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BACHELOR OF SCIENCE EDUCATION HONOURS DEGREE IN BIOLOGY

An assessment on the combined science teachers' experience in conducting practical lessons at form three level: A case study of selected schools in Beitbridge District in Matabeleland South Province.

By

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Research project submitted to Bindura University of Science Education in partial fulfilment of the requirements of Bachelor of Science Education Honours Degree in Biology.

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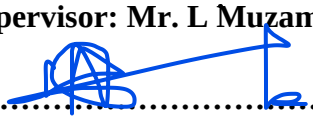
Signature: ……  **……**

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Dedication

I would like to dedicate this project to my son and daughter for their unwavering support throughout the studies.

Acknowledgement

I would like to express my sincere gratitude to the following individuals and organisations for their invaluable support and assistance throughout this research study.

First and foremost, I would like to thank my supervisor, Mr. Last Muzamba, for their guidance, expertise, and unwavering support.

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Their support and cooperation facilitated the smooth execution of this study.

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Finally, above all I thank God the Almighty in Christ Jesus for taking me this far.

Abstract

A study on the assessment on combined science teachers' experience in conducting practical lessons at form three level was conducted at two selected secondary schools in Beitbridge district. The first objective was to assess the benefits experienced by combined science teachers in conducting practical lessons when teaching combined science. The second objective was to identify the challenges experienced by combined science teachers in conducting practical lessons when teaching combined science. The third objective sought to establish the possible solutions to challenges experienced by combined science teachers in conducting practical lessons when teaching combined science. The qualitative research design was conducted. The phenomena were studied from both the researcher's perspective and the interviewee's perspective through multiple sources of information that were gathered through interviews and observations. The study targeted form three combined science teachers , school heads and form three students. The research involved 46 participants, (40 learners, 4 teachers and 2 heads) from two selected secondary schools in Beitbridge district. From the selected sample schools, random sampling was used to select the respondents from form three students. The case study was conducted at two neighbouring secondary schools in the same district. During the research, the researcher respected the views and boundaries of the participants. The data collected from interviews was analysed , interpretively on the basis of conceptual framework. Data collected from interviews and observations was presented thematically. The research findings showed that there are several benefits experienced by combined science teachers in conducting practical lessons when teaching combined science, quite a number of challenges experienced by combined science teachers in conducting practical lessons when teaching combined science and also several possible solutions to challenges experienced by combined science teachers in conducting practical lessons when teaching combined science. Some of the recommendations included that, assessment of practical lessons should be given immediate attention and intensify mentoring it and series of workshops starting from school level upto district level should be done. Furthermore, general meetings with parents or guardians towards resource mobilisation should be done since they are the ones to fund the education of their children.

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CHAPTER 1

1.1 Introduction

In this chapter the background of the study, statement of the problem, objectives of the study, research questions and significance of the study shall be discussed. The delimitation, limitations of the study and the mitigatory measures will also be articulated. Key terms that were used in the research shall be contextually defined in this chapter.

1.2 Background to the Study

The teaching of Combined Science at the Form 3 level is a critical component of secondary education in Zimbabwe. Practical lessons are an essential part of science education, as they provide students with hands-on experience and enhance their understanding of scientific concepts (Bennett, 2015). However, research has shown that many science teachers in Zimbabwe lack the experience and skills to conduct effective practical lessons (Chikanda, 2013).

According to Hodson (2013), practical lessons are essential in science education as they provide students with opportunities to develop their scientific skills and literacy. However, many science teachers in Zimbabwe face challenges in conducting practical lessons, including limited access to laboratory facilities and equipment (Mugwagwa, 2015), inadequate training and support for science teachers (Tshuma, 2019), and high student-to-teacher ratios (Brenchley, 2015).

Chikanda (2013) found that many science teachers in Zimbabwe lack the experience and skills to conduct effective practical lessons. This is due to various factors, including inadequate training and support for science teachers, limited access to laboratory facilities and equipment, and high

student-to-teacher ratios. As a result, students may not develop the necessary scientific skills and literacy required for success in science education.

Bennett (2015) emphasizes the importance of practical lessons in science education, stating that they enhance students' understanding of scientific concepts, develop their scientific skills and literacy, and encourage critical thinking and problem-solving. However, many science teachers in Zimbabwe struggle to conduct effective practical lessons due to the challenges mentioned earlier.

Mugwagwa (2015) highlights the importance of laboratory facilities and equipment in conducting practical lessons. However, many schools in Zimbabwe lack adequate laboratory facilities and equipment, making it difficult for science teachers to conduct effective practical lessons.

Tshuma (2019) found that inadequate training and support for science teachers is a major challenge in conducting practical lessons. Many science teachers in Zimbabwe lack the necessary training and support to conduct effective practical lessons, resulting in students not developing the necessary scientific skills and literacy.

Brenchley (2015) emphasizes the importance of teacher experience and skills in conducting practical lessons. However, many science teachers in Zimbabwe lack the necessary experience and skills to conduct effective practical lessons, resulting in students not developing the necessary scientific skills and literacy.

Furthermore, research has shown that practical lessons are essential in developing students' scientific literacy and critical thinking skills (Wiggins, 2013). However, many science teachers in Zimbabwe struggle to conduct effective practical lessons due to various challenges, including limited access to laboratory facilities and equipment, inadequate training and support, and high student-to-teacher ratios (Mugwagwa, 2015; Tshuma, 2019).

According to Kachingwe (2017), practical lessons are essential in developing students' scientific skills and literacy. However, many science teachers in Zimbabwe lack the necessary experience and skills to conduct effective practical lessons, resulting in students not developing the necessary scientific skills and literacy.

Bennett (2015) emphasizes the importance of teacher experience and skills in conducting practical lessons. Teachers who have experience and skills in conducting practical lessons are more likely to use innovative teaching methods, including practical lessons, than those who lack experience and skills.

Moreover, research has shown that practical lessons are essential in developing students' problem-solving skills and critical thinking (Hodson, 2013). However, many science teachers in Zimbabwe struggle to conduct effective practical lessons due to various challenges, including limited access to laboratory facilities and equipment, inadequate training and support, and high student-to-teacher ratios.

In addition, Chikanda (2013) found that many science teachers in Zimbabwe lack the necessary experience and skills to conduct effective practical lessons. This is due to various factors, including inadequate training and support for science teachers, limited access to laboratory facilities and equipment, and high student-to-teacher ratios.

1.3 Statement of the problem

The past decade has witnessed a lot of challenges that combined science pass rate was dropping at an alarming level while the society will be looking forward to see developments being brought into the region by their young ones who are being educated. The effective implementation of practical lessons in combined science education is crucial for developing students' scientific

literacy skills (Abdulhamid et al., 2019). However, combined science teachers face numerous challenges that hinder effective practical lesson delivery, compromising student learning outcomes (Mumba et al., 2015). Despite the importance of practical lessons, there is a lack of comprehensive understanding of the experiences of combined science teachers conducting practical lessons at the Form Three level.

Research indicates that teachers' experiences significantly influence their teaching methods and student learning outcomes (Nyakoe et al., 2015). However, existing literature focuses primarily on general science education challenges, with limited research specifically exploring combined science teachers' experiences at the Form Three level (Oludipe, 2017). This knowledge gap necessitates an investigation into the experiences of combined science teachers conducting practical lessons in two selected secondary schools in Beitbridge district in Matabeleland South Province in Zimbabwe.

To address these challenges, it is essential to assess combined science teachers' experiences in conducting practical lessons at the Form Three level. This study aims to assess the benefits experienced by combined science teachers in conducting practical lessons, identify the challenges experienced by combined science teachers in conducting practical lessons when teaching combined science.

By investigating combined science teachers' experiences at two selected secondary schools, this study will contribute to establish the possible solutions to challenges experienced by combined science teachers in conducting practical lessons when teaching combined science, ultimately enhancing student learning outcomes.

1.4 Objectives of the study

- The research was guided by the following objectives:
- To assess the benefits experienced by combined science teachers in conducting practical lessons when teaching combined science.
- To identify the challenges experienced by combined science teachers in conducting practical lessons when teaching combined science.
- To establish the possible solutions to challenges experienced by combined science teachers in conducting practical lessons when teaching combined science.

1.5 Research Questions

l) Main research question

- How do combined science teachers' experience in conducting practical lessons at form three level impact students when teaching combined science?

II) Sub research questions

- What are the benefits experienced by combined science teachers in conducting practical lessons when teaching combined science?
- What are the challenges experienced by combined science teachers in conducting practical lessons when teaching combined science?
- What are the possible solutions to challenges experienced by combined science teachers in conducting practical lessons when teaching combined science?

1.6 Purpose of the study

The purpose of the study is to assess combined science teachers' experience in conducting practical lessons at form three level, in the teaching and learning of Combined Science in two selected schools in Beitbridge district in Matabeleland South Province.. Assessing combined science teachers' experience in conducting practical lessons at the form three level serves a multifaceted purpose, benefiting both learners and policy makers. This evaluation aims to enhance teaching effectiveness, improve student learning outcomes, and inform policy decisions.

1.6.1 To learners

For learners, assessing teachers' experience ensures improved learning outcomes. By understanding effective teaching methods, educators can tailor instruction to meet students' needs, fostering academic achievement and practical skills. Enhanced practical skills, developed through hands-on training, equip learners with essential scientific literacy skills. Furthermore, identifying effective teaching strategies promotes student engagement, motivation, and better preparation for assessments.

1.6.2 To Policy makers

Policy makers also benefit from assessing teachers' experience. Informed policy decisions, guided by data-driven insights, enable targeted resource allocation and teacher training initiatives. This evaluation helps policy makers identify areas requiring improvement, informing curriculum evaluation and revision. By understanding teachers' experiences, policy makers can prioritize resource distribution, addressing challenges and optimizing teaching methods.

Educational stakeholders, including school administrators, teacher educators, curriculum developers, and parents, also gain valuable insights. School administrators can make informed

decisions regarding teacher support, resource allocation, and infrastructure development. Teacher educators can design effective pre-service and in-service training programs, addressing identified areas for improvement. Curriculum developers can refine the curriculum, ensuring relevance and effectiveness.The overall purpose of assessing combined science teachers' experience is to:

- Enhance teaching effectiveness and student learning outcomes
- Inform policy decisions and resource allocation
- Promote quality education
- Support teacher professional development
- Address challenges and optimize teaching methods

To achieve these objectives, educators and policy makers must collaborate, sharing expertise and resources. By evaluating teachers' experiences, stakeholders can:

- Identify effective teaching strategies
- Develop targeted professional development programs
- Refine curriculum and assessment methods
- Allocate resources effectively
- Enhance student engagement and motivation

Therefore, assessing combined science teachers' experience in conducting practical lessons at the form three level is crucial for improving teaching effectiveness, student learning outcomes, and

policy decisions. By understanding teachers' experiences, educational stakeholders can address challenges, optimize teaching methods, and ultimately enhance combined science education.

1.7 Delimitations of the study

The study was carried out at two secondary school in Beitbridge district in Matabeleland South Province. This study involves four Combined Science teachers, two headmasters and 40 learners from selected schools. Therefore generalization outside of this demographic context should be done with caution.

1.8 Limitations of the study

To come up with this project a number of constrains had been faced.

1.8.1 Time

Time management was a challenge since there was some need to carry out of the study at the same time adhering to the teaching time table .The study was too short to come with a definite and reliable conclusion.

1.8.2 Money

Shortage of adequate financial had also been a problem since money was needed for transport, buying necessary materials and also making presentable and typed research instruments and the project as a whole. Without adequate financial resources, the researchers may struggle to gather comprehensive data and conduct a thorough analysis.

1. 8.3 Accessibility to computers and internet

Internet access was crucial for conducting literature reviews, gathering data, communicating with participants, and accessing online resources. Without reliable internet access, researcher faced challenges in staying updated with the latest research trends and collaborating with colleagues or fellow researchers. Access to internet had been a problem during the research. There is no internet café close to where the researcher works. To overcome the problem the researcher used her smartphone for researching and for sending emails to the supervisor. The researcher also used a smartphone to type documents and used her workmate's laptop to edit the research.

1.8.4 Resources

Limited funding for research restricted the researcher from conducting a comprehensive study. Research often requires resources for data collection, analysis, and dissemination which can be a barrier if not adequately available and lack of access to essential tools and technology required for data collection and analysis can hinder the ability to conduct a detailed study. In the case of studying challenges faced by combined science teachers on conducting practical lessons, access to laboratories, equipment, and materials for practical experiments is crucial.

