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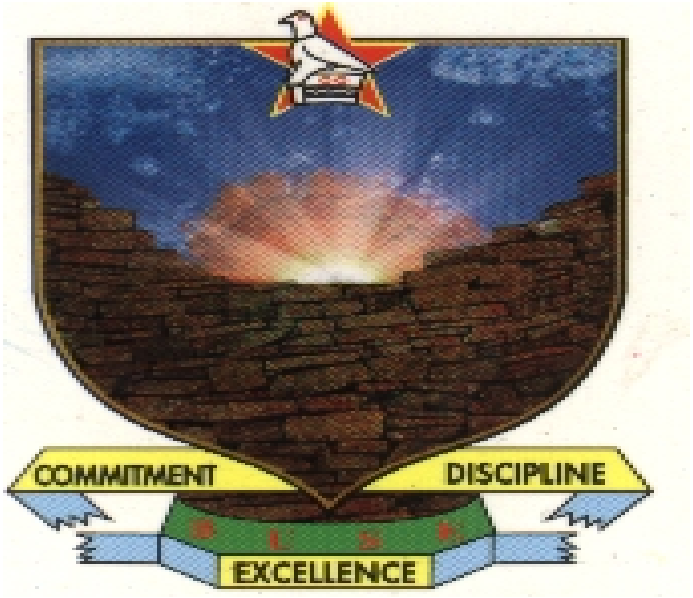

AN ASSESSMENT OF THE FACTORS CAUSING LOW PASS RATE IN ORDINARY LEVEL CHEMISTRY. A CASE STUDY OF EMPANDENI HIGH SCHOOL IN MANGWE DISTRICT.

BY

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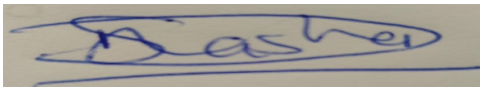

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Dedications

This effort honors God almighty , my creator, tower of strength, source of inspiration, wisdom, knowledge and insight. He has been my source of strength throughout this program and I have only been able to fly on His wings. I also dedicate this work to Mr Shasha, my supervisor who has been supportive throughout the process. To my brothers Howard Nderere, Dumisani Nderere, Blessing Nderere, Godfrey Nderere and my friend Marecha Spatisiwe I appreciate their support. My love for them has no limits

Abstract.

This study looked at factors causing low pass rate in ordinary level chemistry at Empandeni High School in Mangwe District. The study was guided by the following objectives - to establish the extent to which: teaching methods, teacher and student motivation, socio-economic backgrounds, student's attitudes, resources and teacher-student relationships influence performance in ordinary level chemistry at Empandeni High School.

The study used cross-sectional research design to collect data from the population samples. Purposive sampling technique was used to select key informants which were the Chemistry teachers and Head of department. Stratified and simple random sampling techniques were used to select 60 student participants on equal ratios of form threes and form fours. Questionnaires and interviews were used as a means of data collection from Chemistry students and key informants respectively. The research study has revealed that shortage of resources, teacher-pupil ratio, teaching methods, motivation and socio-economic backgrounds of students are some of the factors causing low pass rate in Chemistry at Ordinary level.

The recommendations to alleviate the problem are that schools should consider hiring more qualified chemistry teachers, provide adequate teaching and learning resources, consideration of students' cultural and learning backgrounds in choosing instructional strategies as well as shifting from the traditional methods of teaching to more interactive and child centred approaches.

Abbreviations and Acrynoms

ZIMSEC…….....Zimbabwe School Examinations Council

UNESCO……United Nations Educational Scientific and Cultural Organization

STEM……..Science Technology Engineering and Mathematics

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CHAPTER ONE

1.0 INTRODUCTION TO THE STUDY

1.1 INTRODUCTION

Assessment of performance is not just a testing strategy but a method of teaching and learning that involves both process and product. Performance in examinations in secondary schools remains the major standard for measuring success and qualification in academic achievement. In Zimbabwe, the Zimbabwe School Examinations Council, (ZIMSEC), results tell whether the student understood her studies or not. Examination results have also been used to express to what extent the school is good or bad in ordinary level education. However, the history of Empandeni High School ordinary level results shows that performance in chemistry, physics, biology and mathematics have not been good as compared to arts and commercial subjects. In this research, the researcher investigated the causes of low pass rate in O level chemistry at Empandeni High School in Mangwe district. This chapter presents the background to the study, statement of the problem, research objectives, research questions, significance of the study, delimitations, limitations, and assumptions, definition of terms as well as summary of the chapter focusing on the factors causing low pass rate in ordinary level chemistry.

1.2 BACKGROUND TO THE STUDY

According to Ncube and Tshabalala, (2014), education and development of any society are always related; better life of the people in any country can never be separated from better education. The education level of any particular society is directly proportional to the level of poverty in that given society, (Finley, 2016). This means that improving education plays a crucial role in poverty reduction as well as economic growth of any society, (Vickers, 2015). According to Garrett (2014), there is a general agreement among science educators that Chemistry plays an important role in the development of a country and students must have a better understanding of chemistry in order to think scientifically in ways that transform their future lives.

Despite the fact that chemistry and other natural sciences are important for the development of any developing country like Zimbabwe; the Zimbabwe School Examinations Council, (ZIMSEC), results show that performance in these subjects at ordinary level is lower than that of other subjects (UNESCO, 2008). However, several attempts to improve performance in these subjects have been

put in place. One example is the launch of the STEM scholarship program in Zimbabwe by the Ministry of Higher and Tertiary Education (under Jonathan Moyo in 2016) in a bid to promote the uptake of science, technology, engineering and mathematics disciplines.

Improvement in natural science subjects including Chemistry in secondary schools remains a major challenge in developing countries like Zimbabwe. These subjects require laboratory equipment, chemicals and special laboratories which are very expensive to set up particularly in the developing world. According to Mabula (2012), pupils' pass rate in chemistry can be affected by poor quality classroom teaching and also by lack of interest of pupils towards chemistry. HakiElimu (2013) also indicated that some factors for students' failure are lack of qualified teachers and poor working conditions.

In all schools that offer natural sciences, there is a need for laboratories specifically meant for each science subject because learning of natural sciences is basically dominated by practical lessons. In Mangwe district, basically at Empandeni High School, many factors have impacted negatively on the learning and teaching of chemistry and this prompted the researcher to embark on the study. This study therefore sought to investigate the factors causing low pass rate in chemistry at Ordinary level at Empandeni High School in Mangwe district with a view of identifying appropriate interventions to improve the performance in the study area.

1.3 PURPOSE OF THE STUDY

The aim of this study was to investigate the causes of low pass rate in chemistry at Empandeni High School in Mangwe District at Ordinary level and suggest possible interventions for enhancing good performance.

1.4 STATEMENT OF THE PROBLEM

General observations at Empandeni High School show that the chemistry performance in both the internal and external examination is not good. The table below shows the performance in ordinary level chemistry external examinations at Empandeni High School for the past five years.

YEAR	TOTAL NUMBER OF CANDIDATES	NUMBER OF CANDIDATES PASSED	NUMBER OF CANDIDATES FAILED	PERCENTAGE PASS RATE / (%)
2021	20	8	12	40.00
2020	55	19	36	34.55
2019	62	25	37	40.32
2018	40	19	21	47.50
2017	45	5	40	11.11

Table 1: Empandeni High School O' level chemistry external examinations results from 2017-2021.

The continued poor performance in chemistry has been attributed to a number of factors including students' attitude towards chemistry, teachers' attitude towards students' capabilities, inadequate teaching and learning resources, and poor teaching methodologies. However, it is not clear which of these factors are responsible for the poor performance of chemistry at Empandeni High School at ordinary level. The study therefore sought to isolate the factors which could have been responsible for students' poor performance in ordinary level chemistry at Empandeni High School in Mangwe district.

1.5 RESEARCH QUESTIONS

The main research question of this study was: **What are the factors causing low pass rate in ordinary level chemistry at Empandeni High School in Mangwe District?**

The following sub-questions were derived:

1.5.1 Sub questions

- What are the qualifications and experience of the teachers taking Chemistry at ordinary level?
- What resources are available for chemistry teaching at ordinary level?
- What methods of teaching are being used by teachers in teaching chemistry at ordinary level?
- What are the attitudes of teachers and students towards chemistry subject?

1.5.2 Specific Questions

- Which school based factors might affect students' pass rate in chemistry at Empandeni High School?
- What are the students' background factors that affect chemistry pass rate at Empandeni High School?
- What strategies should be adopted in order to improve Chemistry pass rate at Ordinary Level in Secondary schools?

