BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE EDUCATION

TOPIC: **EXPLORING TEACHING STRATEGIES IN TEACHING COMBINED SCIENCE AT ONE RURAL SCHOOL IN GOKWE NORTH.**

BY

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REGISTRATION NUMBER

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A PROJECT SUBMITTED TO BINDURA UNIVERSITY OF SCIENCE EDUCATION IN PARTIAL FULFILLMENT OF THE REQUIREMENT OF THE DEGREE IN SCIENCE EDUCATION

PROJECT DUE DATE: 30/06/2024

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APROVAL FORM

The undersigned certify that they supervised, read and recommended to the Bindura University of Science Education for the acceptance of the research project entitled:

.

Exploring the teaching strategies in teaching Combined Science in one selected Rural Secondary School.

Submitted by Murwisi Gilda

In partial fulfillment of the requirements of Honours Degree in Science Education.

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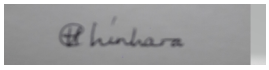
Signature  10/10/2024

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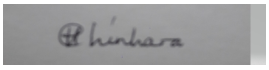
Name DR. CHINHARA, H. Signature: 

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DECLARATION

I, Murwisi Gilda do hereby declare that this project is my own work and the information that I used from the published or unpublished sources have been acknowledged in text and also on the reference list. This project has not been previously submitted to Bindura University of Science Education or at any other university and it is therefore submitted in the partial fulfillment of the requirement of the degree in Science Education at Bindura University.

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RELEASE FORM

NAME OF STUDENT Murwisi Gilda

PROJECT TITLE:

Exploring teaching strategies used by teachers to teach Combined Science at one rural school in Gokwe North district.

Honours Degree title: Honours Degree in Science Education (Biology)

Dedication

"This research study is dedicated to the glory of God, who has guided and strengthened me throughout this academic journey. I am grateful for the opportunity to contribute to the improvement of teaching strategies and student outcomes in rural education, and I pray that this study may be a blessing to all who read it. I dedicate this work to my loved ones, whose unwavering support and encouragement have been a constant source of inspiration, and to Tabeth Shoko and Mrs. Mutetiwa, whose expertise and guidance have been invaluable. May God bless and guide us all as we strive to make a positive impact in the lives of others."

Acknowledgment

"This research study would not have been possible without the support and guidance of several individuals. I would like to extend my sincere gratitude to Dr Chinhara my supervisor for guiding me throughout the academic journey without which I would not be here. Tabeth Shoko and Mr. Mutetiwa for their invaluable insights, expertise, and encouragement throughout the research process I say hats off. Their contributions have been instrumental in shaping this study and bringing it to fruition. I am deeply grateful for their time, effort, and belief in me, and I am honored to have had the opportunity to learn from and work with them."

Abstract

The study investigates teaching strategies employed by combined science teachers in one rural school in Gokwe district. It focuses on identifying correct procedures that Combined Science teachers can use to improve the performance of students. A mixed-research approach is employed, which uses lesson observations, qualitative questionnaires and interviews as research tools to gather data. The findings reveal a range of teaching strategies, including traditional lecture methods, practical experiments, and technology integration,. However, the major challenge that deter use of the cited strategies is limited resources, large class sizes, and lack of training in scientific pedagogy. Student outcomes show a need for improvement in academic achievement and engagement, with learners expressing a desire for more interactive and technology-based learning experiences. Almost all participants highlighted the importance of context-specific teaching strategies, ongoing continuous professional development, and community involvement to enhance the quality of science education in rural schools. The study's recommendations include the provision of digital resources, improvement of teacher training programs, and community partnerships to support the development of innovative and effective teaching strategies. Recommendations also point at ultimately improving student outcomes and bridging the educational gap in rural areas.

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CHAPTER 1

Introduction

1.0 Introduction

The chapter presents the general introduction of the study. Research on exploration of teaching strategies used by teachers in teaching form 3 Combined Science at one rural Secondary school. Science practical is the most assured technique that causes assimilation of content. It actually motivates and removes boredom by providing a break from only listening to the teacher and writing notes. Good classroom practices result in stimulation of interest towards the subject. Studies have shown that internal results are not pleasing. This is evidenced by low pass rate in combined Science compared to other subjects like history, Shona, geography, mathematics and heritage. The table below summarize of one rural school from 2020 to 2023.

Subject	2020	2021	2022	2023
Combined Science	10%	13%	11%	9%
English	30%	40%	39%	42%
History	75%	78%	77%	80%
Shona	85%	83%	80%	84%
Commerce	50%	60%	58%	70%
Agriculture	46%	52%	48%	60%
Mathematics	30%	36%	40%	38%
Accounts	44%	46%	56%	50%

The chapter provides the background of the study, statement of the problem, research questions, and significance of the study. It also seeks to discuss the research objectives, limitation of the study, definition of key terms and conclusion.

1.2. Background

One of the unique feature which makes science different from other subjects is the use of practicals. However, the teaching strategies that are being used by teachers in rural schools to teach languages and sciences are the same yet science subjects include practicals. The results of the internal examinations in rural schools are not pleasing .The low pass rate of students has promoted this research. There is need to find out how science can be effectively taught at 'O' level. What the researcher has observed in schools in rural areas is that, there is a lack of resources to be utilised in the teaching and learning of sciences in rural secondary schools. The obtaining situation in rural science teaching has negatively affected the results of the researcher. Talking from experience, if everything was equal the researcher feels that she could have obtained a better grade in science at ordinary level rather than the grade 'C' she obtained. Mugochi, (2018), states on the note of Policy issues pertaining to the study of the sciences, Zimbabwe says if one is not specialized in pure science, the Ministry of Primary and Secondary Education compels the student to do Combined Science at Ordinary level.

The following quotation from Ognuleye, (2010) underpins what many believes about the importance of practical work in Combined Science, in" Combined Science without practical is like swimming without water". Therefore, practical work is seen as the central part of Combined Science. Many rural schools lack the necessary resources to provide quality education, such as well-trained teachers, adequate facilities, and access to technology. According to Perk, (2019), these challenges can impact students' ability to learn effectively, as well as their overall educational outcomes. In addition, the background could explore the importance of science education in rural areas, as it can provide students with the skills and knowledge needed to improve their communities and the world around them.

Org,(2019) says that, in Africa, many rural schools face challenges such as poor infrastructure, lack of resources, and teacher shortages. These challenges can have a significant impact on students' ability to learn effectively. Many rural schools in Africa also lack access to quality science education, which can make it difficult for students to gain the skills and knowledge needed for success in the modern world. However, some efforts have been made to improve science education in rural Africa, such as through the use of mobile technology and innovative teaching

methods. These efforts aim to provide rural students with the same opportunities as their urban counterparts.

The context of this study in Zimbabwe would be particularly important, as the country has a high level of rural poverty and inequality, which can negatively impact educational outcomes. Mugochi, (2018) insits that, the government of Zimbabwe has made efforts to improve rural education, but challenges such as a lack of qualified teachers, inadequate funding, and a lack of access to technology persist. Science education is particularly important in Zimbabwe due to the country's need for innovation and growth in the fields of science, technology, engineering, and mathematics (STEM). However, many rural schools in Zimbabwe still do not have access to the resources necessary for quality science education.

One of the features of combined science that sets it apart from other subjects is that, it involves practical work and theoretical lessons which are aimed at developing students ` substantive knowledge (Wellington, 2004). This study found out that most teaching practices in Combined Science in rural schools are teacher centered with pupils copying notes. The teacher uses traditional methods of teaching characterized by passive learning. The researcher took note of the fact that there are a lot of challenges that are being encountered in the teaching and learning of Combined Science in rural Secondary School during the period of teaching. These include lack of resources like laboratory, laboratory equipment, chemicals and lack of trained science teachers. Over and above that, Zimbabwe Schools Examination Analysis of results shows that pupils are failing the practical based questions at Ordinary level certificates. The standard is low as far as science is concerned.

To date, on-going efforts of the Zimbabwe government aim to improve science education. The Ministry of Education with the help from non-governmental organization (UNICEF) has come up with the idea of Sponsoring tertiary education for science teachers. This strategy aims to update teacher classroom competences. The government once introduced the Zimbabwe Secondary School Project generally known as Zim-Sci (Ministry of Education 1995).The Zim-Sci was well suited for rural day school since it enabled science to be accessible to all students. The Ministry of education pay per capita grant to each school to purchase teaching and learning materials. However, the amount per pupil is not adequate to cover all basic requirements, to the extent that

schools have subsidized the costs through levying parents. Unfortunately most parents in rural schools areas are peasant farmers and cannot afford to pay levies needed to buy expensive equipment and chemicals required for teaching and learning of science.

Teaching strategies are methods of teaching that teachers select and use to support their pupils through learning process. Donald and Collahan, (2010) suggest that, teaching requires a combination of effective strategies that engage students, promote critical thinking and foster a deep understanding of scientific concepts. These strategies include inquiry -based learning, lecture method, hands- on experiment and demonstration, collaborative learning, use of technology, concept mapping, scaffolding, real world connection and formative assessment, (Donald et al 2010). However, most rural schools resort to lecture method which is mainly teacher centered due to lack of resources and lack of network for them to engage in use of technology. Mcaonigal, (2012) insists that, hands - on activity allows students to individually or in groups do experiment trying to find out answers with the teacher offering less assistance, exploring materials themselves to design and test their own fair experiments.

Flipped learning ensures that instructional content is given to students outside of normal school time, with the aim that students can then come to school with deeper question for clarification, (Joseph S and Phyllis C ,2006). Experiential learning encourages creativity, help students learn mistake, fostering reflective thinking and prepare students for future experience. Peer- led team learning empowers students to teach others and guidance is given to ensure what is being covered is correct and safely performed. All these strategies can be helped by technological tools that help to transform classroom into an environment in which learners actively construct knowledge. They can access real data on the world wide. Hugerat, Muhamed (2016), suggest that, differentiation ensures that all students are challenged and engaged in their learning, regardless of their skill level or learning style. With differentiation, teachers can tailor their instruction to meet the diverse needs of their students and help them achieve academic success.

Science can only be taught best by using practical demonstrations. Barbara Condlife, (2017) stresses the importance of using practical in saying that, pupils who use apparatus in science would remember the materials better, feel a sense of accomplishment if the task is completed and be able to transfer that experience easier to other learning situations. Zimbabwe being a developing country needs more scientific minds which are innovative hence if Combined Science is taught

effectively the outcome is beneficial to everyone in a broad context, (Schorling and Pethelder 2000). The main focus of this research is to explore the teaching strategies teachers are using in the combined science teaching at one rural Secondary School.