1.8.5 Family Responsibilities

Balancing family responsibilities with research activities was challenging. Caring for family members, managing household duties, and fulfilling other familial obligations can consume time and energy that could otherwise be allocated to research. Family commitments may require flexibility in the researcher's schedule, which can affect the consistency and continuity of the research work. Adapting to unexpected family needs or emergencies may disrupt the research timeline.

1.8.6 Significance of the study

Although research indicates that teachers in selected school are facing challenges on conducting practical lessons, little has been done to find the challenges encountered by science teachers in order to solve these problems. This research aimed at investing challenges encountered by combined science teachers on conducting practical lessons so that steps can be taken to enhance the use of practical work in schools. The study is of great importance to the different stakeholders namely teachers, headmasters, school administrators, ministry of primary and secondary and learners.

1.8.7 To the Researcher

The research benefited me as a researcher. This means that the study exposed me a plenty of literature on the challenges that are encountered by combined science teachers in conducting practical lessons when teaching and learning combined science in rural schools and the strategies that can be used to overcome these challenges. Most importantly, the research allowed me to fulfil the requirements of Degree programme.

1.8.8 To Teachers

The study might improved teaching efficiency by identifying the challenges faced by teachers in incorporating practicals into their lessons, educational institutions can provide targeted support and training programs to help teachers overcome these obstacles and this, in turn, can enhance the efficiency and effectiveness of teaching combined science. Also, understanding the challenges teachers face when conducting practicals can lead to improvements in the way practical lessons are conducted. This can result in a better learning experience for students, as practicals play a vital role in helping students grasp scientific concepts and develop practical skills. Moreso, by studying these challenges can contribute to the professional development of teachers by highlighting areas

where further training or resources may be needed. This can ultimately benefit teachers by equipping them with the knowledge and skills necessary to deliver high-quality practical-based lessons. Lastly, the study mighty help teachers to find strategic ways or solutions on challenges encountered in conducting practical lessons when teaching and learning .

1.8.9 To the head

Headmasters play a pivotal role in shaping the overall educational environment of a school. Understanding the experiences faced by combined science teachers in conducting practical lessons can enable headmasters to provide necessary support, resources, and professional development opportunities to enhance teaching practices within their institutions. By addressing these challenges at the administrative level, headmasters can foster a culture of innovation, collaboration, and continuous improvement in science education, ultimately leading to better academic performance and student success. More so, this can provide valuable insights to headmasters. By gaining this knowledge, headmasters can tailor their support and professional development programs to better address the specific needs of these teachers. This can lead to improved teaching practices, enhanced student engagement, and ultimately better learning outcomes in the combined science classes. Recognizing the efforts of combined science teachers in overcoming challenges and conducting practical lessons can boost morale and motivation. Headmasters can consider incentives or rewards to encourage continued growth and innovation in teaching practices.

1.9. To the education Administrators

They will find the recommendations of this project useful in enlightening schools administrators on the important methods that can be used to improve pass rate in Combined Science at Ordinary Level. This study will advise schools on the basic infrastructural requirements. This study will also

provide information to head teachers on how their administrative support affects the performance of secondary school learners in Ordinary level Combined Science.

1.9.1 To the Ministry of Primary and Secondary Education

The Ministry of Primary and Secondary Education will also benefit since they will be able to establish challenges that are encountered by combined science teachers in conducting practical lessons in secondary schools and establish solutions. By so doing this will improve pass rate of Combined Science country wide since they will have solutions to the problems.

1.10 Definition of key terms

1.10.1 Science

Science is a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe (Brenchley 2015). It involves the study of the natural world through observation, experimentation, and evidence-based reasoning (Wiggins 2013). Science refers to a systematic and organized body of knowledge that is obtained through observation, experimentation, and analysis. It is a discipline that studies the natural world, including phenomena, principles, and laws governing various aspects of life and the universe.

1.10.2 Combined Science

Combined Science is a subject that integrates multiple scientific disciplines, such as biology, chemistry, and physics, to provide a comprehensive understanding of the natural world (Wiggins, 2013). It aims to develop students' scientific literacy, critical thinking, and problem-solving skills (Brenchley, 2015). In other words combined science is whereby students or learners study all three sciences biology, chemistry, and physics. This gives learner’s basic scientific abilities in

these subject areas. They develop knowledge and understanding of basic scientific concepts and principles

1.10.3 Teacher

A teacher is an individual who facilitates learning, shares knowledge, and guides students to achieve academic and personal growth (Egan, 2013). Teachers play a critical role in shaping students' understanding, attitudes, and skills in various subjects, including science (Darling-Hammond, 2010).

1.10.4 Practical lessons

Practical lessons refer to hands-on activities, experiments, and investigations that allow students to explore scientific concepts, principles, and processes in a concrete and experiential manner (Hodson, 2013). Practical lessons aim to develop students' scientific skills, critical thinking, and problem-solving abilities (Bennett, 2015). ln other words a practical lesson refers to a hands-on learning experience or interactive activity that allows individuals to apply theoretical knowledge or acquire practical skills in a specific field or subject matter. Practical lessons are often part of educational or training programs and aim to enhance understanding, promote problem-solving abilities, and facilitate the acquisition of practical expertise.

For example, in a science laboratory, students may engage in practical sessions where they conduct experiments, collect data, analyze results, and draw conclusions. These sessions provide students with firsthand experience in conducting scientific research and help them understand the practical application of theoretical concepts (Miller,2014)

1.11 Summary

The chapter focused on background of the study, statement of the problem, objectives of the study, research questions, significance of the study, limitation and delimitation, definition of terms. From background, the researcher briefly discussed some experiences encountered by combined science teachers in conducting practical lessons. In the next chapter the researcher shall look closely to other researcher's or authors views on what they said on experiences that combined science teachers encountered.

CHAPTER 2

2.0 Related literature review

2.1 Introduction

The integration of practical lessons in combined science education plays a crucial role in enhancing learners' engagement, understanding, and critical thinking skills. However, the implementation of practical lessons, specifically in combined science classrooms, is not without its challenges. This chapter review the literature related to existing research on the experiences encountered by combined science teachers on conducting practical lessons in teaching and learning.

2.2 How do Combined Science Teachers' Experiences in conducting practical lessons at Form Three Level impact students when teaching and learning?

The effectiveness of combined science education at the Form Three level is significantly influenced by teachers' experiences in conducting practical lessons. Experienced teachers play a pivotal role in fostering a conducive learning environment, promoting student engagement, and enhancing academic achievement.

Firstly, experienced teachers create a supportive learning environment that encourages active participation and motivation. By conducting practical lessons, teachers develop expertise in managing classrooms, addressing student misconceptions, and adapting instruction to meet diverse needs (Taylor, 2012). This expertise enables teachers to establish a positive classroom atmosphere, promoting student engagement and motivation.

Secondly, teachers' experiences in conducting practical lessons enhance their ability to design relevant and effective experiments. Experienced teachers integrate theoretical and practical

knowledge, developing lessons that cater to diverse learning styles (Koballa, 2014). This integration enables students to visualize complex concepts, develop critical thinking skills, and apply scientific principles to real-world problems.

Thirdly, experienced teachers facilitate collaborative learning, promoting essential skills such as communication, teamwork, and problem-solving. Practical lessons encourage students to work in groups, share ideas, and learn from peers (Henderson, 2015). This social interaction fosters a sense of community, developing students' interpersonal skills and preparing them for future careers.

Fourthly, teachers' experiences impact student learning outcomes by influencing teacher efficacy and confidence. Experienced teachers possess high efficacy, enabling them to manage classrooms effectively, provide constructive feedback, and adapt instruction to meet student needs (Bennett, 2013). This confidence translates to improved student motivation, self-efficacy, and academic achievement.

Lastly, experienced teachers develop reflective practice, continuously evaluating and refining their teaching methods. Reflective practice enables teachers to identify areas for improvement, incorporate new technologies, and address emerging educational trends (Henderson, 2015). This ongoing professional development ensures teachers remain effective and relevant, enhancing student learning outcomes.

In conclusion, combined science teachers' experiences in conducting practical lessons at the Form Three level significantly impact student learning outcomes. Experienced teachers create a supportive learning environment, design effective experiments, facilitate collaborative learning, possess high efficacy, and develop reflective practice. Educators and policymakers must prioritize

teacher professional development, ensuring combined science teachers possess the necessary expertise to deliver high-quality practical lessons.

2.3 What are the benefits of conducting practical lessons in Combined Science teaching and learning?

Conducting practical lessons is an essential aspect of combined science teaching, offering numerous benefits to teachers. These benefits extend beyond the classroom, influencing teachers' professional growth, teaching effectiveness, and personal well-being.

One of the primary advantages of practical lessons is enhanced teaching effectiveness. By engaging students in hands-on activities, teachers clarify complex concepts, promoting deeper understanding and improved academic achievement (Abdulhamid et al., 2019). Practical lessons also foster critical thinking, problem-solving, and analytical skills, essential for scientific literacy. Teachers witness increased student engagement, participation, and motivation, leading to a more productive learning environment.

Conducting practical lessons also contributes to teachers' professional growth and development. By designing and implementing practical activities, teachers refine their pedagogical skills, content knowledge, and creativity (Mumba et al., 2015). This expertise enhances their confidence and effectiveness in the classroom, leading to increased job satisfaction and motivation. Practical lessons provide opportunities for teachers to reflect on their practice, identify areas for improvement, and adapt their teaching strategies.

In addition to professional benefits, conducting practical lessons improves classroom management. Teachers develop strategies to minimize disruptions, ensure safety protocols, and optimize

resource allocation (Nyakoe et al., 2015). Effective classroom management creates a conducive learning environment, allowing teachers to focus on instruction.

Practical lessons also facilitate interpersonal connections between teachers and students. Hands-on activities encourage collaboration, communication, and mutual respect (Oludipe, 2017). Teachers build stronger relationships with students, fostering a positive classroom atmosphere and increased parental trust.

On a personal level, conducting practical lessons enhances teachers' job fulfillment and satisfaction. Witnessing students' excitement and understanding during practical activities boosts teachers' morale and motivation (UNESCO, 2019). Practical lessons also provide an outlet for creativity and innovation, reducing teacher burnout and stress.

Finally, conducting practical lessons benefits the institution as a whole. Improved student outcomes, academic achievement, and teacher effectiveness contribute to the school's reputation and credibility (Chabalengula et al., 2017). Practical lessons support curriculum development and implementation, ensuring alignment with educational standards.

Therefore, conducting practical lessons in combined science teaching offers numerous benefits to teachers. These advantages extend beyond the classroom, influencing teaching effectiveness, professional growth, interpersonal connections, personal well-being, and institutional reputation. Educational stakeholders should prioritize support for practical lessons, providing resources and opportunities for teachers to enhance their instructional practice.

2.4 What are the challenges experienced by Combined Science teachers in conducting practical lessons?

Conducting practical lessons is a crucial aspect of combined science teaching, yet teachers encounter numerous challenges that hinder effective implementation.

One of the primary challenges is inadequate resources, including insufficient laboratory facilities, outdated equipment, and limited materials (Mumba et al., 2015). This scarcity forces teachers to improvise or omit practical activities, compromising learning outcomes.Safety concern is another challenge, ensuring student safety during practical lessons is a significant concern (Nyakoe et al., 2015). Teachers must balance hands-on learning with potential hazards, requiring vigilant supervision and strict safety protocols.

Managing diverse learning styles, abilities, and behaviors in a practical setting poses difficulties (Abdulhamid et al., 2019). Teachers struggle to maintain discipline, minimize disruptions, and optimize learning. Rigid curriculum guidelines and time constraints are also challenges that limit teachers' flexibility in designing practical lessons (Chabalengula et al., 2017). This restricts creativity and innovation, leading to stagnant teaching methods.

Moreover, teachers may lack adequate training, experience, or confidence in conducting practical lessons (Oludipe, 2017). This inadequacy hampers effective lesson delivery and student learning. Maintaining student interest and motivation during lengthy experiments is challenging (UNESCO, 2019). Teachers must devise strategies to keep students engaged and focused.

Assessing student learning during practical lessons is complex, requiring innovative evaluation methods (Kiboss et al., 2018). Teachers struggle to accurately measure student understanding.

Finally inadequate institutional support, including insufficient funding, inadequate infrastructure, and lack of administrative backing, exacerbates challenges (Mbewe et al., 2020).

To overcome these challenges, educational stakeholders must prioritize:

- Resource allocation and infrastructure development.
- Teacher training and professional development.
- Curriculum reform and flexibility.
- Safety protocols and emergency preparedness.
- Innovative teaching strategies and technologies.
- Collaborative planning and peer support.
- Continuous assessment and evaluation.