1.6 RESEARCH OBJECTIVES.

The study was guided by the following objectives:

- To determine the extent to which teaching methods influence performance in chemistry at ordinary level in public secondary schools in Mangwe district.
- To examine the extent to which teacher and student motivation influences performance in chemistry in public secondary schools in Mangwe District.
- To examine the influence of socio-economic backgrounds on students' performance in chemistry.
- To assess the influence of student's attitudes in overall chemistry performance.
- To examine the influence of resources on chemistry teaching and learning process.
- To assess the influence of teacher-student relationships on chemistry performance.
- To identify intervention strategies that can help improve learners' performance in Chemistry at ordinary level.

1.7 ASSUMPTIONS OF THE STUDY

The study will be based on the assumption that:

- All examinations are reliable and valid and can therefore be used as a measure of academic achievements.
- The respondents selected to participate in the study will cooperate and give honest and truthful responses to research questions representing the wider population of secondary school students in Mangwe District.

1.8 SIGNIFICANCE OF THE STUDY

The findings of the study are expected to contribute towards improvement of teaching and learning strategies of chemistry not only for the school under study, but for the entire nation. The study will be expected to contribute to the advancement of science knowledge for social and economic development.

The findings of the study may be of benefit to different stakeholders in the education system. Learners would benefit from suggestions on particular characteristics and study habits that enhance performance in chemistry and also may be able to know the correct attitude they ought to have in order to pass the subject. Classroom teachers will be able to select and adjust their teaching methodologies appropriately to improve the quality of teaching and learning thus providing the best maximum results as they are the curriculum implementers. Chemistry teacher trainers may be able to know the major areas of emphasis as far as the teaching methodologies are concerned. Policy formulators would be guided in gathering useful information which would shed light on why the interventions implemented have not yielded required results. This would also enable policy implementers to adopt strategies that promote good performance in Chemistry.

1.9 DELIMITATIONS OF THE STUDY

The study was carried out at Empandeni high school, Empandeni cluster B in Mangwe district. This is because Empandeni high school is multicultural; comprising a number of ethnic groups with different socio-cultural backgrounds that provided the various expected differences in the learners. The participants included the randomly selected form four Chemistry students, form four Chemistry teachers and the head of science department.

1.10 LIMITATIONS OF THE STUDY

This research was conducted as a case study in one day secondary school so the sample may not be a true reflection of all the secondary schools in Mangwe District. The other limitation is that the outcomes from public schools might not apply to private schools. Since social science research depends on human beings as their major source of information, some respondents may feel insecure to give full information and this creates some bias in data collection.

1.11 DEFINITION OF TERMS

- ***Assessment:*** Is a process for documenting in measurable terms, the knowledge, skills, attitudes and beliefs of the learners (Poehner, 2007). It can also be done through determining students' achievements in tests, projects and examinations.
- ***Chemistry:*** It is a branch of science that deals with study of nature and properties of all forms of matter including how and why substances combine or separate to form another substance.
- ***Chemistry achievement:*** The competency level attained in chemistry including mastery of basic skills (observation, recording, reporting), knowledge and concepts measured in terms of grades a student scores in chemistry examination.
- ***Chemistry curriculum:*** All the experiences a learner goes through in learning Chemistry in a learning institution. They include: time-tabled content, practical work, project, group discussions, excursions and field work.
- ***Motivation:*** Motivation is the act of being motivated or being cause to do something. In this research motivation are incentives which cause either chemistry students or chemistry teachers in secondary schools to act positively on the subject.
- ***Students' attitudes:*** Refers to students' predisposition or a tendency to respond positively or negatively towards education.

1.12 ORGANIZATION OF STUDY

This study is made up of five chapters. Chapter one, the introduction, focuses on the background of the study, purpose of the study, statement of the problem, research questions, objectives of the study, hypothesis, basic assumptions of the study, significance of the study, delimitations of the study, limitations of the study, definition of significant terms used in the study, the organization of the study and the chapter summary. Chapter two reviews related literature with a focus on the major reasons why students do not perform well in Chemistry. Chapter Three presents the research philosophy, the research methodology and strategies. This describes the design of the study, location of study, research instruments, sample size and sampling procedures, data collection and data analysis. Chapter four is data presentation and data interpretation. The last one is Chapter five which presents the summary of the study, conclusion and recommendations.

1.13 SUMMARY

This chapter provided the rationale of the study. It contains introductory concepts such as study background, statement of the problem as well as the research objectives and questions. It also highlights the scope of the study as well as the theory around which the study revolves. There is definition of terms used in the study and it is upon this foundation that the rest of the work (literature review, research methodology for data collection and ultimately, analysis) are based on. The next chapter reviews related literature on factors causing low pass rate in chemistry.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

This chapter presents a review of related literature which, according to Mugenda and Mugenda (2013), involves systematic identification, location and analysis of documents containing information related to the research problem being investigated. The previous chapter put much attention on the rationale of studying chemistry and students' performance so as to provide justification for this study. This chapter on literature review establishes a conceptual framework on variables influencing teaching and learning of chemistry as well as empirical studies on factors influencing students' performance in chemistry. It also highlights the theories of learning chemistry including what other researchers have written about the subject and the gap requiring further research. It consists of relevant themes which have been derived from the research objectives. This review will consider the following as most probable factors that could determine a student's performance in Chemistry:

- Motivation of teachers and students.
- Teacher qualification, experience and performance.
- Pupils' attitude
- Teaching and learning resources availability and use
- Teaching methodologies.

Motivation of teachers and students

Motivation of teachers and students undoubtedly affects students' learning and performance which is the main aim of schools as organizations. Theobald (2016) defines motivation as an innate desire that drives individuals to participate in an activity because of the satisfaction derived from it. Another view by Nukpe (2012), motivation can be referred to as a process of arousing enthusiasm in an individual by instilling an innate feeling, a kind of energizer or desire that causes the individuals to perform their duties with pleasure and high interest in pursuance of the institutional and personal goals. As students are motivated to learn, they are more likely to achieve the goals set for them, either by themselves or by the teacher. Students' motivation to learn is derived from various sources, either intrinsic or extrinsic. Both intrinsic and extrinsic motivation increases

students' drive to learn. Sometimes, students are motivated to learn naturally because of their own interest and enjoyment in the subject or task, which gives deep meaning to what they learn and the effects on their lives. On the other hand, some students learn best because of a tangible reward or the value that is attached to the outcome of learning (Bain, 2014). Students who are intrinsically motivated tend to perform better on the given tasks and are keener to achieve success (Theobald, 2016).

According to Maslow's hierarchy of need theory, most basic needs should be focused on in order to motivate a teacher. These include reasonable pay, work benefits, reasonable living standards, and involvement in cultural activities, health and decent accommodation. According to Al-Aamari (2010), motivating leaders realize that their subordinates are not slaves but wonderful human beings who appreciate an opportunity to express their opinions in any discussion that may impact their assignments. This gives them the internal push and enthusiasm to perform their duties with the aim of effectively achieving goals set by the institution as well as personal goals. Motivation in form of promotion and allowances is another way of making the teachers give their best efforts in an efficient and effective manner in order to achieve set school objectives as far as the results are concerned. Some schools manage to achieve high pass rates because they motivate their teachers with allowances or remuneration and promotions. Incentives and rewards from the school show that the administrators appreciate the work done before expecting more from the teachers. Satisfaction of the motivational factors lead to quality performance and high productivity which enhances quality assurance in the educational system as far as the chemistry performance is concerned.

Teacher qualification, experience and performance

The major general important variable that determines the success of pupils in public examinations and educational performance is teachers' qualification, experience, commitment and effectiveness, (Yara, 2019). The performance of learners depends largely on the quality of teachers involved in the education system. Teacher's qualification and experience are very significant and positively correlated with a student's performance in science, (Mafa & Tarusikirwa, 2013). The adaptations that a teacher makes to accommodate pupils of different abilities depend on the teacher's attitude, experience and level of training among other factors.

In another point of view, Samukange (2015) says in some schools there is a mismatch between the teachers and their areas of specialization. This may be because the subjects of specialization are not offered at the schools where these teachers are stationed. According to Shumba (2010), the subject area qualification is associated with higher student performance in that subject and in this view, the teachers should teach their subject of qualification to achieve better student academic outcome. From this point of view, it is of no doubt that teachers are by far the biggest human resource that determines performance in schools. According to Chikowore (2013), in-service training for the chemistry teachers is very important to ensure that teachers are kept well-informed with current changes in technology and knowledge. It enables teachers to update their knowledge, sharpen their skills and acquire new teaching techniques. Also, staff development is equally important to teachers because it helps teachers to improve their instructional competencies and their capacity to deliver the curriculum thus minimizing the problem of low pass rate in chemistry in secondary schools.