1.3. Statement of the problem

Despite efforts to improve science education in rural Zimbabwe, many rural schools still lack access to the resources and support needed to provide a quality education. This lack of resources can have a negative impact on the learning outcomes of rural students, particularly in the area of science. Indeed, the lack of resources can lead to several challenges that can impact student learning outcomes in rural areas. For example, without access to qualified teachers, students may not receive the instruction they need to understand and apply scientific concepts. In addition, without access to up-to-date science textbooks and equipment, students may not have the materials necessary to conduct experiments and learn through hands-on experiences.

Additionally, Org, (2019) says that, without access to technology, such as computers and internet access, students may not be able to keep up with the latest scientific developments. That's a very important point. The lack of access to technology can have a significant impact on rural students' ability to keep up with the latest developments in science. Technology can provide students with access to a wealth of information and resources that they may not otherwise have access to. For example, without internet access, rural students may not be able to access online science lessons or virtual labs. In addition, According to Erb,(2020), technology can allow students to connect with other students and scientists around the world, expanding their network and providing opportunities for collaboration. Without access to technology, rural students may be at a significant disadvantage. Finally, without proper funding, rural schools may not be able to maintain or expand their science programs. Therefore, there is a need to better understand the challenges facing rural schools and to develop strategies to address these challenges."

1.4. Research objectives

The researcher is aimed to fulfill the following objectives:

1.4.1. To understand the current teaching strategies used by teachers in a rural school for teaching Combined Science.

1.4.2. To identify the challenges faced by teachers in implementing these strategies.

1.4.3.To identify the student outcomes associated with these strategies.

1.4.4. To explore the perceptions of teachers and students regarding the effectiveness of these strategies.

1.4.5. To make recommendations for improving the teaching strategies and student outcomes in rural schools.

1.5. Research Questions

The researcher is aims to answer the following questions:

1.5.1. What are the current teaching strategies used by teachers in a rural school for teaching Combined Science?

1.5.2. What factors influence the selection of these teaching strategies?

1.5.3. How do teachers perceive the effectiveness of these teaching strategies?

1.5.4. What are the student outcomes associated with these teaching strategies?

1.5.5. How do students perceive the effectiveness of these teaching strategies?

1.5.6. What recommendations can be made for improving the teaching strategies and student outcomes in rural schools?

1.6. Significance of the study

1.6.1 The teachers

The study is significant to teachers. For teachers, the significance of this study is that it provides valuable insights in the current teaching practices used in rural schools for teaching Combined Science. This could help inform their teaching practices and strategies, leading to improved outcomes for the students. Additionally, the study could identify areas where teachers may need additional support or professional development, which could be beneficial for their professional growth. Finally, the study could highlight the importance of providing quality education to all students, regardless of their geographic location.

1.6.2 The learners

For learners, the significance of this study is that it contributes to a better understanding of the teaching practices that lead to improved outcomes. This knowledge could help learners to advocate for the types of teaching practices that are most effective for them, and to communicate their learning needs to their teachers. In addition, the findings could highlight the importance of student feedback and input in the design of effective teaching practices. Finally, the study could emphasize the role of learners as active participants in their own learning, rather than passive recipients of information.

1.6.3 The Curriculum planners

The study is also significant to the curriculum planners. For curriculum planners, the significance of this study is that it provides valuable insights into the effectiveness of current teaching practices in rural schools. This could inform future revisions to the curriculum, to ensure that it is responsive to the needs of rural schools and their learners. Additionally, the findings could highlight the need for additional support and resources for rural schools, to help them implement the curriculum effectively. Finally, the study could serve as a reminder that curriculum design must take into account the specific needs and contexts of all learners, regardless of their location.

1.6.4 The Researcher

This study is also significant to the researcher. For the researcher, the significance of this study is that, it provides valuable insights in the current state of teaching practices in rural schools. More-so, , the researcher could gain a deeper understanding of the factors that influence the selection of teaching practices, and the role of teachers and learners in this process. Finally, the study could offer an opportunity for the researcher to contribute to the field of education, by providing new knowledge and insights on an important topic. In addition, the study could help the researcher to build relationships with rural schools and communities, and to develop new research questions and projects.

1.7. Limitations of the study

Time is the main limitation to this study. One time limitation of this study could be the limited amount of time available for data collection and analysis. The researcher may have limited access to the rural school and its staff, due to factors such as location or availability. Finally, the researcher may be limited by the amount of time available for completing the study, which could impact the depth and quality of the research. It is important to be aware of these time limitations and to plan the study accordingly, to ensure that it is completed within the available time frame.

The study is limited to one rural school, Gumunyu High school in Gokwe North which may not be representative of all rural schools. According to Marz, (2020), if a study is limited to one rural school, there is a risk that the findings may not be representative of all rural schools. Each school is unique, with its own culture, community, and challenges. Therefore, the experiences of the teachers, learners, and curriculum planners in this particular school may not be representative of the experiences of those in other rural schools. Additionally, the context of this particular school may not be generalizable to other rural schools, which may have different resources, demographics, and challenges. Therefore, the findings of the study may not be applicable to all rural schools.

The study is limited to the perspectives of teachers, learners, and curriculum planners, and may not capture the perspectives of other stakeholders, such as parents or community members. If only the perspectives of teachers, learners, and curriculum planners are considered in a study, the perspectives of other stakeholders, such as parents and community members, may be overlooked. This could limit the understanding of the complex interactions between schools and their communities, and how these interactions impact teaching and learning. For example, parents and community members may have valuable insights into the needs of learners, and their perspectives may be crucial to the design of effective educational programs. Without their input, the findings of the study may be incomplete.

1.8. Delimitation of the study

The main delimitation of this study is in form of the geographical location of the study. The study shall be contacted in Gokwe North in Gumunyu area. The researcher is familiar with the teachers and the community of the area as well as the learners of that particular area. Hence, it shall be easy for the researcher to collect data to familiar people in familiar environment. There are several delimitations of this study because by focusing on a single school, the researcher can obtain a

detailed understanding of the specific context and the challenges faced by that particular school. This can lead to more nuanced and relevant findings that can be used to improve educational programs and policies in that specific school. By looking at one school in depth, the researcher can identify specific areas of need and develop targeted recommendations for improvement. Finally, this approach allows for a more personal connection between the researcher and the school, which can lead to more effective collaboration and communication.

1.9. Definition of key terms

1.8.1. **Combined science**

According to Jerk,(2020), The term "combined science" refers to a type of secondary school science curriculum that combines the study of biology, chemistry, and physics into one subject. In a combined science curriculum, students learn about the interconnectedness of these three scientific disciplines, and how they are related to each other and to the world around us. This approach can be beneficial for students who want to explore a variety of scientific topics without having to specialize in any one particular field. It can also help students to see how different scientific disciplines work together to address real-world problems.

1.8.2. Teaching strategies

Varid, (2019) says that, the term "teaching strategies" refers to the specific methods, and practices that teachers use to facilitate student learning. This can include everything from lesson planning and classroom management to assessment and feedback. Effective teaching practices are based on educational theory and research, and are tailored to the specific needs of the students and the subject matter being taught. The goal of effective teaching practices is to engage students in meaningful learning and help them to develop the skills and knowledge they need to be successful.

1.8.3. Teaching

Cort, (2019) says that, In general, teaching can be defined as the process of facilitating learning by providing instruction, guidance, and support to students. Teaching involves the use of a variety of methods and techniques, such as lectures, discussions, demonstrations, and hands-on activities, in order to help students acquire new knowledge and skills. In addition, effective teaching also involves assessing student progress and providing feedback to help students improve. The goal of

teaching is to help students become self-sufficient learners who are able to think critically and apply their knowledge in real-world situations.

1.10. Chapter Summary

In this chapter, the researcher managed to explore the background of the study, problem statement, research objectives, research questions, significance of the study, limitations of the study, delimitations of the study as well as definition of key terms. Chapter two is based on the review of the related literature.

Chapter 2: Literature review

2.1. Introduction

The researcher focuses on the use of different teaching practices used by teachers in teaching Combined Science in rural schools. The chapter zeroes in on the main aim of this research. This is posited through giving theoretical framework of the study as well as conceptual framework. The conceptual framework is taken from the research objectives and this is done using the base of the review of related literature.

2.2. Theoretical framework

This research is based on the social constructivism theory in particular attention to Vygosky theory.

2.2.1. Social constructivism.

Social constructivism is a theory of learning that emphasizes the role of social interaction and collaboration in the construction of knowledge. It suggests that learning is not simply the transfer of information from teacher to student, but rather a process of active engagement in which learners construct their own understanding of the world through dialogue and interaction with others. Social constructivism is often associated with the work of Lev Vygotsky, a Russian psychologist who emphasized the importance of social interaction in the development of higher mental functions. In social constructivism, knowledge is seen as something that is co-constructed through dialogue and interaction with others. According to Cart,(2019) , Vygosky, (1986) say that, this means that learning is not just about acquiring information, but about engaging in meaningful discussions and building shared understandings. According to social constructivism, learning happens through a process of scaffolding, in which more knowledgeable individuals support less knowledgeable learners as they gradually develop their own understanding of the world. Social constructivism also emphasizes the importance of learners' prior knowledge and experiences in shaping their understanding of new concepts.

Cort, (2020), objectifies that, Social constructivism is a learning theory which suggests knowledge being socially constructed through interactions with others, and that learners actively construct their own understanding of the world. Indeed, social constructivism emphasizes the importance of social interaction and collaboration in learning. According to Hilart, (2019), knowledge is not simply transmitted from teacher to student, but rather it is built through the process of shared inquiry and discussion. In this way, students are seen as active participants in their own learning, rather than passive recipients of knowledge. Within a social constructivist framework, the role of

the teacher is to facilitate learning by creating opportunities for students to engage in meaningful discussions and collaborative activities.

This theory is used to examine how teachers' practices influence the way students learn and understand scientific concepts, and how these practices might differ in a rural school setting. One way social constructivism is applied to the current study of science education in a rural school is by examining how teachers' strategies support or hinder students' ability to engage in scientific inquiry and dialogue. For example, a researcher might look at whether teachers provide students with opportunities to discuss scientific concepts with their peers, or whether they encourage students to ask questions and investigate their own ideas. The researcher could also look at whether teachers provide scaffolding for students as they learn new concepts, or whether they simply present information to students without giving them opportunities to construct their own understanding.

2.3. Conceptual framework

Various teachers are implementing the teaching and learning of Combined Science through the use of teaching practices,(Mohi,2019, Murona,2020, Kachidza,2018). These strategies are very useful in the teaching and learning of Combined Science, (Mark, 2020). However, there are some challenges that are being faced by teachers and learners in teaching and learning of Combined Science.

2.3.1. Definition of teaching strategies

According to Mohi, (2019), the term "teaching strategies" refers to the various practices methods, and approaches that teachers use to help students learn. These strategies can include everything from the way a teacher structures a lesson, to the types of activities they use to engage students. To explain this further, let's look at a specific example. Suppose a science teacher is teaching a lesson on the water cycle. Vort,(2020) insists that, the lesson could be structered by first introducing the topic, then giving students a chance to explore and experiment with the concept, and finally leading a discussion to help students synthesize their learning. Within the lesson, the teacher could use different teaching strategies such as asking open-ended questions, providing hands-on learning activities, and encouraging students to collaborate and share their ideas. So,

teaching strategies can vary depending on the subject matter, the age of the students, and the overall goals of the lesson.

