior Secondary Leaving Examinations in selected day secondary schools in Mwense District: teacher/pupil ratio, absenteeism, lack of teacher/pupil motivation in schools, inadequate internal and external teacher monitoring in schools, abnormal teacher workload, non-parental involvement in the learning process of their children, late reporting for lessons by both teachers and pupils, schools and communities working in isolation, inadequate syllabi coverage, inadequate qualified human resource, insufficient teaching and learning materials in selected day secondary schools.

### 2.3 Social Cultural Factors

A study by anthropologists like Belinda (2010) asserts that school learning and performance are influenced by complex social, economic, historical, and cultural factors. Indeed, since every society educates the younger generation as a means of passing down the sociocultural attributes of its people, the socio-cultural factors within non-western societies become a composite part of the environment. Therefore they control to a very large extent what a child in such an environment learns and becomes in later life. Since every human "tends to resolve in terms of the meanings available in a particular socio-cultural environment", the baseline is that the meanings become firmly implanted in the cognitive structure and manifest themselves habitually and may act as templates, anchors or inhibitions to new learning.

The provision of amenities and their maintenance are insufficient in many schools across the globe. Besides, worldwide, only 31% of countries have enough amenities. In the poor countries, there are major challenges in providing a full variety of amenities: However, even in countries with more recognised systems of science education programs, there were cases of poor maintenance and loss of amenities noted (Hardman, 1999). A numbers of factors were identified such as: lack of proper

guidance and counseling for pupils from the family, lack of role models from the family and the community at large and shortage of teaching and learning materials.

### 2.4 Environmental Factors

Caillods, Gottelmann-Duret, and Lewin, (1997) found that it was quite common in many African countries that headteachers did not have a science background. The role of many principals was found to be more administrative, with little direct involvement and concern for classroom activity, thus making decisions for Science just like all the other subjects. This does not mean that the headteachers cannot exercise leadership in science education but they must receive appropriate training, and make effective use of their teachers. Science teachers must have a role to play in the management process. Within any school, management structures and management skills must allow proper development of science teaching and appropriate support for it. It has also been evident that some schools have a low rate of parental involvement in the teaching and learning processes. There are different assumptions about lack of support from parents, especially in the rural schools. Some of the reasons are that parents lack confidence in being actively involved in their children's education, since they themselves did not receive proper formal education. Epstein (2002) and Rich (1993) as cited by Pena (2000) explains that some parents choose not to participate or cannot participate in school-family relationships because of their limited education. Another factor that makes some parents unable to participate in their children's education is the migrant labour system, by which fathers and perhaps mothers too move away from their homes in order to find work. This has affected family setups of many rural households, (McDaniel and Zulu, 1996).

Furthermore, lack of support from the society is another factor that impedes the learning of science education. According to Mathonzi, (2001), in many schools, principals and headteachers are struggling with poor resources, and absence of a culture of teaching and learning science. Even if

the communities around the rural schools are willing to make active contributions, they themselves are the victims of poor education, unemployment and general poverty. It is indeed problematic to compare physical indicators with social indicators in rural areas. For instance, the argument in this case is that the building of new schools in rural areas does not in a way change the profile of the community, and may have limited impact on educational achievement. According to Malcolm, Keane, Hoohlo, Kgaka and Ovens (2000), they provide instances how this can be achieved, even in very poor communities and schools. Providing adequate support systems to teachers, learners and communities within the school and outside enhances educational effectiveness. Opportunities for professional development for teachers arise within schools, but there is need also to include outside workshops for teacher development.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 Introduction

Research methodology is a broad term involving all the strategies that describe how, when and where data is to be collected and analysed (White, 2005). In this chapter, the methodology that was applied in the study is explained. Therefore, it will constitute the following components; the research design, research sites, study population, sample size, data collection techniques and instruments and finally the methods of data analysis.

## 3.2 Research Design

Orodho (2003) defines a research design as the scheme, outline or plan that is used to generate answers to research problems. This research adopted a descriptive research design involving the use of interviews as the data collection tool. White (2005) explains that a qualitative approach is the type of inquiry in which the researcher carries out research about people's experiences in natural settings, using techniques like interviews. This design helped to study the perceived factors that contribute to the poor performance of pupils in science education in Mwandi District of Western Province in Zambia.

## 3.3 Research Sites

Mwandi is a small town on the banks of the Zambezi River in the district of the same name in Western Province of Zambia. It is 120 kilometers west of Livingstone town on the M10 Road to Sesheke. The town was separated from Sesheke District in 2012. It is part of the region known as Barotseland. Mwandi means "plenty of fish" in the Silozi language. Approximately 8000 people live in the village proper. They are semi-nomadic cattle herders and fishermen. Infrastructure is

poor, electricity and clean water are not readily available. Most people live on less than $1.00 per day. The people are largely of the Lozi ethnicity. Nevertheless, there are also some people of European descent. The area around the town has the population of between 25,000 and 33,000 people (Magri, 2016).

The study was conducted in three secondary schools whose pseudo names were Avocado Day Secondary School, Banana Boarding Secondary School and Coconut Day Secondary School. The reasons for collecting data from three different schools was to get different perspectives and also to deepen the researcher's understanding of the issues being investigated. Collecting data from three different schools increased the reliability and validity of the findings (White, 2006). Western Province was selected for this study because it was considered to be more convenient for the researcher to visit the participating schools easily and several times during the data collection phase. The three schools were sampled because they had poor weekly and termly continuous assessment results from Grade Ten to Twelve as well as poor school certificate pass percentages for the past five years in Grade 12 final examinations. For example, one school had 47.5%, the other one had 46.6% passing rate, and the last one had 42.8 % but most of the schools in western province had higher marks, ranging from 60% to 100% according to the annual provincial results analysis bulletin (PEO, 2019).