Students' attitude

Attitude is any concept that specifies individuals' feelings of likes or dislikes to anything. According to Langat (2015), attitude determines the students' abilities and willingness to learn the subject and to work on variety of assigned subject tasks. Attitude towards chemistry will be of like and dislike. How students perceive chemistry ideas greatly affects how they solve chemistry problems and also how they accept ideas in the subject. Attitudes towards the subject may be influenced by parents' expectations, teachers' characteristics and many other students' personal factors such as intelligence and career prospects. According to Bolarin (2018), there is a huge relationship between the level of liking of a particular subject and the effort and time that is put in the subject. Learning difficulties can be reduced by a right attitude.

Attitude can be positive or negative. A positive attitude towards a subject is important in improving the students' academic performance. It can be a motivating factor of attention and therefore makes students remember facts easily. Favorable attitudes should be nurtured and enhanced to the benefit of the learners and bring out their best potential. According to Awang, Jindal-Shape and Barber (2013), students with a negative attitude towards a subject are found to exhibit challenging behavior including anti-social and off task behavior. Negative dispositions induce tendencies of fear, anxiety and stress where one resorts to other non-productive practices. Also, a negative

attitude can minimize concentration and commitment to academic work (Avital, 2012). Teachers play a great role in changing the attitude of students by making chemistry learning meaningful and interesting.

Teaching and learning resources availability and use

A resource is any source of information, expertise, supply or support. Resources play an important role in enhancing the teaching and learning process by modifying the teaching and learning situation. The use of the resources involves a broad range of human senses at the same time in the learning process. This facilitates learning and helps in the conveying of the intended purpose. Chemistry is a science subject and it involves inquiry into natural and artificial phenomena. These phenomena cannot be studied effectively through theoretical discussions only but should be learnt using both theoretical and practical approaches.

According to Rughubir (2009), availability of instructional resources does not necessarily translate into effective teaching and learning of a subject. Adequacy of resources is much more important in achieving the latter. This is because most of the resources play an important role in understanding concepts and imparting skills to a learner (Franyo, 2007). The learner can only adequately acquire these concepts and skills through the actual use of or contact with the resources. This is particularly important in chemistry where the hands-on approach to learning has been demonstrated to play a crucial role in the understanding of concepts and retention of content taught, as well as developing the ability to think scientifically. According to Awang (2009) teaching and learning aids and resources increase pupil achievement. In a study conducted by Chikwature and Oyedele (2016), it was found that availability of resources in most cases correlates positively with pupils' performance. Determining the quantity and extent of use of resources for teaching and learning of chemistry at Empandeni High School in Mangwe district formed a crucial segment of this study.

Teaching methodologies

According to Schulman, (1999) as cited in Rudhundu, (2014), a teaching method is a way in which a teacher organizes and manages the teaching-learning situation, presents clear explanations and vibrant descriptions, assigns and checks if learning interacts effectively with learners through questions and probes, answers and reactions, praises and criticisms. Rudhundu (2014) defines a

teaching method as a way of facilitating interaction between the teacher and learners to realize set goals. Chirume and Chikasha (2014) claims that teachers should carry the major part of the blame when they become more authoritarian and less human in their teaching approaches and promote rote learning. This therefore called for a shift in teaching methodologies from traditional methods that mainly center on chalk and talk to more interactive and child-centered approaches such as debates, group work, projects, practical and fieldwork among others (Kasembe, 2011). Just like other subjects, chemistry requires a teacher to prepare appropriately so as to deliver content in a way that could encourage good understanding of the concepts by the learners. Since chemistry is a science subject, a more practical approach may be more appropriate compared to the other teaching methods. According to Hofstein (2004), practical or hands-on activities develop and sharpen the students' skills such as ability to observe, skills in performing routine laboratory tasks and problem solving abilities.

However, some principles on effective teaching are rooted in the logic of instructional methods (Creswell, 2013). The principles of effective teaching rest on fundamental assumptions about optimizing curriculum and instruction. The assumptions include that no single teaching method can be the method of choice for all occasions, for any subject. Instructional methods need change as the students' expertise develops. According to Sitko (2013), it is the role of the teacher to establish the students' ideas in a chemistry concept and then introduce analogies of accepted scientific concepts so that the student can compare their own conceptions with the chemically accepted concepts. This may lead to a better understanding of the chemistry concepts hence greater achievement in the subject. A teacher who exposes learners to a variety of experiences gives them an opportunity to form, test and transfer concepts, (Omari, 2011).

2.2 EMPIRICAL LITERATURE REVIEW

According to Smith (2014), family background influences student performance in chemistry, it is identified that students' cultural backgrounds differ and can affect students' study of chemistry. Furthermore, students from different cultural backgrounds are influenced differently based upon parental experiences, interests and cultural views and attitudes of chemistry education.

One of the most stable and consistently observed phenomena in the field of education is the impact of students' home background on achievement (Sirin, 2005). Students whose parents have a higher level of education, a more prestigious occupation, or greater income tend to have higher

achievement than students whose parents have a lower standing on such socio-economic status indicators. According to UNESCO (2008), a necessary condition for teachers to teach chemistry was not only to know chemistry but also to be competent in understanding the basic contents, concepts and the associated skills. Teachers must consider student's perceptions and the ideas the student brings into the classroom. It was therefore important that teachers should find what their students already know about the concepts or the principles that are to be introduced.

2.3 KNOWLEDGE GAP

Despite those studies done on general students' performance, in chemistry and other natural science subjects in ordinary secondary schools, factors that led to the poor chemistry performance in ordinary level ZIMSEC examination are not fully covered even though the poor performance is generally known by both secondary school teachers, students and the society as a whole. The study done by Maina (2019) was done some years ago for the Coast region only, so it is important to revisit the study in order to see if there is any improvement on the factors studied and also to compare with other regions. According to the literature reviewed, performance in natural science subjects including chemistry is one of the most prominent challenges facing secondary school education in Zimbabwe and other less developed countries in Africa. Chemistry performance in secondary schools is facing overlapping challenges that affect the context of learning. These challenges are related in one way or another with the issues of lack of enough and reliable learning facilities like libraries, shortage of qualified human personnel like chemistry teachers and chemistry technicians to mention a few. It is clear that these are areas that have to be continuously researched from time to time in order to realize to what extent they affect student performance in the chemistry subject at ordinary level.

2.4 SUMMARY

From the foregoing review, it is evident that appropriate effort has been used by various researchers to address the poor performance in sciences in general and chemistry in particular. The efforts have attempted to isolate various factors that contribute to low achievement in chemistry at national level. This chapter has presented the conceptual framework, theoretical framework and empirical studies that informed about the study. In the conceptual framework the researcher has given out assumptions on factors that have an influence on a student's performance in chemistry. It was noticed that students' performance is the function of teaching and learning methods, teacher-

student relationship, school learning environment and school management system. Some of the key authors consulted include Chikwature and Oyedele (2016) who opines that teaching and learning resources have great influence on the performance of pupils and Mangwaya and Tsumele (2016) who postulates that pupils' negative attitude towards a subject were a stumbling block towards improving performance. In the course of the review it was realized that the factors considered tend to be more related to low achievement of the sciences in general and not Chemistry in particular. The researcher therefore sought to determine which factors among those advanced in the review are responsible for the persistent poor achievement of students in ordinary level chemistry at Empandeni high school in Mangwe District. An appropriate research methodology including instruments for data collection was therefore prepared for this task. The next chapter will describe the research methodology.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 INTRODUCTION.

This chapter outlines and describes research methods and techniques that would be used in conducting this research. The description will comprise of the study design, study location, target population, sampling procedure, and instruments used in data collection. The procedure used for data collection and methods employed in data analysis will also be discussed. The issue of data validity and reliability as well as ethical consideration will be covered.

3.2 RESEARCH DESIGN.

According to Omari (2011), a research design refers to a distinct plan on how a research problem will be attacked. Creswell, (2013) defined a research design as the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and control variance. Thus, a research design refers to the methods and procedures employed to conduct the research. The function of the research design is to ensure that the evidence obtained enables the researcher to effectively address the research problem logically and as clearly as possible (Leedy et al, 2013).

This study applied both quantitative and qualitative research approaches. Quantitative research is the type of research method that uses objectivity in measuring and describing a phenomenon. It also reaches many people, and contacting them is easier (McMillan & Schumacher, 2010). Quantitative research can be experimental which entails the manipulation of variables, or non-experimental where there is no manipulation of the conditions (Hopkins, 2008). Quantitative approach helps to quantify the problem by generating numerical data from the field and transforming them into usable statistics. According to Tichapondwa (2013), a qualitative research design refers to a systematic process of generating data and logically analyzing it in the form of words. Qualitative research design was also suitable for this study because it enabled the researcher to obtain an in-depth understanding of factors causing low pass rate in O' Level Chemistry at Empandeni High School in Mangwe district by studying humans in their natural setting (Cresswell, 2013). It also provided the researcher with a vast range of options and opportunities for exploring diverse issues affecting performance in Chemistry because it employs a variety of methods in its enquiry such as observations, interviews and document analysis (Lewis, 2015). This enabled the

researcher to understand phenomena from a holistic viewpoint to access activities, events and relationships in their whole content. In addition, the qualitative approach was suitable because it is grounded in the experiences and voices of research participants and the design was useful when exploring human behavior, attitudes, opinions, behaviors, and other defined variables of the population that cannot be quantified.

