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CHALLENGES ENCOUNTERED BY COMBINED SCIENCE TEACHERS AT FORM THREE LEVEL ON USE OF PRACTICAL SESSIONS IN TEACHING AND LEARNING, IN TWO SCHOOLS, IN NEMBUDZIA ZONE

By

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Release form

CHALLENGES ENCOUNTERED BY COMBINED SCIENCE TEACHERS ON UTILISATION OF PRACTICAL SESSIONS AT FORM THREE LEVEL, IN TWO SCHOOLS IN NEMBUDZIA ZONE.

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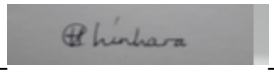

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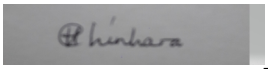

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APPROVAL FORM

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DECLARATION

I declare that this dissertation has been a result of my original efforts and investigations and such work has not been presented elsewhere for the purpose of degree assessment. Additional sources of information have been acknowledged by means of references.

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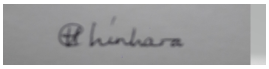
……	
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DEDICATION

This research is dedicated to my husband and fellow friends for their support. My mother for their guidance, encouragement, care and support especially in the hard times when I was trying to produce this document

ABSTRACT

The researcher conducted a study to investigate the challenges encountered by combined science teachers on practical sessions in teaching and learning. The study was contacted in two schools, in Nembudzia zone Gokwe North district. This study utilized a qualitative descriptive case study to explain challenges encountered by combined science teachers during practical sessions in teaching and learning. The researcher used interviews, focus groups and observations as data collection instruments. This researcher interviewed five teachers, forty learners and two headmasters from school X and Y. Focus group discussions were done with 8 groups and observations were made during combined science lessons delivery. Data collected from interviews, observations and focus groups were analyzed using themes that originated from the data gathered. The findings revealed that the schools are experiencing different challenges, they are lacking laboratory materials, and equipment are old and damaged, lacking administrative support and many more. The study recommended that school science laboratories should be sufficiently equipped with laboratory equipment to help accommodate all learners. Furthermore, assessment of practical sessions should be given immediate attention and intensify monitoring by school heads, schools should frequently organise continuous professional development meetings for their teachers so that they share ideas for new developments in research. The Ministry of Primary and Secondary Education should provide more laboratory equipments to schools to strengthen the learning and to provide more funds for construction of proper laboratories to secondary schools.

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CHAPTER ONE

1.1 INTRODUCTION

Education is a powerful weapon that has the ability to change the world (Davidson, 2016). As an integral part of the education system, teachers play a vital role in the change process, in shaping the future generation and providing them with the required knowledge and skills to face challenges. The teaching of science is incomplete without practical sessions. Welford, (2015) postulated that, practical sessions are an integral complex of learning to apply theoretical knowledge in real world settings. These sessions are designed to provide hands --on experiences that complement classroom instruction and theoretical learning. Ramnarain, (2011) added that, practical sessions in education can take place in various forms, including laboratory experiments, research activities, field exercise and other experiential learning opportunities. method (Welford, 2015).

Learning combined science has benefits for the country's sustained development and is worthy part of the nation's school curriculum of one country. Combined science plays an increasingly crucial role in the lives of all Zimbabweans due to its influence on the scientific and technological development which underpins our country's economic growth and social well-being of our community. The Zimbabwean legacy has resulted in limited access to scientific knowledge and devaluing of indigenous scientific knowledge in certain sectors of the community due to the poor quality or lack of education (Miller,2014). The application of combined Science knowledge has a profound impact on world-wide issues and events such as economic, environmental, social, political, ethical and technological(Welford,2015).

Gudyanga and Jita, (2019) said that, practical sessions in secondary schools of Zimbabwe are also studied to investigate challenges encountered by combined science teachers on using practical sessions in teaching and learning. Researchers conducted in Zimbabwe indicate that secondary learners do not receive the practical experiences specified in the official science curriculum (Gudyanga and Jita, 2019). About 65,8 %of laboratory activities were not done in science education at secondary schools in Zimbabwe (Feyera, 2014). In the same way, about 55.3% learners had not been engage with practical activities while learning combined science.

Therefore, the objective of this review is to investigate challenges encountered by combined science teachers on use of practical sessions in teaching and learning. The researcher is extremely interested to investigate these challenges and find the solutions on overcoming these challenges. Additionally, its practice in wider way from different findings will be collected, organized and presented from different research findings in worldwide.

1.2 BACKGROUND TO THE STUDY

The government of Zimbabwe through the Ministry of Primary and Secondary Education aims to promote and facilitate high quality, Primary and Secondary Education. The curriculum being implemented in Zimbabwe schools is competence-based. One of the features of combined science that sets it apart from other school subjects is that it involves practical sessions which are predominantly aimed at developing learners' substantive scientific knowledge. According to Abell (2014), Science is the intellectual and practical activity encompassing the systematic study of the structure and behavior of the physical and natural way through observations and experiment.

Abell, (2014), states that the importance of combined science being taught in schools is indisputable not only because it is a fundamental building block for higher education but is essential to equip learners with the knowledge and skills they need to navigate our increasingly complex world. High quality education hinges upon the use of diverse teaching methods including experimentation, discovery, discussions, demonstrations, group work, e-learning, educational tours, and simulations. Form three learners in selected schools are doing combined science as a learning area. Mastery of combined science matter by learners is poor as indicated by the scores they get in tests and exercises as well as grades from continuous and summative assessments. Pass rate in combined science is poor in selected schools at Ordinary level. The differences in academic achievement by learners is attributed to different teaching methods by teachers in the schools and challenges they encountered during implementation of combined science subjects. The schools are not using experiments well in teaching and learning of combined science, as they view experiments as being time-consuming and resource intense. More focus is on rote learning and memorization for learners to do well in final examinations written at Form Four.

Combined science is an important subject that can help learners to develop critical thinking skills and problem-solving abilities. Practical methods, such as hands-on activities and inquiry-based

learning, have been shown to be effective in promoting learners learning in combined science (Gudyanga and Jita, 2019). However, combined science teachers often face challenges when implementing practical sessions in the classroom. This study aims to explore the challenges encountered by combined science teachers on use of practical sessions, with the goal of identifying ways to support and improve the use of these methods in the classroom. The findings of this study can inform the development of professional development opportunities for combined science teachers, as well as the design of science curricula and resources. Ultimately, this study seeks to contribute to a better understanding of how to effectively promote learners learning in combined science through the use of practical sessions.

Ford, (2015) postulated that, it is important to recognize that science education is a vital component of a well-rounded education. In addition, science literacy is increasingly important in today's society, as scientific knowledge and understanding are essential for making informed decisions about important issues such as health, the environment, and technology. Despite the importance of science education, many learners continue to struggle with learning combined science. Davis and Pettish, (2017) added that, one factor that has been identified as contributing to this struggle is the use of traditional, teacher-centered methods of instruction, such as lectures and rote memorization. These methods can often be unengaging for learners and do not provide opportunities for learners to develop scientific inquiry skills. In contrast, practical methods of instruction, such as inquiry-based learning, have been shown to be more effective in promoting student learning in science. Inquiry-based learning involves students in active exploration and investigation of scientific concepts, with the teacher serving as a guide and facilitator. This type of instruction has been shown to increase learner's engagement, interest, and motivation, and can lead to improved academic performance.

However, despite these benefits, combined science teachers at selected schools cited that they are facing challenges when incorporating practical sessions into their classroom instruction for combined science. This study aims to explore the challenges encountered by combined science teachers on use of practical sessions with the goal of identifying ways to support and improve the use of these methods in the classroom. The findings of this study can inform the development of professional development opportunities for combined science teachers, as well as the design of

science curricula and resources. Ultimately, this study seeks to contribute to a better understanding of how to effectively promote student learning in combined science through the use of practical sessions (Miller,2014).

These challenges may include, limited resources, these schools have inadequate laboratory facilities, equipment, and materials needed for conducting experiments effectively. Ford, (2015) additionally said that, this limitation can hinder teachers' ability to provide hands-on experiences to learners and limit their understanding of complex scientific concepts and time constraints is another challenge, the curriculum demands in combined science often leave limited time for conducting practical activities. Teachers have to cover a wide range of topics within a limited timeframe, leaving them with less time to plan, prepare, and execute practical lessons successfully. This causes confusion among the learners since they were not able to understand some of the topics covered.

More so, some teachers are adequately trained or have access to professional development opportunities focused on the effective implementation of practical methods. The lack of training can hinder their confidence, competence, and ability to utilize practical approaches effectively ,many combined science teachers at the selected schools said that ,they are not doing workshops that will enhance their teaching and this leads to low pass rates at ordinary level .Teachers and students motivation, while practical sessions have the potential to enhance learners engagement and motivation, some learners may not find science experiments or laboratory work interesting or relevant to their daily lives. Teachers may need to employ creative instructional strategies and personalized approaches to foster learners' interest and active participation during practical sessions and these teachers need to be motivated so that they will implement these practicals successfully (Gudyanga and Jita ,2019)

Another challenge is class size. Combined Science classes of most rural schools tend to be large, making it difficult for teachers to provide individualized attention and supervision during practical activities. Ramnarain and Hlatswayo, (2018) cited that, large class sizes can increase the risk of accidents, limit students' access to materials, and reduce the opportunity for hands-on learning experiences and assessment and evaluating learning outcomes from practical activities can be challenging. Traditional assessments, such as written tests, may not accurately measure learners' understanding and application of scientific concepts acquired through practical sessions.