### 3.4 Study Population

Population refers to an entire group of persons or elements that have at least one thing in common. Population also refers to the larger group from which the sample is taken (Kombo, 2006). The target population in the study comprised science education teachers from three different secondary schools, pupils from Grade 10 to Grade 12 from the three schools and community members in each area where each school is situated in Mwandi District to make up the sample size.

### 3.5 Demographic Information

The study explored demographic characteristics of the pupils, teachers and community members. They included the grade, gender and the age bracket. The researcher focused on these three demographic characteristic of the pupils because of their importance in understanding the academic performance. For example, in the case of gender, male and female students usually require different types of learning environment such as boarding infrastructure, co-curricular infrastructure and sanitation facilities. Secondly, girls and boys may experience different learning challenges. For example, girls require sanitary pads for them to attend classes while menstruating, while boys do not. Having both genders in the study is therefore important in examining whether the study captured the views of the learning environment utilised by both male and female students.

#### *3.5.1 Avocado Secondary School Profile*

Avocado School is a day co-education secondary school found in the heart of Mwandi town. It is situated approximately 300 meters from the trading area, with two streams of grades at each grade and had a total of about 475 pupils. The school had modern infrastructure with two classrooms that were used as science laboratories (improvised) and a computer one. Avocado School is connected to the national grid.

#### *3.5.2 Banana Secondary School Profile*

Banana School is a co-education secondary school with boarding facilities located 3 kilometers from the M10 (Livingstone-Sesheke Road) to the south on the banks of the Zambezi River. It is surrounded by villages. It is one of the recently built schools by the Zambian government with modern structures and it is connected to the national grid. The school had two streams per grade with a total of 450 pupils with two science laboratories, one computer laboratory and a library.

### *3.5.3 Coconut Secondary School Profile*

Coconut School is a co-education day secondary school located 30 kilometers north of the M10 (Livingstone-Sesheke road) with about 350 pupils. The school is one of the upgraded schools in the midst of villages with a swampy environment and a stream. The school had neither a science laboratory nor a computer one. The school had a combination of modern structures and pole and mud classrooms connected to the national grid.

## 3.6 Target population

**Learners;** learners from Avocado and Coconut Secondary schools had very similar characteristics. Pupils from far places who attended these two schools found themselves renting pole and mud shacks in the nearby villages sometimes as weekly boarders. The pupils' source of income was mainly from trading in fish and cattle. A few of them were lucky as they were being sponsored by a non-profit organisation known as Orphans and Vulnerable Children (OVC).

Pupils at Banana Boarding School who came from the surrounding villages like Sibongo Village, Mwandi Royal Village were day scholars while those from Sesheke and other towns along the line of rail were in the boarding. Some pupils came from as far as the Copperbelt Province of Zambia.

The pupils who came from the surrounding areas of Banana School's source of income was similar to that of the Avocado and Coconut schools which were fishing and cattle herding.

**Teachers;** Avocado School had a total of five science teachers with only one female teacher. The Science Department had only one degree holder who happened to be the Head of Department and the rest were studying with different universities. Banana Boarding Secondary School had four male Science teachers who were degree holders. These were the beneficiaries of the fast track

trainings the Zambian government had introduced. Coconut Day Secondary School had four male science teachers, two-degree holders and the other two were diploma holders.

**The community;** Mwandi is a center of Barotse traditional culture, housing the kuta council which adjudicates disputes and legislates on issues related to the people of Mwandi and Sesheke districts. A notable individual from Mwandi is Senior Chief Inyambo Yeta IV of the Barotse Royal Establishment (BRE). Mwandi Mission Hospital is one of the largest employer in the district. The people of Mwandi are predominantly semi-nomadic cattle herders and fishermen. Most community members were engaged in fish, milk, fishing nets, and groceries trading. The highest level of illiteracy in Mwandi had been reported. It was also revealed that approximately 50 percent of the people above 35 years had not received schooling (Magri, 2016).

### 3.7 Sample and sampling techniques

Kothari (2004) defines sampling as "the selection of some part of an aggregate or totality on the basis of which a judgment or inference about the aggregate or totality is made". The aggregate is a population of interest that by collecting information from the sample, a generalised knowledge about that population can be obtained.

The sampling process in this study was purposive sampling. Ary et al (2014) defines purposive sampling as "a non-probability sampling technique in which subjects/units to be representatives of the population are included in the sample". The advantages of purposeful sampling are that the participants relevant to the study are selected, therefore, reducing costs and saving time. It also allows for the collection of reliable and robust data (Tongco, 2007).

### 3.8 Sample Size

The study sample was a total of 45 pupils (15 from each school), nine (9) teachers (three from each school) and nine (9) community members (three from each surrounding community of each school) giving a grand total of 63 participants.

### 3.9 Characteristics of the Sample

The total numbers of pupils who participated in the study were 45; 20 male and 25 females. These were Grade 10 to 12 pupils and their ages ranged from 17 to 20 years. The study had sampled a total number of 9 teachers; 8 were male and 1 female. 5 of the teachers were diploma holders and 4 were degree holders in science teaching. The total number of parents who participated in the study were 9 comprising 4 male and 5 female and their ages ranged from 35 to 55 years.

### 3.10 Data Collection

In this research three different tools were used, and these were interview guides, focus group discussion guide and key informant interview guides.

### 3.11 Semi-Structured Interviews

Semi-structured Interviews were part of the data collection technique. By definition, it entails a face-to-face encounter between the researcher and participants aimed at gaining a meaningful understanding of a perspective on experiences, or situations as expressed in their own words. A set of questions is carried by the researcher. Ospina (2004) noted that, "at the root of in-depth interview is an interest in understanding the lived experience of other people and the meaning they make of it". This technique was used to collect data from 9 parents who were purposively selected. The participants were 3 (three) from each community surrounding the school.