However, the study also used cross-sectional research design due to time limitation and economy. The design enabled the researcher to collect data across the sampled population at one point using the same instruments at the same time (Kothari, 2015). The research design also enabled the researcher to obtain information concerning the determinant factors for performance and assess the opinions of Principals, Chemistry teachers and students on how these factors contribute to performance in Chemistry (Best & Kahn, 2012).

This mixed methods design uses three models, which are:

Explanatory: Where the quantitative data are collected first. After the analysis of its results then qualitative data are collected to further explore the quantitative results, using a few individuals (Creswell, 2013).

Exploratory: Whereby the qualitative data are collected first from a few individuals. From its results a theme, idea, perspective or belief is built in order to design a quantitative study (Creswell, 2013).

Triangulation: Both qualitative and quantitative data were gathered simultaneously. This method gave qualitative and quantitative data equal priority. The data were then integrated to provide a comprehensive understanding of the problem at hand. Hence this method increases the validity and credibility of the results, especially when both the qualitative and quantitative results match (Kothari, 2015).

3.3 THE TARGET POPULATION AND SAMPLE.

Mugenda and Mugenda (2013), defines target population as that population to which the researcher wants to generalize the result of the study. The target population in this study was the ordinary level Chemistry teachers, ordinary level Chemistry students, Heads of department and educational administrators at Empandeni High School. The School was selected as a sample to represent all

the schools in Empandeni cluster B and Mangwe District as a whole. Chiromo (2009) defines a sample as a small group which is thought to be a true representative of the large population. According to the information obtained from the school records, both form 3 and 4 chemistry students add up to 105 and there are four chemistry teachers at this school. Chemistry teachers were targeted as they were the major agents of curriculum implementation at this selected school.

3.4 SAMPLING PROCEDURES.

The study used purposive, stratified and simple random sampling techniques to select the participants of the research. Stratified random sampling was used to select equal representation of both sexes of pupils to participate in the research thus eliminating gender bias. The researcher first divided the pupils into two groups basing on sex from which thirty girls and thirty boys were selected using simple random sampling technique. Simple random sampling ensured that everyone in the stratum had an equal chance of being selected hence eliminated bias as well (Cohen et al, 2010). A total of 60 students were selected from the school. In the random selection of girls and boys for a study sample, pieces of paper labeled 'YES' or 'NO' were put in a box and after thorough shaking, girls and boys were allowed to pick pieces of paper from the box in their respective groups. Those who picked papers written 'YES' were involved in the study. Purposive sampling was used to select key informants. Purposive sampling means that respondents are chosen on the basis of their knowledge of the information desired (Calderon, 2013). The main goal of purposive sampling is to focus on Chemistry teachers only which are best respondents to the research questions and have experience in teaching the subject.

3.5 DATA COLLECTION INSTRUMENTS

Chiromo (2009) explains that research instruments are tools used by the researcher to generate data. In this study, data was obtained through questionnaires on students selected and from interviews on key informants such as chemistry teachers.

Questionnaires

A questionnaire is a tool for collecting information which is made up of a set of written questions or pictures that requires a response given in various options (McMillan & Schumacher, 2010). They were developed so as to get opinions and views of the respondents specific to objectives of the study. Questionnaires were found appropriate in enabling the researcher to gather a large

amount of data economically (Orodho, 2009). The questionnaires were developed based on the research objectives. According to Dawson (2012), questionnaires can be close-ended, open-ended or both. In this study, closed-ended questionnaires were used. Closed-ended questionnaires follow a format which has prescribed answers and are prepared in advance, (Pathak, 2008). A closed-ended questionnaire saves time because it is easily administered and the answers are recorded quickly. It is easy to code because the respondents answer similar questions and all the questions have to be answered. The disadvantages of a closed-ended questionnaire include that no new issues are dealt with, and the respondents cannot voice their own opinions (Dawson, 2012). The questionnaires used are in the appendices of this study. Respondents were given questionnaires and enough time was given to interact with the questions. Respondents replied on their own free will without any influence from another person. The researcher did 'face-to-face' delivery of the questionnaires to the identified individuals. This method was chosen because it allowed information, in respect of the questionnaires, to be clarified to the respondents before they complete the questionnaires. The face-to-face delivery resulted in a high response rate.

Interviews

An interview is an interaction between two or more people for purposes of exchanging information through a series of questions and answers (Bryant, 2011). In this study, interviews were used to gather information from the chemistry teachers as the key informants. According to McNamara (2015), interviews are used to get the story behind a participant's experience and to get in-depth information about the topic. Woods (2011) agrees with this by stating that a lot of relevant information about people's experiences is collected by directly questioning or talking to them. According to Dawson (2012), interviews can be structured, semi-structured or unstructured. This study employed both semi- structured and structured interviews.

a) ***Semi-structured interview*** is a type of interview where the researcher compares and contrasts specific information with information that was gained by means of other interviews. The interview uses an interview schedule with topics or questions to be discussed. However, the order in which the questions are asked is not fixed but is determined by the conversation between the researcher and the participant (Woods, 2011). However, this type of interview makes use of flexible questions which helped much to explore other important information

that arose in the interview session though not pre-set. The role of the researcher is to probe the participants for more information (Taylor & Bogdan, 2014).

b) ***Structured interview*** is a type of interview whereby the researcher prepares questions beforehand, and they are arranged and asked in a particular order (Dawson 2012). Identical questions are asked for each individual, and the researcher does not probe the participants but only clarifies instructions (Taylor & Bogdan. 2008). Structured interviews were selected for this research because they made it easier to replicate discussions and to get standardized views on the topic. It was easy to simplify the findings.

The interviews were conducted simultaneously with the issuing of the questionnaires. The researcher conducted interviews only with teachers. The interview questions are in the appendices of this study.

3.6 VALIDITY AND RELIABILITY OF THE STUDY INSTRUMENTS

- VALIDITY

Validity refers to the degree to which an instrument measures what it is supposed to measure. According to Kothari (2015), content validity can be determined by using a panel of persons who shall judge how well the measuring instrument meets the standards. For this study content validity was tested by discussing the instruments with the supervisor who analyzed the instruments' suitability in line with the research questions. The Supervisor's comments helped to improve the validity of the questionnaires. The pilot test also helped to improve the teachers' questionnaires as well as the interview schedules.

- RELIABILITY

Reliability is the measure of the degree to which a research instrument yields consistent results or data after repeated trials (Mugenda and Mugenda 2013). To establish reliability, the researcher piloted the research instrument to a few chemistry students and teachers. Those who took part in the pilot study would not participate in the actual study. This helped the researcher identify the relevance of the item in relation to the study. Also to ensure reliability of the collected information, some of the items in questionnaire and interviews were asked more than once to see if there is consistency in responses from the respondents. In this study, the pilot data was collected through personal contact, which would familiarize the researcher with problems likely to be encountered

in the field during the main study. Also the reliability of the instruments was reflected on the items that were structured in simple English language, which the respondents may find easy to understand and internalize.

3.7 ETHICAL CONSIDERATION

To obtain a population of study, data collection and dissemination of the findings, the researcher was sensitive to research ethics and its values. This helped to ensure that a good image of research enterprise in the world is maintained (Omari, 2011). Ethical considerations are principles that guide and govern the researcher in carrying out a study (Chiromo, 2009). Ethical consideration for this study included communicating the aims of the investigation to the respondents, establishing understanding with the respondents and being honest at all times. The researcher took necessary precautions for the confidentiality of both the data and the respondents. The researcher has sought permission from the respondents to carry out the research with them. The researcher also informed the participants verbally that their participation in the study is voluntary and that they have a right to withdraw from the research anytime they feel so. This ensured that the participants were participating voluntarily. The objectives of the study were also explained. The participants were told why they have been chosen to take part in the study and how the results of the study will be used.

3.8 SUMMARY

This chapter described the research and explained why it was chosen, sampling methods used in the study were also discussed in detail. The chapter further described the data collection instruments and the rationale behind their selection. The researcher also described the methodology which was going to be followed in gathering and analyzing data. The chapter also clarified how validity and reliability was ensured and also explained how the ethical considerations were adhered to during the collection of the data. Empandeni High school in Mangwe district was selected as a representative of other schools in the district. Population of study was selected using purposive and simple random sampling methods and was made up of chemistry ordinary level students, chemistry teachers, head of department and head of the school. In the next chapter the researcher will present the results, an analysis of the results and the conclusion.