By acknowledging and addressing these challenges, educators can enhance the effectiveness of practical lessons in combined science teaching, ultimately improving student learning outcomes.

2.5 What are possible solutions to challenges experienced by Combined Science Teachers in conducting practical lessons?

Combined science teachers encounter numerous challenges while conducting practical lessons, hindering effective teaching and learning. To address these obstacles, various solutions can be implemented to enhance the teaching and learning experience.

One of the primary challenges is inadequate resources. To overcome this, schools can collaborate with other institutions to share resources, seek external funding or grants, or utilize virtual or simulation-based laboratories. Additionally, teachers can develop low-cost, locally relevant practical activities, encouraging community involvement and donations (Hofstein and Lunetta, 2013).

On the aspect of safety concerns, ensuring student safety is paramount. Teachers can develop and enforce strict safety protocols, conduct regular risk assessments, and provide safety training for students. Proper ventilation, storage of chemicals, and emergency response plans must also be established (Kidd and Saunders, 2017) .

Focusing on classroom management, effective classroom management strategies can minimize disruptions and optimize learning. Teachers can develop clear lesson plans, use group work, and encourage student accountability. Implementing peer-to-peer learning and providing opportunities for student reflection and feedback also enhances classroom management (Marzano, 2017).

The challenge of curriculum constraints can be addressed by revising curriculum guidelines to incorporate flexible, inquiry-based learning approaches. Teachers can collaborate with curriculum developers, use integrated teaching methods, and develop contextual practical activities (Hofstein and Lunetta, 2013).

Furthermore on teacher preparation, regular professional development opportunities, mentorship programs, and collaboration with experienced teachers can enhance this. Action research and reflection also foster teacher growth, (Ingersoll and Merrill, 2017).

Student engagement can be addressed by hands-on, inquiry-based learning, real-world examples, and student-led investigations boost student engagement. Technology-enhanced learning tools and

opportunities for student presentation and feedback also promote engagement (Koehler and Mishra, 2013).

On assessment and evaluation, innovative assessment methods, peer and self-assessment strategies, and technology-enhanced assessment tools can evaluate student learning effectively (Boud, 2013).

Focusing on the institutional support, establishing science education committees, providing dedicated laboratory spaces, and allocating sufficient funding for resources and training demonstrate institutional commitment to practical science education (Kidd and Saunders, 2017).

Finally on the aspect of government and policy support, developing and implementing science education policies, providing funding for initiatives, and establishing national standards support practical science education (Osborne, 2013).

In conclusion, addressing challenges faced by combined science teachers requires a multi-faceted approach. By implementing these solutions, educators can provide effective, engaging practical lessons, enhancing student learning outcomes.

2.6 Human resources on practical use

Further conditions inhibiting the use of practical lessons when teaching combined Sciences are some teachers teach subjects in which they are not specialized. Teachers who teach subjects which they do not specialize are known to be reluctant to do practical work (Taylor, 2012). He also observed that many rural schools in Zimbabwe do not have laboratories and it is reasonable to conclude that such schools also did not have technicians. Others studies also point to learners' persistent lack of experimentation skills (Ramnarain, 2014). Sometimes high school graduates are hired to work as untrained laboratory technicians from the same practical-work-starved or deficient school system and hence cannot effectively function as laboratory technician.

Moreso, various studies results have indicated the work experience influences directly the knowledge and skill of teachers on implementing practical sessions in combined science. As a result of experience, teachers will develop confidence which is very important personality for the teachers to be successful to overtake planned activities in practical sessions. The research has been conducted in some secondary teachers said they were fairly confident. The main reasons given for this were experience, knowing the subject and having enthusiasm for it, and having time to practice in school or to attend courses and conferences. Teachers must understand that learners with limited strength or mobility can have a full laboratory experience with appropriate accommodation, such as a lab assistant (Tenaw, 2015).

Consequently, in the absence or poor implementation of practical lessons learners' performance in combined science subjects would be poor and lose interest. The other finding that has important implications is that the doing of practical lessons is significantly dependent on teachers' motivation. Those who are motivated to do practical work will find ways to do so even in the most poorly resourced of schools. Conversely those who are not motivated will not do practical work even when they have access to the best of resources. Only when the teachers are ready, willing and able to use resources they implement (Abudullah, 2013).

In the case study conducted by (Taylor, 2012) no relationship was found between the availability of resources and the level of practical work performed. This finding suggests that improving the resources will make little difference unless accompanied by other interventions as well. Hence, basic determinant factors for the practical work implementation and practice in combined science education at secondary schools have been identified in this review.

2.7 Intervention strategies to help Combined Science teachers to overcome challenges in conducting practical lessons in Combined Science.

School head is pivotal for the school to provide important facilities and laboratory room for the implementation and successful achievement of science educational quality. Some of the finding has indicated that reason for very little implementing practical lessons were lack of concern and support of school principals. Adequate planning by the school head, with appropriate involvement of teachers, learners, parents and the community, can raise curriculum standards and help the school meet learning achievement goals and successfully implement their important policy directives or targets (Mbewe et al, 2020).

The school head must be able to adjust the internal workings of the school to monitor and guide teachers' conditions of service and school financing system on implementation of practical work. Promote powerful learning-teaching processes that facilitate overall science educational achievement for all learners. This occurs when school leadership sets realistic, but high expectations for both learners and teachers, in the laboratory and classroom, and provides various ways for them to pursue learning through the active participation of the learner and the reflective guidance of the teacher. It would appear that in a school where innovation is generally supported, combined science teachers engage in higher levels of practical work (Polit and Hungler, 2013).

Some studies have identified as School Management did not influence the implementation practical work in the school (Polit and Hungler, 2013). It would appear that in a school where innovation is generally supported, combined science teachers engage in higher levels of practical sessions. A review in McMillan and Schumer, (2010) examines that the school principals as key guarantor of successful implementation of the school curriculum so as to improve leaners academic achievement.

It is obvious that schools have to provide by necessary materials (books, classrooms, laboratory materials, guidance on teaching learning of combined science education and others) for learners so that students have to get access in achieving their science subjects effectively (Gebrekidan,2014)

2.8 Summary

The literature review highlights the impact of combined science teachers' experiences in students learning and outcomes, benefits experienced by combined science teachers' in conducting practical lessons, several challenges encountered by combined science teachers on conducting practical lessons in teaching and learning. These challenges include lack of resources, time constraints, lack of teacher training, safety concerns, classroom management difficulties, and the assessment of practical activities. Solutions to challenges faced by combined science teachers in conducting practical lessons and intervention strategies have also been highlighted. Addressing these challenges requires collaborative efforts among school administrators, other stakeholders to ensure the provision of necessary resources, training opportunities, and support systems to enhance the implementation of practical lessons in combined science classrooms. The next chapter the researcher will look on research paradigm, design and methodology.

CHAPTER 3

3.1 Introduction

In this chapter, the researcher described the research methodology that was used to explore the experiences encountered by combined science teachers in conducting practical lessons in teaching and learning of Combined Science. Firstly, the researcher discussed the research approach and design that was employed in this study. The researcher also described the population, research sample and sample procedure, followed by research instruments that was used. Finally, the researcher gave the details on data presentation, analysis and interpretation. Ethical considerations were also included.

3.2 .1 Research paradigm/ Approach

Fraenkel and Hyun, (2012) define research paradigm as "a study that investigates the quality of relationships, activities, situations, or materials." On the other hand, Patton, (2010) state that qualitative research (paradigm) produces findings not arrived at by means of statistical procedures but rather a systematic, interactive and subjective approach used to describe life experiences and give them meaning.

3.2.2 Interpretive paradigm

This study used an interpretive paradigm, which considers the experiences of individuals as the main source of interpreting reality. According to Cohen, Manion & Morrison (2017), an interpretive paradigm allows the researcher to understand the phenomena being studied and interpret explanations of the phenomena given by the participants. This research paradigm was selected because the researcher focused on the interpretation of experiences encountered by combined science teachers on use of practical lessons in teaching and learning. Cohen et al. (2017)

states that the advantage of using interpretive research is to provide a rich description of the phenomenon being studied. Therefore, this study intends to use an interpretive approach to explore and to gain a deeper understanding of the experiences encountered by Combined Science teachers on use of practical lessons in teaching and learning.

3.2.3 Research Approach

The study employed qualitative approach because it gives the researcher an opportunity to understand the practices, views and opinions of Combined Science teachers who teach Combined Science using practical lessons and the experiences they always encounter during teaching and learning of Combined Science. Creswell (2014) defines qualitative research as a type of educational research in which researchers rely on the views of participants. He also argues that qualitative research brings civic responsibility that is needed for change in the society. Therefore, the study builds on this strength to bring changes for Matabeleland South Combined Science educators in terms of practical work.

Human beings construct their own reality based on their settings and this can be interpreted differently by different stakeholders (Abdullah, 2013). Thus, to understand teachers' challenges, it was essential to study participants in their real context (Creswell, 2014). In this study, two selected schools were the natural settings in which the data was collected without manipulating the teachers' classroom environment. Hence, the approach allowed the researcher to have highly detailed descriptions of Combined Science teachers' views and opinions in the school setting in which they teach.

3.2.4 Advantages of qualitative research approach

The study also employed a qualitative research approach because:

- It gives the researcher the opportunity to understand practical lessons during Combined Science teaching and learning practices, views, and opinions of combined Science teachers to determine the challenges they face.
- The flexibility of qualitative approach allowed them to speak in their own voice, rather than conforming to categories and terms imposed on them by others (Yin,2012).
- As Stake (2011) commended, qualitative approach enabled the researcher to probe deeply for clarification of data given by participants.
- It permits the researcher to enforce subjectivity, due to the fact that I interpreted the data based on reality.
- It makes it possible for me to gain understanding and insight into the challenges that teachers were experiencing on using practical lessons when teaching and learning Combined Science.

3.2.5 Disadvantages of qualitative research

Beyond the above advantages, there are limitations:

- Qualitative research is typically subjective in nature, relying on the researcher's interpretation of data.
- This subjectivity can introduce bias and limit the generalizability of findings, as the researchers may interpret the data differently.
- Qualitative research often relies on a small sample size, which may limit the generalizability of the findings. The experiences and challenges encountered by a

specific group of combined science teachers may not be representative of the larger population of combined science teachers.

- Qualitative research involves in-depth interviews, observations, and analysis of rich and detailed data.
- Qualitative research can be time-consuming, requiring significant resources and effort to collect and analyze the data.
- It primarily focuses on exploring individuals' experiences, perceptions, and motivations.
- It may not provide precise numerical data, making it difficult to compare and measure the extent of challenges faced by combined science teachers (Cronin, 2014).

3.3 Research design

Research design refers to the set of methods and procedures used for the collection and analysis of the measures of variables stated in the research problem (Creswell 2014). Patton (2010) believes that a research design can be an implementation method of the research which comprises of steps and explanations of how data would be analyzed, interpreted and presented. In essence, research design acts as the holds together the various elements of a research project ensuring coherence and clarity through the research process.

This study employed a case study design. According to Cronin (2014) case study design is a highly legitimate research method appropriate for both qualitative and quantitative research, mainly dealing with “the understanding and change of interwoven complexities associated with interpersonal processes that emerge in a wider social context. He added that, case study design is an intensive inquiry that investigates a contemporary phenomenon within its natural setting.

3.3.1 Advantages of a case study

The advantage of the case study is that it can "close in" on real-life situations and test views directly in relation to phenomena as they unfold in practice" and it states that the most obvious advantage is that the case study provides a detailed analysis in the individual case. Creswell, (2014) argues that intensive study methods have their strength in obtaining detailed and relevant data. The information was not taken out of context and the study included multiple variables and runs deep. The internal validity is therefore high, which makes these studies very valuable. By studying individual cases in-depth the researcher found the information he or she did not anticipate to find from the start and because of this, case study research was a very good method for creating hypotheses. These hypotheses helped the researcher to structure future research, and case studies therefore plays an important part in advancing a field's knowledge base (Kumar, 2014).

Case studies can also offer important evidence to complement experiments. They are very well suited to help explain the how and why questions by investigating and they are also highly useable when the investigator has little control over events (krieger,2012).He also added that, case studies are preferable when investigating current or contemporary events when it's not possible to manipulate relevant variables and allows investigators to retain a holistic view of real-life events, such as individual life cycles, small group behavior, organizational and managerial processes, neighborhood change, school performance, international relations and the maturation of industries . The case study design was used as it allows the researcher to gain insight and understanding of the experiences encountered by combined science teachers on use of practical lessons when teaching and learning. This is important for the purpose of identifying and recommending helpful mitigation measures that could address the challenge of the study area and other places with similar challenges.