### 3.12 Focus Group Discussions

A focus group is a small group of carefully selected participants who contribute to open discussions for research. Focus group discussion is frequently used as a qualitative approach to gain an in depth understanding of social issues. The method aims to obtain data from a purposely selected group of individuals rather than from a statistically representative sample of a broader population (Nyumba, 2018). In this study, three (3) Focus Group Discussions were constituted; one from each selected school comprising 15 participants (pupils). From each school, the composition was 5 pupils were taken from a Grade 10 class, 5 from a Grade 11 class and the other 5 from a Grade 12 class. The researcher ensured that the discussion was kept on track and that all topics were covered which answered the research questions and subsequently the objectives.

### 3.13 Key Informant Interviews

Key informant interviews are qualitative in-depth interviews with people who know what is going on in the environment under study. The purpose of key informant interviews is to collect information from a wide range of people, including community leaders, professionals and residents who have first-hand knowledge about the subject under investigation. In this case, three (3) teachers from each selected school were interviewed bringing the total to 9 key informants (teachers).

### 3.14 Data Analysis

Data analysis is the process of evaluating data using analytical and logical reasoning to examine each component of the data provided. It involves the process of gathering, reviewing and then analysing data from various sources to form some sort of finding or conclusion.

Qualitative data was analysed thematically. This entailed that the recorded interviews and field notes were the main data sources, and that they were organized according to the types of responses. The interviews and data from participants were transcribed as accurately as possible by listening to the recorded interviews and discussions again and comparing them with the transcriptions. Data analysis involved an ongoing process of continual reflection about the data as well as asking analytical questions.

### 3.15 Ethical Considerations

Creswell (2003) advises that consideration of ethical issues at every stage of the research is important so as to make the identities of the respondents confidential. Therefore, before conducting this study in schools the researcher got ethical clearance from the University of Zambia. Thereafter the researcher sought permission from the Provincial Education Officer for Western Province to visit the schools in the province.

The participants were informed that the information they would provide was to be used for research purposes only and their actual names were not going to be revealed in the report as recommended by Creswell (2003).

At each school the researcher revealed his identity and background to the Headteacher, participating teachers and pupils as well as the parents. The researcher sought permission from the Headteachers of the schools before embarking on data collection from the teachers and pupils. Before recording the interviews and collecting data, the researcher asked for permission from participants and explained why he needed to interview them.

# CHAPTER FOUR

# PRESENTATION OF THE FINDINGS

## 4.1 Introduction

The overall findings of the study on the perceived factors leading to poor performance amongst pupils in science education in selected schools in Mwandi District were presented in this chapter.

### 4.1.2 Total Number of People per Household

The total number of people each pupil who took part in the study lived with at home was as follows; 4 participants lived with between 2 and 4 members, 16 participants lived with between 4 and 6 members, this was followed by those who were between 6 and 8 family members who were 15 participants, then those with the total number above 8 family members each represented were 8 and 2 participants were those who could not respondent to the question. This part was imperative in this study, as the physical home space had an effect on the pupils' concentration on studying and eventually academic performance is affected either in the positive or negative.

### 4.1.3 Availability of Teaching and Learning Materials

The schools which were selected in this study did not have enough needed science education textbooks**.** The findings revealed that 30 pupils out of 45 who took part in the study alluded to the fact that in these schools science education textbooks were not enough. From the three selected schools 15 participants said the schools did not have adequate needed textbooks for science education.

In terms of the learning and teaching materials, six leaners indicated that the school had enough. On the other hand, one of the participants mentioned,

*Even though we have the teaching and learning materials, they are not adequate to carter for the entire school.*

From the teachers' point of view on this matter, most of them agreed with the majority of the pupils that said the schools did not have enough needed science textbooks, while others said the school had some but not all needed textbooks. Most community members' point of view was that the selected secondary schools in Mwandi District did not have the needed materials to meet the standard of learning science education and only a few were not sure about the situation because they had never visited the said schools. Upon inquiring from the community members if they were involved in helping the selected schools to have the needed materials, most of them said they were not involved at all. Only one community member said he was involved since he was a Parents Teachers Committee (PTC) Chairman.

It was learnt that all the three schools did not have enough textbooks, library facilities and laboratories to enable them be fully equipped for science education. One of the teachers said,

*Pupils who have difficulties in science have poor backgrounds as they come from basic schools which have no laboratories and that they learn from without especially with insufficient qualified science teachers.*

### 4.1.4 Equipped Science Education Laboratory Availability

The results indicated that the majority of the pupils from the three selected schools said that their schools did not have equipped Chemistry and Physics laboratories and only few participants said the school had equipped Science laboratories. One pupil from the school which had no laboratory facilities said,

*We face a lot of difficulties in understanding concepts especially in Chemistry as a result of learning from without. We are not able to practice what we learn in class because we do not have laboratory facilities.*

The majority of the participants said they had never used a laboratory from the time they came to the secondary school and only few participants said they had used a laboratory. This entails that only one school out of the selected three secondary schools in Mwandi District had a laboratory. However, to those who alluded to the fact that the school had a laboratory, when asked to find out which materials were not available, most of the respondents said that laboratories did not have chemicals and apparatuses to use when conducting experiments. The teachers also said the laboratories lacked what to use during experimentations such as chemicals, condenser, separating funnel and many others.

### 4.1.5 Learning Environment Conducive for Effective Teaching and Learning of Science Education in Secondary Schools

A few participants had a conducive learning environment for science education while the majority indicated that they did not have a conducive environment for learning science education. This coincides with the Social Cognitive Theory, which assents that classroom learning is essentially shaped by factors within the academic environment. It was observed that the majority of pupils stated that the environment was not conducive for learning as far as Science was concerned. As indicated earlier, the schools lacked qualified Science teachers, laboratories and equipment to make the learning environment conducive. Upon being probed more, one of the teachers said,

> *When the number of pupils in class is more than the required number, we hardly get time to pay attention to academically weak students in class, and this significantly affects pupils.*

One teacher also stated,

> *Being a rural setup, pupils here are disadvantaged in the sense that they are not exposed to industries where science is put in practice as compared to their counterparts in the urban areas.*

Regarding the conduciveness of the learning environment at the respective schools, some community members indicated that the environment was conducive while others indicated that it was not conducive. Since two of the schools were very close to the social amenities, one of the community members said,

> *In this area, pupils like dodging classes and end up drinking during school time.*

Another community member said,

> *Here, most pupils prefer going fishing and selling fish to being in class. This affects a lot of pupils academically in this district.*

### 4.1.6 Teachers Perception of the Effect of Lack of these School facilities and Academic Performance

On the teacher's response regarding the effects of lack of facilities on students' performance, all the teachers agreed that lack of laboratories, libraries, co-curricular activities like Junior Engineers Technicians Scientists (JETS) fairs and classrooms affected the students' performance, while 8 strongly agreed lack of textbooks affected pupils' performance and 9 strongly agreed that lack of classroom facilities also affected performance.