Understanding the challenges faced by combined science teachers on use of practical sessions when teaching and learning is crucial for addressing these issues effectively. By identifying and addressing these challenges, educators, policymakers, and institutions can develop strategies, provide resources, and offer training opportunities to support combined science teachers in delivering high-quality, practical-based instruction. Such efforts will help enhance students' learning experiences, promote scientific literacy, and foster a generation of innovative thinkers and problem solvers.

In more recent studies, researchers note that, by not involving learners into practical sessions this can contribute to high failure rate. (Miller,2014). In the same way, Ford (2015) emphasized the contribution of poor performance in Combined Science to job opportunities in Science related fields. Currently in Zimbabwean schools, given the high unemployment, there is a big probability that learners and teachers lack motivation. Thus, this may be happening in schools in Gokwe North District, that teachers have a variety of challenges all which will be uncovered with this study. Below is a table that shows Zimbabwe School Examinations Council (ZIMSEC) Examinations pass rates in Combined Science for selected schools in Gokwe North District in the year 2021 to 2023. These results motivated the researcher to carry out the study in the selected schools in order to find out the problem.

Pass rate of combined science from 2021-2023

	SUBJECTS	% PASS RATE 2021	2022	2023
School X	**Mathematics**	**50**	61	67
	English	54	54	57
	History	92	94	94
	Geography	76	79	78
	Combined science	40	35	29
School Y	**Mathematics**	40	45	48
	English	38	42	44
	History	52	54	58
	Geography	48	51	54
	Combined science	20	16	14

Source. Gokwe North District offices

The table above shows the flow of passes of O-level in selected subjects. An analysis of the table shows that in these two selected schools, the pass-rate of combined science is descending. It is against this background that the researcher is forced to investigate the causes for poor pass rate in combined science. From the researcher's perception, this is an area worth studying as she feels it has not received much attention at all. This presentation will seek to fill this gap.

1.3 STATEMENT OF THE PROBLEM

There is a broad consensus in science education that hands-on activities are of central importance to teaching combined science in an effective and engaging way. Indeed, the current Zimbabwean combined science curriculum advocates student-centered approach with learners active engagement in laboratory activities which promotes scientific skills and recommends that schools should be equipped with modern laboratory (Zimbabwe Institute of Education, 2012). Conversely, shortage of resources, laboratories and equipments, textbooks, teacher's competencies as some of the challenges in most rural schools has been cited as main obstruction to teachers on organizing practical sessions (Barley ,2019). This results in poor learners' performance in combined science subjects, due to the fact that teachers do not teach using teaching and learning strategies as per the instruction given by the combined science syllabus.

However, despite a range of studies on teaching and learning combined science in rural secondary schools, I did not come across a clear investigation on challenges encountered by combined science teachers on use of practical sessions in teaching and learning. Thus the researcher seeks to explore how these challenges are contributing to low pass rate in combined science.

1.4 Research Questions

l) Main research question

- What challenges are encountered by combined science teachers on use of practical sessions when teaching and learning.

II) Sub research questions

- What resource challenges are encountered by combined science teachers on use of practical sessions when teaching and learning.

-What are environmental factors that affect the implementation of practical sessions in teaching and learning of combined science?

- How do schools assist combined Science teachers to overcome challenges on practical sessions in teaching and learning.

1.5 Aim of the study

The aim of the study is to investigate the challenges encountered by combined science teachers on use of practical sessions in teaching and learning.

1.6 Objectives of the study

1. To find out challenges encountered by combined science teachers on use practical sessions in teaching and learning.
2. To find out environmental factors that affects the implementation of practical sessions in teaching and learning of combined science.
3. To propose feasible keys that can address the challenges encountered by teachers when trying to use practical sessions in teaching and learning of combined science.

1.7 Purpose of the study

The purpose of the study is to investigate the challenges encountered by combined science teachers on use of practical sessions at form three level, in teaching and learning, in two schools, in Nembudzia zone.

1.8 Delimitations of the study

The study is delimited to secondary schools in Nembudzia Zone. The study involves five combined science teachers, two headmasters and 40 learners from two selected schools. Therefore, generalizations outside of this demographic context should be done with caution.

1.9 Limitations of the study

To come out with this project a number of constrains will be faced.

- Time

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

- Money

Shortage of adequate financial will also be a problem since money is 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.

- Accessibility to computers and internet

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

- Resources

Limited funding for research will restrict 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 use of practical sessions access to laboratories, equipment, and materials for practical experiments is crucial.

- Family Responsibilities

Balancing family responsibilities with research activities can be 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.

1.10. SIGNIFICANCE OF THE STUDY

Although research indicates that many teachers in schools are facing challenges on practical sessions, little has been done to find the challenges encountered by combined science teachers in order to solve these problems. This research aimed at finding challenges encountered by combined science teachers on use of practical sessions 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.

- To the Researcher

The research will be beneficial to me as a researcher. This means that the study will expose me a plenty of literature on the challenges that are encountered by combined science teachers on use of practical sessions when teaching and learning combined science in rural schools and the strategies that can be used to overcome these challenges. Most importantly, the research will allow me to fulfil the requirements of Degree Programme.

- To Teachers

  The study might improve 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 sessions 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 on use practical sessions when teaching and learning combined science

- To Learners:

The study of challenges faced by combined science teachers on use of practical sessions directly impacts the learning experience of students. Practical activities not only make learning more engaging and enjoyable but also help students develop critical thinking, problem-solving skills, and a deeper conceptual understanding of scientific principles. By addressing the challenges encountered by teachers in implementing practical sessions, learners can benefit from enhanced learning outcomes, improved retention of knowledge, and increased interest in science subjects.

- To Parents

The study will be important to the parents so that they will understand the learning environment of their children and understand the challenges and opportunities their children may face in science classes. By understanding the challenges faced by teachers this will provide parents with insights into how these challenges may impact their children learning outcomes in sciences and research findings can also inform parents on how they can support and collaborate with teachers to address the challenges, ultimately benefitting their children education.

- To Headmasters:

Headmasters play a pivotal role in shaping the overall educational environment of a school. Understanding the challenges faced by combined science teachers on use of practical sessions 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 learners' success. More so, this can provide valuable insights to headmasters and 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 implementing practical sessions can boost morale and motivation. Headmasters can consider incentives or rewards to encourage continued growth and innovation in teaching practices.

- 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.

- To the Ministry of Primary and Secondary Education

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

1. 11. DEFINATION OF KEY TERMS

Combined Science - This 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 (Barley, 2019)

A teacher is an educational professional who imparts knowledge, skills, and values to students in academic institutions such as schools and universities. They are responsible for planning and delivering lessons, assessing student progress, and facilitating student learning (Allen and Ryan,2010).

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 (Barley ,2019).

A practical session 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 (Ramnarain and Hlatswayo,2018). Practical sessions 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)

Score, (2015) define teaching as an art and science of imparting knowledge to others. He also added that teaching involves the sharing of information and ideas to facilitate learning and understanding and it involves the use of appropriate methods and strategies to engage learners, facilitate their learning and help them achieve better.

Learning is the knowledge acquired through study, experience or being taught. It is the essence of all educational acquisition of skills and attitudes that leads to a change in behavior, which is the goal of education Miller, (2014).

A school is both the educational institution and to provide learning spaces and learning environments for teaching students under the direction of teachers (Score, 2013).

1.12 ORGANIZATION OF THE REMAINDER OF THE STUDY

Chapter two focuses on the review of related literature and research related to the problems being investigated. Chapter three focuses on research methodology, paradigm, research approach and research instruments which includes interviews, observations and focus group and the results of the analysis and findings emanating from the study shall be presented in the chapter four. Lastly, chapter five will focus on summary of the study and findings, conclusions and recommendations.

1.13 SUMMARY

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

2.0 RELATED LITERATURE REVIEW

2.1 INTRODUCTION

The integration of practical sessions in combined science education plays a crucial role in enhancing learners' engagement, understanding, and critical thinking skills. However, the implementation of practical sessions, specifically in combined science classrooms, is not without its challenges. This literature review aims to identify and synthesize existing research on the challenges encountered by combined science teachers on use of practical sessions in teaching and learning. The chapter also covered the theoretical framework.

2.2 PURPOSE OF PRACTICAL SESSIONS IN COMBINED SCIENCE EDUCATION.

The Purposes of practical sessions in combined science education have been stated in many literatures in different ways. Learners interpretations of the taught models, used to explain theory, can be tested and re-evaluated through such practical sessions, thus, improving learners conceptual understanding work. According to Hofstein and Lunetta, (2004) practical sessions are used to motivate and increase students' interest in combined science relates more to aims of affective character. The skill category involves laboratory work that aims to allow learners opportunity to practice, handling special equipment, using standard techniques, comprehension and execution of instructions.