CHAPTER FOUR

4.0 DATA PRESENTATION, ANALYSIS AND INTERPRETATION/DISCUSSION

4.1 INTRODUCTION

The purpose of this study was to investigate factors that cause the poor performance at ordinary level chemistry at Empandeni High School which is located in Empandeni cluster B in Mangwe District. The study made use of a mixed methods design to determine the factors that cause the learners' poor performance in the subject. This chapter presents the findings of the study based on data generated from chemistry teachers, head of departments and chemistry students through use of questionnaires and interviews. It also contains the responses from the key informants on what they perceived as the contributing factors to the poor performance in chemistry at ordinary level. In this chapter, the study findings are presented using tables, graphs and narrations with regard to the research questions and interviews conducted. Thereafter the findings were discussed by looking at what the literature have exposed.

4.2 DEMOGRAPHIC PROFILE OF TEACHERS

This section presents the demographic profile of teacher participants. Demographic profile includes the gender, educational attainment, number of years in service and the length of teaching experience.

Educational attainment

The four chemistry teachers purposively selected for this study were asked to indicate their highest level of academic qualifications. The responses obtained are in table 4.2.1 below.

Table 4.2.1: The highest academic qualification of chemistry teachers

LEVEL OF EDUCATION	NUMBER
Master's degree in Education	1
Bachelor's degree in Education	2
Diploma in Education	1
TOTAL	**4**

The respondents were asked to state the highest qualification attained. The results given in table 4.2.1 above shows that 2 of the teacher participants were bachelor degree holders while 1 have master's in education and another 1 out of 4 have diploma in education. The total percentage of qualified teachers was 100%. This means that they all have trained to work well in their positions.

Teacher professional experience

The four teacher participants were asked to indicate their professional experience. The results were summarized in Table 4.2.2 below.

Table 4.2.2: Teacher professional experience

Working experience	Frequency
Below 5 years	0
6 - 10 years	2
Above 10 years	2
TOTAL	**4**

The table 4.2.2 above shows that 2 teachers have been teaching for more than 10 years. 2 have taught for more than 5 years but below 10 years and none of the teachers had teaching experience of less than 5 years. This means that they all have necessary skills to work well in their positions.

4.3 DEMOGRAPHIC PROFILE OF STUDENTS

Students were among the target group from which the researcher collected information using questionnaires. At the school, a total of 60 ordinary level Chemistry students were randomly selected and involved in the study. This figure included both form 3 and form 4 students. This population sample was a mixture of students of different ages (ranging from 15 to 21 years) from different backgrounds. The learners' backgrounds were investigated in order to ascertain if it had an impact on their learning in one way or another. Under learners' backgrounds, the aspects looked at included gender, age, the learners' guardians and the distance from home to the school. The results on the biographical background of the learners are presented in the table 4.3.1 below.

Table 4.3.1: Age groups and numbers of learners involved in the study

Age group	Frequency	Percentage (%)

	Males	Females	
15-16 years	15	19	56.67
17-19 years	9	10	31.67
20-21 years	6	1	11.67
TOTAL	**30**	**30**	**≈100.00%**

In this study, instruments that were used to collect data included the interview and questionnaires. Findings were presented according to themes in the instruments.

The researcher personally delivered the questionnaires to students and conducted interviews with teachers, academic masters and the head of the school. This part presents the findings of the facts obtained from the field, which is guided by the research objectives. The objectives were:

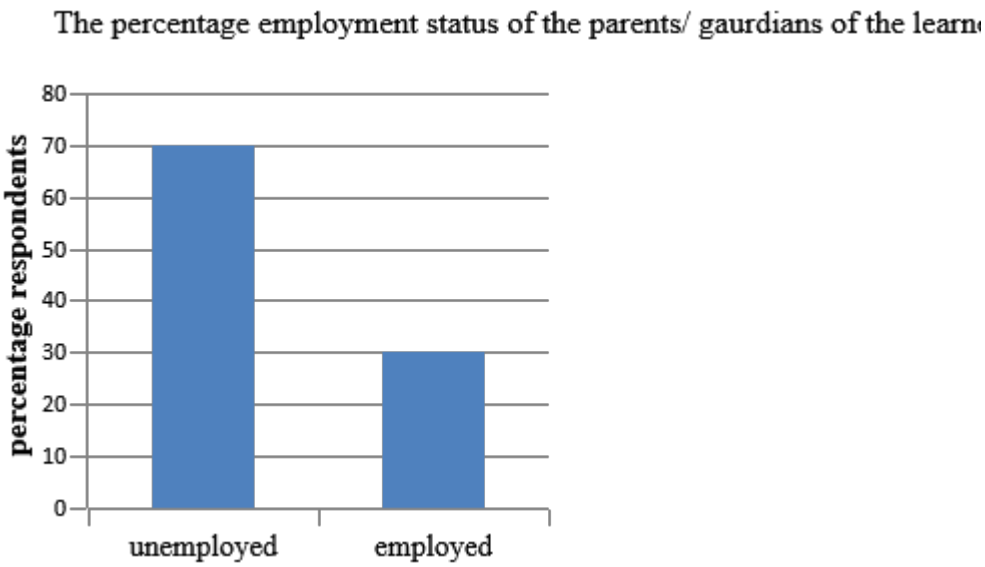
- To determine the extent to which teaching methods influence performance in chemistry at ordinary level in public secondary schools in Mangwe district.
- To examine the extent to which teacher and student motivation influences performance in chemistry in public secondary schools in Mangwe District.
- To examine the influence of socio-economic backgrounds on students' performance in chemistry.
- To assess the influence of student's attitudes in overall chemistry performance.
- To examine the influence of resources on chemistry teaching and learning process.
- To assess the influence of teacher-student relationships on chemistry performance.
- To identify intervention strategies that can help improve learners' performance in Chemistry at ordinary level.

4.4 BACKGROUNDS' INFLUENCE ON STUDENTS' PERFORMANCE IN CHEMISTRY.

According to Smith (2014), students' cultural backgrounds differ and can affect students' influences to study chemistry. Students from different cultural backgrounds are influenced differently based upon parental experiences, interests in chemistry and cultural views towards chemistry education. Smith's research also indicates that students who are studying higher-level chemistry are influenced differently as compared to students who are studying lower level

chemistry. The employment status of the parents and their education level were the aspects investigated under the socio-economic backgrounds of the learners.

Figure 4.4.1 showing the employment status of the parents/guardians of learners.



The Figure 4.1.1 above shows that 42 out of 60 learners (70%) stated that their parents were unemployed, and only 18 learners, (30%), stated that their parents were employed. This implies that the majority of the learners come from poor families where there is no constant income. Poverty has been identified as a factor that contributes towards the poor academic performance of the learners (Chinyoka & Naidu, 2014). This also implies that since there is no constant income, the learners may struggle to afford educational trips or extra study material.

<u>The education levels of the parents / guardians.</u>

The results in figure 4.4.2 below illustrate the education level of the participant's parents/guardians.

Figure 4.4.2 shows the education levels of the parents / guardians of the learners.

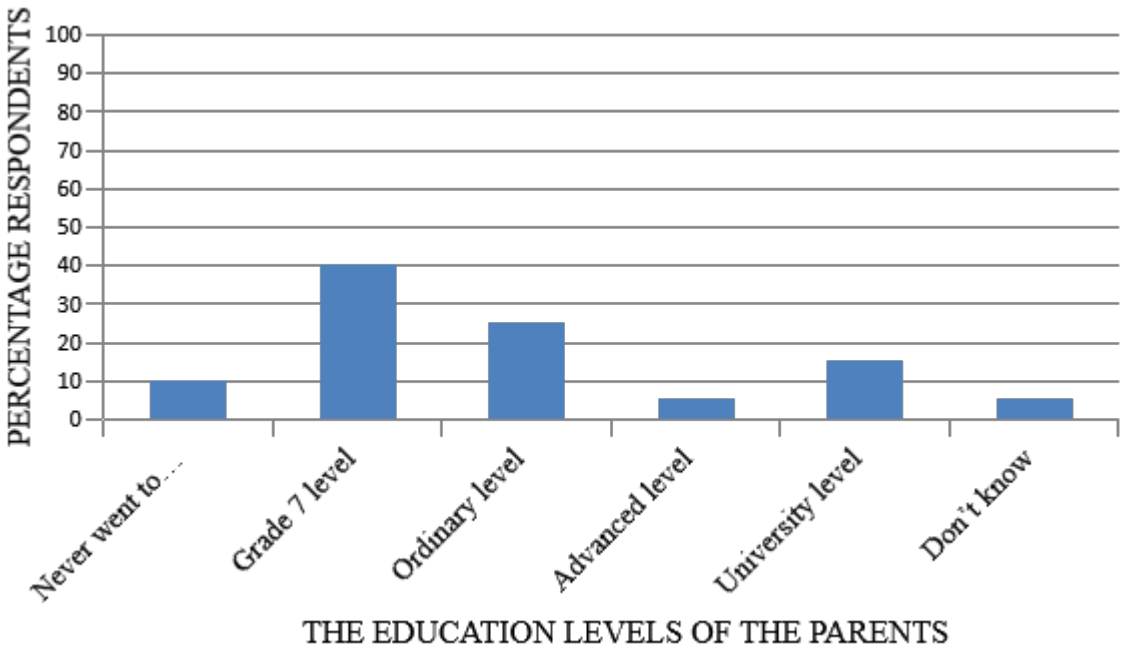


Figure 4.4.2 indicates that 57 out of 60 learners responded. From these responses, 6 learners stated that their parents never went to school; and from those who were identified as educated only 9 completed training after secondary school. These findings suggest that the illiteracy level of parents or guardians was high. Hence they could not assist their children educationally, because they were either not knowledgeable of the syllabus or of the medium of instruction. According to Kavanagh (2013), this situation could affect the performance of a child. Students whose parents have a higher level of education, a more prestigious occupation, or greater income tend to have higher performance than students whose parents have a lower standing on such socio-economic status indicators.