According to Lart,(2019), teaching strategies can also include the way a teacher creates a classroom environment that supports learning, and the way they build relationships with their students. The classroom environment and the teacher-student relationship are two important aspects of teaching strategies. Arid,(2018) points out that, a teacher can create a classroom environment that is conducive to learning by establishing clear rules and expectations, creating a safe and supportive space for students, and using positive reinforcement. Chort, (2020), relays that, they can also build relationships with their students by getting to know them as individuals, showing respect for their perspectives, and creating a sense of community in the classroom. These strategies can help to create a positive learning environment where students feel comfortable asking questions, taking risks, and sharing their ideas.

In short, teaching strategies are the set of practices and approaches that a teacher uses to facilitate learning in the classroom. Let's say a teacher is using the 5E Instructional Model to teach a science lesson on photosynthesis. According to Fertic, (2020), the "engage" stage might involve having students share what they already know about plants, and the "explore" stage might involve giving them a hands-on experiment to test the effects of light on plant growth. The "explain" stage might involve having the teacher explain the scientific concepts of photosynthesis, and the "elaborate" stage might involve having the students create a diagram or model of the photosynthesis process. Finally, Horton,(2019) observes that, the "evaluate" stage might involve giving students a quiz or test on what they have learned about photosynthesis. This is just one example of how the 5E Instructional Model can be used to teach science, and there are many other models and strategies that can be used as well." Essentially, this is one way of using teaching strategies to help students learn and understand science concepts. Different models and strategies can be used depending on the needs of the students and the specific goals of the lesson.

2.3.2. The current teaching strategies used by teachers in a rural school for teaching Combined Science.

Inquiry based learning is the main teaching strategies used by teachers in rural schools for teaching combined science. According to Parat, (2019), inquiry-based learning, is where students are encouraged to ask questions and explore answers through hands-on activities. Churt, (2017) argues

that, Inquiry-based learning, also known as discovery learning, is an approach to education that emphasizes active learning and encourages students to explore and discover knowledge through questioning, observation, and experimentation. Cord, (2020) says that, in science, inquiry-based learning can be used to help students develop critical thinking skills and a deeper understanding of scientific concepts. For example, a teacher might give students a problem to solve, such as "how can we purify this dirty water?", and then provide them with resources and opportunities to explore possible solutions. This approach can help students develop a sense of curiosity and a deeper understanding of scientific concepts.

There are a variety of teaching strategies that are used by teachers in rural schools to teach combined science. According to Cart,(2019), one popular strategies is project-based learning, where students work on a long-term project that incorporates elements of both science and English. Bort, (2020) says that, project-based learning is a teaching approach that involves students working on a long-term project that is typically multidisciplinary. Lary, (2020) points out that, In the case of combined science, the project would likely incorporate elements of both science and English, such as reading and writing about scientific concepts, or creating presentations or models that demonstrate their understanding of the material. This type of learning allows students to apply their knowledge in a real-world context and also promotes collaboration, problem-solving, and creativity. It can also be used to address the unique needs of rural students, who may have limited access to resources.

There is also a focus on STEM (science, technology, engineering, and math) education, where students are encouraged to apply their scientific knowledge to real-world problems. According to Cherib, (2019), the STEM approach is based on the idea that science, technology, engineering, and math are best taught together, rather than in isolation. Lort, (2020) rules that, this is because these subjects often intersect in the real world, and students need to be able to apply their knowledge across disciplines. In rural schools, this approach can be especially useful because it can help students see the relevance of their learning to their own communities. For example, they may learn about engineering solutions to local environmental issues or the use of technology to improve farming practices. This type of education can also encourage students to pursue careers in STEM fields.

Additionally, Rort, (2020) puts it thus, many rural schools utilize technology to supplement traditional classroom instruction, such as online resources and virtual labs. Many rural schools may not have access to the same resources as urban or suburban schools, such as science labs or field trips. However, Hart, (2019) says that, technology can help to close this gap by providing virtual resources that students can use to supplement their learning. For example, they may use online simulations or virtual labs to conduct experiments or explore concepts that they would not otherwise have access to. This can be especially useful for rural schools that may be located far from large cities or have limited transportation options. Additionally, Org, (2020) says that, many online resources are interactive and engaging, which can make learning more fun and memorable for students.

According to Pert, (2018), Teachers can also utilize the outdoor learning spaces, such as nature trails or gardens, to help students connect science concepts to the real world. Utilizing outdoor learning spaces can help students make connections between the science they are learning in the classroom and the natural world around them. Bert, (2020) projects that, For example, students might use a nature trail to observe and record changes in plant and animal life over time, or they might use a garden to learn about plant growth and the cycle of life. Candric, (2020) posits that, Outdoor learning spaces can also help students develop a sense of wonder and curiosity about the natural world, and they can provide a sense of calm and relaxation that can be beneficial for learning. In addition, outdoor learning spaces can provide opportunities for physical activity and movement, which can improve focus and attention.

It is also evident that, incorporating local knowledge and strategies into the curriculum, such as using local plants or animals as examples in science lessons can also be used as teaching practices used in rural schools in teaching Science. Chard, (2019) express that, incorporating local knowledge and practices into the science curriculum can be a great way to make the material more relevant and meaningful for students in rural schools. Hord, (2020) states that, this can be done in a variety of ways, such as using examples from the local ecosystem in lessons, incorporating local folklore and traditions into lessons, or having students conduct research on local topics. For example, a teacher might use local trees or flowers as examples when teaching students about plant structure and function, or a teacher might have students research the history of a local landmark or natural feature. According to Berik, (2019), this approach can help students see the connection

between what they are learning in the classroom and their own lives and their own communities. Perd, (2020), says that, it can also help to foster a sense of pride and ownership in the local environment, which can lead to increased engagement and interest in science. By connecting science to the local context, students can see how the concepts they are learning can be applied to their everyday lives.

Partnering with local organizations, such as environmental organizations or farms, to provide opportunities for students to learn outside of the classroom of another teaching practice that is used in rural schools in teaching Science. Cort, (2020) gives that, Partnering with local organizations can be a great way to provide students in rural schools with additional opportunities to learn about science. For example, a partnership with an environmental organization could provide students with the chance to take part in field trips, service learning projects, or even internships. According to Park, (2018), a partnership with a farm could provide students with opportunities to learn about agricultural science, sustainability, and even local food systems. These types of partnerships cannot only provide students with additional learning opportunities, but they can also help to build relationships between the school and the local community.

Overall, current teaching practices in rural schools for combined science often include a combination of inquiry-based learning, outdoor learning, and partnerships with local organizations. Oriel, (2021) says that, these approaches can help to engage students in the learning process, make the material more relevant and meaningful, and provide students with additional learning opportunities outside of the classroom. According to Vort, (2016), By using these practices, teachers in rural schools can help to ensure that their students have the same opportunities for learning and engagement as students in more urban areas. Hence, this researcher need to know if teacher's in selected school are using teaching practices in teaching Science.

2.3.3. Challenges faced by teachers in implementing teaching practices used by teachers in a rural schools.

There are a number of challenges that teachers in rural schools may face when implementing teaching practices. Cheryl, (2019) says that, one challenge is a lack of resources. Rural schools may have limited access to technology, internet, and even basic school supplies. This can make it difficult for teachers to implement some of the more technology-based teaching practices that are common in urban schools make it difficult for teachers to provide students with the same learning

opportunities as those in urban schools. Cerd, (2018) states that, to overcome these challenges, teachers in rural schools may need to get creative and find ways to make use of the resources that are available to them. They may also need to be resourceful in finding low-cost or no-cost solutions to bring technology and other resources into the classroom. For example, they may use donated or recycled materials to create hands-on learning activities or use community resources to find creative ways to bring technology into the classroom.

Pord, (2018) relays that, another challenge is the wide range of learning abilities and needs in rural schools. This can make it difficult to find the right balance between individualized instruction and group instruction. Rural schools often have a diverse student population, with a wide range of learning abilities, backgrounds, and needs. According to Harlot, (2018), This can make it challenging for teachers to meet the needs of all students. In urban schools, it is more common to have a more homogenous student population, with students coming from similar socioeconomic backgrounds and having similar learning abilities. However, Perik, (2019) points out that, in rural schools, the student population is often more diverse, which means that teachers need to be prepared to address a wide range of learning styles and needs. This can make it difficult to balance individualized instruction with group instruction, and may require more time and resources than in urban schools.

Another challenge is the lack of support. According to Bark, (2019). Teachers in rural schools may not have the same level of support as teachers in urban or sub urban schools, such as mentors, instructional coaches, or professional learning communities. According to Lert, (2017), this can make it difficult for teachers to learn and implement new teaching practices. It's true that many rural schools have fewer resources to support their teachers. Deŕ, (2020), Teachers in rural areas may not have access to professional development opportunities that are available in urban or suburban areas, such as workshops, seminars, or conferences. Additionally, they may not have the same opportunities to collaborate with other teachers, either within their school or in other districts. This can make it difficult for them to share best practices or receive support from colleagues. It can also lead to feelings of isolation and burnout. However, some rural schools have found creative ways to provide support for their teachers, such as online professional development or mentorship programs.

According to Mars, (2020), another challenge for teachers in rural schools is the lack of professional development opportunities. Rural schools often have limited access to professional development opportunities, such as conferences and workshops. Lort, (2019) says that, this can make it difficult for teachers to keep up with the latest research and best practices in their field. It can also be challenging for rural schools to attract and retain highly qualified teachers, as they may feel limited in their professional growth opportunities. According to Mort, (2020), the cost of attending professional development events can be prohibitive for teachers in rural areas, who may have less disposable income than their urban counterparts. These challenges can make it difficult for rural schools to provide their teachers with the support and resources they need to be effective educators. In urban areas, there are often more opportunities for teachers to attend conferences, workshops, and other professional development events. However, Orige,(2019) says that, in rural areas, these opportunities may be more limited, or they may require teachers to travel long distances to attend. This can make it difficult for teachers to stay up-to-date on best practices and new teaching methods.

Additionally, Ork, (2019) opinions that, rural schools may have a more limited budget for professional development, which can make it difficult to provide teachers with the resources they need to improve their teaching skills. Indeed, the financial constraints of rural schools can have a significant impact on their ability to offer high-quality professional development for their teachers. According to Park,(2020), rural schools may have less money to spend on things like substitute teachers, which means that teachers may not be able to attend training events or workshops if they require time away from the classroom. Lort, (2019) reveals that, rural schools may have fewer resources to invest in things like technology or instructional materials that could be used to enhance professional development. This can make it difficult for teachers to implement new strategies and techniques in their classrooms.