Different authors in science education contend that practical sessions in combined science has many purposes. These are motivation for learners, the excitement of discovery, consolidation of theory, development of manipulative skills, knowledge of standard techniques, general understanding of data handling, development of other skills which analytic, evaluative, planning, applied mathematically (Miller,2014). The role of practical sessions in combined science teaching recorded in the literature includes to encourage accurate observation and description, making phenomenon more real, arousing and maintaining interest and promoting a logical and reasoning method of thought stated in Science Community Representing Education (SCORE, 2008). It is also indicated that understanding of combined science include how it works, concepts of scientific processes, collaborative working, reproducible results, fair testing (Watts, 2013). In combined Science, learners do practical sessions to expand their knowledge in an attempt to understand the world around them (Kolucki and Lemish, 2011). It develops learners' understanding of ideas,

theories and models. Research has established that achievement and skills improved when learners are taught combined science using practical sessions.

Attending laboratory sessions is important in learning combined science because practical sessions in a way brings to life what is explained in textbooks. By seeing educators demonstrating or conducting experiments themselves, learners supplement what is in textbooks and as a result learning is enhanced (Miller and Abrahams,2013). Also practical sessions help improve learners' higher order learning skills such as analysis, problem solving and evaluating. Secondary school is basic in preparing students for science education. It is at this level they expose, observe and interact with laboratory equipment, activities and learn precaution or safety rules. Poor performance in combined Sciences is due to absence of practical sessions while teaching combined Sciences (Makgato, 2007). A secondary school's laboratory should have the equipment necessary to conduct meaningful demonstrations and experiments. However, many research findings in different countries have indicated practical sessions either totally does not be done or poor implementation in secondary schools in many countries of the world.

2.3 THEORETICAL FRAMEWORK

The research was underpinned by progressivism theory which was propounded by John Dewey. Progressivism is a philosophical and educational movement that emphasizes experiential learning, critical thinking, and democratic values in education. John Dewey, was one of the key figures in the development of progressivism, and his ideas have shaped educational theory and practice for more than a century. Dewey's theory of progressive education argues that students should be actively engaged in learning experiences that are relevant and meaningful to their lives. In practical sessions, this could involve teachers encouraging students to explore real-world problems and design solutions through hands-on projects and experiments (Dewey, 1916).

According to Dewey, practical sessions should be organized around a problem or task that is meaningful and relevant to students. This could involve tasks such as designing and testing a new product, exploring a scientific phenomenon in nature, or addressing an issue of social or environmental concern. Dewey believed that students learn best when they are actively engaged

in a process of inquiry and problem-solving. To support this, teachers should provide scaffolding and guidance that help students develop their skills and understanding, but should also allow students to take the lead in identifying and solving problems (Dewey, 1938).

In a Dewey-inspired classroom, practical sessions might involve a variety of collaborative and project-based learning activities. After completing a practical session, learners might be asked to reflect on what they learned, identify areas for improvement, and share their ideas and experiences with their peers (Dewey, 1938).

Dewey's progressivism theory emphasizes the importance of experiential learning, which involves learning through direct experience and active engagement with the environment. This approach views learning as a process of meaning-making and understanding that occurs through interactions between the learner and the world around them (Dewey, 1938). According to Dewey, experiential learning is most effective when it is authentic and relevant to students' lives. This means that teachers should design learning experiences that are meaningful, interesting, and connected to students' interests and experiences.

Dewey, (1916) postulated that, in practical sessions, experiential learning could involve students conducting experiments, designing and testing products, or engaging in fieldwork to explore real-world phenomena. By giving students the opportunity to apply their knowledge and skills in authentic contexts, teachers can help students develop a deeper understanding of scientific concepts and processes, as well as important transferable skills such as critical thinking, problem-solving, and collaboration.

The progressivism theory of experiential learning can help science teachers address a number of challenges they may encounter during practical sessions, including engagement and motivating for learners by providing opportunities for hands-on exploration and discovery. This can help to keep students engaged and interested, even when the subject matter is complex or challenging and also helps learners to connect abstract scientific concepts to their own experiences and observations, leading to a deeper understanding of the material (Dewey,1938).

By engaging in experiential learning activities, learners can develop important transferable skills, such as critical thinking, problem-solving, and communication, which will serve them well in future academic and professional contexts and also help to motivate students by providing a sense

of ownership and control over their learning. Experiential learning can help science teachers to address challenges related to diversity and equity in the classroom. By tailoring experiential learning activities to the unique needs and experiences of different learners. Teachers can help to create a more inclusive and welcoming learning environment for all students. For example, teachers can design experiments or projects that incorporate cultural elements or incorporate the experiences of underrepresented groups. This can help to increase student engagement and interest, while also promoting greater understanding and empathy among students(Dewey,1938).

However, Chandra and Shamar, (2004) pointed out that, some other scholars like Mager's critiques of Dewey's progressivism theory of experiential learning primarily center around the need for clear learning objectives and the importance of structured instructional design. Mager emphasized the necessity of clearly defined learning outcomes and the need for a systematic approach to instructional design, which contrasts with Dewey's emphasis on experiential and hands-on learning. One of Mager's key critiques is the potential lack of clarity and specificity in Dewey's approach. Mager argued that without clear learning objectives and a structured instructional design, there is a risk of ambiguity and inefficiency in the learning process. He advocated for a more systematic and goal-oriented approach to education, which aligns with his work in instructional design and performance improvement.

Overall, Mager's critiques of Dewey's progressivism theory of experiential learning highlight the importance of clear learning objectives, structured instructional design, and effective assessment strategies. While Dewey's emphasis on experiential learning has significant merit, Mager's perspective offers valuable insights into the potential challenges and limitations of a purely experiential approach to education.

While Dewey's progressivism theory provides a valuable framework for addressing challenges in practical combined science sessions, it is important for teachers to be aware of potential limitations and pitfalls. Some of the challenges that may arise when implementing experiential learning in practical sessions include time and resource constraints

2.4 RESOURCE CHALLENGES ON PRACTICAL USE

When teachers are unable to incorporate practical, hands-on activities into their lessons, they may find it difficult to engage learners in meaningful learning experiences. This can lead to decreased motivation and enthusiasm for both the teacher and the learners and If learners are not given the opportunity to actively participate in practical activities, they may struggle to fully grasp and retain complex concepts and ideas. When teachers are limited to theoretical approaches in their teaching, they may become less effective at delivering instruction that meets the diverse needs of their levels. This can result in lower levels of learners learning and achievement(Score,2013).

- **Laboratory equipment and supply**

For all kinds of scientific experiments, whether in a research laboratory in schools there is the need for various laboratory apparatus and laboratory equipment. Laboratory apparatus are tools and equipment used by scientists, researchers and students to perform their tasks. The laboratory apparatus differs from laboratory to laboratory, from subject to subject. The apparatus and equipment found in any given laboratory could vary depending on the field of study, nature of study and level of the researchers, like high school, or professional. The various fields of science are complex and very wide (Gudyanga and Jita,2019).

There are certain general purpose laboratory apparatus, which are just a few of laboratory apparatus used by scientists today. For instance, as stated by Ramnarain and Hlatswayo, (2018) asserted that working in science laboratory can only be possible if there are sufficient pieces of equipment for experiment. Laboratory equipment are the key to any practical sessions, which promotes long term memory in students, enhances pupil's development of the ethical dimension of science, inspires the spirit of collaboration and active participation among learners, exposes learners to scientific experiences that could ultimately help them in developing scientific attitudes and skills and inculcate in the students the spirit of inquiry and scientific mode of thinking.

Miller (2016) cited that, lack of laboratory facilities negatively affects learners in several ways. Firstly, it hinders their ability to engage in important scientific activities such as observing, measuring, analyzing, and describing and this limits their development of skills such as observation, measurement, prediction, interpretation, and decision making, which are crucial in

the field of combined science. Additionally, the absence of adequate laboratory facilities leads to a reliance on abstract thinking and theoretical concepts, which can discourage both teachers and learners. Moreover, the experiments that are available may not be relevant or interesting, and may not be related to real-life situations. This lack of relevance and interest further diminishes the learning experience for learners. Overall, the insufficient laboratory facilities in schools hinder learners practical learning experiences and limit their ability to fully engage with the subject matter

Watt, (2013) reported that when instructional equipment is appropriately utilized, they bring about more effectiveness in teaching and learning process, but this depends on teacher's ability to use them efficiently. Hence, from its definition and purpose requires that learners need to have access to laboratory facilities and equipment in order to develop their scientific process skills.

Adedayo, (2015) asserted that, the practice in many rural areas has been observed there are problem regarding availabilities of lab equipment and on its usage. For instance, most secondary schools in rural areas have no science laboratories and the few that have them are at low level equipped and poorly maintained. In effect, this situation of the laboratories is inadequate.