4.5 TEACHING METHODS

The researcher wanted to find out how teaching methods influence students' performance in chemistry. To understand some of the things that had the influence on teaching and learning methods in chemistry on students' performance the researcher conducted interviews with the chemistry teachers and head of school. From the findings made, it was revealed that chemistry teachers used teacher-centered teaching methods more often.

The chemistry teachers confirmed what had been said by pupils complaining about the lack of enough teaching and learning materials. One teacher confessed that to him the teacher-centered

approach was good as his students lack a good chemistry background. This implies that teachers use teacher centered approaches more often and this did not promote student participation. Chikowore (2012) believes that if the teaching style remains teacher-centered and authoritarian it inhibits successful learning. Poyla (2011) asserts that one of the most important factors improving performance is students' active involvement in the teaching and learning process. Mangwaya, Mangwaya and Tsumele (2016) emphasise that active learning is a factor leading to a better pass rate as learners can verbalize and discuss ideas as they are presented thus, giving an opportunity for exposing and correcting confusions and misunderstandings. This therefore calls for a shift from the traditional methods that mainly centered on chalk and talk to more interactive and child centered approaches such as debates, field work, group work and demonstrations. Therefore, teacher centered approaches contribute to low pass rate in Chemistry.

4.6 TEACHING AND LEARNING RESOURCES

On teaching and learning resources, one of the chemistry teachers said: *"We don't do all experiments in the syllabus mainly because some chemicals are not available"*. The heads of departments also said the same thing when they were interviewed.

On textbook availability and accessibility, all pupils indicated that they do not have enough textbooks to use. The chemistry teachers confirmed what had been said by pupils when they were interviewed.

One teacher said*: "I am forced to dictate all notes during the lesson because the textbooks are very few. We only have one textbook for form three and one for the form fours"*. This was also supported by the heads of departments when they were interviewed.

Lack of adequate resources and materials is a significant factor contributing to low pass rate in chemistry at Empandeni High School. This is supported by Jobolingo (2012) who ascertains that successful teaching and learning requires the necessary supporting resources. Mafa and Tarusikirwa (2013) argue that in the absence of adequate apparatus and chemicals the teaching and learning of chemistry suffers and this adversely affects pass rate. Chikwature and Oyedele (2016) found that the availability of textbooks in most cases correlated positively with pupil performance. According to Mapolisa and Tshabalala (2014), schools which have textbooks perform much better than schools which do not have. This means that low pass rate in chemistry

is caused by shortage of resources such as chemicals for experiments and textbooks among other resources.

4.7 TEACHER-STUDENTS' RELATIONSHIP AND PERFORMANCE IN CHEMISTRY

In the field it was found that students attending chemistry have similar favorable perceptions on their relationships with the teachers as they indicated that the relationship was good.

Table 4.7.1: Teachers' Relationship with Students

RELATIONSHIP DESCRIPTION	NUMBER OF STUDENTS	PERCENTAGE (%)
Very good	36	60
Good	15	25
Average	6	10
Poor	3	5

From the table 4.7.1 above, it clearly shows that teachers and students have good relationships. It means the students' performance cannot be affected by relationships. Based on the data presented in the above table, there is no matter of concern between students' performance and the relationship between teachers and their students.

4.8 NUMBER OF LEARNERS IN A CLASS AND PERFORMANCE IN CHEMISTRY

On the number of learners in a chemistry class, the entire teachers indicated that the numbers were too large making it difficult for them to implement effective classroom management skills. The heads of departments also said the same thing when they were interviewed. The average number of learners in a chemistry class was found to be 50.

According to Benton & Pallett (2013), reducing class size increases overall student achievement, especially for younger, disadvantaged children. Smaller class sizes provide the opportunity for personal attention and additional instructional help when necessary. The following are some of the benefits of fewer students in a classroom, (Jarvis 2008).

- Students receive more individualized attention and interact more with the teacher.
- Teachers have more flexibility to use different instructional approaches.

- Fewer students are less distracting to each other than a large group of children.
- Teachers have more time to teach because there are fewer discipline problems.
- Students are more likely to participate in class and become more involved.

Basing on this information, there is a matter of concern between the class size and the students' performance at Empandeni High School.

4.9 LANGUAGE OF INSTRUCTION AND PERFORMANCE IN CHEMISTRY

To understand if language of instruction had an influence on students' performance, the researcher conducted interviews with the chemistry teachers. The questionnaires were issued to students to indicate the language used more often by the teachers in class and the language they prefer mostly to be used in the learning process. From the findings made, it was revealed that chemistry teachers used English language in teaching more often. This was also confirmed by students who indicated on questionnaires that teachers use English language in the teaching and learning process. The table 4.9.1 below shows the data collected from students' questionnaires on preferred language of instruction.

Table 4.9.1: Students' preferred language of instruction.

LANGUAGE	**FREQUENCY**	**PERCENTAGE (%)**
English only	12	20
Local language only	0	0
Mixture of English and local language	48	80
TOTAL	**60**	**100**

From the table 4.9.1 above, it clearly shows that most students (80%) preferred a mixture of English and local language as language of instruction and a small percentage (20%) indicated that they prefer only English as a language of instruction. None showed preference for local language only and this means that English was at the center as a language of instruction.

According to Litke 2012, learning in a language that students use and understand is one of the most critical factors in determining students' success in academic and life outcomes. This also can

yield significant benefits both at the individual and systemic levels which include: improved education access; increase in learner-centered teaching practices and assessment and improved education efficiency due to lower dropout and repetition rates. Based on the data collected, language of instruction had no significant effect on the students' chemistry performance.

4.10 OTHER FACTORS AFFECTING CHEMISTRY PERFOMANCE

During interviews, the teachers mentioned the learning environment and school management system as some of the factors affecting chemistry performance at Empandeni High school. The head of school cannot escape the blame for the persistent poor performance of students in chemistry as far as the learning environment is concerned. Hellinger and Heck (2015) states that in many ways, the school head is the most important and influential individual in any school environment. It is the management skills of the head that set the benchmark, the direction and the tone of the learning environment. The school head's management is pivotal for the morals of the teachers and sets the degree of concern for what students may or may not become.

4.11 SUMMARY

According to the study, the researcher realized that students' performance was not much affected by teacher-students' relationship but with factors other than that. This research study has revealed that low pass rate in chemistry at Empandeni High School is caused by many factors which include social backgrounds of learners, lack of teacher and student motivation, inadequate resources, use of teacher centered methodologies in chemistry teaching and learning process, pupil's attitudes and teacher-pupil ratio in chemistry classes. The next chapter will focus on the summary, conclusions and recommendations of the study.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

In this chapter the researcher presents a summary of the findings, discusses the limitations of the study including recommendations from the study in relation to the improvement of the learner's performance in the chemistry. The chapter also draws conclusions in relation to factors causing low pass rate in ordinary level chemistry at Empandeni High School in Mangwe district and makes suggestions for areas of further research in respect of the poor performance of learners in the public secondary schools in Mangwe district.

5.2 SUMMARY

The study was done in Mangwe district as a case study of Empandeni High School in Empandeni cluster B and the results were generalized to the whole Empandeni cluster B since there were similar traits as far as the chemistry results are concerned. Empandeni High School was selected to represent other schools in the cluster and Mangwe district as a whole because it has pupils from diverse backgrounds which will be a true reflection of the 10 secondary schools in the cluster and 42 secondary schools in the district. The participants of the study were four chemistry teachers who were purposively selected for the study and 60 chemistry students from form three and form four who were selected using simple random sampling technique. The questionnaires and interviews were used in collecting the data from the field.