3.3.2 Disadvantages of case study

"It is widely believed that case studies are useful in the study of human affairs because they are down-to-earth and attention-holding but that they are not a suitable basis for generalization" (Stake, 2011). This is one of the biggest concerns and most common critiques against case studies, its lack of scientific generalizability. The major problem is that the studies are highly specific, that is, that they only relate to a particular context or a few units. The question that arises is if it is possible to generalize from the result, to say that what applies to the few also apply to all others.

Critics believe that, in fact, the study of a small number of cases cannot offer any grounds for establishing reliability or generality of findings. The area that is studied in case studies are often too narrow to be able to draw scientific conclusions. Case studies, and intensive studies as a whole, are therefore said to have low external validity and the greatest concern with the case study, according to Creswell (2014), is its lack of rigor. This means that all too often the case study investigator has so much freedom that he becomes sloppy and does not follow the systematic procedures, or allows dubious evidence or biased views to influence the directions of the findings and conclusions. He states that this lack of rigor is less likely to be present when using other methods because of the existence of numerous methodological texts providing investigators with specific procedures to be followed, which is limited in the case study method.

3.4 Population

Krieger (2012) defines population as all members of any well - defined class of people, events and objects. According to Creswell (2014), a population is the entire group of individuals, items or data points that researcher is interested in understanding describing. In essence, a population is the entire group of individuals, items or data points that a researcher is interested in

understanding or describing an to whom the research results will be generalized. The population of study therefore represents the target of the study as defined by the aims and objectives of the study. The study population was on four Combined Science teachers, forty form three combined science learners and two headmasters in Beitbridge district in Matabeleland South Province.

3.5.0 Sample and sampling procedures

3.5.1 Sample

A sample is a smaller set of data that is chosen and or selected from a larger population using a predefined selection method (krieige,2012). According to Creswell (2014) a sample is a sub set of individuals or cases selected from a larger population. Therefore a sample is a smaller group of individuals or cases selected from a larger population with the goal of making inferences about the population based on the data collected from the sample. The researcher focused on two schools in Matabeleland South Province in Beitbridge district. The researcher specifically targeting forty, form three learners who are doing combined science and four combined science teachers and two headmasters from the selected schools

3.5.2 Sampling procedure

According to Creswell (2014) sampling procedures are methods used to select a sample from a population, with the goal of making inferences about the population. Pilot and Hungler (2013) define sampling procedures as the methods used to select a sample from a population, with the goal of ensuring that the sample is representative of the population and that results can be generalized. In other words sampling procedures refer to select a subset of individuals or cases from larger population with the goal of making inferences about the population based on the data

collected. The researcher used random sampling to select forty learners from two selected schools. The researcher used purposive sampling procedure to select four combined science teachers and two headmasters for the study. Purposive sampling is a procedure where the researcher chooses the sample based on who is thought to be appropriate for the study. Members of the sample are those that can adequately answer the research questions. The researcher used purposeful sampling which allows me to choose the site and participants who illustrates the features which I was interested in for the relevance of my study (Creswell, 2014). A total of four Combined Science teachers, two headmasters and forty learners was included in this study.

3.6 Data collection instruments

Research instruments are tools (for example questionnaires, interviews, and observations) intended to obtain data on a topic of interest (Babbie, 2013). The researcher used interviews and observations. According to Kumar (2014) research Instruments refer to tools or devices used to collect data, and they can be questionnaires, interviews, observation schedules or psychological tests. Therefore research Instruments are tools or methods used to collect data on a research study.

3.6.1 Interviews

Kumar, (2014) defines an interview as a gentle conversation between two or more people where questions are asked to a person to get the required answers. Creswell (2014) highlights that interviews are a qualitative data collection method in which the researcher asks questions to gather information about their experiences, attitudes or opinions. Therefore, interviews are a way of collecting data through direct personal interaction with participants.

The selected participants were teachers who teach Combined Science. The interview method involved the researcher asking questions to the participants in order to gather in-depth, qualitative

information about their thoughts, feelings, experiences, and perspectives. The interview guide was divided into different parts, where the researcher introduced herself, informed the participants about the interview, and explained the research or interview process.

3.6.2 Advantages of interviews

- The interviews gave the researcher the flexibility to pursue an idea in the response in more detail that is, the interviewer can provide direct feedback to the respondent, giving clarifications, and help alleviate any misconceptions or apprehensions over confidentiality that the respondent may have in answering the interviewer's questions. Interviewers can probe if the respondent's answer is too brief or unclear.

- This gives interviewers some flexibility in dealing with unstructured questions and is especially suited for handling complex questions.

- Personal interviews ensure that the respondent was answering all questions asked and interviewers have the opportunity of showing respondents items such as sample products, graphs, and sketches, which can aid in their answers.

- Score, (2013) added that, interviewing respondents personally can increase the likelihood of their participation, as many people prefer to communicate directly verbally, sharing information and insights, interviews are useful to get comprehensive information about personal feelings, perceptions and opinions and they also allow more detailed questions to be asked.

3.6.3 Disadvantages of interviews

- Personal interviews are usually more expensive. Factors influencing the cost of the interview include the respondents' geographic proximity, the length and complexity of the interview.
- There is lack of anonymity as respondents are not anonymous in a personal (face-to-face) interview and may be reluctant to disclose certain information to the interviewer. Hence, consideration must be expanded by the interviewer when dealing with sensitive questions to avoid bias effects on the respondent's part.
- When a person selected for an interview and cannot be reached for the first time, a callback must be scheduled which results in extra cost and time spent.
- Interviewers cheat to make their life easier and save time and effort and the interviewer's individual questioning style, techniques, approach, and demeanor may influence the respondents' answers (Krieger, 2012).

3.6.4 Observation method

Creswell, (2014) cited that, observation method is a more natural way of gathering data. It seeks to ascertain what people think and do by watching them in action as they express themselves in various activities and situations. Creswell (2014) defines observation method as a research technique used to collect data by systematically watching, recording and analysing behaviors, interactions, or phenomena in their natural or controlled environments. He also pointed out that observation is very important in a research as one can benefit a great deal in research through observing what would be happening in the field of study. Thus, the observation method was used as a tool for collecting data by looking closely at Combined Science lesson deliveries in relation

to challenges Combined Science teachers face when using practical lessons. Self-report can be used to obtain information easily and economically as people often give false information about themselves. Direct observation of behavior has become an important measure of evaluating the effect of improvisation.

Through observations, more can be discovered hence paving way for data triangulation in case of this study. When a researcher takes on the role of a complete participant in a group, his or her identity is not known by any of the individual being observed. The researcher interacts with members of the group as natural as possible, as if he or she is none of them. When a researcher chooses the role of participant-as-observer, he or she participates fully in the activities of the group being studied but makes it clear that he or she is doing research. When a researcher chooses the role of observer-as-participant, he or she identifies fully straight off as a researcher but makes pretenses of being part of the participants in the group being observed.

3.6.5 Advantages of observations

- Observations lead to a deeper understanding than an interview alone because it provides knowledge of the context in which an event occurs and enable the researcher to see things of which the participants themselves are not aware that they are unwilling to discuss.
- "What people do may differ from what they say they do". They also note that observation enables a researcher "to look at everyday activities and behavior. (Patton 2010)
- It provides a practical application for a hypothesis.
- It can help make research more complete.

- Assessment of practice skills can also be better done by observation.
- Observation is recognized as the most direct method of data collection when one is interested in their overt behavior.
- Data collection through observation is qualifiable and accurate because the researcher will be seeing actual behavior unlike questionnaires where people write what they think which is totally different from actual behaviors (Creswell 2014).

In case of this study, experimentation is simply observation under controlled conditions.

3.6.6 Disadvantages of observations

- Establishing the validity of observation is always difficult.
- There is a chance of researcher bias observational in research. Experts say that this can be a very big problem. Some activities and behaviors can be difficult to understand. There are numerous situations in which observation alone is inadequate. Many of the items of observation cannot be defined with sufficient precision.
- Observation technique is affected by observer bias or the art of subjectivity, whereby the observer tends to see what he or she desires.
- Observation takes time as behaviors and reactions must be carefully watched to trace similarity and repeated occurrences (Patton,2010).

However, in this study, the researcher adopted the participant-as-observer role to be close to the teachers and learners while classes were going on in order to observe other shortcomings which contributed to some of the challenges that teachers encounter during practical lessons. Practical lessons enabled the researcher to observe the learners while doing practical work. The researcher

used her designed observation table which she ticks and recommend on areas of observations and everything was recorded.

3.6.7 Credibility and trustworthiness

Credibility and trustworthiness are vital concepts in research, ensuring study findings are reliable, believable and accurate (Hammersly 2013)

Interviews and observations were used to complement and look for consistency, patterns and discontinuities in the data collected. This process ensured more valid and reliable data which makes a diverse construction of realities of teachers' views and opinions of their teaching practices in practical work.

The study ensured that constructs presented by participants was accurate. The interpretation of interviews and observations relied on the participants' own words and concepts. As indicated earlier in the chapter, the audio-tape recorder was used to capture the data and reflect on what was interpreted. Interviews were audio-taped and recorded. Classroom observations were video recorded after obtaining permission from the participants and transcripts created a thick description of the data.

The study used to observe participants and member checking of interview transcripts to share the interpretations with the teachers in order to corroborate the data. Reflexivity was considered throughout the research process, Bassey (2018) states that interpretive research requires researchers to be aware of the standpoint from which they conduct the research. Qualitative data could be descriptive and interpretive.

The researcher was aware of the role of the participants within the research process. In order to guard against being bias, the study examined any assumptions critically as potential threats to

validity. The study ensured that it does 'prove' a particular perspective or manipulate the data to arrive at predisposed truths (Patton, 2014). The study understands the world as it is, "to be true to complexities and multiple perspectives as they emerged, and to be balanced in reporting both confirming and disconfirming evidence".

3.7.0 Data presentation, analysis and interpretation

3.7.1 Data analysis

Data analysis is a systematic examination of data to identify patterns, themes and relationships (Creswell 2014). According to Bryman (2012), data analysis is the process of systematically examining and interpreting data to extract meaningful insights, patterns and relationships.

3.7.2 Data interpretation

Kumar (2014) notes that data interpretation refers to drawing conclusions and meaning from analysed data. Bryman (2012), defines data interpretation as the process of assigning meaning to the results of data analysis, identifying patterns, relationships, and trends and drawing conclusions based on the findings.

3.7.3 Data interpretation and analysis

Pilot and Hungler (2013) define data interpretation and analysis as the process of examining and understanding the meaning of data collected during a research study with the goal of identifying patterns, themes and relationships and drawing conclusions based on the findings. Kumar (2014) propounds that data interpretation and analysis involve the use of statistical and non-statistical methods to examine and understand the meaning of data.

This study used qualitative data analysis, characterized by descriptive accounts of the research participants. The researcher reviewed the interview transcripts, and the emerging concepts was recognized and analyzed taking into account their interconnections. The data that was gathered from interviews and observations was utilized to comprehensively describe, interpret, and analyze the case. Bryman, (2012) described qualitative data analysis as a systematic process of coding, categorizing, and interpreting data. Thematic analysis was suitable for this study because, it involved reduced accumulated data to a manageable size, developing summaries, and looking for patterns. Coding was used from the beginning of data generation to break down the data into manageable pieces. All themes that emerged from interviews and observations was used to help the researcher in answering the research questions about the teachers' use and perceptions of the importance of practical work and the challenges teachers encounter in conducting practical lessons.

3.8 Ethical considerations

McMillan and Schumacher (2010) state that since educational research naturally involves humans as participants, researchers are required to protect the "rights of the participants" in the study. Therefore, letters were written beforehand to the participants and their school principals to get permissions for the study and to get their agreement as participant.

Bryman (2012) define ethics "as a matter of principled sensitivity to the rights of others and that while the truth is good, respect for human dignity is better". Patton, (2014) argues that no researcher can demand access to an institution or materials. The participants were informed about the aim of the study and they have an opportunity to choose whether to participate in the study after being informed. The participants identified was not disclosed and the data generated from the research was kept confidential. Moreover, participants were informed that they are free to withdraw from the study at any time without any obligation and any harm. To further ensure

anonymity of the participants, the names and the names of the schools of the respondents was not revealed in the research.