Ministry Education of the country (2002) pointed that each science subject must have a separate well equipped laboratory. The failure of learners to excel in practical examinations is because of "the lack of basic skills for doing simple experiments in the combined sciences (Gudyanga and Jita,2019). The basic reason identified was lack of practical sessions in teaching combined science is due to the inability to provide well-equipped science laboratories.

The availability of physical resources on the level of practical sessions was often claimed by teachers that their ability to do practical work is hampered by the lack of laboratories and science equipment (Hattingh, 2007). Again in the same way other research result also confirm in other districts as identified factors lack of equipment in the laboratory have influenced the learner's attitude towards combined science practical sessions in secondary schools (Adedayo, 2015).

In opposite some finding justify the availability of resource and implementations of practical work do not have significant relationship. In some well-resourced schools teachers do very few science demonstrations and almost no classroom experiments which results in learners not attaining the skills necessary for learning science. For example, the case studies done by Tollesa and

Mohammed, (2016), where again no relationship was found between the availability of resources and the level of practical sessions performed. On this case study school had four laboratories, but did zero practical sessions implementation. The finding identified that improving the resources would make little difference unless accompanied by other interventions as well. These interventions include the motivation of teachers, training of teachers (Hattingh,2007) and training of how to use equipment supplied to schools. Teachers who are motivated to do practical work will find ways to do so even in the most poorly resourced schools.

Similarly, in most schools they lack resources that are required for implementing practical work. In some of the older schools a considerable number of equipment and chemicals were present however, these have been kept idle for years without usage and consequently most of the equipment were broken and parts missing (Gebrekidan, 2014).

In general, in most schools no practical work is implemented due to lack of equipment and other laboratory facilities. But in some schools because of lack of motivation of teachers and support of school principals practical work implementation hindered and have made negative impact on learner's academic achievement.

- **Laboratory manuals**

In Zimbabwe factors impacted on the successful implementation of effective combined science teaching was noted that in many secondary schools the curriculum materials like laboratory manuals are in short supply (Oyoo, 2013). In case of rural secondary schools do not have practical guide or laboratory manuals for science education. Effectiveness in combined laboratory instruction requires that learners be provided with practical guides. These resource give a wide range of practical activities together with detailed procedures to be followed in which as a consequence boost practical instruction.

To practice laboratory experiments, there are no well-prepared laboratory manuals (Feyera, 2014). Similarly, in some uburn areas one of laboratory-related factors the lack instructional materials are the problem identified for implementation of practical work, as a result, it is the determinant factor to practice practical sessions, which makes negative impact on students' academic achievement in science education. According to the finding in (Makgato, 2007) also indicated that lack of manuals in sample schools contributed to the poor performance of learners in combined

Sciences. Schools that did not conduct experiments manuals are the key determinants for the implementation of practical sessions in secondary schools in combined science education.

- **Laboratory rooms**

Laboratories have multiple benefits ranging from making learning concrete to lying basis for science education in the subsequent levels. There is no controversy that science teaching must take place in a laboratory. In laboratories a minimum requirement room should have enough space, should have gas electricity and water in sufficient quantity to use; be 'future proofed' as far as possible (SCORE, 2008)

The outcome study made by Adedayo (2015) revealed that the possible laboratory-related factors influencing the students' attitude towards practicals in secondary schools were lack of separate laboratory. Laboratory room is not proportional with the number of learners and some schools do not have totally laboratory rooms, materials and technicians (Feyera 2014). Except one all schools of the study sample do not have separate lab room for each science subject (Physics, chemistry, biology) to work properly.

Kolucki and Lemish, (2011) also indicated that science laboratories were at a very poor status. Most of the laboratory rooms were not to the standard (or not built for laboratory purpose) and lacked even the most basic facilities like running water, source of electricity; working tables, sinks and hoods. In some cases, the rooms had broken windows, roofs, doors and as a result were not secure places in which to keep materials (Gebrekidan, 2014). This shared truth with the survey that was done in Afar which the laboratory rooms of available were common laboratories for science were too small to hold all learners and not suitable to work in, due to lack of ventilation as far as the temperature of the environment is very hot.

2.5 HUMAN RESOURCES ON PRACTICAL USE

Further conditions inhibiting the use of practical sessions 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 (SCORE, 2008). 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.

- **Teachers work experience**

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).

- **Teacher performance and attitude**

Consequently, in the absence or poor implementation of practical sessions 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 sessions 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 (Hattingh, 2007).

In the case study conducted by (Ajai,2009)) 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.

2.6 ENVIROMENTAL FACTORS AND SAFETY ON PRACTICAL USE

Gudyanga and Jita, (2019) postulated that, the lack of safety measures during practical sessions poses significant risks to both learners and teachers. It is crucial to establish clear guidelines, provide appropriate safety training, and maintain well-equipped laboratories to minimize the potential for accidents. Implementing safety protocols not only protects individuals but also promotes a culture of responsibility and professionalism in scientific practice. Gudyanga and Jita, (2019), also added that, inadequate safety measures can undermine the educational value of practical sessions, leaners should be encouraged to develop a strong understanding of safety protocols, risk assessment, and emergency procedures. By integrating safety into the curriculum and ensuring proper supervision, educational institutions can create a safe learning environment that nurtures scientific inquiry and critical thinking.

Davis and Pettish, (2017) posits that, the absence of safety measures during practical sessions not only jeopardizes the well-being of individuals but also hampers learners engagement and confidence in scientific exploration. By prioritizing safety, instructors can create a supportive and secure environment that allows students to fully immerse themselves in hands-on experiences, fostering a deeper understanding and appreciation of scientific concepts. These perspectives emphasize that safety measures are essential for the successful implementation of practical sessions in combined science education. They highlight the need for clear guidelines, proper training, and a culture of safety to ensure the well-being of individuals and optimize the learning outcomes of practical activities.

- **Time Constraints**

The basic frame work for learning special for practical sessions in combined science is availability of time. Following this the teachers and learners needs enough time to carry out practicals in combined science. Special practical work requires adequate time to teach and learn science. The problem of inappropriate time schedule becomes obvious when we realize that the last five minutes in each lesson periods are often expectedly devoted for entry behavior and closure of activities (Miller and Abraham's,2013). To embrace the new perspective in science education system that is described as bookish and exist a gap between the school and the industries. We must devote adequate time for practical teaching instead of the lesson period to be one or two times 30-40 minutes each per week. If time for practical instruction is as important in learning as the designers

of curriculum and many researchers think, the period for all practical in combined sciences must be increased to three or four periods of 40 minutes each per week.

Most of class time, that of the teacher's as well as of the learners is used for dealing with the practicalities of the tasks, that is giving instructions, collecting the equipment, handling them in producing the data and cleaning up afterwards. Very little or no time at all is devoted to discussing the ideas behind the phenomena or otherwise developing the conceptual skills of the students. In a prior study (Millar and Abrahams, 2009) found that most of the teachers in the study (24 out of 25) devoted very little or no time at all for supporting the development of the learners' knowledge through discussion, the time was spent concentrating on the practicalities. They expected the correct deductions to arise from the results provided those were produced successfully. Due constraints emanating from other challenges for example, inadequate laboratory equipment, single science laboratory or small laboratory space, time was wasted during shifts and in many cases practical activities would not be as conclusive as required (Kapting'ei and Kimeli, 2014).

International comparisons (such as TIMSS) indicate that students in the UK spend more time on practical activities than do students in most other countries. Hence, a significant number of learners in some countries see science experiments as being enjoyable. For example, an online survey of students (n=1,450) reported that in terms of enjoyability of school science activities, the top three were 'going on a science trip or excursion' (85%), 'looking at videos' (75%) and 'doing a science experiment in class' (71%) (Cerini et al. 2003, p.10). Teachers work load 69.81% of the teachers taught 16-20 periods per week (Solomon & et.al. 2015). 71.69% of the teachers taught five and more than five sections. Also 73.59% of the teachers taught 2 different classes. Hence, there must be adequate time that allotted for the implementation of practical sessions so that students can internalize what they have learnt.

Researchers have highlighted the significant impact of not having enough time during practical sessions on learners learning and understanding of scientific concepts ,Watts,(2013) highlighted that limited opportunity for exploration and discovery provide learners with the opportunity to engage in hands on activities ,explore scientific phenomenon and make their own discoveries, however where there is not enough time allocated for these sessions , learners may miss out on the chance to full explore and understand the concept being taught. He added that practical sessions often provide a platform for inquiry based learning, where learners can ask questions, design

experiments and investigate scientific phenomena. insufficient time in these sessions restrict learners' ability to engage in this type of learning, limiting their opportunities for independent thinking and scientific enquiry.

- **Large class size allocation**

It is noted by different studies generally uneven allocations are made for the study of science in Zimbabwe. Many schools have large class sizes, in some cases as many as eighty learners with few possibilities of meaningful group or individual work and few opportunities for direct contact with teachers (Gebrekidan, 2014). Hence, Class sizes are often excessively large, and taught in the poorest conditions by limited number of teachers. Similarly, other finding class size of secondary schools in rural areas were extremely large when compared to the standard set by the MOE of Zimbabwe (2000), which are 35 per classroom as reported in (Solomon & et.al. 2015). It was found that 71.69% of the sample teachers replied that the average number of learners in their school was between 70 and 80. In this regard, the majority of combined science teachers could not check up their learners during practical sessions, exercise, homework and assignment. As result the teaching and learning of practical sessions has been highly affected.