### 4.1.7 Motivated by Science Teachers

The majority participants said that they were motivated by their Chemistry and Physics teachers while 5 participants said they were not motivated by their Science Education teachers. All the teachers from the three selected schools alluded to the fact that they did motivate their pupils. It was also inquired from the participants on how they were motivated by their Science teachers, most of the participants said their Science teachers encouraged them to study hard in Science because most of the good careers in the world were science oriented. The others learners said their

teachers motivated them by telling them that they could only become doctors or nurses by working hard in science education. Despite the motivation that was received by the pupils, one teacher said,

> *There is only one female science teacher in the district. This makes female learners think that science subjects are just for male learners.*

**Table 4.1 Time Allocated to Studying Science Education**

| **Frequency** | **Number** |
|---|---|
| Every day | 3 |
| Twice a week | 30 |
| N/R | 2 |
| N/A | 10 |
| **Total** | **45** |

The table 4.1 above indicates the time allocated to study science education. The majority of participants who were 30 participants studied science education twice a week while 3 participants studied science education every day. 10 did not respond and 2 did not know the number of times they studied science education.

**Table 4.2 Attitude towards Science Education**

| **Attitude** | **Number of pupils** |
|---|---|
| Positive | 29 |
| Negative | 16 |
| **Total** | **45** |

Table 4.2 above shows the attitude of pupils towards learning science education in the selected three secondary schools in Mwandi District. Many participants said they had a positive attitude towards learning science education while a quarter of the participants alluded to the fact that they had a negative attitude towards learning science education. From the teachers' point of view, most of the teachers from the three selected schools in Mwandi District alluded to the fact that most of the pupils had a very poor attitude towards learning science education especially girls which

mostly contributed to the poor results in the district. Others said the attitude towards Chemistry was better but very few had a good attitude towards learning Physics.

### 4.1.8 Guardians Helping Pupils in Understanding the Importance of Science Education

The majority of the participants alluded to the fact that the people they lived with did not help them in understanding the importance of learning while a few participants pointed to the fact that the people they stayed with did help them in understanding the importance of learning science education

### 4.1.9 Difficulties in Learning Science Education

Many of the pupils said they had difficulties learning Chemistry and Physics while a few participants said they did not have any difficulties in learning Chemistry and Physics.

One of the teachers said,

> *Most of the pupils have difficulties in calculations especially in Physics, and you find that most of the pupils at this school shun Science and prefer information subjects*.

The only parent who was involved in school Parents Teachers Committee mentioned,

> *These are rural schools, not all pupils have access to things like computers or technology as compared to those in town. As a result, the pupils lag so much behind in fulfilling their full potential as the environment does not support them to thrive in Science*.

On the pupil's perspectives, the majority of the pupils alluded to the fact that there were no enough classroom spaces in the schools such that in some cases four pupils shared a desk meant for three pupils. One of the pupils strongly revealed that,

> *Classes are overcrowded, therefore, the level of individual attention from the teachers is low. This makes it difficult for us to understand every explanation.*

A quarter of the participants indicated that their school had no single Science laboratory, while the majority of the participants had difficulties in attending school as their homes were far away from school, thus covering long distances to reach the school. A good number of participants pointed out that the schools did not have enough apparatuses to use for experiments. The majority of the participants also said there was a shortage of Science teachers in the schools while on the other hand, the majority of the pupils had difficulties in understanding Science concepts and a good number of participants stressed that there was lack of Science textbooks.

The findings show that the majority of the pupils that took part in the study walked a distance of between 5 and 10 kilometers. This was followed by those who walked a distance of less than 5 kilometers, while others said they walked a distance of about 10-15 kilometers.

One of the pupils said,

> *I wake up around 04 hours and it takes me about two and half hours to reach school. I always reach school very tired, so i fail to concentrate in class. I always reach home very late in the evening such that I don't even find time to study.*

**Table 4.3 Tests Results Performance**

| **Grade** | **Term One (Number of pupils)** | **Term Two (Number of pupils)** | **Term Three (Number of pupils)** |
|---|---|---|---|
| Distinction | 0 | 1 | 0 |
| Merit | 3 | 2 | 3 |
| Credit | 25 | 20 | 30 |
| Satisfactory | 10 | 12 | 5 |
| Unsatisfactory | 7 | 10 | 7 |
| **Total** | **45** | **45** | **45** |

Table 4.3 shows the end of the three terms tests results for the participants in the science education for the year 2020. In Term One; none got a distinction, 3 got merits, 25 got credits, 10 got

satisfactory results and 7 got unsatisfactory results. In Term Two; 1 got a distinction, 2 got merits, 20 got credits, 12 got satisfactory and 10 got unsatisfactory results. In Term Three; none got a distinction, 3 got merits, 30 got credits, 5 got satisfactory and 7 got unsatisfactory results.