3.9 Data Triangulation

In order to ensure context validity, an expert was consulted that is the research supervisor to check for suitability of the interviews designed and observations were made to ensure credibility and trustworthiness. Moreover the use of interviews and observation method helped the researcher to triangulate and to build on each type of data collection while at the same time compensating for potential weakness in any single approach (Patton 2014). Triangulation was used to complement and look for consistency patterns and discontinues in the data collected.

According to Creswell (2010) , triangulation is the process of using multiple methods or data sources to validate findings. Patton (2010) also emphasizes the importance of triangulation stating that triangulation is a way of increasing the validity and reliability of findings by using multiple methods, data sources and investigators. This process ensured more valid and reliable data which makes a diverse construction of realities of participants views and opinions of their teaching practices in practical work.

The interview data and observation data both support that practical lessons help student understand the concepts, students can see the application of the concepts in real-life situations and help the teacher for assessment and evaluation of students. Both data support that lack of safety and lack of resources and equipment are challenges in conducting practical lessons. The interview data provides quotes from participants that highlight the issues, while the observation data provides evidence of the issue in practice.

3.10. Summary

This chapter focused on the research methodology and design of the study. A qualitative interpretive approach guided the data collection process. Purposeful sampling directed the selection of the participants. The data was collected using interviews, and classroom observations. Data interpretation and analysis was also looked at in this chapter as well as ethical considerations including triangulation of data. The next chapter discussed was on data presentation, analysis and interpretation.

4.0. DATA PRESENTATION, INTERPRETATION, ANALYSIS AND DISCUSSION.

4.1. Introduction

This chapter focused on data presentation, interpretation, analysis and discussion. The data collected was on assessing teachers' experience in conducting practical lessons at form three level in Combined Science in two secondary schools in Beitbridge District. The findings of the research study were presented according to the research questions using the thematic approach. Data was collected using interviews, and observations. The following were pseudo names which were used during the research, T1 for teachers, H1 for headmasters and L1 for learners. Themes followed answering the research questions.

4.2 Data Presentation

4.2.1 Presentation of open ended interview questionnaires.

The interview data was collected from 4 combined science teachers, 40 form three students and 2 heads from two selected secondary schools. The data obtained through face to face interview with respondents are presented according to the order of objectives of the study.

Question 1 : What are the benefits experienced by combined science teachers in conducting practical lessons?

From the study all participants indicated that practical lessons benefit a lot to teachers and learners as well, when teaching combined science. All combined science teachers were involved in the survey. Participants interviewed indicated that practical lessons are of great importance. On the benefits experienced the responses included that conducting practical lessons promote professional growth, improve teacher confidence, enhance pedagogical skills, improve student engagement, enhance student understanding of scientific concepts, increase student motivation , increase classroom management and improve assessment and evaluation.

T1 responded that :

"On my side conducting practical lessons has helped me to improve my teaching practices. I have learned how to engage students more effectively and make the lessons more interactive. Practical lessons improve student engagement that is practical lessons increase interest in learners in combined science. Practical lessons make Science come alive for my students. They love getting hands-on experience and seeing the concept in action."

T2 commented on that saying,

"*students are more enthusiastic about Science and practical lessons."*

T2 also responded saying:

" I think the biggest benefit is that it helps students to understand the concepts better. When they see the experiments and investigations, it makes more sense to them. As for me , I found that practical lessons help to assess student understanding more accurately . I can see how they apply theoretical concepts to real-world problems."

In line with the responses which were given, Abrahams (2010) supports that saying practical lessons enhance interest , hands on experiences spark students' in science making it more enjoyable and interactive.

T3 viewed that:

"Conducting practical lessons have helped me to feel more confident in my teaching abilities. I know that I am providing students with a high quality learning experience. Practical lessons enhance conceptual understanding that is to say hands-on experience help students grasp complex

scientific concepts. I have seen a significant improvement in student understanding of scientific concepts after conducting practical lessons. It really helps to clarify the material."

T4 commented:

"*Practical lessons clarify abstract concepts. Learners understand better when then carry out experiments.*

T4 said:

"*Practical lessons increase student motivation that is practical lessons motivate students to learn and explore scientific concepts Practical lessons also help to develop the students' critical thinking and problem and problem- solving skills. They have to think critically and come up with solutions to the problems. Moreover, I have found out that practical lessons help me to develop strategies for managing student motivation and engagement. I can see how students respond to different teaching."*

This is supported by Bybee 2010 saying practical lessons motivate students to learn and engage with scientific concepts.

L1 had this to say:

"I understand scientific concepts better rather than doing theories only. This help us even in the examination, concepts that you have done practical it's much easier to recall than concepts that have been done theoretically."

L2 responded*:*

"Scientific concepts that we learn theoretically accompanied by practical lessons are easy to grasp.

L3 responded:

" I think practical lessons help me understand the concepts better. When l see the experiments and investigations, it makes more sense to me."

L4 responded:

Practical lessons make science more interesting and interactive. I can see how the concepts apply to real- life situations."

L5 responded*:*

" I find it easier to remember the concepts when I have done the practical work. It's like I have exprienced it firsthand."

L6 responded :

" Practical lessons make science more enjoyable and engaging. I look forward to the practical lessons because they are hands on and interactive."

L7 responded:

"I feel more motivated to learn when I am doing practical work. I can see the relevance of the concepts to real- life situations."

L8 said:

"Practical lessons help me stay focused and concentrated. I am more engaged in the learning process when l am doing practical work."

Question 2: What are the challenges experienced by combined science teachers in conducting practical lessons when teaching combined science?

The study found out that there are common challenges that are experienced by combined science teachers in conducting practical lessons. Quite a number of challenges were raised by participants during interviews. One of the challenges raised by teachers, heads and learners was of poor resource allocation.

H1 had this to say:

"Our public school are facing a big challenge when it comes to the issue of resource allocation. Our challenge emanates from large enrolments while levies are not paid. Many of our candidates are sponsered by BEAM. As a government program, we don't have power to push for timeously payment hence we suffer on resource mobilization. We procure little resources to cover every one."

H2 cited this:

" Most of our learners they do not pay levies in time . We have a levy that is allocated for practicals but only few learners who pay the school fees are the ones who pay again the practical fee hence the resources which are for practical lessons will be catering for everyone including those who don't pay fees . Therefore little funds will be allocated for the resources to use for practical lessons."

This was also supported by one Tr1 who said:

"Resource allocation is challenge. We receive little chemicals for our experiments and we end up reserving for our form 4 students. The form three suffer a lot. Our school is failing to purchase simple equipment and we are operating on improvisation all the time."

T2 responded*:*

-*"The biggest challenge I face in conducting practical lessons is the lack of resources and equipment. We don't have enough equipment or materials to conduct experiments. "*

T3 responded:

" I think the main challenge is the time constraint. We have to cover a lot of content in a short amount of time, and it's hard to fit in practical lessons."

The above notion was also in agreement with the results from all the combined science teachers where participants agreed that resource allocation is a big challenge for combined science teachers during practical lessons,

T4 responded that :

"We teach large classes and when it comes to practical lessons time we use little resources available. We are forced by situations to make large groups of around 5-8 learners. Large groups compromise participation of learners".

Another challenge noted was shortage of furniture in classrooms. From the findings the study showed that all the interviewed participants indicated that they are having challenges with tables and chairs during practical lessons. T3, H2 and indicated the shortage of furniture.

H2 had this to say:

"We are failing to purchase enough furniture for our students due to none payment of levies by majority of our learners. Also economic challenges such as inflation is bringing challenges with our finances. Parents pay levies in local currency while suppliers prefer the united states dollars".

T2 had this to add:

"For combined science practical lessons learners need to have proper furniture like long tables and long stools. Our school have ordinary tables and chairs. In many cases we use desk which are not user friendly for free movement . Another challenge is the safety concern . We have to make sure that the students are following the safety protocols and procedures, and that can be time-consuming."

Question 3: What are the possible solutions to challenges experienced by combined science teachers in conducting practical lessons when teaching combined science.

Several suggestions were given in line with how schools can help combined science teachers to address the challenges of conducting practical lessons. The heads indicated that they need to make follow ups on practical sessions.

H1 had to say:

"*Teachers need a follow up all the time. We need to have regular visit during combined science lessons. In some cases, it's not a matter of resources. It maybe teacher's attitude towards practical lessons*".

This was also supported by T2 who had this to say:

"In some instances as teachers we just ignore the practical lessons. There is need for our heads to make some spot checks during combined science lesson".

The other way raised by all teachers was that of organizing trainings at school, cluster and district level. Teachers supported the idea of inviting experts at school level.In support with what other teachers said on the issue of inviting experts,

T4 cited this:

"With changes in the curriculum there is need to organize trainings at school, cluster and district level. This will go long way in strengthening the art of teaching and learning of combined science concepts".

T3; had this to put:

"We had challenges with practical lessons. We learnt more during one of the workshop organized at district level. I would love to have more training and support in conducting practical lessons. It would really help me to improve my teaching."

It was also indicated that teachers need to engage into team teaching. Other participants pointed out that it improves the way of doing things. Teams help each other. T4 had this to say:

"*We learn a lot during team teaching lessons . The young teachers are coming up with better ways of doing things while the experienced teachers help young teachers with the way of solving challenges during practical lessons*".

Majority of the learners had this to say:

"our science teachers came as a group during one of our lessons last term. We enjoyed that lesson. Everyone was almost participating in that lesson. Teachers were assisting every group".

4.3 Discussion of findings

This area represents discussion of findings of the study. The research questions led the discussion to be organized under the following broad themes:

(I) The benefits experienced by combined science teachers in conducting practical lessons when teaching combined science.

(II) The challenges experienced by combined science teachers in conducting practical lessons when teaching combined science.

(III) The possible solutions to challenges experienced by combined science teachers in conducting practical lessons when teaching combined science.

4.3.1 The benefits experienced by combined science teachers in conducting practical lessons when teaching combined science.

The study found out that conducting practical lessons is an integral component of combined science education, offering numerous benefits for both students and teachers. For combined science teachers, conducting practical lessons can enhance their teaching practices, improve teacher confidence, promote professional growth, and increase job satisfaction, improve student engagement, increase student motivation, and enhance conceptual understanding

One of the primary benefits of conducting practical lessons for combined science teachers is improved teacher confidence. Research has shown that teachers who engage in practical work in science education report higher levels of confidence in teaching the subject (Abdullah, 2013). This increased confidence can be attributed to the hands-on experience teachers gain from conducting practical lessons, enabling them to better understand the subject matter and laboratory procedures. As a result, teachers become more effective in their teaching, leading to improved student outcomes.

Conducting practical lessons also enhances the pedagogical skills of combined science teachers. Taylor (2012) noted that practical work in science education enables teachers to develop their

lesson planning, classroom management, and assessment skills. By engaging in practical lessons, teachers can refine their teaching strategies, ensuring that they provide students with the most effective learning experiences. This, in turn, leads to improved student engagement, motivation, and academic achievement.

Furthermore, conducting practical lessons can increase job satisfaction among combined science teachers. Koballa (2014) found that teachers who engaged in practical work in science education reported higher levels of job satisfaction compared to those who did not. This increased job satisfaction can be attributed to the sense of fulfillment teachers derive from seeing their students engage in hands-on learning experiences and develop a deeper understanding of scientific concepts.

In addition to improved teacher confidence, enhanced pedagogical skills, and increased job satisfaction, conducting practical lessons also enables combined science teachers to develop better classroom management skills. Bennett (2013) noted that practical work in science education requires teachers to manage student behavior, promote a safe and respectful learning environment, and ensure that students follow laboratory procedures. By developing these skills, teachers can create a more productive and efficient learning environment, leading to improved student outcomes.

Finally, conducting practical lessons provides combined science teachers with opportunities for professional development. Henderson (2015) found that teachers who engaged in practical work in science education were more likely to participate in ongoing professional development, staying updated on the latest scientific discoveries and laboratory techniques. This ongoing professional development enables teachers to refine their teaching strategies, ensuring that they provide students with the most effective learning experiences.

Therefore, conducting practical lessons offers numerous benefits for combined science teachers, including improved teacher confidence, enhanced pedagogical skills, increased job satisfaction, better classroom management, opportunities for professional development, increase student motivation, improve student engagement and improve assessment and evaluation. As educators, it is essential that we prioritize practical work in science education, ensuring that teachers have the support and resources they need to provide students with high-quality learning experiences.

4.3.2 The challenges experienced by combined science teachers in conducting practical lessons when teaching combined science.

The study found out that conducting practical lessons is an essential component of combined science education, providing students with hands-on experiences that enhance their understanding of scientific concepts. However, combined science teachers often face numerous challenges when conducting practical lessons, which can hinder the effectiveness of these experiences.