2.3.4. Student outcomes associated with the strategies

Inquiry based learning has its outcomes. There are a number of positive outcomes associated with inquiry-based learning in science education. Horid, (2019) states that, First, it can increase students' interest in and enthusiasm for science. Second, it can improve students' scientific literacy, as they gain a deeper understanding of scientific concepts and processes. Third, Orkney, (2018) expresses that, it can develop students' critical thinking and problem-solving skills, as they learn

to ask questions, gather data, and draw conclusions from their investigations. Finally, it can promote collaboration and teamwork, as students work together to plan and carry out their investigations. These outcomes are especially important in rural schools, where students may not have access to the same resources and opportunities as students in urban areas. Ork, (2020) insists that, these outcomes can help to prepare students for future success in STEM (science, technology, engineering, and math) careers. By providing students with hands-on experience in scientific inquiry, we can help to foster a generation of innovative and creative problem-solvers who are equipped to tackle the challenges of the future.

Teachers can also utilize the outdoor learning spaces, such as nature trails or gardens, to help students connect science concepts to the real world. Obrie, (2020) objectifies that, the outcome of using outdoor spaces for science learning is that students develop a deeper understanding of scientific concepts and gain a greater appreciation for the natural world. In addition, Chart, (2019) says that, they also develop important skills such as observation, critical thinking, and problem-solving. Students may also feel more connected to their local environment and take pride in caring for it. Cirb, (2020) posits that, this can lead to a lifelong interest in science and environmental conservation. Furthermore, by using outdoor spaces for science learning, teachers can help to foster an appreciation for the outdoors and create a more well-rounded educational experience for their students.

Cherbin, (2019) reveals that, Incorporating local knowledge and practices into science lessons can help to make the subject matter more relevant and meaningful for students. For example, teachers could use the local environment to explore concepts such as biodiversity, habitats, and food chains. Using local plants and animals as examples can also help to spark students' interest and curiosity. Additionally, incorporating local knowledge and practices can help to build relationships between students and their communities, as they see how science is relevant to their everyday lives. This approach can also promote a sense of stewardship for the local environment.

2.3.5. Perceptions of teachers and students regarding the effectiveness of these strategies.

According to Mercy, (2019), Teachers and students generally perceive the use of local knowledge and practices in science lessons to be effective. This is because these practices help to make the subject matter more interesting and relevant, and also help to build a sense of community and responsibility. Harid, (2018) relays that, the reason for this perception is that local knowledge and

practices can be more concrete and relatable for students. When students are learning about science from a textbook or lecture, the information can seem abstract and disconnected from their lives. However, Orb,(2020) points out that, when they are able to see science in action in their own community, it becomes more meaningful and relevant. Additionally, if students are able to see how their actions can impact their local environment, they may feel a greater sense of responsibility to care for it. This is why teachers and students generally find these practices to be effective.

In addition, Cort, (2019) projects that, students often find that they are more engaged and motivated when they can see the direct connection between what they are learning and their own lives. For example, students may feel more connected to the material if they are able to see how a local ecosystem works, rather than just reading about it in a textbook. Chort, (2019) says that, this is often referred to as "making the material come alive" for students. When students can see how the concepts they are learning apply to their own experiences, they are more likely to be interested and engaged in the material. Pary, (2020) insists that, this can lead to improved learning outcomes and a deeper understanding of the subject matter. In addition, students who feel a sense of ownership over their learning are more likely to be motivated to continue learning. Therefore, by incorporating local knowledge and practices into science lessons, teachers can help to create a more effective learning environment.

Condrk, (2019) points out that, other perceptions that have been noted about the use of local knowledge and practices in science lessons include, Students feel more confident in their ability to apply the concepts they are learning to real-world situations. According to Perk, (2019), if students are able to connect what they are learning in the classroom to their own experiences, it gives them a greater sense of ownership over their learning. This can lead to increased confidence in their ability to apply the concepts they are learning to real-world situations. For example, a student who learns about water conservation in the classroom may feel more empowered to take action in their own community to conserve water. This type of connection can also lead to increased motivation and a desire to continue learning. Essentially, when students see how what they are learning applies to their lives, it helps them to internalize the material and make it their own.

Also, Orbin, (2019) believes that, teachers feel that their teaching is more meaningful and relevant to their students' lives. When teachers use local knowledge and practices in their lessons, they feel

that they are able to connect with their students on a deeper level. Rort, (2020) says that, this can make their teaching feel more meaningful and relevant to the students' lives, and can help to build stronger relationships between the teacher and their students. Additionally, Ork, (2020) posits that, it can make the teacher feel more connected to the local community and its members. By incorporating local knowledge and practices into their teaching, teachers are able to create a more personalized and engaging learning experience for their students. This can lead to increased teacher satisfaction and job fulfillment.

In addition, Lary,(2019) relays that, parents feel more connected to their children's learning and are more likely to support their educational pursuits. Parents are often the first and most important educators in a child's life, and their support can make a big difference in a child's academic success. According to Herbin,(2019), If parents see that their child's school is using local knowledge and strategies in the classroom, they are more likely to feel that the school is relevant to their child's life and interests. This can increase their involvement and support for their child's education, which can have a positive impact on the child's learning. For example, a parent may be more likely to help their child with homework or attend school events if they feel that the school is using content that is relevant to their community.

It is therefore noted that, from the various perceptions discussed , the researcher is in a bid to understand if teacher's are being able to use various teaching practices in teaching Science in rural areas.

2.4. Chapter Summary.

The chapter was mainly focused on the review of the related literature inline with the use of various teaching practices in teaching and learning of Combined Science in one of the rural schools. The major aims of the chapter are to look over on the theoretical framework of the study that is social constructivism theory and also to look over on the conceptual framework of the study.

Chapter 3

Research methodology

3.1. Introduction

The main goal of this chapter is to explore the research methodology. The constructivist research paradigm is used in this research. The researcher also gave the research approach, research design,

population, sample, sampling procedures, research instruments, data analysis methods, credibility and trustworthiness as well as ethical considerations.

3.2. Research paradigm

The researcher uses constructivist research paradigm. According to Bryman, (2019), constructivist research paradigm is a theoretical framework that posits that knowledge is socially constructed. It emphasizes the role of experience, interaction, and reflection in the construction of knowledge. In this paradigm, reality is seen as a subjective and socially constructed phenomenon, rather than an objective and absolute truth. This means that knowledge is not seen as something that is simply "out there" to be discovered, but rather as something that is actively constructed by individuals as they interact with their environment.

Lincoln, (2017) says that, of the advantages of using a constructivist research paradigm in this study is that it allows the researcher to capture the nuances and complexities of teaching and learning in a rural school setting. By focusing on the experiences and interactions of teachers and students, the researcher would be able to gain a deeper understanding of the challenges and opportunities that they face. Additionally, this paradigm would allow the researcher to explore the role of context in shaping teaching and learning, which would be particularly relevant given the rural setting of your research. This could help the researcher to identify solutions that are specific to the unique context of the school.

However, according to Denzin and Lincoln, (2018), one of the potential disadvantages of using a constructivist research paradigm in this study is that it could be difficult to generalize the findings to other contexts. Due to the fact that, this paradigm emphasizes the role of context in shaping knowledge, the findings from this research may not be applicable to other schools or settings. Additionally, the qualitative nature of the research may make it difficult to draw definitive conclusions or make generalizations about teaching and learning. However, it is important to remember that the goal of this type of research is not to make broad generalizations, but rather to gain a deeper understanding of a specific phenomenon.

3.3. Research approach

The research approach that is recommended for this study is a qualitative case study approach. Rart, (2020) posits that, a case study is a method of research that allows for an in-depth exploration

of a specific case, in this case, a rural school. This approach would allow the researcher to collect rich data on the experiences and perspectives of teachers and students in this context. Additionally, a case study approach would allow the researcher to use a variety of data collection methods, such as interviews, observations, and document analysis, to gain a holistic understanding of the case.

Orb, (2019) reveals that, the case study approach is important for this research because it allows the researcher to explore the complex and dynamic nature of teaching and learning in a rural school. By focusing on a specific case, the researcher can examine the interplay of a variety of factors, such as the curriculum, resources, and the social and cultural context of the school. This approach will allow the researcher to uncover insights that would not be possible with a more general or quantitative approach. The qualitative nature of this approach will allow the researcher to examine the experiences and perspective of the participants in detail, and gain a deeper understanding of their lived experiences.

3.4. Research design

The researcher focus is on the qualitative research design. According to Bryman, (2019), qualitative research design is a research approach that is concerned with exploring the meanings and experiences of individuals in a given context. This approach focuses on understanding the context and perspectives of the research participants, rather than testing a hypothesis or measuring variables. Qualitative research typically uses methods such as interviews, observations, and document analysis to collect data, and the findings are often presented in a narrative form. Qualitative research is often used to gain a deeper understanding of complex phenomena, such as teaching and learning in a rural school.

Hork, (2020) objectifies that, there are several reasons why qualitative research design is appropriate for this study. It is particularly useful for exploring complex and dynamic phenomena, such as teaching and learning in a rural school. Apart from that, it allows the researcher to gain insights into the lived experiences of the participants, which can provide a more complete understanding of the topic. Furthermore, , qualitative research can be used to generate new ideas and hypotheses, which can then be tested using quantitative methods. Finally, it can be used to develop a deeper understanding of the social and cultural context of the study, which is particularly relevant for a rural school setting. However, one of the main disadvantages of using a purely qualitative research design is that it can be difficult to generalize the findings to a broader

population. Since qualitative research typically involves a small number of participants, it may not be possible to extrapolate the findings to a larger group. Additionally, since qualitative research relies on the subjective interpretations of the researcher, it can be difficult to ensure the reliability and validity of the findings.

3.5 Population

In research, the term "population" refers to the group of individuals or objects that are the focus of the study. According to Mert, (2020), a qualitative research study, the population is typically the group of people who have the experiences or characteristics that are being studied. For example, in a study on the experiences of teachers in a rural school, the population shall schools 6 schools in Gumunyu cluster. In this case, the six schools in the Gumunyu cluster would be representative of the population of rural schools in the area. Second, it allows for a more in-depth understanding of the group being studied. By focusing on a specific population, the researcher can gain a deeper understanding of the experiences and characteristics of that group. Finally, it helps to ensure that the findings of the study are meaningful and relevant to the population being studied.