**Table 4.4 Challenges Pupils Faced in Learning Science Education**

| **Challenge** | **Number of participants supporting** |
|---|---|
| Lack of enough classroom spaces | 7 |
| Lack of laboratories | 8 |
| Long distances to schools | 6 |
| Lack of equipment to use for experiments | 9 |
| Shortage of science teachers in schools | 9 |
| Difficulties in understanding concepts | 9 |
| Lack of science textbooks | 9 |

Table 4.4 highlights the perceived challenges teachers faced in teaching science, 7 teachers indicated lack of enough classroom space, 8 indicated lack of laboratories, while 6 indicated long distances to school, and one teacher indicated,

> *Some pupils live in very far-flung places as far as 10 kilometers away from the school. By the time they reach school, they are already tired.*

All the teachers indicated lack of equipment for use in the laboratories, shortage of Science teachers, difficulties in understanding science concepts by the pupils and lack of science textbooks.

Community members perceived that there were some challenges pupils faced in learning Science, 9 members indicated lack of enough classroom space, 7 indicated insufficient teachers of Science, while 6 indicated proximity to social amenities like bars which usually played loud music during lesson times, 7 indicated that pupils had a tendency of opting to miss lessons and go fishing in the quest to raise funds for domestic use and school fees, 3 members indicated lack of libraries, 2 indicated lack of internet facilities for research and 6 indicated long distances to the school

# CHAPTER FIVE

# DISCUSSION OF THE FINDINGS

## 5.1 Introduction

This chapter represents the discussion of the research findings based on the data collected and interpreted with the help of the objectives of the study in relation to the literature review and the tables in the findings. It seeks to answer the research questions on the availability of necessary teaching and learning material for Science, teaching and learning environment for science education in secondary schools and challenges faced by pupils in learning Science. The data is discussed thematically.

In this study, it was revealed that poor performance in Science among secondary school pupils in Mwandi District was due to various factors among them negative attitude towards the subject, lack of exposure of both teachers and students, lack of the necessary materials required during the process of teaching and learning sciences, lack of laboratories and laboratory equipment and well-trained laboratory technicians or teachers. Science students were not well equipped with the relevant knowledge they required in order to pass their examinations and even to practise science related activities after graduating.

## 5.2 Availability of Necessary Teaching and Learning Materials of Science in Mwandi District.

On the availability of teaching and learning materials in secondary schools in Mwandi District as the objective number one, it was shown that all the three secondary schools in Mwandi District had inadequate learning and teaching materials.

One of the three secondary schools completely did not have a Science laboratory and those that had the laboratories lacked requirements such as chemicals and apparatuses. From the teachers' point of view on this matter, most of them agreed with the majority pupils that said the schools did not have enough needed Chemistry and Physics materials, while others said the school had some but not all of the required materials. While from the community members' point of view, nine of them alluded to the fact that the selected secondary schools in Mwandi District did not have the needed materials to meet the standard of learning/teaching Chemistry and Physics. From the study it was learnt that lack of teaching and learning materials for Science was a major contributor to the continuous poor performance of pupils in the subject in Mwandi District.

Various studies cited similar reasons as causes of poor performance in science subjects. (Dzana, 2012) said students fail Science due to lack of enough and quality textbooks, their perception of science subjects that they are hard and too little time is allocated for practical lessons. The findings of this study compared to other previous studies done in different areas of the world, are evident that student's attitude towards sciences contributed a lot to their success or failure. The quality and availability of the materials and textbooks also contributed a lot to the performance of the learners.

The study showed that the two schools in Mwandi District had no libraries and that even the one that had a library had inadequate and outdated reading materials. In fact, the study established no difference in performance between the schools with and without a library. The study agrees with Ogunseye (1986) who stated that the total absence of an organised school library spelled doom for thousands of students, hence schools operating without libraries had the academic performance of their pupils affected.

Six of the teachers interviewed pointed to lack of science materials such as textbooks, laboratory, chemicals as well as apparatus as being the major problems. A teacher from the school which had no Science laboratory facilities stressed that pupils had difficulties in understanding concepts especially in Chemistry as a result of learning from without. Some of the things they learnt they had never seen them before and that most of the lessons were done theoretically. They did not know how to use instruments practically because the school in the area did not have a laboratory. From the teacher's point of view, they alluded to the fact that most of the pupils faced challenges on how to use apparatus, as a result of inadequate learning and teaching material.

Schools which had textbooks, laboratory equipment and other necessary resources performed much better than schools which did not have these resources (Ambogo, 2010 and Cyril & Lucas, 2010). In this study, the schools that did not have these resources were found to be performing poorer than the school (s) which had the resources in place.

It was also inquired from the communities to find out if they were involved in helping the selected schools in the study so as to have the needed materials, most of them said they were not involved at all only one community member said he was involved through being a Parents Teachers Committee Chairman. All the parents stressed that the factors that contributed to poor performance in Science were inadequate learning facilities in secondary schools which included science equipment and laboratories, shortage of qualified and devoted instructors and lack of ability by the scholars to do well in science practicals.

### 5.3 To Assess Teaching and Learning Environment for Science Education in Secondary Schools.

The second objective of the research was to assess the teaching and learning environment of science education in selected secondary schools of Mwandi District. Results revealed that the schools which had the science laboratories, did not have enough rooms. They had one room for both preparations and teachings. Dudek (2000) agrees with this finding since his study found that adequate classrooms were the best requirements to access education as most of the teaching and learning took place in a classroom unlike other facilities. The classroom has no alternative.

Furthermore, these findings agreed with Kostelnik, Whiren, Sodermann and Gregory (2009) that overcrowded schools in New York City had students scoring significantly lower in both Science and other subjects than did students in schools with enough infrastructures. All the pupils suggested that more classrooms should be built in order to accommodate the increasing number of the pupils in the schools. From this study, it was learnt that, there was need to build enough infrastructure to accommodate all the pupils. It was also noted that the pupil-teacher ratio was too high, making it difficult for pupils to comprehend. This was an indication that the number of students in classes were more than the recommended number. This affects learning and teaching because the teachers get overwhelmed by the number of students especially when marking the assignments given to the students.

It was also inquired from the pupils on how they were motivated by their Science teachers, all the pupils said their Science teachers encouraged them to study hard in Science because most of the good careers in the world were science oriented. All the pupils said that their teachers motivated

them by also telling them that they could only become doctors or nurses by working hard in sciences.