2. 7 SCHOOL ROLES IN PROMOTING PRACTICAL SESSIONS

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 sessions 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 (Hofstein and Lunneta,2004).

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 (Hattingh, 2007).

Some studies have identified as School Management did not influence the implementation practical work in the school (Hattingh, 2007). 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 several challenges encountered by combined science teachers on use of practical sessions 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. 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 sessions in combined science classrooms.

3.0. RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the researcher described the research methodology that was used to explore the challenges encountered by combined science teachers on use of practical sessions in teaching and learning of Combined Science. Firstly, the researcher explained 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 about trustworthiness as well as the ethical issue considerations in the study.

3.2 Research paradigm

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.

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 (2007), 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 challenges encountered by combined science teachers on use of practical sessions 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 challenges encountered by Combined Science teachers on use of practical sessions in teaching and learning.

3.3 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 sessions and the challenges they always encounter during teaching and learning of Combined Science. Creswell (2008) 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 Gokwe North Combined 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 (Sarandakos, 2005). Thus, to understand teachers' challenges, it was essential to study participants in their real context (Creswell, 2009). 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.

ADVANTAGES OF QUALITATIVE RESEARCH APPROACH

The study also employed a qualitative research approach because it gives the researcher the opportunity to understand practical sessions 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. Moreover, it permits the researcher to enforce subjectivity, due to the fact that I interpreted the data based on reality. Hence, the approach was considered appropriate for this study because it makes it possible for me to gain understanding and insight into the challenges that teachers were experiencing on using practical sessions when teaching and learning Combined Science.

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. He

also added that, 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. This can be time-consuming, requiring significant resources and effort to collect and analyze the data and 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).

3.4 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. 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.

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.

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, (2012) 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 (Merriam, 2009).

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 challenges encountered by combined science teachers on use of practical sessions 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.

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 Yin (2009), 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.

3.5 POPULATION

Krieger (2012) defined population as all members of any well - defined class of people, events and objects. 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 Combined Science teachers, form three combined science learners and headmasters in Gokwe North.

3.6 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). The researcher focused on two schools in Nembudzia zone, in Gokwe North district. The researcher specifically targeting forty form three learners who are doing combined science and five combined science teachers and two headmasters from the selected schools

SAMPLING PROCEDURE

Sampling is a technique or a process of choosing a sub-group from a population to participate in the study. The researcher used random sampling to select forty learners from two selected schools. The researcher used purposive sampling procedure to select combined science teachers and 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 ,2009) Thus, l selected the schools that offers combined science. In addition, the schools are convenient to me because they are easily accessible. The key participants in this study were combined science teachers, hence I only chose teachers who teach combined science in two selected schools. A total of five Combined Science teachers and two headmasters was included in this study.

3.7 RESEARCH INSTRUMENTS

Research instruments are tools (for example questionnaires, interviews, and observations) intended to obtain data on a topic of interest(Merriam,2009). The researcher used interviews, observations and focus group.

3.7.1 INTERVIEWS

Merriam, (2009) defined an interview as a gentle conversation between two or more people where questions are asked to a person to get the required answers. 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.

The confidentiality consent form stated that the information collected during the interview would only be used for research purposes and would only be recorded with authorization from the participants, engaging questions, and the interview guide. The researcher informed the combined Science Subject teacher participants about the purpose of the study, its objectives, and the duration of the interview guide. Informed consent was obtained from the participants before the one-on-one interview, ensuring their comprehension of the study's parameters and objectives. The researcher strictly follows ethical guidelines by securing informed consent and safeguarding the participants' privacy during the interview process. The researcher personally administers the interview guide to the participants to foster authenticity in their answers.

This qualitative study, which employs the descriptive approach, utilized open-ended questions and uncovered the difficulties experienced by Combined Science teachers and their methods of overcoming them. Every utterance made during the interview was recorded using an audio recorder and was used as evidence for the curriculum vitae.

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 and 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.

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. Moreover, 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).

3.7.2 OBSERVATION METHOD

Creswell, (2012) 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. 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 sessions. 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.

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 Patton, (2010) postulated that "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.

It provides a practical application for a hypothesis. In other words, it can help make research more complete. Adding on, 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. Creswell, (2012) notes that 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. In case of this study, experimentation is simply observation under controlled conditions.

DISADVANTAGES OF OBSERVATIONS

Establishing the validity of observation is always difficult. There is a chance of researcher bias in observational 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 sessions. Practical

sessions 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.

3.7.3 FOCUS GROUP DISCUSSION

Carey, (2013) defines focus groups as a research technique that collects data through group interaction on a topic determined by the researcher. This definition has three essential components. It clearly states that focus groups are a research method devoted to data collection and it locates the interaction in a group discussion as the source of the data and also acknowledges the researcher's active role in creating the group discussion for data collection purposes. According to Merriam, (2009) Focus group is a qualitative technique for data collection, it is "a group comprised of individuals with certain characteristics who focus discussions on a given issue or topic".

Focus group consists of a small group of people, usually between six and nine in number, who are brought together by a trained moderator (the researcher) to explore attitudes and perceptions, feelings and ideas about a topic". A focus group provides a setting for the relatively homogeneous group to reflect on the questions asked by the interviewer.

The researcher conducted one focus group discussion that lasted for 30 minutes with 25 learners of school X and 15 learners of school Y. During a Focus Group discussion, the researcher raised questions which was answered by learners in groups. The researcher's role is to facilitate and thus allowed conversations to flow and develop without guiding the learners to a particular answer. This stimulated the learners to freely share and discuss their views and opinions(Carey,2013). During the discussion, the researcher used focus group discussion guide that helped her to be systematic. The researcher took notes using field notebook and used the digital audio recorder for recording the whole discussion to ensure the information captured could be transcribed and analyzed later.

ADVANTAGES OF FOCUS GROUP

One benefit of comparing focus groups to other methods is a more sophisticated understanding of the strengths and weaknesses of focus groups. For example, rather than just listing exploratory research as a strength of focus groups, it is now necessary to note that individual, nominal interviews can be a more effective technique for idea generation. Comparisons to other methods have thus led to the conclusion that the real strength of focus groups is not simply in exploring what people have to say, but in providing insights into the sources of complex behaviors and motivations (Bassey,2018).

The advantages of focus groups for investigating complex behaviors and motivations were a direct outcome of the interaction in focus groups, what has been termed "the group effect" (Carey,2013). An emphasis on the specific kinds of interactions that occur in focus groups is also an improvement over vague assertions that "synergy" is one of their strengths.

What makes the discussion in focus groups more than the sum of separate individual interviews is the fact that the participants both query each other and explain themselves to each other. As Morgan and Krueger (2013) have also emphasized, such interaction offers valuable data on the extent of consensus and diversity among the participants. This ability to observe the extent and nature of interviewees' agreement and disagreement is unique strength of focus groups. A further strength comes from the researcher's ability to ask the participants themselves for comparisons among their experiences and views, rather than aggregating individual data in order to speculate about whether or why the interviewees differ.

DISADVANTAGES OF FOCUS GROUP

The weaknesses of focus groups, like their strengths, are linked to the process of producing focused interactions, raising issues about both the role of the moderator in generating the data and the impact of the group itself on the data. With regard to the role of the moderator, Morgan and Krueger (2013) used discourse analysis to compare the conversations between interviewers and interviewees in a single focus group and a set of individual interviews. They concluded that the dynamics of the individual interviews put more burden on the informants to explain themselves to the interviewer, while the moderator's efforts to guide the group discussion had the ironic consequence of disrupting the interaction that was the point of the group.

3. 8 CREDIBILITY AND TRUSTWORTHNESS

In order to ensure context validity, two experts were consulted to check for the suitability of the interviews designed and observations and necessary adjustments were made to ensure credibility and trustworthiness. Moreover, the use of multiple methods helped the researcher to triangulate and to build on each type of data collection while at the same time compensating for potential weaknesses in any single approach (Patton, 2014). Triangulation was 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 follow up discussions after observations 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. 9 DATA ANALYSIS

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, focus groups and observations was utilized to comprehensively describe, interpret, and analyze the case. Cohen et al. (2007) 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 on practical use.

3.10 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 participants.

Cohen et al. (2007:58) 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.

Upon completion of this research, a copy of the thesis was given to each participant that took part in the research and a summary of the findings and recommendations was discussed with the participating Combined Science teachers.

3.10.1SUMMARY

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, focus groups and classroom observations. The next chapter discussed was on data analysis and presentation.

4.0. DATA PRESENTATION, INTERPRETATION, ANALYSIS AND DISCUSSION.

4.1. INTRODUCTION

This chapter is on data presentation, interpretation, analysis and discussion. The data collected was on challenges encountered by combined science teachers at form three level on the use practical sessions in the teaching and learning in two schools in Nembudzia Zone. The findings of the research study were presented according to the research questions using the thematic approach. Data was collected using interviews, focus group discussion and observations. The data will be presented using tables. The chapter started with biographical data for heads, teachers and learners. The following were pseudo names which were used during the research, T1 for teachers for headmasters and L1 for learners. Themes will follow answering the research questions.