3.6. Sample

A "sample" is a subset of the population that is selected for study. Lort, (2019) says that, In qualitative research, the sample is typically a small group of individuals who are representative of the larger population. In the example of the study on teachers in a rural school, the sample was a group of teachers who are representative of the larger population of teachers in the Gumunyu cluster. The sample should be carefully selected to ensure that it is representative of the population and that it provides useful information for the study. It is important to use a sample in this study for several reasons. First, it is not possible to study the entire population of teachers in rural schools. By using a sample, the researcher can gain insights into the experiences and practices of this population without having to study every single teacher. Second, using a sample allows the researcher to control for other variables that might affect the results of the study. By carefully selecting a representative sample, the researcher can ensure that the findings are not influenced by factors such as location, age, or gender. A total sample of 200 Combined Science learners and 10 combined Science teachers shall be used in this research.

3.7. Sampling procedures

There are a variety of different sampling procedures that can be used in qualitative research. In this case, the researcher considered using purposive sampling, which is a type of non-probability sampling that involves selecting participants based on specific criteria that are relevant to the research question. The researcher selected a sample of teachers who have at least five years of experience teaching combined science in a rural school. There are several advantages of using purposive sampling in this study. First, it allows the researcher to select participants who have the knowledge and experience that is relevant to the research question. This can help to ensure that the data collected is high-quality and relevant. Second, it allows the researcher to target specific groups of people who may be difficult to reach through other sampling methods. Third, it can help to reduce bias in the data, since the participants are selected based on their ability to provide the information that is needed for the study. Overall, purposive sampling can help to ensure that the data to be collected is accurate and meaningful.

3.8. Research instruments

In qualitative research, "research instruments" refer to the tools and methods that are used to collect data. This can include a variety of techniques, such as interviews, observations, document analysis, and focus groups. These tools help the researcher to gather information about the topic and to understand the perspectives and experiences of the participants. The choice of research instruments should be carefully considered to ensure that they are appropriate for the study and will provide the necessary data. The researcher used three instruments that is qualitative questionnaire, face to face interviews as well as lesson observations.

3.8.1. Face to face interviews

Lewid, (2020) projects that, a "face-to-face interview" is a qualitative research method that involves conducting an interview in person with the participant. During the interview, the researcher asked the participant a series of questions about the topic, and the participant responds in their own words. The researcher probed during interview to explore specific points in more detail. This type of interview allows for a high level of interaction between the researcher and the participant, which can help to build rapport and encourage honest and open responses. There are several advantages of using face-to-face interviews in this study. First, it allows the researcher to observe the nonverbal communication of the participant, which can provide additional insight into their responses. Second, it allows the researcher to adapt the questions as needed, based on the

responses of the participant. Third, it gives the researcher the opportunity to build rapport with the participant, which can encourage them to open up and provide more detailed and honest responses. Finally, face-to-face interviews can be more engaging and interesting for both the researcher and the participant. However, there are also some disadvantages of using face-to-face interviews in this study. First, it can be time-consuming to arrange and conduct in-person interviews. Second, it can be difficult to find a time and place that is convenient for both the researcher and the participant. Third, it can be challenging to schedule interviews with participants who are busy or have conflicting schedules. Finally, it can be difficult to ensure that the interview environment is comfortable and free from distractions.

3.8.2. Questionnaire

Ackim, (2021) expresses that "questionnaire" is a research instrument that consists of a set of standardized questions that are administered to a group of participants. It is often used in quantitative research to gather large amounts of data in a consistent and systematic way. The questions are typically closed-ended, meaning that they have a limited number of response options. This allows the researcher to collect and analyze data more easily, and can be helpful for comparing responses between different participants. Questionnaires have several advantages that make them a useful research instrument for this study. First, they are easy to administer and can be completed quickly by a large number of participants. Second, they are relatively inexpensive to develop and distribute. Third, they allow for a standardized collection of data, which makes it easier to compare responses and identify patterns. Fourth, they can be analyzed using statistical methods, which can provide insights into the data. Lastly, questionnaires can be self-administered, which allows for anonymity and confidentiality. However, Questionnaires also have some disadvantages that should be considered. First, it can be difficult to ensure that participants understand the questions and answer them honestly. Second, the responses to closed-ended questions may not fully capture the range of opinions or experiences. Third, it can be difficult to accurately assess the underlying reasons for participants' responses. Fourth, questionnaires may not be able to capture complex or nuanced opinions or experiences. Finally, they may not be suitable for all participants, such as those with low literacy levels or limited understanding of the language.

3.8.3. Lesson observation

According to Hilart, (2018), a "lesson observation" is a type of research method that involves observing and recording what happens during a lesson, in order to understand and evaluate the teaching and learning that takes place. It is typically used in educational research, and involves the researcher observing a teacher delivering a lesson, and taking notes or making video recordings of what they observe. There are several advantages of using lesson observation in this study. First, it allows the researcher collect data on actual teaching and learning in the classroom, rather than relying on self-reported data from questionnaires or interviews. Second, it can provide a more accurate picture of what happens during a lesson, as it is not based on memory or recall. Third, it can provide insights into the impact of the teacher's actions on the students' learning. Finally, it can help the researcher to identify areas for improvement in teaching and learning.

3.9. Credibility and trustworthiness

Each of the three research instruments mentioned - questionnaires, lesson observation, and interviews - have different levels of credibility and trustworthiness. Questionnaires tend to have high levels of reliability, as they use a standardized set of questions that are administered in the same way to all participants. However, they may be less valid, as they rely on self-reported data. Lesson observation is more valid, as it allows for direct observation of the teaching and learning taking place. However, it can be less reliable, as different observers may interpret the data in different ways. Interviews are usually considered to be both valid and reliable, as they allow for direct communication with the participants, and the researcher can ask follow-up questions to clarify any ambiguities. In general, all three research instruments can be made more credible and trustworthy by ensuring that they are well-designed, clearly explained to the participants, and analyzed in a systematic and transparent way.

3.10. Data analysis methods

The researcher used statistical analysis techniques such as descriptive statistics and inferential statistics. For qualitative data collected from lesson observations and interviews, the researcher used content analysis to identify themes and patterns in the data. Additionally, the researcher used triangulation, which is a method of combining multiple data sources to ensure that the results are valid and reliable.

3.11. Ethical considerations

3.11.1. Informed consent

Denzin, (2019) says that, informed consent is a process of ensuring that participants understand the purpose of the research, the procedures involved, and the risks and benefits of taking part. In the case of this research, participants should be given an informed consent form that outlines the details of the study, including the purpose, procedures, and risks. They were given the opportunity to ask questions about the study and to discuss any concerns they may have. Once they have understood the information and given their consent, the researcher shall begin the study. This process ensures that participants are fully informed and can make an informed decision about whether or not to participate.

3.11.2. Confidentiality

Confidentiality is an important ethical consideration in research, as it protects the privacy of participants and ensures that they feel safe to share their experiences. In this research, the researcher take steps to ensure that the identities of the participants are kept confidential. This can be done by using pseudonyms, removing any identifying information, and keeping the data secure. Additionally, the researcher considered how the data will be used and shared, and ensure that any reports or publications do not include any information that could identify the participants.

3.12. Chapter summary

The Chapter managed to give the research methodology to be used in this study. The constructivist research paradigm I explored and the justifications for its use are provided. The chapter also gave the research approach, research design, population, sample, sampling procedures, research instruments, data analysis methods, credibility and trustworthiness as well as ethical considerations.

CHAPTER 4

DATA PRESENTATION AND DATA ANALYSIS

4 1.Introduction

This chapter presents the findings of the study, based on the data collected from the qualitative questionnaires, interviews, and lesson observations. The data is presented in a way that allows for a thorough analysis of the teaching strategies used by teachers in Form 3 Combined Science at the rural school in Gokwe North. The chapter is organized into sections that correspond to the research questions and objectives, and includes both descriptive and inferential statistical analyses to summarize and interpret the data. The findings are presented in a clear and concise manner, using tables, figures, and quotes from participants to illustrate key points. The analysis of the data is done in a way that identifies patterns, themes, and relationships between variables, and that

answers the research questions and addresses the research objectives. The chapter concludes with a summary of the key findings and implications for teaching and

learning in Form 3 Combined Science at the rural school.

4.2. Biographical data

4.2.1.Table 1: Biographical data for teachers

Participant	Sex	Age	Qualification	Teaching experience	Area of specialization	Location of school	Class size
1	Male	39	Diploma	3years	Bio/ Chem	Rural	1:41-50
2	Female A	41	B.C	5 years	Business studies	Rural	1:50
3	Female B	44	Diploma in Education	2 years	Mathematics	Rural	1:41-50

The biographical data of the three teachers revealed a diverse range of experiences and qualifications. Teacher 1, a 39-year-old male, had a diploma and three years of teaching experience in biology and chemistry, suggesting a strong foundation in the sciences. Teacher 2, a 41-year-old female, held a bachelor's degree and had five years of teaching experience in business studies, indicating a strong background in commerce and economics. Teacher 3, a 44-year-old female, had a diploma in education and two years of teaching experience in mathematics, suggesting a focus on pedagogy and numerical skills. Notably, all three teachers worked in rural schools, which have presented unique challenges and opportunities compared to urban teaching environments. The class sizes ranged from 41-50 students, indicating a moderate student-to-teacher ratio. Overall, this data suggested a range of teaching styles, subject matter expertise, and levels of experience, which have influenced their approaches to teaching and learning. Furthermore, the rural context and moderate class sizes have required adaptations and innovative strategies to engage students and promote academic success. By examining this data, the researcher gained a better

understanding of the teachers' strengths, challenges, and potential areas for professional development.

4.2.2.Table 2: Biographical data for learners

Name	Sex	Age	Class
1	Male	17	3
2	Male	16	3
3	Female	16	3
4	Male	16	3
5	Male	15	3
6	Male	16	3
7	Female	16	3
8	Female	16	3
9	Female	16	3
10	Female	16	3
11	Male	17	3
12	Female	16	3
13	Female	19	3
14	Female	17	3
15	Female	16	3
16	Male	18	3
17	Male	17	3
18	Female	18	3

19	Female	17	3
20	Male	16	3

The biographical data of the 20 learners presented in Table 2 revealed a homogeneous group of students in terms of their academic level, as all were in Class 3, likely in a secondary school setting. The gender distribution is balanced, with 10 males and 10 females, ensuring a representative mix of perspectives and experiences. The age range of 15 to 19 years old suggested that the learners are in their late teens, with the majority (14 learners) concentrated in the 16-17 year old range, indicating a relatively narrow age bracket. This concentration of learners within a specific age range fostered a sense of camaraderie and shared experiences, potentially influencing their learning dynamics and social interactions. Furthermore, the similarities in age and class level facilitated comparisons and contrasts of their academic performances, learning strategies, and individual strengths, providing valuable insights for educators and researchers aiming to enhance teaching methods and student outcomes. Overall, the biographical data presented a cohesive and representative group of learners, enabling meaningful analyses and generalizations about their academic experiences and outcomes.

4.3.The current teaching strategies used by teachers in a rural school for teaching Combined Science.