These results are also supported by the findings of Clark (2002) in his study he alluded to the fact that school test scores were more likely to improve when students spent at least 15 hours per week with teachers doing high quality learning activities If students spent 8-15 hours a week in out of school learning activities while guided by adults they would achieve high standards, students would be focused and engaged. They would also know how to study, plan and complete projects if they had access to libraries and reference materials. However, this was not the case with pupils from Mwandi District as they lacked commitment and seriousness when it came to studying and school work.

Gardner and Hill (1999), recommends that good infrastructure promotes teaching and learning; classrooms, laboratories and libraries should be well located and equipped. From the teachers' point of view on this matter, most of the teachers said the school environment from the three selected schools had impacted negatively on the performance of the pupils in Chemistry and Physics. The negative attitude towards the subject and the perception the communities had of Science as a subject that it was difficult for pupils to understand also had a negative impact on the pupils' performance.

The majority of the pupils who participated alluded to the fact that the people they lived with did not help them in understanding the importance of learning Science, while those who were being helped pointed to the fact that the people they lived with did help them and were involved in helping them understand the importance of learning science education. This was supported by overwhelming responses from the community members from the three selected schools who said

that they were not involved at all in helping school going children in improving their performance in Science. This was one of the environmental factors and was in line with what Caillods et al (1997) alluded to. There were different assumptions about lack of support from parents, especially in the rural schools. Some of the reasons were that parents did not receive proper formal education, hence, they found it difficult to be actively involved in their children's education.

Further, Epstein (2002) and Rich (1993) explained that some parents choose not to participate in school family relationships because of their limited education. Therefore, it can be said that one of the perceived factors which contributed to poor performance in Science in Mwandi District was lack of guardians' participation in their children's learning process of Chemistry and Physics.

The study brought out, in general, that the learning environment in public secondary schools was poor. There was only one secondary school that had a library and even this one had inadequate study materials. It was also learnt that most of the classrooms in all the schools were overcrowded with nearly all learners sharing desks (three or four learners sharing a desk in some cases) in classrooms. While accepting that infrastructure was just one determinant factor, it would not be far-fetched to conclude that infrastructure had been a key factor in the below average performance in Science by Mwandi pupils in promotion tests and national examinations over the years.

The study explored the period the students had been in school. On average all the pupils had been at the particular schools for more than two years, while the teachers had been teaching at their respective schools for more than three years on average. This was long enough to assess the influence of infrastructure in academic performance.

### 5.4 Difficulties Faced by Pupils in Learning Science

The third objective was to establish the difficulties pupils faced in learning science education in selected secondary schools of Mwandi District. In this research, participants indicated quite a number of the challenges they faced in learning Science.

This is similar to the findings of Pendidikan (2017) who revealed that experiments, calculations, graphs and conceptual explanations could be referred to as difficulties in representation of the science formulas.

While good academic performance was associated with a good learning environment, Dudek (2000) observed that uncomfortable and unsuitable classrooms caused problems such as limited concentration span, writing difficulties and illness, thus reduced the learning opportunities.

Community members perceived challenges pupils faced in learning Science such as lack of enough classroom space, insufficient teachers of Science, long distances to school as two of the three secondary schools were day schools, proximity to social amenities like bars that usually played loud music during lesson times and some pupils engaged in beer drinking, pupils had a tendency of opting to miss lesson and go fishing, lack of libraries, and lack of internet facilities for research.

Parents further emphasised the insufficiency of school science and computer laboratories as a key setback hindering pupils' good performance in Science. They emphasised the need for government to come on board and help improve the situation as the school performance in sciences was said to be going down every year.

From the teachers' point of view from all the schools, it was learnt that the biggest challenge they were facing was the negative attitude that the students had towards the Science subject.

During the examination period the student saw the equipment for the first time, hence poor results. They had never practised or had a chance to handle the equipment.

In relation to the Social Cognitive Theory, it was deduced that self-efficacy and outcome expectations affected performance. Thus, students with stronger self-efficacy beliefs and outcome expectations were seen to set and work towards more challenging academic goals than those with weaker self-efficacy beliefs or less positive outcome expectations. Furthermore, the findings also showed that lack of qualified science teachers hindered learners from realising their full potential in learning. This equally corresponded with the Social Cognitive Theory that poor school learning environment was not viable in helping pupils perform better in Science due to lack of laboratories and laboratory equipment.

# CHAPTER SIX

# CONCLUSION AND RECOMMENDATIONS

## 6.1 Introduction

This chapter presents a summary of the findings from the study that was done on perceived factors leading to poor performance amongst pupils learning Science from three selected schools in Mwandi District of Zambia.

## 6.2 Conclusion

The findings of this study revealed that there was significant negative effect of lack of teaching and learning resources on the performance of learners in Science. The science performance in the secondary schools under study could be improved if students were involved in practical lessons under the guidance of well trained and qualified personnel. This would increase their motivation and change their attitude towards science subjects, hence raise their performance.

The main conclusions drawn from this study were as follows:

Non availability of teaching and learning materials generally affected the performance of students. These materials should be made available and they should be of good quality in order for them to produce accurate results during practical sessions. The other schools had no equipment at all and opted for alternatives to practicals which was not applicable since these students required that knowledge for their future careers.

The teaching and learning environment in some of the secondary schools was found to be unfit for Science lessons. One school had no single laboratory and the practical lessons were done in the

classrooms. Therefore, Parents, the government and the society at large should ensure that the environment is conducive for learning to take place effectively.

The findings of this study indicated that one of the major difficulties that the teachers faced while teaching Science was the students' negative attitude towards the subject. They had a perception that Science was always very tough compared to other subjects which discouraged them, hence, affected their performance.

### 6.3 Recommendations

Based on the findings of the study, the following recommendations were made;

I. There is a need for parents or guardians in the area to organise themselves and encourage their school going children to concentrate in studying Science by setting some time to study the subject.