4.2.1 Biographical Data for heads

Table 1. showing biographical data for Heads.

Number	Sex	Type of school	Location of school	Age	Qualification	Experience	Enrolment of the school
H1	M	DAY	RURAL	42-55	DEGREE	ABOVE 15	400
H2	M	BOARDING	RURAL	42-55	MASTERS	ABOVE 15	1000

The researcher interviewed two heads and all were male. The researcher wanted to know the biographical data for heads. One head was from a day school and the other from a boarding school. The above variables have significant contribution to the topic on challenges faced by combined science teachers on use of practical sessions in the teaching and learning. The working experience of all the heads was above fifteen years.

Two heads took part in the research and all of them had higher qualifications in school administration which is positive contribution towards quality educational provisions. It was not clear whether their experience had much to do with the teaching and learning of combined science.

4.2.2 Biographical Data for teachers

Table 2. showing biographical data for teachers.

No.	Sex	Type of school	Age	qualification	Experience in years.	Class size	Subject
T1	F	Boarding	31-35	Dip in Edu	3-5	31-40	Chemistry
T2	F	Day	31-35	Dip in Edu	3-5	21-30	Chemistry
T3	M	Day	36-45	Degree	11-15	Above 50	Biology
T4	M	Day	36-45	Dip in Edu	6-10	Above 50	Chemistry
T5	M	day	36-45	Degree	Above 15	Above 50	Biology

The researcher interviewed five teachers, 3 males and 2 females. The researcher wanted to know the biographical data for each teacher. Three teachers were from boarding school and two teachers from day school. The above variables have significant contribution to the topic on challenges encountered by combined science teachers on use of practical sessions in teaching and learning. The working experience of all the teachers was above three years.

Five teachers took part in the study, all of them had professional qualification (secondary diplomas/ degrees) with science as a teaching subject. Their teaching experiences varies from three to above 15 years. The study was mostly composed of qualified and experienced teachers. According to Tenah (2015) 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. It was not clear whether their teaching experience translate into the way they teach combined science lesson.

4.2.3. Biographical data for learners .

Table 3. showing biographical data for learners.

Learner	Age	Type of school	Location of school
L1	15-16	boarding	Rural
L2	15-16	boarding	Rural
L3	15-16	boarding	Rural
L4	15-16	boarding	Rural
L5	15-16	boarding	Rural
L6	15-16	boarding	Rural
L7	15-16	boarding	Rural
L8	15-16	boarding	Rural
L9	15-16	boarding	Rural
L10	15-16	boarding	Rural
L12	15-16	boarding	Rural
L13	15-16	boarding	Rural
L14	15-16	boarding	Rural
L15	15-16	boarding	Rural
L16	15-16	boarding	Rural
L17	15-16	boarding	Rural
L18	15-16	boarding	Rural
L19	15-16	boarding	Rural
L20	15-16	boarding	Rural
L21	15-16	boarding	Rural
L22	Above 16	boarding	Rural
L23	Above 16	boarding	Rural
L24	15-16	boarding	Rural
L25	Above 16	boarding	Rural
L26	15-16	day	Rural
L27	15-16	day	Rural

L28	15-16	day	Rural
L29	15-16	day	Rural
L30	15-16	day	Rural
L31	Above 16	day	Rural
L32	15-16	day	Rural
L33	15-16	day	Rural
L34	15-16	day	Rural
L35	15-16	day	Rural
L36	15-16	day	Rural
L37	15-16	day	Rural
L38	15-16	day	Rural
L39	Above 16	day	Rural
L40	15-16	day	Rural

The researcher interviewed forty learners. Their age was almost the same in the range 15-16 years. This imply that they were fit for the level hence they were supposed to master the concepts well. The two schools were in a rural environment though one school was a boarding.

In the next session the researcher wanted to find out resource challenges on practical use, that is the nature of resources. The following responses are

4.4 Nature of resource challenges.

TABLE.4

Common challenges	heads	teachers	Learners
-poor resources allocation	2	5	21
-large enrolments	2	5	12
-shortage of furniture	2	5	10
-shortage of chemicals	2	5	20
-old and damaged equipment	2	4	21
-non availability of laboratories	2	4	10

The table above showed common challenges raised by participants during interviews. One of the challenge 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 supposed to be paid 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."

This was also supported by one Tr 1 and Tr 3 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."

The above notion was also in agreement with the results from Tr 5 and 4 where participants agree that resource allocation is a big challenge for combined science teachers during practical sessions. Tr 4 and 5 responded that

"We teach large classes and when it comes to practical session 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. The table showed that all the interview participants indicated that they are having challenges with tables and chairs during practical sessions. The two heads, five teachers and 10 learners indicated the shortage of furniture. One head 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".

This was in line with the focus group result that shortage of tables, chairs, benches, and desk is hindering the teaching and learning of combined science. One participant had this to add:

"For combined science practical session 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"

The researcher also observed that learners have no proper furniture for practical sessions. At one school learners were seated on tree seater desks.

4.4.1 Laboratory equipment and Resources.

The study found out that non availability of laboratories was a major challenge faced by combined science teachers. This finding was in agreement with what was noted by Bajar (2014) who cites that, the practice in many rural areas has been observed there are problem regarding availabilities of lab equipment and on its usage. For instance, most secondary schools in rural areas have no science laboratories and the few that have them are at low level equipped and poorly maintained (Ajayi 2008). On the same note the Ministry Education of the country (2002) pointed that each science subject must have a separate well equipped laboratory. The failure of learners to excel in practical examinations is because of "the lack of basic skills for doing simple experiments in the combined sciences.

The study also found that lack of laboratory equipment was a challenge facing combined science teachers. This finding was in line with the findings by Hattingh (2007) that the availability of

physical resources on the level of practical sessions was often claimed by teachers that their ability to do practical work is hampered by the lack of laboratories and science equipment. Again in the same way other research result also confirm in other districts as identified factors lack of equipment in the laboratory have influenced the learner's attitude towards combined science practical sessions in secondary schools (Adedayo, 2015).

The study also revealed that non availability of laboratory rooms was another challenge faced by combined science teachers. This finding is in agreement with what was noted by Ajaja (,2009) that there is no controversy that science teaching must take place in a laboratory. In laboratories a minimum requirement room should have enough space; should have gas electricity and water in sufficient quantity to use; be 'future proofed' as far as possible (SCORE, 2008). Laboratories were at a very poor status. Most of the laboratory rooms were not to the standard (or not built for laboratory purpose) and lacked even the most basic facilities like running water, source of electricity; working tables, sinks and hoods. In some cases, the rooms had broken windows, roofs, doors and as a result were not secure places in which to keep materials (Gebrekidan, 2014).

4.5. Environmental factors that affect the implementation of practical sessions in the teaching and learning of combined science.

The second research question enquire of this study enquired about the environmental factors affect the implementation of practical sessions in the teaching and learning of combined science

Table 5: Showing environmental factors

Environmental factors	Heads	teachers	Learners
Non availability of specialized equipment	2	5	23
No laboratory	2	4	13
Classroom without window panes	1	2	17
Poor ventilation in classrooms	2	4	10
No lab technician to help students	2	3	14
No safety precautions provided	2	3	10
No fire extinguishers	2	2	6

From the table 5 all participants indicated that they were environmental factors affecting combined science teachers during practical sessions. One issue raised was that of non-availability of specialized equipment. H2 had this to say:

"Our schools are operating without specialized equipment for practical sessions in combined science. Our labs are empty. They are just buildings".

This was in line with what participants in the focus group discussions were participants agreed that our labs are just empty rooms without specialized equipment for practical sessions. L 15, L23, L12, L9L, L3 and L31 pointed out that:

" There are no safety equipments provided at our school and most of the times we suffocated during practical sessions because there is shortage of space and there is poor ventilation."

Tr 2 ,3 and 5 also indicated that, “We just plan practical sessions but we end up using chalk board illustrations. It is difficult to carry practical sessions since we don’t have equipment and mostly the schools are not providing safety equipments like gloves, googles, lab coats which can be used during practical sessions."

This was also echoed by L13 and 17 during focus group discussion who had this to say:

“From form one up to three now our teachers use chalkboard illustrations and pictures showing experiments. We only draw diagrams and label them”.

All teachers also pointed out that there are no resources for lesson preparation. Tr 4 had this to say:

“We are just making use of our personal phones to access important documents such as the syllabus while we need had copies. We don’t have enough chemicals in most cases to try experiments”.

Another aspect raised was that of few apparatuses for practical sessions such as beakers, measuring cylinders, small stands among many others. Tr 2 noted that:

“We are operating on improvisation. We don’t have enough apparatuses for use during practical sessions”.

This was also raised during focus group discussion where L31,40,33 and 27 had this to say:

“We asked to bring empty containers of yoghurt, wires and bottle drinks”.