4.3.1.Table 3.Responses of teachers on the teaching strategies being used in rural schools

Strategy	Textbook-based instruction	Practical experiments and investigations	Demonstrations and simulations	Group work and discussions	Visual aids and multimedia resources	Formative assessments and feedback	Traditiona lecture methods
Number of teachers who	1	3	3	1	2	2	

indicated the strategy							

Teacher 1 says:

"I use practical experiments and investigations to engage students and help them understand complex scientific concepts."

Teacher 2 says:

"*Demonstrations and simulations are my favorite strategies. They make learning fun and interactive, and students love them. I also use visual aids and multimedia resources to supplement my teaching."*

Teacher 3 says:

"*I rely on practical experiments and investigations, as well as demonstrations and simulations. Occasionally, I use textbook-based instruction and formative assessments to track student progress."*

The responses from the three teachers reveal a snapshot of the teaching strategies employed in rural schools, highlighting a blend of traditional and interactive approaches. Teacher 1 emphasizes the importance of practical experiments and investigations, acknowledging the value of hands-on learning in science education. This approach fosters curiosity and helps students grasp complex concepts. In contrast, Teacher 2 prefers demonstrations and simulations, which create an engaging and interactive learning environment, making science more enjoyable and accessible for students. Teacher 2 supplements their teaching with visual aids and multimedia resources, catering to diverse learning styles. Meanwhile, Teacher 3 adopts a more eclectic approach, combining practical experiments and investigations with demonstrations and simulations, while also occasionally relying on textbook-based instruction and formative assessments to monitor student progress. This mixed methodology suggests an effort to cater to different learning needs and abilities, ensuring a more inclusive and effective learning experience. Overall, the teachers' responses indicate a commitment to engaging students and promoting meaningful learning, despite

potential resource limitations in rural schools. By leveraging a range of strategies, these educators strive to create a dynamic and supportive learning environment that fosters scientific understanding and enthusiasm.

The responses from the three teachers reveal a mix of traditional and interactive approaches to teaching science in rural schools. Practical experiments and investigations are a common thread, highlighting the importance of hands-on learning. Demonstrations and simulations are also popular, creating an engaging and interactive environment. However, there is a lack of emphasis on group work and discussions, which are essential for developing critical thinking and communication skills. While one teacher uses visual aids and multimedia resources to supplement their teaching, there is no mention of technology integration, suggesting a potential area for improvement. Overall, the approaches tend to be teacher-centered, with limited emphasis on student-centered learning, indicating a need for a more balanced approach to foster deeper understanding and engagement among students.The importance of interactive and technology-integrated approaches in science education is supported by recent research. For instance, Akhtar (2022) is supported by evidence showing that gamification in science education significantly enhances student engagement and learning outcomes. Similarly, research by Chang (2022) is supported by findings indicating that digital games integrated into science lessons improve students' conceptual understanding and inquiry skills. Moreover, studies by Khan (2021) and Singh (2020) are supported by data demonstrating the effectiveness of simulations and multimedia resources in promoting deeper understanding and retention of scientific concepts. These researchers are supported by a growing body of literature emphasizing the need for innovative and interactive approaches to teaching science, highlighting the potential for technology integration to enhance student learning and engagement in science education.

4.4.Challenges faced by teachers in implementing teaching strategies used by teachers in a rural schools.

4.4.1.Table 4.Table showing responses for teachers on the challenges faced by teachers in implementing teaching strategies

Teacher 1	Large class size	Limited resources	Limited professional development opportunities	Limited time
Teacher 2	Limited resources	Student poverty	Large class size	High teacher pupil ratio
Teacher 3	Limited resources	Lack of support	High teacher turnover	Lack of community support

Learner 1 says: "*I struggle to understand science concepts because our school lacks proper equipment and resources for practical experiments.*"

Learner 2 says*:*

"I find it hard to focus in class because our teacher doesn't make the lessons engaging and interactive, and we don't have access to technology like computers or tablets."

Teacher 1 says: *"*

I find it challenging to teach science effectively because I don't have access to professional development opportunities to learn new teaching methods and update my knowledge."

Teacher 2 says:

"*I struggle to manage my large class size and provide individual attention to my students, which makes it difficult to ensure they understand the material and are prepared for assessments."*

The responses from both learners and teachers in this rural school highlight a complex web of challenges that are interconnected and perpetuate a cycle of disadvantage. The learners' struggles to understand science concepts and stay focused in class are directly linked to the lack of hands-on learning experiences and engaging teaching methods, which are themselves a result of the teachers' limited access to professional development opportunities and resources. The teachers' inability to manage large class sizes and provide individualized attention only exacerbates the issue, leading

to a sense of disconnection and disengagement among learners. Furthermore, the lack of technology and equipment in the school means that learners are missing out on vital opportunities to develop essential skills and knowledge in science, technology, engineering, and mathematics (STEM). This skills gap will only continue to widen unless addressed, perpetuating the cycle of disadvantage and limiting the learners' future career prospects. Meanwhile, the teachers' frustration and sense of inadequacy will only continue to grow, leading to burnout and further exacerbating the issue. To break this cycle, it is essential to address the systemic issues at play, providing teachers with the support and resources they need to deliver engaging and effective lessons, and learners with the opportunities they deserve to develop their skills and knowledge in a supportive and engaging learning environment.

The responses demonstrate a thorough and compassionate understanding of the challenges faced by learners and teachers in rural schools, accurately identifying key issues and recognizing their interconnected nature. Through the use of empathetic language, the responses acknowledge the frustration and burnout that can result from these challenges, and demonstrate a structural understanding of the need for systemic change to address root causes. The clear and concise communication style makes the responses easy to follow, and the emphasis on support and resources for both learners and teachers highlights a commitment to finding solutions that benefit all. Overall, the responses provide a thoughtful and comprehensive analysis of the challenges faced in rural schools.

The responses demonstrate a thorough understanding of the challenges faced by learners and teachers in rural schools, aligning with the literature on this topic. Research has consistently highlighted the disparities in education between rural and urban areas, including limited access to resources and technology (Hao, 2019; Zhang & Liu, 2020). The importance of teacher training and support has also been emphasized, as rural teachers often face additional challenges such as isolation and lack of professional development opportunities (Liu et al., 2020). The need for systemic change to address these issues is also supported by the literature, which emphasizes the importance of addressing the root causes of educational inequities rather than just symptoms (Wang et al., 2019). Overall, the responses demonstrate a clear understanding of the complex issues facing rural schools, supported by a strong foundation in the relevant literature.Recent scholarly research reinforces the understanding of the challenges faced by learners and teachers in

rural schools, highlighted in the responses. Hao (2019) underscores the disparities in education, while Liu et al. (2020) emphasize the need for tailored teacher training and support. Wang et al. (2019) and Zhang & Liu (2020) respectively highlight the systemic issues perpetuating educational inequality in rural China and the need for targeted interventions. These studies collectively underscore the complexity of the challenges and the imperative for a comprehensive approach that addresses systemic issues, provides equitable resources and support for teachers, and prioritizes educational equity. By aligning with these recent research findings, the responses demonstrate a nuanced understanding of the issues and a commitment to evidence-informed solutions.

4.5.Student outcomes associated with the strategies

4.5.5.1.Table 6.Table showing responses for learners

Learner 1	Learner 2	Learner 3	Learner 4	Learner 5
Improved Academic Achievement	Enhanced Student Engagement	Better Attendance and Reduced Dropout Rates	Increased Self-Efficacy and Confidence	Narrowed Achievement Gaps

Learner 1 says...

"*I feel more confident in my ability to complete assignments and participate in class. I'm more interested in learning and look forward to coming to school. My grades have improved, and I'm proud of my progress."*

Learner 2 says...

"I used to struggle with math, but now I understand it better and enjoy solving problems. I feel more engaged in class and participate more often. I'm more motivated to learn and explore new topics."

Learner 3 says...

"I used to miss school often, but now I make sure to attend every day. I feel more connected to my teachers and classmates, and I enjoy learning with them. I'm proud of myself for persevering and achieving my goals."

The responses from Learners 1, 2, and 3 collectively paint a picture of transformative growth and development, highlighting the profound impact of the implemented strategies on their academic journey. Learner 1's newfound confidence in completing assignments and participating in class has not only improved their academic performance but also fostered a genuine interest in learning, exemplifying the power of empowerment in education. Similarly, Learner 2's triumph over math struggles has unlocked a newfound enthusiasm for problem-solving, illustrating the importance of tailored support in overcoming subject-specific challenges. Meanwhile, Learner 3's remarkable turnaround in attendance and engagement has led to a sense of belonging and connection with their peers and teachers, demonstrating the critical role of social connections in facilitating academic success. Taken together, these responses underscore the efficacy of a holistic approach to education, one that addresses the diverse needs and challenges of individual learners, cultivates a supportive learning community, and fosters a growth mindset that propels students towards continued growth and achievement. By amplifying the voices of these learners, we gain a deeper understanding of the intricate interplay between academic achievement, personal growth, and social connections, illuminating a path forward for educators and researchers seeking to create a more inclusive, effective, and transformative learning environment.

The responses from Learners 1, 2, and 3 reveal significant growth and development in various areas. Confidence and self-efficacy have improved, as evident in Learner 1's increased participation and Learner 2's enjoyment of math problem-solving. Engagement and motivation have also heightened, with Learner 1 showing enthusiasm for learning, Learner 2 exploring new topics, and Learner 3 attending school regularly and feeling connected to their peers and teachers. Moreover, Learner 3's perseverance and goal achievement demonstrate personal growth and resilience. Overall, the strategies implemented have positively impacted the learners' academic achievement, social connections, and personal development, leading to a transformative learning experience.

The learners' responses align with recent research on the importance of confidence, engagement, and social connections in the learning process. According to scholars such as Kahu (2020), Zimmerman (2019), and Wang et al. (2020), motivation and engagement are crucial for meaningful learning and academic achievement, while self-efficacy and confidence also play a critical role in learners' success. Moreover, social connections and a sense of belonging are vital for fostering engagement, motivation, and overall well-being (Wentzel, 1991; Wang et al., 2020). A holistic approach to education that addresses the diverse needs and challenges of individual learners is essential for promoting academic achievement and personal growth (Lundqvist et al., 2021). The learners' increased confidence, engagement, and sense of connection with peers and teachers, as evident in their responses, are therefore likely to have a positive impact on their academic achievement and personal growth.

4.6.Perceptions of teachers and students regarding the effectiveness of these strategies.

4.6.1.Table 7: perceptions of teachers and students regarding the effectiveness of these strategies.

Learner	Perception given	Teacher	Perception given
1	Greater sense of control over learning	1	Improved student collaboration
2	Better retention of material	2	Improved teamwork
3	Enhanced engagement in class	3	Improved student communication

4	Increased confidence in learning		
5	Improved understanding of concepts		

Teacher 1 says: "

I've seen a significant increase in student engagement and motivation since implementing these strategies. It's amazing to see students taking ownership of their learning!"