One of the primary challenges faced by combined science teachers is inadequate resources. Research has shown that many schools lack the necessary equipment, materials, and facilities to conduct practical lessons in combined science (Taylor, 2012). This can limit the types of experiments and investigations that teachers can conduct, making it difficult to provide students with engaging and meaningful learning experiences. For example, a study by Abdullah (2013) found that teachers in Malaysian schools reported a lack of resources, including equipment and materials, as a major obstacle to conducting practical lessons in science.

Another challenge faced by combined science teachers is safety concerns. Conducting practical lessons can pose safety risks to students, particularly when handling hazardous materials or equipment (Bennett, 2013). Teachers must ensure that students follow proper safety protocols and

procedures, which can be time-consuming and require significant planning. Furthermore, teachers may need to provide additional support and supervision to students who require special assistance, which can add to the complexity of managing a practical lesson.

Time constraints are another challenge faced by combined science teachers when conducting practical lessons. Teachers often have to manage large class sizes and limited laboratory space, which can make it difficult to provide students with sufficient time to complete experiments and investigations (Koballa, 2014). Additionally, teachers may need to spend significant amounts of time preparing for practical lessons, including setting up equipment and materials, which can take away from other important teaching tasks.

Lack of technical support is another challenge faced by combined science teachers when conducting practical lessons. Teachers may require technical assistance to set up and operate equipment, particularly if they are not familiar with the technology (Henderson, 2015). However, technical support may not always be available, particularly in schools with limited resources. This can lead to frustration and delays, which can disrupt the flow of the lesson.

Finally, insufficient training is another challenge faced by combined science teachers when conducting practical lessons. Teachers may not receive adequate training or professional development to conduct practical lessons effectively, particularly if they are new to teaching or have limited experience in the subject area (Abdullah, 2013). This can lead to a lack of confidence and competence in conducting practical lessons, which can negatively impact student learning outcomes.

Therefore, combined science teachers face numerous challenges when conducting practical lessons, including inadequate resources, safety concerns, time constraints, lack of technical

support, and insufficient training. These challenges can hinder the effectiveness of practical lessons and limit the learning experiences of students. Therefore, it is essential that schools and education authorities provide teachers with the necessary support and resources to conduct practical lessons effectively.

4.3.3 The possible solutions to challenges experienced by combined science teachers in conducting practical lessons when teaching combined science.

4.3.4 School heads and SDC

The study found out that the school head plays an important role in alleviating challenges experienced by combined science teachers on the of conducting practical lessons. This finding was in line with what was said by Adedayo, (2015) that adequate planning by the school head, with appropriate involvement of teachers, learners, parents and the community, can raise curriculum standards and help the school meet learning achievement goals and successfully implement their important policy directives or targets. A review in Ornstein and Hunkins (2013) examines that the school principals as key guarantor of successful implementation of the school curriculum so as to improve leaners academic achievement.

4.3.5 Organizing workshops

The research found out that schools may organize workshops at school level, district level or cluster level to help teachers on how to address challenges on conducting practical lessons in combined science lessons. This finding was in line with the views raised by Henderson (2015) that programs must equip teachers with the following relevant skills teachers must be able continually to learn to address the problems of practice they encounter and to meet the unpredictable learning needs of all of their students—and they must take responsibility for contributing what they learn not only to their own practice but also that of their colleagues. This means that programs must help

teachers develop the disposition to continue to seek answers to difficult problems of teaching and learning and the skills to learn from practice (and from their colleagues) as well as to learn for practice. These expectations for teacher knowledge mean that programs need not only to provide teachers access to more knowledge, considered more deeply, but also to help teachers learn how to continually access knowledge and inquire into their work. The skills of classroom inquiry include careful observation and reasoned analysis, as well as dispositions toward an open and searching mind and a sense of responsibility and commitment to children's learning.

4.4 Observation Data

The data was collected from two combined science lessons that were observed in two different secondary schools. The observations were recorded using an observation guide.

Observation Guide: Combined Science Practical Lessons at Form Three Level

Observer Information

- Observer's name: Kwangwa Mildred

- Teacher's Name: T1

- School: X secondary school

- Grade level: form 3

- Date of Observation: 04 December, 2024

Pre-Observation Notes

The teacher was from X schoolwith three years experience in teaching combined science and is a diploma in education holder . Specialized in Biology.

Practical lesson was conducted in a classroom since there was not laboratory.

The objectives of the lesson were clearly stated, measurable and achievable.

Lesson Information:

- Topic: Photosynthesis Experiment

- Duration: 60 minutes

- Number of Students: 25

Observation Categories:

1. Lesson Planning and Preparation

I). Was the lesson plan clear and concise?

- The teacher had a clear and concise lesson plan.

II). Were the learning objectives clearly stated?

- Objectives of the lesson were clearly stated.

III). Were the necessary materials and equipment available?

- some of the necessary materials and equipment were available.

2. Teacher's Instructional Strategies

I). Did the teacher use a variety of instructional strategies (e.g. demonstrations, discussions, hands-on activities)?

- The teacher used a variety of instructional strategies, including demonstrations, discussions and hands-on activities.

II). Were the instructions clear and concise?

- Instructions given were clear and concise.

III). Did the teacher provide opportunities for student questioning and feedback?

- The teacher provided the opportunities for questioning and feedback from students.

3. Student Engagement and Participation

I). Were the students actively engaged in the practical activity?

- The students were actively engaged in the experiment.

II). Did the students work collaboratively in groups?

- The students worked collaboratively in groups.

III). Were the students able to ask questions and seek help when needed?

- Some of the students were able to ask questions and eek help when needed.

4. Safety and Laboratory Management

I). Were the students aware of the safety protocols and procedures?

- The teacher ensured that the students followed the safety protocols and procedures.

II). Was there laboratory well-organized and managed?

Though the was no laboratory, the classroom was well organized and managed

III). Were the necessary safety equipment and materials available?

- safety equipment were not available but some materials needed were available.

5. Assessment and Feedback

I). Did the teacher assess student understanding during the practical activity?

- The teacher assessed student understanding during the experiment.

II). Was feedback provided to students during the lesson?

- The teacher provided feedback to the students.

III). Were the assessment criteria clear and transparent?

- The assessment were clear and transparent.

Overall Comments:

The teacher demonstrated Good lesson planning and preparation skills with improvised materials and equipment, with clear and concise instructions. The students were actively engaged in the practical activity and worked collaboratively in groups. The teacher provided opportunities for student questioning and feedback, and assessed student understanding during the practical activity, though the safety and laboratory needs to be improved.

Rating Scale:

1. Lesson Planning and Preparation: 3(Good)

2. Teacher's Instructional Strategies: 4 (Very Good)

3. Student Engagement and Participation: 3 (Good)

4. Safety and Laboratory Management: 1(Poor)

5. Assessment and Feedback: 4 (Very Good)

Key: The rating scale is based on a scale of 1-5, where 1 is Poor and 5 is Excellent.

Observation Guide: Combined Science Practical Lessons at Form Three Level

Observer Information

- Observer's name: Kwangwa Mildred

- Teacher's Name: T3

- School: Y secondary school

Grade level: form 3

- Date of Observation: 04 December, 2024

Pre-Observation Notes

The teacher was from school Y with four years experience in teaching combined science and is a diploma in education holder . Specialized in Chemistry.

Practical lesson was conducted in a classroom since there was no laboratory.

The objectives of the lesson were clearly stated, measurable and achievable.

Lesson Information:

- Topic: Cellular Respiration Experiment

- Duration: 60 minutes

- Number of Students: 15

Observation Categories:

1. Lesson Planning and Preparation

I). Was the lesson plan clear and concise?

- The teacher had a well-organised lesson plan.

II). Were the learning objectives clearly stated?

- Objectives of the lesson were clearly stated.

III). Were the necessary materials and equipment available?

- Some of the necessary materials and equipment were not readily available.

2. Teacher's Instructional Strategies

I). Did the teacher use a variety of instructional strategies (e.g. demonstrations, discussions, hands-on activities)?

- The teacher used a combination of lectures and hands on activities but some students seemed disengaged during the lesson.

II). Were the instructions clear and concise?

- Instructions given were clear and concise.

III). Did the teacher provide opportunities for student questioning and feedback?

- The teacher provided the opportunities for questioning and feedback from students.

3. Student Engagement and Participation

I). Were the students actively engaged in the practical activity?

- The students were generally engaged during hands-on activity, but some struggled with the equipment and materials.

II). Did the students work collaboratively in groups?

- The students worked collaboratively in groups.

III). Were the students able to ask questions and seek help when needed?

- Some of the students were able to ask questions and eek help when needed.

4. Safety and Laboratory Management

I). Were the students aware of the safety protocols and procedures?

- The teacher ensured that the students followed the safety protocols and procedures.

II). Was the laboratory well-organized and managed?

Though the was no laboratory, the classroom was well organized and managed

III). Were the necessary safety equipment and materials available?

- safety equipment were not available but some materials needed were available but not labelled properly..

5. Assessment and Feedback

I). Did the teacher assess student understanding during the practical activity?

- The teacher assessed student understanding during the experiment.

II). Was feedback provided to students during the lesson?

- The teacher did not provide explicit feedback to the students.

III). Were the assessment criteria clear and transparent?

- The assessment were clear and transparent.

Overall comments:

The teacher demonstrated good lesson planning and preparation skills though some materials and equipment were not available, with clear and concise instructions. The students were actively engaged in the practical activity and worked collaboratively in groups. The teacher needs improvement on giving opportunities for student questioning and feedback, and assessed student understanding during the practical activity, together with the safety and laboratory needs to be improved.

Rating Scale:

1. Lesson Planning and Preparation: 3(Good)

2. Teacher's Instructional Strategies: 4 (Very Good)

3. Student Engagement and Participation: 3 (Good)

4. Safety and Laboratory Management: 1(Poor)

5. Assessment and Feedback: 2 (Satisfactory)

Key: The rating scale is based on a scale of 1-5, where 1 is Poor and 5 is Excellent.

4.5 Summary of Observation Data

The Observation Data suggests that the teachers were generally well prepared and used a variety of instructional strategies to engage students. However, some areas for improvement were noted including the need for more explicit feedback to students and better organization of materials and equipment. Safety should be ake into consideration as well.

4.6 Summary

The chapter presented, interpreted, analyzed and discussed data addressing the research questions of the study. The results from qualitative data were presented thematically as emanating from research question of the study. Adhering to first research question, the study found out that practical lessons promote professional growth, increase teacher confidence, improve student engagement, enhance conceptual understanding, improve assessment and evaluation and increase student motivation. In corresponding to the second research question of the study found out that the challenges experienced by combined science teachers were including non-availability of resources such as laboratories, materials and equipment, time constraints, equipment, large enrolments shortage of furniture and few chemicals. Adhering to research question number three of the study, the study found out that there are various solutions to challenges experienced by combined science teachers with major being no resources for lesson preparation, no apparatuses

for use. In corresponding with research question three the study found out that school heads play a pivotal role in helping combined science to teachers to address the challenges of using practical lessons. The next chapter provides the summary, conclusions and recommendations.

CHAPTER 5

5.0 Summary, conclusion and recommendations.

5.1. Introduction.

The purpose is to provide the summary, conclusion and recommendations of the chapter. The study sought to assess combined science teachers' experience in conducting practical lessons at form three level. It was answering the following research questions firstly, what are the benefits experienced by combined science teachers in conducting practical lessons when teaching combined science. Secondly what are the challenges experienced by combined science teachers in conducting practical lessons at form three level when teaching combined science. Thirdly what are the possible solutions to challenges experienced by combined science teachers in conducting practical lessons when teaching combined science. The findings were as follows shortage of resources, such as laboratories, equipment lab rooms and lab technicians, as well as large enrollment.

5.2. Summary of findings

The summary of the findings of research question one which sought to found out what benefits experienced by combined science teachers in conducting practical lessons when teaching combined science, the study found out that conduct practical lessons fosters effective teaching, student engagement, and professional growth and also increase confidence.

The summary of the findings of research question number two which sought to find out what are the challenges experienced by combined science teachers in conducting practical lessons when teaching combined science, The study found out that environmental factors affecting teachers were

non availability of specialized equipment, absents of laboratories, few apparatuses, poor ventilation on classrooms and non-provision of safety equipment.

The summary of the findings of research question number three which sought to find out what possible solutions to challenges experienced by combined science teachers in conducting practical lessons when teaching combined science, The research found out that heads of school may help by providing the required equipment for combined science equipment. They also help by making sure authorities build laboratories for science lessons. They also help by supervising teachers during combined science lessons. They also have a responsibility of organizing workshops at school, cluster and district level.