From data analysis in chapter four, the study isolated some factors which were found to be contributing to the poor performance of students in ordinary level chemistry at Empandeni High School in Mangwe district. Research findings have identified school-based factors (the availability and the use of teaching and learning resources), socio-economic factors (the education level of the parents/guardians and their economic status), student factors (entry behavior, motivation and attitude), teacher characteristics and teaching methods as factors that contribute to poor performance in ordinary level chemistry at Empandeni High School.

From the data collected, it shows that the majority of the learners come from poor families where there is no constant income. Poverty has been identified as a factor that contributes towards the

poor academic performance of the learners (Chinyoka & Naidu, 2014). Since there is no constant income, this also implies that the learners may struggle to afford educational trips or extra study material.

The findings also suggest that the illiteracy level of parents or guardians was high hence they could not assist their children educationally, because they were either not knowledgeable of the syllabus or the medium of instruction. According to Kavanagh (2013), this situation could affect the performance of a child. Students whose parents have a higher level of education, a more prestigious occupation, or greater income tend to have higher performance than students whose parents have a lower standing on such socio-economic status indicators.

The use of teacher-centered approaches more often did not promote student participation. Chikowore (2012) believes that if the teaching style remains teacher-centered and authoritarian it inhibits successful learning. Poyla (2011) asserts that one of the most important factors in improving performance is students' active involvement in the teaching and learning process. Mangwaya, Mangwaya and Tsumele (2016) emphasize that active learning is a factor leading to a better pass rate as learners can verbalize and discuss ideas as they are presented thus, giving an opportunity for exposing and correcting confusions and misunderstandings.

Positive attitude of learners towards chemistry is an important factor in improving their academic performance. Jobolingo (2012) ascertains that interest in the subject is a motivating factor for students who in turn respond and participate actively and like the subject. Langat (2015) believes students with a positive attitude towards chemistry are motivated to excel in the subject because they value it, enjoy it and are interested in it. Based on the gathered information, teachers' and pupils' negative attitude contribute to low pass rate in Chemistry.

Lack of adequate resources and materials is a significant factor contributing to low pass rate in chemistry at Empandeni High School. This is supported by Jobolingo (2012) who ascertains that successful teaching and learning requires the necessary supporting resources. Mafa and Tarusikirwa (2013) argue that in the absence of adequate apparatus and chemicals the teaching and learning of chemistry suffers and adversely affects pass rate. Chikwature and Oyedele (2016) found that the availability of textbooks in most cases correlated positively with pupil performance. According to Mapolisa and Tshabalala (2014), schools which have textbooks perform much better

than schools which do not have. This means that low pass rate in chemistry is caused by shortage of resources such as chemicals for experiments and textbooks among other resources.

The number of learners in a chemistry class is also a cause of concern. According to Benton & Pallett (2013), reducing class size increases overall student achievement. Smaller class sizes provide the opportunity for personal attention and additional instructional help when necessary as students interact more with the teacher. Teachers have more time to teach because there are fewer discipline problems and also students are more likely to participate in class and become more involved in the learning process. This necessarily means that large numbers of pupils in a chemistry class at Empandeni High school causes low pass rate in chemistry at ordinary level.

The learning environment and school management system are some of the factors affecting chemistry performance at Empandeni High school. The head of school cannot escape the blame for the persistent poor performance of students in chemistry as far as the learning environment is concerned. Hellinger and Heck (2015) states that in many ways, the school head is the most important and influential individual in any school environment and it is the management skills of the head that set the benchmark, the direction and the tone of the learning environment. At Empandeni High school, the school management system and the learning environment also contribute to the low pass rate at ordinary level chemistry.

5.3 CONCLUSION

The major objective of the research was to find out factors affecting ordinary level chemistry pass rate at Empandeni High School in Mangwe District. Research findings have identified school-based factors (the availability and the use of teaching and learning resources, teacher-pupil ratio in chemistry classes, the learning environment and the management system), socio-economic factors (the education level of the parents/guardians and their economic status), student factors (entry behavior, motivation and attitude), teacher characteristics and teaching methods as factors that contribute to poor performance in ordinary level chemistry.

Based on the findings in the light of the specific objectives of the study, it can be concluded that:

- Poverty is among the major factors that contribute towards the poor academic performance of the learners.
- The use of teacher-centered approaches cannot promote student participation in the learning process. Students' active involvement is important in the teaching and learning process since learners can verbalize and discuss ideas as they are presented thus, giving an opportunity for exposing and correcting confusions and misunderstandings.

- Positive attitude of learners towards chemistry is an important factor in improving the students' academic performance.
- Facility distribution and accessibility in secondary schools is a significant factor contributing to low pass rate in chemistry.
- Learning environment and school management system are important factors in improving the students' academic performance.
- Teacher-pupil ratio is also an important factor to be considered in improving the students' academic performance.
- Not only facility and human personnel oriented problems affect poor performance in secondary schools but also students' home support, the illiteracy level of parents or guardians can influence the morale of students and thus affect the performance of a child studying chemistry.

5.4 RECOMMENDATIONS

Based on the results of the study, the following recommendations were made:

Chemistry Teachers

The researcher recommends chemistry teachers to consider students cultural and learning backgrounds in choosing instructional strategies. It is suggested that they align teaching methods with the assessed learning needs and capabilities of students. Teachers may attempt to find a balance of teaching strategies rather than teaching students hence few understand the subject and at last many fail the subject. Teachers must be able to realize the importance of recognizing learning styles, identify students' differences, and adjust the teaching methods accordingly. By doing so, teachers would be able to deliver content clearly, making every student understand concepts, and motivate students leading better performance in chemistry.

There is also a need by the teachers to shift from the traditional methods of teaching that are mainly centered on chalk and talk to more interactive and child centered approaches such as debates, field work, group work and demonstrations.

Students

The findings indicated some positive attitude towards chemistry by students. There should therefore be a need for education stakeholders to find out why students' performance is not congruent to their attitude.

The study highly recommends that students take in hand their perception and feedback towards their teachers' teaching methods in order for the teachers to effectively bring in line their way of teaching to the students' way of learning. It is recommended that for students to learn effectively, they need to be flexible on strategies outside their preferences in order to meet the demands of the challenging environment. Students must be ready to be guided in chemistry using learner centered methods, which is the very effective way of guiding learners during a learning process. Students must not be lazy by not doing self-practice daily. They are also encouraged to actively participate in classroom activities in order to have a satisfying learning outcome.

School Administrators

Schools should consider hiring more qualified chemistry teachers to mitigate the challenges of teacher-pupil ratios. The schools should also strive to provide adequate teaching and learning resources such as textbooks, chemicals and apparatus. Where schools are limited in terms of finances improvisation should be encouraged where possible. This should be immediate intervention to improve performance. School authorities should organize career guidance programs for students to develop positive attitudes to pursue chemistry. It is also highly recommended that school administrators provide more in-service seminars, trainings and workshops for the teachers focusing more on how the teachers would enable them to align their instructional strategies they prefer and use to the learning preferences and capacities of the students.

The majority of the students seem to be very positive towards Chemistry though their performance is far below average. After considering this aspect the researcher concluded that there may be other factors which have major influence on student's chemistry performance at Empandeni High School and this need further research.