II. The schools and the communities should work together in ensuring that pupils concentrate on their education and take full responsibility of their education and discourage them from involving themselves in outside school activities like fishing. School managers should also fence their schools in order to monitor movements of pupils.

III. Guidance teachers should provide motivational talks on the importance of learning Science by educating the pupils on the career prospects anchored on science education.

IV. There is need for schools management, Science teachers, parents and teachers committees to introduce education tours so that teachers and pupils from this district can interact with people in the industries such as the mining plants and Hydro power plants where the science knowledge and skills are applied for the pupils to get motivated and appreciate the applicability of the science education in real life.

V. Government and other stakeholders should construct science laboratories and stock them with the required equipment. There is also need to build computer laboratories with proper internet so that both pupils and science teachers can utilise them for research.

VI. The Ministry of General Education (MOGE) should employ more qualified Science teachers as well as procure updated Chemistry and Physics textbooks for schools in Mwandi District.

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# APPENDICES

## Appendix A: Consent Form for Natural Sciences Teacher

### INTRODUCTION

I am a Masters student in sociology of education at the University of Zambia. I am conducting a study on perceived factors leading to poor performance amongst pupils learning science. I have picked on you as a Science teacher to participate in this study.

Therefore, I am requesting you to help with data collection by having a personal interview with me.

### PROCEDURE

I will interview you face to face. With your permission, the interview will be audio-taped.

Notes will also be written during the interview.

### BENEFITS

You will not benefit directly from taking part in the study. However, this study will help us understand why we have lower grades in science results.

### DISCOMFORTS

I do not expect much discomfort from you taking part in the one on one interview. However,

I will ensure that the personal interview is shortened as much as possible.

**CONFIDENTIALITY**

Your name and the name of the school will not be published in any report. Instead, pseudo names will be used. In addition, all recorded information and transcripts will be destroyed after all data has been analysed.

**RIGHT TO REFUSE OR WITHDRAW**

Your participation in this study is completely voluntary. If you decide to drop out or refuse to take part in the study, there will be no penalty to you.

**CONSENT**

I have read this consent form and have been requested to take part in the study and I have given free consent by signing this form. My consent to participate in the study is voluntary and I may withdraw from the study at any time if need be. I am also aware that the information I will provide, will be treated in confidence and I will not be personally identified.

I also understand that the one on one interview will be audio-taped. My initials below certify that I agree to have the interview and one on one interview will be audio-taped.

I agree to have the one-on-one interview audio-taped.

Initials

Name of Teacher……

Signature of Teacher……..

I acknowledge that I have witnessed the Teacher sign this consent form

Name of HOD……

Signature of HOD……...

Date……

**Appendix B: Consent Form for Pupils**

**INTRODUCTION**

I am a Masters student in sociology of education at the University of Zambia. I am conducting a study on perceived perceived factors leading to poor performance amongst pupils learning Science. I have picked on you to participate in this study. Therefore, I am requesting you to help with data collection by participating in a group interview.

**PROCEDURE**

I will interview you in a group of six pupils. With your permission, the group interview will be audio-taped. Notes will also be written during the interview.

**BENEFITS**

You will benefit directly from taking part in the study. This study will help us understand why we have lower grades in Science results.

**DISCOMFORTS**

I do not expect much discomfort from you taking part in the group interview. However, I will ensure that the group interview is shortened as much as possible.

**CONFIDENTIALITY**

Your name and the name of the school will not be published in any report. Instead, pseudo names will be used. In addition, all recorded information and transcripts will be destroyed after all data has been analysed.

**RIGHT TO REFUSE OR WITHDRAW**

Your participation in this study is completely voluntary. If you decide to drop out or refuse to take part in the study, there will be no penalty to you.

**CONSENT**

I have read this consent form and have been requested to take part in the study and I have given free consent by signing this form. My consent to participate in the study is voluntary and I may withdraw from the study at any time if need be. I am also aware that the information I will provide, will be treated in confidence and I will not be personally identified.

I also understand that the group interview will be audio-taped. My initials below certify that I agree to have the group interview audio-taped.

I agree to have the group interview audio-taped.

Initials

Name of pupil……

Signature of pupil……

I acknowledge that I have witnessed the pupil sign this consent form

Name of Teacher……

Signature of Teacher……

Date……

## Appendix C: Consent Form for Community Members

### INTRODUCTION

I am a Masters student in sociology of education at the University of Zambia. I am conducting a study on perceived factors leading to poor performance amongst pupils learning Science. I have picked on you to participate in this study. Therefore, I am requesting you to help with data collection by participating in a personal interview.

### PROCEDURE

I will interview you alone. With your permission, the interview will be audio-taped. Notes will also be written during the interview.

### BENEFITS

You will benefit directly from taking part in the study. This study will also help us understand why we have lower grades in Science results.

### DISCOMFORTS

I do not expect much discomfort from you taking part in the interview. However, I will ensure that this personal interview is shortened as much as possible.

### CONFIDENTIALITY

Your name will not be published in any report. Instead, a false name will be used. In addition, all recorded information and transcripts will be destroyed after all data has been analysed.

**RIGHT TO REFUSE OR WITHDRAW**

Your participation in this study is completely voluntary. If you decide to drop out or refuse to take part in the study, there will be no penalty to you.

**CONSENT**

I have read this consent form and have been requested to take part in the study and I have given free consent by signing this form. My consent to participate in the study is voluntary and I may withdraw from the study at any time if need be. I am also aware that the information I will provide, will be treated in confidence and I will not be personally identified.

I also understand that the interview will be audio-taped. My initials below certify that I agree to have the interview audio-taped.

I agree to have the personal interview audio-taped.

Initials

Name of parent……

Signature of parent……

I acknowledge that I have witnessed the parent sign this consent form

Name of Parent……

Signature of Parent……

Date……

**Appendix D: Letter of Introduction**

**THE UNIVERSITY OF ZAMBIA**

**SCHOOL OF EDUCATION**

**DEPARTMENT OF EDUCATIONAL PSYCHOLOGY, SOCIOLOGY AND SPECIAL EDUCATION**

Serial No…….