L34 reiterated that:

“Our schools should improve on resource provision. We fail to get a small beaker”.

Also participants indicated the issue of health protective clothing. One head puts that:

“Our learners and teachers have no protective wear. They just put on their uniforms and school shoes. Techers use their ordinary clothes”.

This was also echoed by focus group participant were one responded by saying:

“We don’t have the right health wear to use during practical sessions”.

All learners during focus group discussion raised the issue of protective wear. This was also observed by the researcher during one of the combined science lesson.

The study found out that environmental and safety on practical use was one of the challenges encountered by combined science teachers. This finding was in line with Gudyanga and Jita, (2019) that, the lack of safety measures during practical sessions poses significant risks to both learners and teachers. Thompson (2000) posits that, the absence of safety measures during practical sessions not only jeopardizes the well-being of individuals but also hampers learners' engagement and confidence in scientific exploration.

The study also found out that large enrolments was a challenge faced by combined science teachers. This finding was in agreement with Solomon (2015) s research. In their research the found that class sizes were often excessively large, and taught in the poorest conditions by limited number of teachers. Similarly, other finding class size of secondary schools in rural areas were extremely large when compared to the standard set by the MOE of Zimbabwe (2000), which are 35 per classroom as reported in (Solomon. 2015). It was found that 71.69% of the sample teachers replied that the average number of learners in their school was between 70 and 80. In this regard, the majority of combined science teachers could not check up their learners during practical sessions, exercise, homework and assignment. Ramnarain and Hlatswayo, (2018) cited that, large class sizes can increase the risk of accidents, limit students' access to materials, and reduce the opportunity for hands-on learning experiences and assessment and evaluating learning outcomes from practical activities can be challenging.

It was also established that there are lab technicians which is also give combined science teachers a challenge. This finding was in agreement with Tollesa and Mohammed, (2016) who puts that technicians in science have an essential role to play in current and future science education. They have considerable skill and expertise not available anywhere else. Trained and experienced technicians have a detailed knowledge of practical techniques and often greater expertise (than do the science teachers) in matters of technique, health & safety, efficiency and economy. They also enable teachers to offer varied and stimulating science lessons. Recently, there has been much discussion about reducing the workloads of teachers by increasing the role of teacher assistants. Whilst technicians should not be used instead of teacher assistants, their support can help to make science teachers workloads more manageable. Inadequate levels of technician support can often be linked to underachieving science departments. The role of the science technician in UK secondary schools has, to date, been poorly considered by many schools as stated in Consortium

of Local Education Authorities for the Provision of Science Services (CLEAPSS, 2009). This has impeded opportunities which could offer essential practical work support for science teachers (Soares and Lock, 2007). Reasons are attributed to the lack of knowledge and understanding of how the technician's role, by school's senior management, is structured .7).

4.6. Ways school can assist combined science teachers to overcome challenges on practical sessions.

Table 6: ways of assisting combined science teachers.

Ways	Heads	teachers	learners
Make follow up on practical sessions	2		
Organize trainings at school, cluster and district level	2	5	
Visiting departments at least twice per term	2	3	
Carrying out income generating projects.	2	4	5
Teachers attend seminars and workshops	2	4	7
Seeking donations from old students and non-organizations	1	3	
SDC to build laboratories	2	5	25
Observing practical sessions	2	3	
Having regular meetings with combined science teachers	2	5	

The table 6 above showed ways school can help combined science teachers to address the challenges of conducting practical sessions. The heads indicated that they need to make follow ups on practical sessions. Head 1 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 session".

This was also supported by Tr 2 who had this to say:

"In some instances as teachers we just ignore the practical session. 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. This was also noted during focus group discussion where majority of the learners had this to add:

> "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".

Tr 4 had this to put:

"I had challenges with practical sessions. I leant more during one of the workshop organized at district level".

The idea of organizing trainings was also raised by many learners during focus group discussion. They agreed that combined science teachers are to be staff developed into certain areas.

It was also indicated that teachers need to engage into team teaching. Tr 1 and 3 pointed out that it improves the way of doing things. Teams help each other. Tr5 who is a senior teacher had this to say:

"We learn a lot during team teaching sessions. 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 sessions".

Also children from high school during focus group discussions indicated that they enjoyed team teaching. 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 helping every group".

4.6.1 School heads and SDC

The study found out that the school head plays an important role in alleviating challenges faced by combined science teachers on the use of practical sessions. 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.

4.6.2 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 of using practical sessions in combined science lessons. This finding was in line with the views raised by Darling-Hammond (2006) 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.

4.7 Conclusion.

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. In corresponding to the first research question the study found out that the challenges faced by combined science teachers were non availability of resources such as laboratories, lab room, equipment, large enrolments shortage of furniture and few chemicals. The study found out that environmental factors are also a challenge to combined science teachers. Adhering to research question number two the study found out that there were various challenges encountered by combined science teachers with major being no resources for lesson preparation, no apparatuses for use and no lab technician to assist teachers and learners. 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 sessions. The next chapter provides the summary, conclusions and recommendations.

Chapter 5: SUMMARY, CONCLUSION AND RECOMMENDATIONS.

5.1. Introduction.

The purpose is to provide the summary, conclusion and recommendations of the chapter. The study sought to find out the challenges encountered by combined science teachers on the use of practical sessions in the teaching and learning. It was answering the following research questions firstly what resource challenges are encountered by combined science teachers on use of practical sessions when teaching and learning? Secondly what are environmental factors that affect the implementation of practical sessions in teaching and learning of combined science? Thirdly how do schools assist combined Science teachers to overcome challenges on practical sessions in teaching and learning. The findings were as follows large enrolments, shortage of resources, such as laboratories, equipment lab rooms and lab technicians.

5.2. SUMMARY

The summary of the findings of research question number one which sought to find out resource challenges are encountered by combined science teachers on use of practical sessions when teaching and learning. The study found out that the main challenges were resource allocation, non-availability of equipment and lab rooms. In some cases, the rooms had broken windows, roofs, doors and as a result were not secure places in which to keep materials.

The summary of the findings of research question number two which sought to find out environmental factors that affect the implementation of practical sessions in teaching and learning of 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 how do schools assist combined Science teachers to overcome challenges on practical sessions in teaching and learning. 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 challenges faced by combined science teachers on the use of practical sessions included non-availability of equipment, large classes, shortage of furniture, poor resource allocation, few chemicals, old damaged equipment, and absents of lab technicians.

On environmental factors the study concludes that the challenges include non-availability of laboratories, special rooms, safety equipment, absents of electricity, water, poor ventilation from old classrooms as well as few apparatuses such as beakers and capillaries.

On how schools can do to assist combined science teachers on the use of practical sessions the study concludes that school heads 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 on the use of practical sessions when teaching and learning.

- The researcher recommends that assessment of practical session must 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 once 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.

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

BINDURA UNIVERSITY OF SCIENCE EDUCATION

Date: 10. 04. 2024

TO WHOM IT MAY CONCERN

NAME: NHIDZA ORAIEEN REGISTRATION NUMBER: B1437810

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:

CHALLENGES ENCOUNTERED BY COMBINED SCIENCE TEACHERS AT FORM 3 LEVEL ON USING PRACTICAL METHODS IN TEACHING AND LEARNING OF COMBINED SCIENCE IN TWO SCHOOLS, IN NEMBUDZIA ZONE.

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
9 APR 2024
P. BAG 1020
BINDURA

Z Ndemo (Dr.)
CHAIRPERSON - SAMED

MINISTRY OF PRIMARY AND SECONDARY EDUCATION
THE HEAD
SCHOOL

APPENDIX 1 – INTERVIEW GUIDE FOR HEADS, TEACHERS AND LEARNERS

INTERVIEW QUESTIONS FOR TEACHERS ON CHALLENGES ENCOUNTERD BY COMBINED SCIENCE TEACHERS AT FORM THREE LEVEL, ON USE OF PRACTICAL SESSIONS IN TEACHING AND LEARNING, IN TWO SCHOOLS, IN NEMBUDZIA ZONE.

My name is Nhidza Ordleen. 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 challenges encountered by combined science teachers at form three level on use of practical sessions in teaching and learning, in two schools, in Nembudzia Zone. 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: Demographic Data :(Complete by ticking the appropriate response)

1. Sex: Male [ ] Female [ ]

2. Type of school?

Day school	Boarding school	Pvt school	Others (specify)

3. Location of the school

Rural level	Growth Point	Mine	Others (specify)

4.Age of teacher in (years) 20-25[ ] , 26-30 [ ],31-35 [ ],36-45 [ ],45- 55 [ ], over 55

5.What is your highest professional qualification\s

Secondary level	Diploma in Education	First Degree with education	Postgrad	Others (specify)

6. What is your area of specialization?

Mathematics	Physics	Biology	Chemistry	Other(specify)

7. Please indicate your teaching experience.

0-2 years	3-5 years	6-10years	11-15 years	Above 15

8.For how long have you been teaching combined science.

0-2 years	3-5 years	6-10 years	11-15years	Above 15

9.What is your class size.