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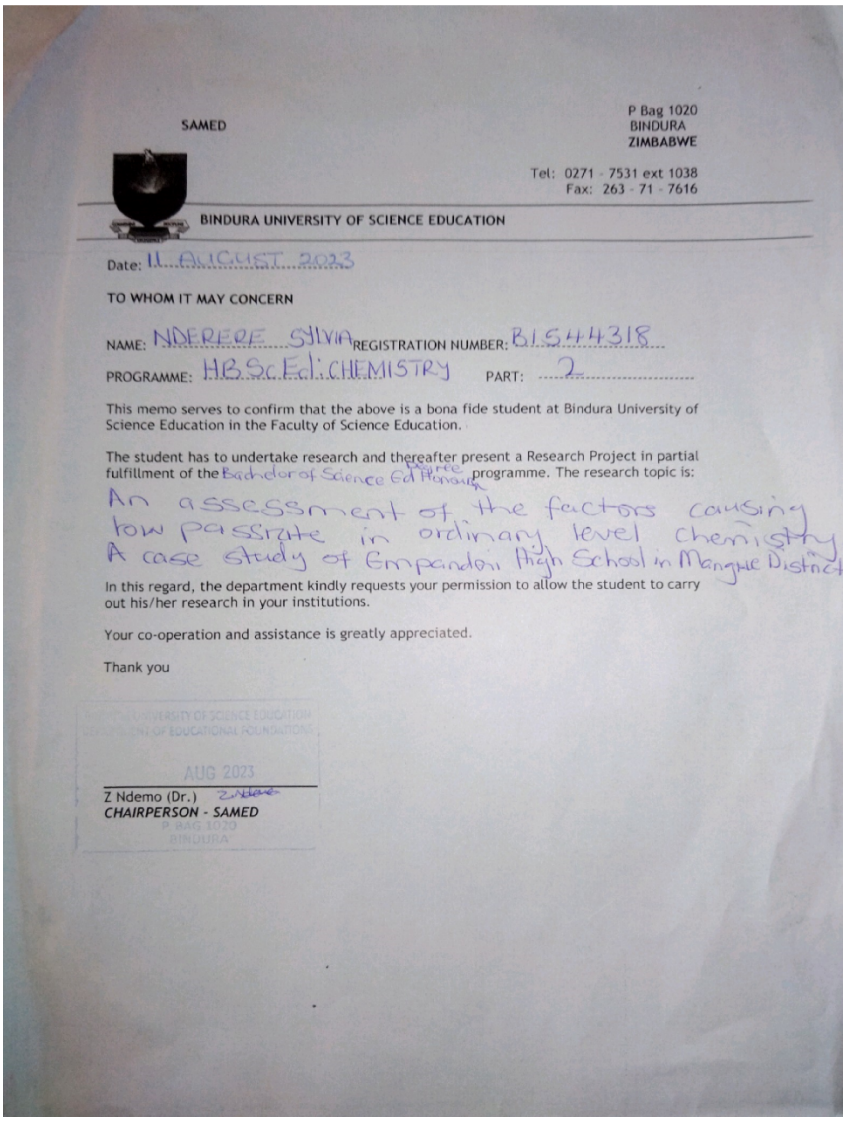
APPENDICES

APPENDIX A

PERMISSION LETTER FROM THE UNIVERSITY



SAMED

P Bag 1020
BINDURA
ZIMBABWE

Tel: 0271 - 7531 ext 1038
Fax: 263 - 71 - 7616

BINDURA UNIVERSITY OF SCIENCE EDUCATION

Date: 11 AUGUST 2023

TO WHOM IT MAY CONCERN

NAME: NDEREDE SYLVIA REGISTRATION NUMBER: B1544318

PROGRAMME: HB.Sc.Ed: CHEMISTRY PART: 2

This memo serves to confirm that the above is a bona fide student at Bindura University of Science Education in the Faculty of Science Education.

The student has to undertake research and thereafter present a Research Project in partial fulfillment of the Bachelor of Science Ed Honours Degree programme. The research topic is:

An assessment of the factors causing low passrate in ordinary level chemistry A case study of Empandeni High School in Mangwe District

In this regard, the department kindly requests your permission to allow the student to carry out his/her research in your institutions.

Your co-operation and assistance is greatly appreciated.

Thank you

BINDURA UNIVERSITY OF SCIENCE EDUCATION
FACULTY OF EDUCATIONAL FOUNDATIONS
AUG 2023
P BAG 1020
BINDURA

Z Ndemo (Dr.)
CHAIRPERSON - SAMED

APPENDIX B

INTERVIEW QUESTIONS FOR TEACHERS

My name is Nderere Sylvia, a student at Bindura University of Science Education studying Bachelor of Science Education Honors Degree in Chemistry. I am carrying out research on the factors causing low pass rate in ordinary level chemistry at Empandeni High School in Mangwe District. The research is being done in partial fulfillment of the requirements of the programme being studied.

You have been selected to participate in this research. Your input is very important for meeting the objectives of this research. Your responses will be treated with confidentiality and shall be used for research purposes only in this study.

1. How would you describe the socio economic background of your learners? Do you think it has an impact on their performance?

2. How would you describe the attitude of learners towards chemistry and would you relate it to their performance in the subject?

3. How many learners do you have in your chemistry class? Does the number of learners in your class affect the learner's performance in Chemistry? Explain why and how?

4. Do you think parents play an important role in their child’s education? Explain why.

5. Are you able to do practicals? If not, why? If yes, do you see them useful in making learners understand chemistry concepts?

6. What teaching aids do you use when teaching Chemistry? Do you believe they assist learners to do better?

7. What would be your comment on the language of instruction in relation to learner performance?

8. Do you know your entire learners abilities? How do you assist learners who struggle with understanding chemistry concepts?

9. Would you say your learners are motivated to learn chemistry? How do you help those who are not motivated?

10. Are you motivated to teach chemistry in the current conditions of your school, if not what causes you to be demotivated?

11. What factors would you identify as contributing to poor performance of your learners in Chemistry subjects? Explain why.

Thank you !

APPENDIX C

QUESTIONNAIRE FOR CHEMISTRY STUDENTS

My name is Nderere Sylvia, a student at Bindura University of Science Education studying Bachelor of Science Education Honors Degree in Chemistry. I am carrying out research on the factors causing low pass rate in ordinary level chemistry at Empandeni High School in Mangwe District. The research is being done in partial fulfillment of the requirements of the programme being studied.

You have been selected to participate in this research. You are therefore requested to answer the following questions in honesty. Your input is very important for meeting the objectives of this research. Your responses will be treated with confidentiality and shall be used for research purposes only in this study.

*Please indicate your preferable answer by putting an **X** in the box provided on each response, unless otherwise explained.*

A. Biographic background

1. What is your gender?

   Boy ☐ Girl ☐

2. What is your age group?

   15-16 ☐ 17-19 ☐ 20-21 ☐

3. Are your parents still alive?

   Both ☐ Mother ☐ Father ☐ None ☐

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

   Grand parents ☐ Older siblings/s ☐ Younger siblings/s ☐

   Extended family ☐ Orphanage ☐

5. What is the highest level of education of your parents or guardian?

   Never went to school ☐ Completed secondary level ☐

   Completed primary level ☐ Completed advanced level ☐

   Completed studies at university level ☐ Do not know ☐

6. Are your parents or guardians employed?

Yes ☐ No ☐

7. Distance from home to school.

Less than 5km ☐ 5-10 km ☐ 11-15 km ☐ 16-20 km ☐ More than 20 km ☐

8. How do you get to school?

Walk to school ☐ Bicycle ☐ Hitch hiker ☐

Dropped off by parents ☐ Lift club ☐

B. <u>Learning, Teaching and School activities</u>

9. About the chemistry teacher:

*Indicate next to each statement whether you **strongly agree, agree, neither disagrees nor agree, disagree, strongly disagree.** Indicate by putting an **X** in the appropriate box to the following meaning of numbers.*

Strongly agree	1
Agree	2
Neither disagree nor Agree	3
Disagree	4
Strongly disagree	5

	1	2	3	4	5
a. Your teacher is always in class on time.					
b. Your teacher uses all the allocated time for teaching.					
c. Your teacher knows his /her learning area very well.					
d. Your teacher uses different teaching methods.					
e. The teacher uses prior knowledge before every new chapter.					
f. The teacher explains the same thing in different ways to help you understand.					
g. Your teacher gives you class tests more often.					
h. The teacher uses test results to give extra help to learners.					

i. Your teacher is approachable.					
j. Your teacher motivates you to learn.					
k. Your teacher organizes extra lessons for you to understand.					
l. Does your teacher care if you understand the lesson?					
m. Does your teacher invite other science teachers from other schools to teach?					
n. Does your teacher ask you the same question in different ways for you to understand?					

10. About the learner:

*Indicate next to each statement whether you **strongly agree, agree, neither disagrees nor agree, disagree, strongly disagree.** Indicate by putting an **X** in the appropriate box to the following meaning of numbers.*

Strongly agree	1
Agree	2
Neither disagree nor Agree	3
Disagree	4
Strongly disagree	5

	1	2	3	4	5
a. Are you always on time?					
b. Would you define chemistry lessons as interesting?					
c. Do you understand the teaching language very well?					
d. Do you understand the chemistry language?					
e. Do you do your homework regularly?					
f. When you don't understand the teacher do you ask?					
g. Do you have access to the library or any source of information at your home place?					

11. What language does your chemistry teacher use while teaching?

English only ☐ Mixture of English and local language ☐

Local language only ☐

12. Which language do you prefer mostly?

English only ☐ Mixture of English and local language ☐

Local language only ☐

13. What can you say about teacher-student relationships in the chemistry class?

Very good ☐ Good ☐ Average ☐ Poor ☐ Bad ☐

14. How often do you get absent from class?

Once a month ☐ More than once a month ☐

Never ☐

15. What is the reason for your absenteeism?

Illness ☐ Sent by elders to do house chores ☐

Taking care of siblings at home ☐

16. How does your parent or guardian involve him/herself in your learning?

Assists in every aspect of learning ☐ Not involved at all ☐

Attends parent meetings only ☐

17. Are there any gifts given to the best students in chemistry at your school?

Yes ☐ No ☐

Thank you for participating in this survey!