5.3 Conclusions

Conclusions were general notions which the researcher drew from the research findings in chapter four. The conclusions were relatively to the research question identified in chapter one.

The study concludes that the are several benefits experienced by combined science teachers in conducting practical lessons when teaching combined science which included improvement of student engagement, enhancing conceptual understanding, improve assessment and evaluation of students and increase student motivation. Challenges experienced by combined science teachers in conducting practical lessons included non-availability of equipment, large classes, shortage of furniture, poor resource allocation, few chemicals, old damaged equipment, and absents of lab technicians.

On what are the possible solutions to challenges experienced by combined science teachers in conducting practical lessons when teaching combined science, the study concludes that school heads should help in resource allocation. They can make follow ups on practical lessons. Heads

are encouraged to organize trainings at school level, cluster level or district level. School may also support teachers to go for in-service programs. School may seek donations from old students or well-wishers such as non-governmental organizations.

5.4. Recommendations

In light of the findings and the conclusions that were observed the subsequent recommendations were identified by the researcher as means of addressing the challenges encountered by combined science teachers in conducting practical lessons when teaching and learning.

- The researcher recommends that assessment of practical lessons should be given immediate attention and intensify monitoring it .
- The researcher recommends the open door policy to the public and private partnership towards resource mobilization. Partners may provide material such as chemicals, equipment, furniture, mechanize water, electricity and even build laboratories.
- The researcher recommends a series of workshop starting from school level up to district level. This will go a long way to improve teachers' proficiency.
- The researcher recommends team teaching.
- The researcher general meetings with parents or guardians towards resource mobilization since they are the ones to fund the education of their children.
- The researcher recommends fair allocation of resources by the heads and SDC.
- The Ministry of Primary and Secondary Education should provide more laboratory equipments to schools to strengthen more the learning of learners and provide more funds for construction of proper laboratories to secondary schools.

- Policy makers and authorities should consider whether teachers and schools are adequately equipped to cope with challenges of teaching combined science in secondary schools. Articulate a clear policy on inclusion and provide adequate financial support to all the schools to support learners and teachers.

5.5 Summary

The chapter focused on the summary of findings which were guided by research questions of the study. It also highlighted the recommendation corresponding to the challenges encountered by combined science teachers in conducting practical lessons.

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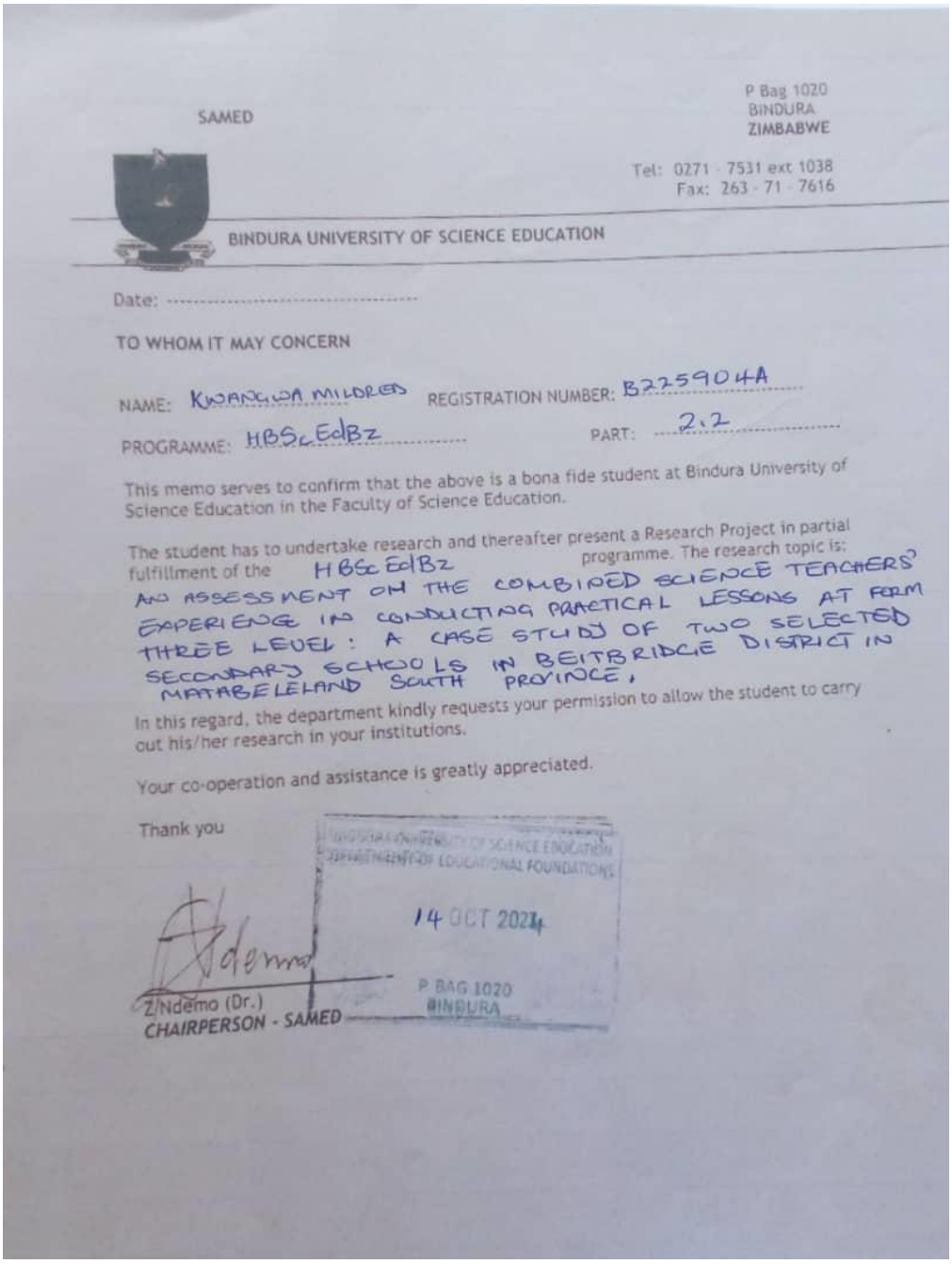
APPENDIX : A Consent Letter



SAMED

P Bag 1020
BINDURA
ZIMBABWE

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

BINDURA UNIVERSITY OF SCIENCE EDUCATION

Date: .....

TO WHOM IT MAY CONCERN

NAME: KWANGWA MILDRED REGISTRATION NUMBER: B2259044

PROGRAMME: HBSc Ed/Bz PART: 2.2

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 HBSc Ed/Bz programme. The research topic is:
AN ASSESSMENT ON THE COMBINED SCIENCE TEACHERS' EXPERIENCE IN CONDUCTING PRACTICAL LESSONS AT FORM THREE LEVEL : A CASE STUDY OF TWO SELECTED SECONDARY SCHOOLS IN BEITBRIDGE DISTRICT IN MATABELELAND SOUTH PROVINCE.

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
DEPARTMENT OF EDUCATIONAL FOUNDATIONS
14 OCT 2021
P BAG 1020
BINDURA

Z.Ndemo (Dr.)
CHAIRPERSON - SAMED

Shashi Primary School

P. O Box 221

Beitbridge

30 October 2024

The Provincial Education Director

Ministry of Primary and Secondary Education

P. O. Box 5824

Gwanda

Zimbabwe

Dear Sir or Madam

RE: REQUEST FOR A PERMISSION TO CARRY OUT A RESEARCH IN BEITBRIDGE DISTRICT SECONDARY SCHOOLS.

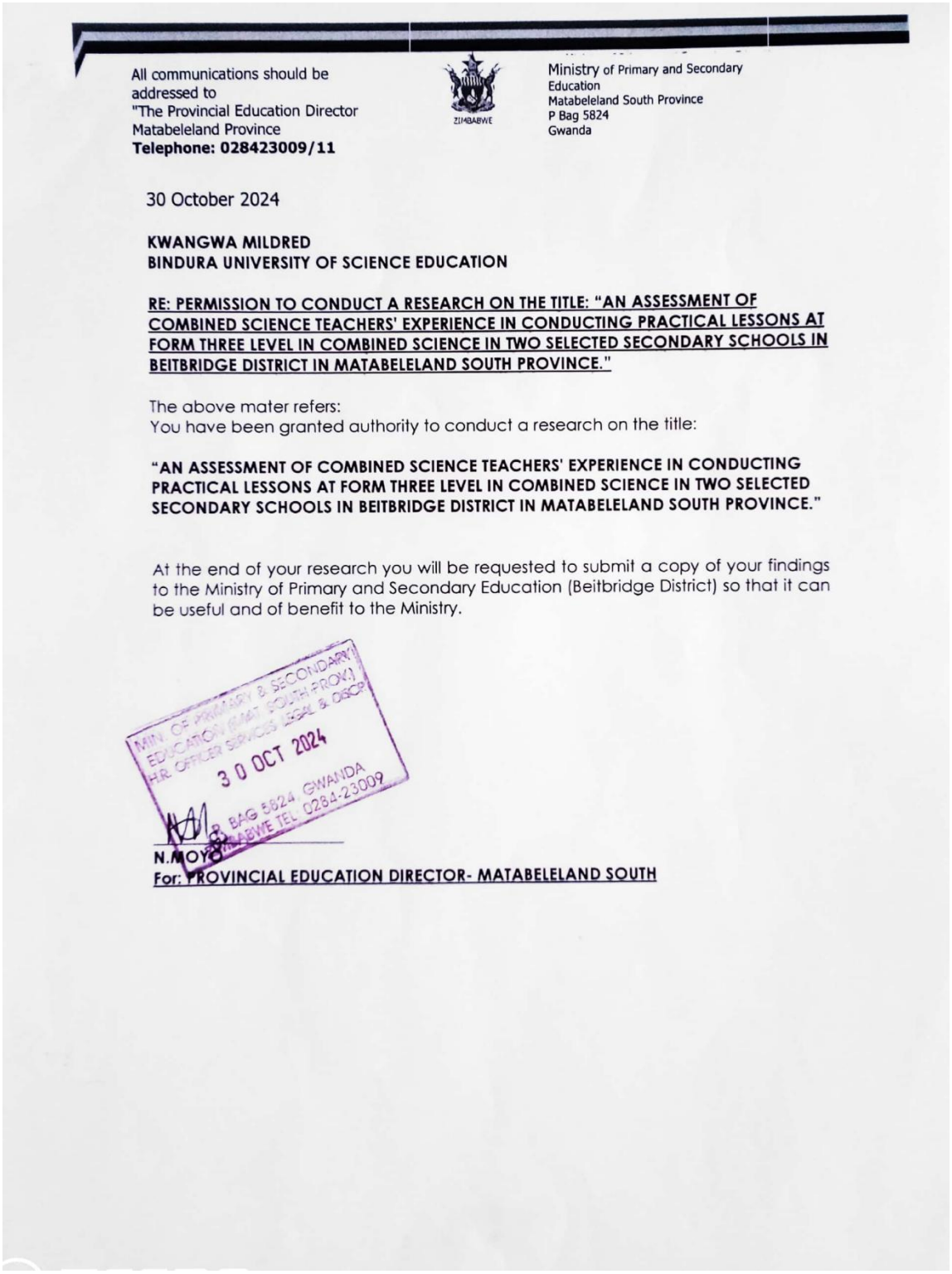
The above reference matters. My name is Kwangwa Mildred EC No 0990773B a final year student studying with BUSE specializing with Bachelor's of Science Education Honor's Degree in Biology. I hereby request for a permission to carry out a research in Beitbridge District secondary schools. I am currently busy with my research titled: An assessment of Combined Science teachers' experience in conducting practical lessons at form three level in Combined Science in two selected secondary schools in Beitbridge District in Matabeleland South Province in Zimbabwe.

Your usual corporation will be greatly appreciated.

Yours Faithfully

Kwangwa Mildred (B225904A)

Appendix: B Consent Letter



All communications should be addressed to
"The Provincial Education Director
Matabeleland Province
Telephone: 028423009/11

ZIMBABWE

Ministry of Primary and Secondary Education
Matabeleland South Province
P Bag 5824
Gwanda

30 October 2024

KWANGWA MILDRED
BINDURA UNIVERSITY OF SCIENCE EDUCATION

RE: PERMISSION TO CONDUCT A RESEARCH ON THE TITLE: "AN ASSESSMENT OF COMBINED SCIENCE TEACHERS' EXPERIENCE IN CONDUCTING PRACTICAL LESSONS AT FORM THREE LEVEL IN COMBINED SCIENCE IN TWO SELECTED SECONDARY SCHOOLS IN BEITBRIDGE DISTRICT IN MATABELELAND SOUTH PROVINCE."