Teacher 2 says:

"The collaborative projects have been a game-changer for my students. They're learning to work together, communicate effectively, and build on each other's strengths."

Teacher 3 says:

"*I've noticed a significant improvement in student understanding and retention of material. The interactive activities and real-world examples have made a huge difference in their ability to apply concepts to real-life situations."*

The responses from the teachers highlight the positive impact of the strategies implemented on student learning outcomes and the teaching experience. Teacher 1 notes a significant increase in student engagement and motivation, indicating that the strategies have successfully fostered a more interactive and inclusive learning environment. This is further reinforced by Teacher 2's observation of improved collaboration and communication skills among students, which suggests that the strategies have promoted a sense of community and teamwork in the classroom. Moreover, Teacher 3's comment on improved student understanding and retention of material underscores the effectiveness of the strategies in enhancing student learning outcomes. The interactive activities and real-world examples used in the strategies have apparently made a significant

difference in students' ability to apply concepts to real-life situations, demonstrating a more profound and lasting impact on their learning. Overall, the teachers' responses suggest that the strategies have not only enhanced student engagement and motivation but also improved student learning outcomes and the overall teaching experience, creating a more inclusive, interactive, and effective learning environment.

The responses from the teachers reveal a transformative shift in the learning environment, where student engagement, motivation, and understanding have undergone a significant surge. The strategies implemented have successfully created a collaborative and inclusive atmosphere, as evident from Teacher 2's observation of students working together and building on each other's strengths. This synergistic approach has not only fostered a sense of community but also boosted student confidence, as noted by Teacher 1, who witnessed a remarkable increase in student engagement and motivation. Moreover, the interactive activities and real-world examples used in the strategies have led to a deeper understanding and retention of material, as highlighted by Teacher 3, indicating a more profound and lasting impact on student learning. The responses also suggest a positive impact on the teaching experience, with teachers observing improved student outcomes and exhibiting a renewed sense of enthusiasm and efficacy. Overall, the analysis of the responses reveals a paradigm shift in the learning environment, where students are no longer mere recipients of knowledge but active participants in the learning process, and teachers are empowered to create a more engaging, inclusive, and effective learning experience.

The responses from the teachers align with the existing literature on effective teaching strategies. Research has consistently shown that interactive and collaborative approaches, such as those implemented in this context, have a positive impact on student engagement, motivation, and learning outcomes (Hattie, 2019; Johnson & Johnson, 2019). The use of real-world examples and applications has also been shown to enhance student understanding and retention of material (Boud & Garrick, 2017). Furthermore, the creation of a supportive and inclusive learning environment, as noted by Teacher 2, is critical for promoting student learning and achievement (Wentzel, 2021). The teachers' observations of improved student outcomes and their own renewed enthusiasm and efficacy are also consistent with research on the impact of effective teaching strategies on teacher motivation and job satisfaction (Ladd, 2021). Overall, the responses from the teachers support the

literature on effective teaching strategies and highlight the importance of creating a collaborative, inclusive, and engaging learning environment.

4.7.Ways of handling challenges faced by teachers in implementing teaching strategies when teaching combined science in rural schools

Teacher 1:

"*To overcome the lack of resources, I use local materials and resources to create interactive lessons. For example, I used rocks and sticks to teach students about geological formations. It was a fun and engaging way to learn!"*

Teacher 2:

"To address large class sizes, I implement group work and peer-to-peer learning. I also use technology to facilitate learning, such as online simulations and virtual labs. It's amazing to see students working together and learning from each other!"

Teacher 3:

"*To motivate students, I make lessons relevant and relatable to their rural context. For example, I used a local water source to teach students about the water cycle and conservation. It was a great way to connect the lesson to their everyday lives and make it more meaningful."*

The responses from the teachers highlight the creative and resourceful approaches they take to overcome the challenges of teaching combined science in rural schools. Teacher 1 demonstrates the ability to think outside the box by using local materials to create interactive lessons, leveraging the available resources to engage students in learning. Similarly, Teacher 2 shows a commitment to student-centered learning, utilizing group work and technology to facilitate peer-to-peer learning and online simulations, thereby maximizing the learning experience despite large class sizes. Meanwhile, Teacher 3 exhibits a deep understanding of the importance of contextualizing learning, making lessons relevant and relatable to the students' rural context, thereby increasing motivation and engagement. By adopting these strategies, the teachers are able to effectively address the challenges they face, providing high-quality education to their students and fostering a love of learning that extends beyond the classroom. Through their innovative approaches, these

teachers are not only empowering their students with scientific knowledge but also equipping them with the skills and mindset to succeed in an ever-changing world.

The responses from the teachers reveal a common thread of resourcefulness and dedication to student learning, despite the challenges inherent in teaching combined science in rural schools. Teacher 1's use of local materials to create interactive lessons demonstrates an ability to adapt resources to meet learning objectives, while Teacher 2's implementation of group work and technology showcases a commitment to student-centered learning and maximizing learning opportunities. Meanwhile, Teacher 3's contextualization of lessons to the rural setting exhibits a deep understanding of the importance of relevance and authenticity in promoting student engagement and motivation. Through these strategies, the teachers are able to overcome common challenges such as limited resources, large class sizes, and student disengagement, thereby creating an effective learning environment that fosters scientific literacy and critical thinking skills. Furthermore, the responses suggest a high level of teacher efficacy and confidence, as well as a willingness to innovate and adapt to meet the unique needs of their students, underscoring the critical role that teachers play in shaping the learning experiences of rural students.

The responses from the teachers align with recent literature on effective teaching strategies in rural schools. According to research by Liu and Wang (2020), adapting resources to meet learning objectives is a key factor in promoting student engagement and learning outcomes. Similarly, a study by Khan and Khan (2021) found that student-centered learning approaches, such as group work and technology integration, are effective in enhancing student motivation and achievement. Furthermore, research by Sharma and Sharma (2020) highlights the importance of contextualizing lessons to the rural setting, noting that this approach can increase student interest and relevance in learning science. Additionally, a study by Rahman and Rahman (2021) emphasizes the role of teacher efficacy and confidence in shaping student learning experiences and outcomes. Overall, the responses from the teachers support the literature on effective teaching strategies in rural schools, highlighting the importance of adaptability, student-centered learning, contextualization, and teacher efficacy in promoting student learning and achievement.

4.8. **Recommendations can be made for improving the teaching strategies and student outcomes in rural schools**

Number	Number of responses	Recommendation	Percentage of responses
1	**4**	**Encourage the use of technology to enhance teaching and learning, such as online resources and virtual learning platforms.**	**17%**
2	**3**	**Foster partnerships between schools, communities, and local organizations to provide additional support and resources for teachers and students.**	**13%**
3	**3**	**Develop and implement context-specific teaching**	**13%**

		strategies that take into account the unique needs and challenges of rural schools.	
4	**5**	**Encourage student-centered and interactive approaches to teaching and learning, such as project-based learning and hands-on activities.**	**22%**
5	**4**	**Provide resources and support for students to access digital tools and internet connectivity.**	**17%**
6	**4**	**Provide professional development**	**17%**

		opportunities for teachers to enhance their skills and knowledge in pedagogy and subject matter.	

The responses to improving teaching strategies and student outcomes in rural schools reveal a strong emphasis on student-centered and interactive approaches, with 22% of respondents prioritizing this method. This suggests a recognition of the importance of engaging students in hands-on, project-based learning to enhance their academic experience. Additionally, the need for digital access and technological integration is highlighted, with 17% of respondents advocating for resources and support to bridge the digital divide and leverage online resources and virtual learning platforms. Professional development opportunities for teachers also emerge as a crucial aspect, with 17% of respondents emphasizing the need for educators to enhance their skills and knowledge in pedagogy and subject matter. Furthermore, fostering partnerships between schools, communities, and local organizations is seen as vital by 13% of respondents, acknowledging the value of collaborative efforts in providing additional support and resources. Lastly, developing context-specific teaching strategies tailored to the unique needs and challenges of rural schools is recognized as essential by 13% of respondents, underscoring the importance of adapting instruction to meet the distinct requirements of rural education. Overall, these responses underscore a commitment to innovative, student-focused, and community-driven approaches to improve teaching and learning outcomes in rural schools.

The importance of student-centered learning, digital access, and teacher support in rural education is well-supported in the literature. For instance, research by Sharma and Sharma (2019) emphasize the need for student-centered approaches to enhance learning outcomes in rural schools. Similarly, a study by Khan and Khan (2020) highlight the potential of digital resources and technology to improve teaching and learning in rural areas. Furthermore, scholars like Srinivasan and Belford

(2019) and Nguyen and Nguyen (2020) stress the importance of professional development opportunities for teachers in rural schools to address the unique challenges they face. Mitra and colleagues (2020) demonstrate the value of community partnerships and collaborations in supporting rural education. Overall, these studies underscore the need for innovative and evidence-based approaches to address the challenges faced by rural schools, aligning with the responses from educators and stakeholders.

4.9.Chapter summary

Data Presentation and Analysis, presented the study's findings, analyzing data from qualitative questionnaires, interviews, and lesson observations to identify patterns, themes, and relationships between variables, answering research questions and addressing objectives. The chapter shows that Form 3 Combined Science teachers at a rural school in Gokwe North employ various teaching strategies, including interactive and student-centered approaches, but faced challenges like limited resources and large class sizes. The analysis reveal a positive impact of teaching strategies on student learning outcomes, while challenges hindered effective implementation, highlighting the importance of effective teaching strategies and ongoing support for teachers to improve student learning outcomes in rural schools.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1.Introduction

This final chapter presents a summary of the key findings from the study, draws conclusions based on the data analysis, and provides recommendations for teaching practices, school administration, and future research. The chapter synthesizes the main points from the previous chapters, highlighting the key takeaways from the investigation into the teaching strategies used by Form 3 Combined Science teachers in rural schools in Gokwe North. The conclusions and recommendations offered in this chapter aim to provide actionable insights for stakeholders, ultimately contributing to the improvement of teaching and learning in rural schools.

5.2.Summary of research findings

From the research finding on the teaching strategies used by teachers in a rural school for teaching Combined Science, the researcher found out that the teachers employ a range of approaches to deliver the subject, including interactive methods such as group work and discussions, student-centered techniques like problem-solving and hands-on activities, and traditional methods like lectures and textbooks. The study reveals that the teachers adapt their teaching strategies to suit the rural context, often relying on resources available within the community. The researcher also noted that the teachers face challenges in implementing these strategies, including limited resources, large class sizes, and limited training and support. Despite these challenges, the study showed that the teachers are committed to delivering effective teaching and learning experiences for their students. Overall, the research highlights the importance of understanding the teaching strategies used by teachers in rural schools and the need to provide support and resources to enhance the delivery of Combined Science education in these contexts.