1:20	1.21-30	1:31-40	1:41-50	1:above 50

SECTION B: RESOURCE CHALLENGES ON PRACTICAL USE

1.Which material resources do you have in your school for the teaching and learning of combined science?

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

2.What are your views on nature of equipment and your resources in your laboratory?

……
……
……

3.How do shortage of resources affect the use of practical sessions

……
……

4.How do you see the effectiveness of the resources used in practical sessions?

.....
.....

5.What adjustments do you make based on the assessment?

……
……

C). ENVIRONMENTAL FACTORS AND SAFETY ON PRACTICAL USE

1.How do you typically plan and prepare for practical sessions in your combined science classes?

……
……

2. What infrastructure and facilities are available to support practical sessions. Are the any gaps need to be addressed?

……
……

3.What low- cost or no- cost materials have you sourced from the local environment that allow practical work to still take place?

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

4.How do you describe the class size for room spaces make practical sessions more challenging?

.....
.....

5.What strategies do you use to ensure that all learners actively participate and engage on practical activities?

……
……
……

6. Are there any health, safety or issues that are particularly relevant for practical sessions. If not what strategies do you use on healthy safety?

.....
.....

D) SCHOOL ROLES IN SUPPORTING PRACTICAL SESSIONS

1.Have you received any professional development or training specifically focused on integrating practical sessions into combined science teaching and learning? If so, what are the benefits of these training sessions?

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

2.What role do your school leaders play in assisting combined science teachers with challenges in practical sessions?

……
……

3.In what ways do you collaborate with other combined science teachers to share best practices and address common challenges in practical utilization?

……
……

4.Can you provide an example of a time when the school effectively assisted you in overcoming a specific challenge related to the practical use of resources in science education?

……
……

THANK YOU

INTERVIEW GUIDE FOR LEARNERS ON CHALLENGES ENCOUNTERRED BY COMBINED SCIENCE TEACHERS, AT FORM THREE LEVEL ON PRACTICAL USE, IN TEACHING AND LEARNING, IN TWO SCHOOLS, IN NEMBUDZIA ZONE.

My name is Nhidza Ordleen. 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 challenges encountered by combined science teachers, at form three level, in teaching and learning, in two schools, in Nembudzia Zone. 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.

Section A: Demographic Data

1.Age:

13 -14 [ ] 15-16 [ ] 16 and above [ ]

2.Type of school?

Day school	Boarding school	Pvt school	Others (specify)	

3.Location of the school

Rural	Growth point	Mine	Others(specify)

INTERVIEW QUESTIONS

SECTION B: RESOURCE CHALLENGES ON PRACTICAL USE

1. Do you have a combined science laboratory? If not, where does your practical sessions takes place?.....
.....
2. How well –maintained and up to date are the laboratory facilities and equipment sessions?
……
……
3.How many times do you do practical?
……
……
4.Are there enough tools for everyone in your class to use during your practical science session?
.....
.....

5.In your opinion, what resources do combine science teachers require effectively to integrate practical sessions?
.....
.....

C) ENVIRONMENTAL FACTORS AND SAFETY IN PRACTICAL USE

1. What type of safety equipments are provided for you to use during practical sessions?
.....
.....
.....
2. What happens if equipments or materials are damaged or not functioning properly during a practical session.?
.....
.....

3.What are some environmental factors that can impact the implementation of practical during practical sessions?.....….....

.....….....….....….....….....….....

4.How do you ensure the safety of yours and others during practical sessions?
…….…....….……..…….....
.....
..

5.Why is it necessary to assess and understand the potential environmental hazards during practical sessions?.....…….....…….....

.....

D) SCHOOL ROLES IN SUPPORTING PRACTICAL SESSIONS

1.In your opinion, what role does the school play in supporting practical sessions?

.....

2. How do you think the school can improve the support and organization of practical sessions?.....

.....

3.What measures do your school take to promote sustainability and minimize the environmental impacts during the implementation of Practical sessions?

.....

.....

4.What steps can be taken to monitor and evaluate the effectiveness of environmental safety measures during the implementation of practical sessions?

.....

.....

Thank You

INTERVIEWS FOR HEADMASTERS ON CHALLENGES ENCOUNTERD BY COMBINED SCIENCE TEACHERS AT FORM THREE LEVEL,ON USE OF PRACTICAL SESSIONS IN TEACHING AND LEARNING,IN TWO SCHOOLS, IN NEMBUDZIA ZONE.

My name is Nhidza Ordleen. 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 challenges encountered by combined science teachers at form three level on use of practical sessions in teaching and learning, in two schools, in Nembudzia Zone. 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……

Section A: Demographic Data :(Complete by ticking the appropriate response)

1. Sex: Male [ ] Female [ ]

2. Type of school?

Day school	Boarding school	Pvt school	Others (specify)

3. Location of the school

Rural level	Growth Point	Mine	Others (specify)

4.Age of Headmasters in (years) 30-40[ ] , 41 -50 [ ], 42- 55 [ ], 56- 65 [ ], 65 and above [ ].

5.What is your highest professional qualification\s

Diploma in Education	First Degree with Education	Maters	PHD	Others (specify)

6. Please indicate your working experience.

0-2 years	3-5 years	6-10years	11-15 years	Above 15

8.For how long have you been in administrative position

0-2 years	3-5 years	6-10 years	11-15years	Above 15

9.What is enrolment of your school?

<200	<400	<600	<800	<1000	>1000

INTERVIEW QUESTIONS

Section B: RESOURCE CHALLENGES ON PRACTICAL USE

1.What are the most common resource challenges that your school face when conducting practical sessions?

……
……

2.How have budget constraints impacted the availability and condition of combined science equipments and consumable materials in your school?

……
……
3.How do you prioritize resource allocation and ensure equitable distribution among various departments or areas of the school.?
.....
.....
.4. What are challenges have you encountered in maintaining, replacing and repairing damaged equipment s?
.....
.....
5.As the head of the school, how do you priorities these maintenance needs?
.....
.....
.....

C)ENVIRONMENTAL FACTORS AND SAFETY ON PRACTICAL USE

1.Do your combined science teachers have adequate access to specialized safety equipment? If not, what barriers prevent you from providing these necessary resources?
……
……
2.How do you ensure your combined science teachers have adequate planning time to effectively design and deliver high quality practical sessions?
.....
.....
3.What safety protocols are in place to protect both learners and teachers during practical sessions?.....
.....
4.How are potential hazards identified and mitigated?
.....
.....
.....
5.Have there been any accidents in the past related to environmental factors or resource challenges? What measures were taken to prevent similar occurrences in the future?
.....
.....
.....

D) SCHOOL ROLES IN SUPPORTING PRACTICAL SESSIONS

1.What steps have you take to address funding limitations?
.....
.....

2.What types of training and professional development opportunities do you provide for your combined science teachers to help them effectively manage practical sessions?

.....

.....

3.How do you solicit input from your combined science teachers to understand their most pressing needs.?

.....

.....

4.What collaborative processes do you have in place to address these needs?

.....

.....

5.In what ways do you involve your combined science teachers in the procurement and maintenance of science equipment and consumables?

.....

.....

APPENDIX 2: OBSERVATION GUIDE

My name is Nhidza Ordleen. 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 challenges encountered by combined science teachers, at form three level, in teaching and learning, in two schools, in Nembudzia Zone.

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 Table (number….)

Issues to observed	AVAILABILITY (yes/no)	COMMENTS
Number of learners per working group		_____ _____
No of learners attending practical sessions		_____ _____
Classroom conditions (desks, boards, roof, windowpanes		_____ _____
Access to laboratory equipment/ apparatus(Resources)		
State of the laboratory equipments, resources/apparatus		_____ _____

NO of periods per week		_____ _____ ___
NO of practical exercise		_____ _____
Lerner's attitudes during practical session		_____ _____
Trs attitude during practical session		_____ _____
Seminars done per term		_____ _____
Type of practical method employed		_____ _____
Teachers improvising		
School supportive measures on challenges		_____ _____
Science departmental file		

Thank you for your time and participation

APPENDIX 3: FOCUS GROUP DISCUSSION GUIDE

My name is Nhidza Ordleen. 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 challenges encountered by combined science teachers, at form three level, in teaching and learning, in two schools, in Nembudzia Zone. This information wilI 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. Your participation in the study is voluntary and the information you give will be treated as confidential.

A) RESOURCE CHALLENGS ON PRACTICAL USE

1. What are the resource lacking which may cause challenges in teaching and learning of combined science?

……
……

2.How well –maintained and up to date are the laboratory facilities and equipment?

……
……

B) ENVIRONMENTAL FACTORS AND SAFETY DURING PRACTICAL SESSION

3.What type of safety equipments are provided for you to use during practical sessions?

……
……

4. Why is it necessary to assess and understand the potential environmental hazards before doing practical sessions?

…….....….....….....….....….....…….....
.....

C) SCHOOL ROLES IN SUPPORTING PRACTICAL SESSIONS

5.In your opinion, what role does the school play in supporting practical sessions?

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

6.How do you think the school can improve the support and organization of practical sessions?.....
.....
.....

Thank you for your time and participation.