**Research Topic:** Perceived Factors leading to poor performance amongst pupils learning Science education in selected secondary schools in Mwandi District.

**Dear Pupil,**

I am a postgraduate student at the University of Zambia carrying out academic research with respect to the above stated topic. You are one of the pupils who have been selected from the entire population in this class and I am humbly asking for your voluntary participation in this research which is sociology of education. Please be assured that the information that you will give will be treated with great confidentiality and it is not for government but for me as a student as alluded to above. For this reason you are not supposed to mention your name or give any other information that will display your identity. The interview will take approximately 20-25 minutes.

**Instructions:**

Do not indicate your name or NRC number on the questionnaire

Give as many responses as possible for each question but please be as brief as possible by filling in the space provided. Tick one response where it requires you to do so and more where it as well requires you to do so.

You are free to ask the researcher for clarity where you are not clear.

Yours faithfully,

**Ndala Kelvin**

**Appendix E: Focus Group Discussion for Pupils**

**SECTION A: BACKGROUND INFORMATION**

1. What is your Sex?

   (i) Male [ ] (ii) Female [ ]

2. What is your age range?

   (i) Below 13 years [ ] (ii) 13-16 years [ ] (iii) 16-19 Years [ ] (iv) Above 19 Years [ ]

3. What grade are You?

   (i) Grade 10 [ ] (ii) Grade 11 [ ] (iii) Grade 12 [ ]

4. What is your marital status?

   (i) Single [ ] (ii) Married [ ] (iii) Divorced [ ] (iv)Widowed [ ]

   (ii) Others specify……

5. Are your parents still alive?

   (i) Both are alive [ ] (ii) Mother only [ ] (iii) Father only [ ] (iv) None is alive [ ]

6. If your answer to question 4 is none, who do you live with at home?

   (i) Alone [ ] (ii) Grandparents [ ] (iii) Older sibling [ ] (iv) Younger sibling [ ] (v) Extended family [ ] (vi) Well-wishers [ ] (vii) Orphanage [ ]

7. What language do you mostly use at home?

   (i) English [ ] (ii) Lozi [ ] (iii) Nkoya [ ] (iv) English and Lozi [ ] (v) Above three [ ]

8. State the total number of people that you live with at home

   (i) Between 2-4 [ ] (ii) Between 4-6 [ ] (iii) Between 6-8 [ ] (iv) Above 8 [ ] (v) Not sure [ ]

9. What is the education attainment of the people you live with?

   (i) Never [ ] (ii) Primary level [ ] (iii) Secondary level [ ](iv) College/university level [ ]

10. What is the distance from home to school?

    (i) Less than 5 Km [ ] (ii) 5-10 Km [ ] (iii) 10-15 Km [ ] (iv) 15-20 Km [ ] (v) Above 20 Km [ ]

11. What is the occupation/source of income of the people you live with?

    (i) Work for Government [ ] (ii) Work for a private organization [ ] (iii) Farm produce [ ] (iv) Not sure [ ] (v) Other specify…….

**SECTION B: AVAILABILITY OF TEACHING AND LEARNING MATERIALS**

12. Does the school have enough needed science textbooks?
13. Are the materials available up to date?
14. In your opinion, how would do you rate the performance in science at this school?
15. State some of the science materials you feel the school needs to have?
16. Have you ever used a laboratory since you came to this school?
17. If yes, how often do you use your laboratory?
18. In your opinion, are the laboratory well equipped with the needed learning and teaching materials?
19. Do you have a computer laboratory at this school?
20. If yes, do you think the computers are enough for every pupil to access?

**SECTION C: LEARNING AND TEACHING ENVIRONMENT**

21. In your opinion, do you have enough desks in your class?
22. How would you describe the teaching and learning environment at your school?
23. Do your Science teachers motivate you to learn the subject?
24. If yes, how are you motivated by your teachers?

25. How does your school environment allow you to study science?
26. How often do you study science in a week?
27. State some of the reasons you feel your school environment does not allow you to study science?
28. What is your attitude towards learning science?
29. As a pupil at this school, how does the school and the teaching staff help you to understand the importance of learning science?
30. How does the people you stay with help you in understanding the importance of learning?
31. How does the people you live with motivate you as a pupil to work hard in science?

**SECTION D: DIFFICULTIES IN LEARNING CHEMISTRY/PHYSICS**

32. What difficulties do you find in learning Science at your school?
33. Explain the main difficulties you find in learning Science?
34. What do you think can be done at this school to improve the performance in Science?

**End of interviews thank you for your time and cooperation!!!**

**Appendix F: Interview Guide for Key Informants**

1. How is the availability of teaching and learning materials in Science at your school?
2. State and explain some of the materials in Science the school needs to have?
3. As a school, do you have a science laboratory?
4. If you do have the laboratory at this school, how often are pupils taken to the laboratory?
5. You as a Science teacher explain how you motivate your pupils in learning Science?
6. How would you rate the attitude of the pupils towards the learning of Science?
7. State and explain the impact of the school environment towards the teaching and learning of Science at this school?
8. How would you rate the overall performance of the pupils in Science at this school?
9. What difficulties as a teacher of science do pupils face when it comes to learning these sciences?
10. What do you think should be done to improve the performance of pupils in Science at this school?

**End of interviews thank you for your time and cooperation!!!**

**Appendix G: Semi-Structured interviews for Community members**

1. As a member of this community, does the secondary school have the necessary materials required for the learning of Science of the pupils?
2. State and explain how you are involved in ensuring the school has the required materials in Science for good performance of the community school going children?
3. Explain how you are involved in helping school going children in improving their performance in Science?
4. Is the community environment conducive for effective learning of Science?

6. What challenges do pupils face when it comes to learning Science?

7. What do you think should be done to help pupils in this area improve their performance in Science?

**End of interviews thank you for your time and cooperation!!!**