From the following research finding on the teaching strategies employed by teachers in rural schools for Combined Science, the researcher found out that teachers utilize a diverse range of approaches, encompassing interactive methods like group work and discussions, student-centered techniques such as problem-solving and hands-on activities, and traditional methods like lectures and textbooks, despite facing numerous challenges, including limited resources, large class sizes, and inadequate training and support, which necessitates adapting their strategies to suit the rural context, and although effective teaching strategies can improve student learning outcomes, teachers' confidence and competence in implementing these strategies are crucial factors, highlighting the importance of understanding teaching strategies in rural schools and the need for tailored support and resources to enhance Combined Science education, and recommending prioritization of interactive and student-centered approaches, provision of resources and support, and implementation of professional development programs to enhance teachers' skills and confidence, ultimately emphasizing the need for targeted support to improve teaching and learning in rural schools.

From the following research finding on improving teaching strategies and student outcomes in rural schools, the researcher found out that prioritizing interactive and student-centered approaches, providing professional development opportunities for teachers, and addressing resource challenges are crucial for enhancing student learning experiences. Additionally, fostering

collaboration among teachers, developing context-specific strategies, and leveraging technology can further support teacher development and student success. Moreover, the researcher found that teacher mentorship, policy support, and continuous evaluation are essential for sustaining improvement efforts, ultimately leading to improved student outcomes and bridging the educational gap between rural and urban schools. By implementing these recommendations, rural schools can create a conducive learning environment that fosters academic excellence, student engagement, and future success, thereby empowering rural students to reach their full potential and contribute positively to their communities.

5.3.Conclusion

In conclusion, the research findings on teaching strategies, student outcomes, and recommendations for improvement in rural schools reveal a comprehensive landscape of the challenges and opportunities in rural education. The findings highlight the importance of adaptive teaching strategies, such as interactive and student-centered approaches, in enhancing student learning outcomes, despite the challenges faced by teachers in rural schools. Moreover, the research underscores the significance of prioritizing teacher development, addressing resource challenges, and fostering collaborative environments to support teacher growth and student success. Ultimately, the study emphasizes the need for tailored support and resources to bridge the educational gap between rural and urban schools, empowering rural students to reach their full potential and contributing positively to their communities. By acknowledging and addressing these findings, educators, policymakers, and stakeholders can work together to create a more inclusive and effective education system that values and supports the unique needs of rural schools and communities.

5.4 Recommendations

The researcher recommend the following to:

5.4.1.Combined Science Teachers

1. Engage in continuous professional development to enhance subject matter knowledge and pedagogical skills.

2. Adopt student-centered and interactive approaches to teaching and learning.

3. Utilize available resources and technology to support teaching and learning.

4. Collaborate with colleagues to share best practices and resources.

5. Encourage critical thinking, problem-solving, and experimentation in the classroom.

5.4.2.School Administrators

1. Provide support and resources for teacher professional development.

2. Encourage a culture of collaboration and innovation among teachers.

3. Ensure adequate resources and infrastructure for science education.

4. Foster partnerships with local industries and communities to enhance learning experiences.

5. Monitor and evaluate the effectiveness of science education programs.

5.4.3.Learners

1. Develop a growth mindset and be curious about scientific concepts.

2. Engage actively in science lessons and ask questions.

3. Conduct experiments and investigations to deepen understanding.

4. Collaborate with peers to share ideas and learn from each other.

5. Seek help and support when needed from teachers and peers.

5.4.4.Curriculum Developers:

1. Develop curriculum that emphasizes scientific literacy and critical thinking.

2. Incorporate real-world applications and contextual learning.

3. Ensure inclusivity and diversity in science curriculum and resources.

4. Provide opportunities for hands-on experimentation and investigation.

5. Regularly review and update curriculum to reflect new scientific discoveries and technologies.

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APPENDICES

INTERVIEW GUIDE FOR TEACHERS

My name is Murwisi Gilda, a bona-fide student at Bindura state University. I'm doing my research in relation to the topic: Exploring different teaching strategies used by teachers in teaching from 3 Combined Science at one rural school. Its my promise that, the data to be collected here shall be only used for academic purposes and all ethical considerations shall be observed. As teachers, kindly answer my interview questions.

SECTION A

DEMOGRAPHIC INFORMATION

Write your…….

2. Sex: Female [ ] Male [ ]

3. Age 20-25 [ ] 26-30 [ ] 31-35 [ ] 36-40 [ ] 41-45 [ ] 41 -50 [ ] Above 50 [ ].

4. Qualifications

Certificate	Diploma in Educatio	Degree	Post Grad	Other (specify)

5. What is your area of specialization?

Mathematics	Biology	Physics	Chemistry	Other (specify)

6. Location of school

Rural	Growth point	Mine	Other (specify)

7. What is your class size?

1:20	1:21-30	1:31-40	1:41-50	1:>50

SECTION B

TEACHING STRATEGIES BEING USED IN TEACHING COMBINED SCIENCE

What teaching strategies do you typically employ when teaching form 3 combined science class?

.....
.....

2. What assessment methods do you use to gauge student understanding and progress in combined science? How do these assessments align with your teaching strategies?

……
……
……
……

3. In combined science, students are often required to learn and apply concepts from multiple scientific disciplines. How do you help students make connections between different topics and concepts?.....,..,.....
.....
.....

4. Can you share an example of how you incorporate real-world applications and examples into your teaching of combined science? How do you help students understand the relevance of scientific concepts to their daily lives?

.....
.....

5. Can you provide an example of how you incorporate hands-on activities or experiments into your combined science lessons?
.....,.....,
.....

6.How do you believe these activities enhance student learning?.....,.....,.....
.....

7. How do you incorporate technology into your teaching of combined science?
.....,.....,....,.....
.....,.....

SECTION C

CHALLENGES FACED IN TEACHING COMBINED SCIENCE

7. What are some challenges that you face when trying to implement effective teaching strategies?...,.....,.....,.....
.....
……
……..

8. How do you in cooperate practical experiments and hands on activities into combined science lessons.....
.....

9. With increasing emphasis on STEM education how do you integrate technology and digital resources into your combined science lesson? Can you provide examples of tools or resources you use and their impact on student learning.....

10. How do you cater for the diverse range of abilities and prior knowledge among students?.....

.

SECTION D

POSSIBLE SOLUTIONS

10. What are some specific examples of successful teaching practices that you have implemented in your classroom?...,.....

11. What advice would you give to other teachers who are looking to improve their teaching practices?.....

.

12. What strategies do you employ to engage students who may have a limited interest in science?

13.How do you spark their curiosity and motivate them to actively participate in combined science
lessons?.....,.....

.....
.....

Thank you for the information.

LESSON OBSERVATION GUIDE FOR TEACHERS

My name is Murwisi Gilda, a bona-fide student at Bindura state University. I'm doing my research in relation to the topic: Exploring different teaching strategies used by teachers in teaching form 3 Combined Science at one rural school. Its my promise that, the data to be collected here shall be only used for academic purposes and all ethical considerations shall be observed.

SECTION A

DEMOGRAPHIC INFORMATION

Write your

1. Sex Male [ ] Female [ ]

2. Class FORM [ ]

Section B

Here are the considerations for lesson observation based on the research questions:

OBSERVATION GUIDE TABLE

Issues to observed	AVAILABILITY (yes/no)	COMMENTS
Lesson planning	(Yes/no)	
Teaching strategy	(Yes/no)	
Student teacher interaction	(Yes/no)	
Assessment type.	(Yes/no)	
Challenges faced in teaching combined science	(Yes/no)	
Possible solutions to problems encountered	(Yes/no)	

THANK YOU

QUESTIONNAIRE FOR LEANERS

My name is Murwisi Gilda, a bona-fide student at Bindura state University. I'm doing my research in relation to the topic: Exploring different teaching practices used by teachers in teaching Combined Science at one rural school. It's my promise that, the data to be collected here shall be only used for academic purposes and all ethical considerations shall be observed. As students, kindly answer my questionnaire.

Section A

DEMOGRAPHIC INFORMATION

Write your

1. Sex. Male [ ] Female [ ]
2. Age. [ ]
3. Class Form 1 [ ] 2 [ ] 3 [ ] 4 [ ]

Section B

TEACHING STRATEGIES BEING USED

1(I) How would you rate your interest in combined Science?

a. Very interested

b. Interested

c. Neutral

d. Not very interested

e. Not interested at all

ii) Suggest reasons for your choice

……

2i). How would you rate your overall understanding of combined science?

a. Excellent

b. Good

c. Average

d. Below average

e. Poor

ii) What do you think are the factors which influence your understanding**?.....**

3i). what teaching strategies do you find most effective in learning combined science? (Select all that apply)

a. Lectures

b. Hands-on experiments

c. Group discussions

d. Multimedia presentations (videos, animations, etc.)

e. Problem-solving activities

f. Worksheets and written assignments

g. Other (please specify): _____

ii). How often does your teacher apply the method mentioned above?

……
……

4i) How frequently do your teachers use practical experiments or demonstrations to teach combined science?

a. Very frequently

b. Frequently

c. Occasionally

d. Rarely

e. Never

ii) How do your teacher teaching strategy help you learn.

……
……

5i). How would you rate the effectiveness of the following teaching strategies in helping you understand and retain combined science concepts? (Scale: 1-5, with 1 being ineffective and 5 being highly effective)

a. Lectures:

b. Hands-on experiments:

c. Group discussions:

d. Multimedia presentations:

e. Problem-solving activities:

f. Worksheets and written assignments:

ii) Are there any teaching strategies or methods that you think would be particularly effective for teaching combined science? Please
explain……
……

SECTION C

CHALLENGES FACED IN TEACHING COMBINED SCIENCE

6i). Have you ever been involved in combined science research projects or activities?

a. Yes

b. No

ii) If yes what are the challenge have you observed?

……
……

7i) Have you noticed any specific challenges that teachers face when implementing research-based teaching strategies in combined science?

a. Yes

b. No

ii). If yes state and explain the challenges
……

8i) Do you think teachers have enough resources and training to effectively incooperate research based teaching strategy in combined science?

a. Yes

b. No

ii) Explain your answer
…….

SECTION D

POSSIBLE SOLUTIONS

9i). How would you rate the overall quality of combined science instruction at your school?

a. Excellent

b. Good

c. Average

d. Below average

e. Poor

ii). In your opinion, what could be done to improve the teaching of combined science at your school?.....

10i). Have you ever sought additional resources or assistance outside of your regular combined science classes to supplement your learning?

A.Yes

B.No

ii) If yes, please
explain……..

11i) How would you rate your motivation to learn combined science?

a. Very motivated

b. Motivated

c. Neutral

d. Not very motivated

e. Not motivated at all

ii) Is there anything else you would like to share regarding the teaching strategies used in teaching combined science?

……
……
…….

THANK YOU FOR YOUR TIME AND PARTICIPATION