The above mater refers:
You have been granted authority to conduct a research on the title:

"AN ASSESSMENT OF COMBINED SCIENCE TEACHERS' EXPERIENCE IN CONDUCTING PRACTICAL LESSONS AT FORM THREE LEVEL IN COMBINED SCIENCE IN TWO SELECTED SECONDARY SCHOOLS IN BEITBRIDGE DISTRICT IN MATABELELAND SOUTH PROVINCE."

At the end of your research you will be requested to submit a copy of your findings to the Ministry of Primary and Secondary Education (Beitbridge District) so that it can be useful and of benefit to the Ministry.

MIN. OF PRIMARY & SECONDARY EDUCATION (MAT SOUTH PROV.) HR. OFFICER SERVICES, LEGAL & DISCIP
30 OCT 2024
P. BAG 5824, GWANDA ZIMBABWE TEL: 0284-23009

N.MOYO
For: PROVINCIAL EDUCATION DIRECTOR- MATABELELAND SOUTH

BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE EDUCATION

Appendix I INTERVIEW QUESTIONS FOR TEACHERS

INTERVIEW QUESTIONS FOR TEACHERS EXPERIENCES ENCOUNTERD BY COMBINED SCIENCE TEACHERS IN CONDUCTING PRACTICAL LESSONS AT FORM THREE LEVELS IN TWO SELECTED SECONDARY SCHOOLS BEITBRIDGE DISTRICT IN MATABELELAND SOUTH PROVINCE IN ZIMBABWE

My name is Kwangwa Mildred. I am currently studying for a Bachelor of Science Honors Degree in Biology with Bindura University of Science Education, Department of Science Education. As part of my degree program I am currently carrying out a research on assessing combined science teachers' experiences in conducting practical lessons at form three level, in two selected secondary schools, in Beitbridge district in Matabeleland South Province in Zimbabwe. This information will only be used for purpose of this study.

Your participation in the study is voluntary and the information you give will be treated as confidential.

INTERVIEW GUIDE FOR TEACHERS (Number……)

SECTION A: THE IMPACT OF TEACHER'S EXPERIENCE ON STUDENTS WHEN TEACHING PRACTICAL LESSONS IN COMBINED SCIENCE .

1.What is your experience in teaching combined science at form three level?

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

2.How often do you conduct practical lessons in your in your combined science classes?

.....,.....,.....

.....

3. What type of practical lessons do you typically conduct in your combined science classes ?

……
……

4.How do you assess the impact of of practical lessons on your students understanding of combined science concepts?

.....
.....

5. What challenges do you face when conducting practical lessons in your combined science classes?

……
……

6. How do you think your experience in conducting practical lessons impact your teaching of combined science?

.....

.....

7. What support or resources do you think would help you improve your teaching of practical lessons in combined science?

B). BENEFITS EXPERIENCED BY COMBINED SCIENCE TEACHERS IN CONDUCTING PRACTICAL LESSONS WHEN TEACHING COMBINED SCIENCE.

1. How often do you conduct practical lessons in your combined science classes?

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2. What types of practical lessons do you typically conduct in your combined science classes?

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3. What benefits do you think students derive from participating in practical lessons in combined science?

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4. How do you assess the impact of practical lessons on students' understanding of combined science concepts?

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5. What challenges do you face when conducting practical lessons in combined science?

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6. How do you think your experience and training in conducting practical lessons impact your teaching of combined science?

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7. What support or resources do you think would help you improve your teaching of practical lessons in combined science?

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C) POSSIBLE SOLUTIONS TO CHALLENGES EXPERIENCED BY COMBINED SCIENCE TEACHERS IN CONDUCTING PRACTICAL LESSONS WHEN TEACHING COMBINED SCIENCE.

1. What do you think are the most effective solutions to the challenges you face when conducting practical lessons in combined science?

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2. How do you think the school administration can support you in overcoming the challenges you face in conducting practical lessons?

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3. What resources or equipment do you think would be most helpful in facilitating practical lessons in combined science?

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4. How do you think professional development opportunities can help you improve your skills in conducting practical lessons?

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5. What role do you think technology can play in enhancing practical lessons in combined science?

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6. How do you think collaboration with other teachers or experts can help you overcome challenges in conducting practical lessons?

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7. What do you think are the most important factors to consider when designing practical lessons in combined science?

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THANK YOU

Appendix II INTERVIEW GUIDE FOR LEARNERS

Bindura University of Science Education

Faculty of Science Education

INTERVIEW GUIDE FOR LEARNERS ON EXPERIENCES ENCOUNTERRED BY COMBINED SCIENCE TEACHERS IN CONDUCTING PRACTICAL LESSONS IN COMBINED SCIENCE AT FORM THREE LEVEL IN TWO SELECTED SECONDARY SCHOOLS IN BEITBRIDGE DISTRICT IN MATABELELAND SOUTH PROVINCE IN ZIMBABWE.

My name is Kwangwa Mildred . I am currently studying for a Bachelor of Science Degree in Biology with Bindura University of Science Education, Department of Science Education. As part of my degree program I am currently carrying out a research on assessing combined science teachers' experiences in conducting practical lessons at form three level in combined science at two selected secondary schools in Beitbridge District in Matabeleland South Province in Zimbabwe . This information will only be used for purposes of this study. Do not write your name, and be assured that the data to be collected will be used only in this. You are not compelled to do this exercise and it will be kept confidential and privacy.

INTERVIEW QUESTIONS

SECTION A: THE IMPACT OF TEACHER'S EXPERIENCE ON STUDENTS WHEN TEACHING PRACTICAL LESSONS IN COMBINED SCIENCE

1. How often do you participate in practical lessons in your combined science classes?

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2. What do you think is the most helpful aspect of practical lessons in combined science?

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3. How do you think practical lessons help you understand combined science concepts?

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4. What challenges do you face when participating in practical lessons in combined science?

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5. How do you think your teacher's experience in conducting practical lessons impacts your learning of combined science?

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6. What do you think would make practical lessons in combined science more effective or engaging?

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B) BENEFITS EXPERIENCED BY COMBINED SCIENCE TEACHERS IN CONDUCTING PRACTICAL LESSONS WHEN TEACHING COMBINED SCIENCE.

1. How often do you participate in practical lessons in your combined science classes?

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2. What do you think is the most helpful aspect of practical lessons in combined science?

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3. How do you think practical lessons help you understand combined science concepts?

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4. Have you noticed any improvement in your understanding of combined science concepts after participating in practical lessons?

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5. Do you think practical lessons make learning combined science more enjoyable?

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6. Have you experienced any challenges or difficulties during practical lessons in combined science?

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7. How do you think your teacher's approach to practical lessons affects your learning experience .

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C) POSSIBLE SOLUTIONS TO CHALLENGES EXPERIENCED BY COMBINED SCIENCE TEACHERS IN CONDUCTING PRACTICAL LESSONS WHEN TEACHING COMBINED SCIENCE.

1. What do you think would make practical lessons in combined science more engaging and effective?

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2. How do you think your teachers can improve the way they conduct practical lessons?

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3. What resources or equipment do you think would be most helpful in facilitating practical lessons in combined science?

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4. How do you think technology can be used to enhance practical lessons in combined science?

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5. What do you think are the most important factors to consider when designing practical lessons in combined science?

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Thank You

Appendix III INTERVIEWS FOR HEADMASTERS

BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE EDUCATION

INTERVIEWS FOR HEADMASTERS ON EXPERIENCES ENCOUNTERED BY COMBINED SCIENCE TEACHERS IN CONDUCTING PRACTICAL LESSONS AT FORM THREE LEVEL AT TWO SELECTED SECONDARY SCHOOLS IN BEITBRIDGE DISTRICT IN MATABELELAND SOUTH PROVINCE IN ZIMBABWE.

My name is Kwangwa Mildred. I am currently studying for a Bachelor of Science Honors Degree in Biology with Bindura University of Science Education, Department of Science Education. As part of my degree program I am currently carrying out a research on assessing combined science teachers' experiences in conducting practical lessons at form three level in two selected secondary schools in Beitbridge district in Matabeleland South Province in Zimbabwe. This information will only be used for purpose of this study.

Your participation in the study is voluntary and the information you give will be treated as confidential.

INTERVIEW GUIDE FOR HEADMASTERS. Number……

INTERVIEW QUESTIONS

Section A: The impact of combined science teachers' experiences in conducting practical lessons in combined Science.

1. What is the school's policy on conducting practical lessons in combined science at the Form Three level?

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2. How does the school support combined science teachers in conducting practical lessons?

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3. What resources or equipment are available to combined science teachers to facilitate practical lessons?

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4. How does the school evaluate the effectiveness of practical lessons in combined science?

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5. What professional development opportunities are provided for combined science teachers to improve their skills in conducting practical lessons?

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6. How does the school ensure that combined science teachers have the necessary experience and training to conduct practical lessons effectively?

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7. What role does the school administration play in promoting the use of practical lessons in combined science?

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C)BENEFITS EXPERIENCED BY COMBINED SCIENCE TEACHERS IN CONDUCTING PRACTICAL LESSONS WHEN TEACHING COMBINED SCIENCE.

1. What is the school's policy on conducting practical lessons in combined science?

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2. How does the school support teachers in conducting practical lessons in combined science?

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3. What resources are available to teachers to conduct practical lessons in combined science?

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4. How does the school assess the impact of practical lessons on students' understanding of combined science concepts?

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5. What challenges do you think teachers face when conducting practical lessons in combined science?

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6. How does the school prioritize practical lessons in combined science in the curriculum?

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D) POSSIBLE SOLUTIONS TO CHALLENGES EXPERIENCED BY COMBINED SCIENCE TEACHERS IN CONDUCTING PRACTICAL LESSONS WHEN TEACHING COMBINED SCIENCE.

1. What support or resources does the school provide to help teachers overcome challenges in conducting practical lessons?

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2. How does the school prioritize practical lessons in combined science in the curriculum?

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.....

3. What budget allocations are made for resources and equipment to facilitate practical lessons in combined science?

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4. How does the school evaluate the effectiveness of practical lessons in combined science?

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5. What professional development opportunities are provided for teachers to improve their skills in conducting practical lessons?

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Appendix IV OBSERVATION GUIDE

BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE EDUCATION

APPENDIX 3: OBSERVATION GUIDE

My name is Kwangwa Mildred. I am currently studying for a Bachelor of Science Honors Degree in Biology with Bindura University of Science Education, Department of Science Education. As part of my degree program I am currently carrying out a research on assessing combined science teachers' experiences in conducting practical lessons at form three level in two selected secondary schools, in Beitbridge district in Matabeleland South Province in Zimbabwe. This information will only be used for research purposes. Do not write your name, and be assured that the data to be collected will be used only in this.

SECTION A: Observation Guide

Observation Guide: Combined Science Practical Lessons at Form Three Level

Observer Information

- Observer's name:

- Teacher's Name:

- School:

- Grade level:

- Date of Observation:

Pre-Observation Notes

Lesson Information:

- Topic:

- Duration:

- Number of Students:

Observation Categories:

1. Lesson Planning and Preparation

I). Was the lesson plan clear and concise?

II). Were the learning objectives clearly stated?

III). Were the necessary materials and equipment available?

2. Teacher's Instructional Strategies

I). Did the teacher use a variety of instructional strategies (e.g. demonstrations, discussions, hands-on activities)?

II). Were the instructions clear and concise?

III). Did the teacher provide opportunities for student questioning and feedback?

3. Student Engagement and Participation

I). Were the students actively engaged in the practical activity?

II). Did the students work collaboratively in groups?

III). Were the students able to ask questions and seek help when needed?

4. Safety and Laboratory Management

I). Were the students aware of the safety protocols and procedures?

II). Was the laboratory well-organized and managed?

III). Were the necessary safety equipment and materials available?

5. Assessment and Feedback

I). Did the teacher assess student understanding during the practical activity?

II). Was feedback provided to students during the lesson?

III). Were the assessment criteria clear and transparent?

Overall Comments:

Rating Scale:

1. Lesson Planning and Preparation:

2. Teacher's Instructional Strategies:

3. Student Engagement and Participation:

4. Safety and Laboratory Management:

5. Assessment and Feedback:

Key: The rating scale is based on a scale of 1-5, where 1 is Poor and 5 is Excellent.

Thank you for your time and participation.