BINDURA UNIVERSITY OF SCIENCE EDUCATION

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TITLE

Barriers to effective implementation of practical lessons in Ordinary Level combined science classes in rural day secondary schools in Chapanduka Cluster in Buhera District .

BY

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A RESEARCH PROJECT IS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE BACHELOR OF SCIENCE EDUCATION HONORS DEGREE BIOLOGY

DECLARATION

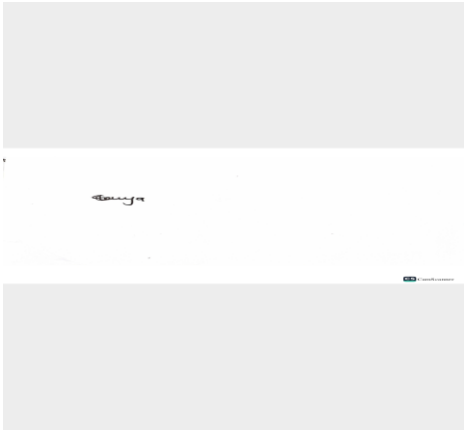
I, Tinarwo Munyaradzi T. hereby declare that, except for other peoples work which has been duly acknowledged, this research project is the result of my research and has neither in part nor in whole been presented in an education programme.

Signed: mttinarwo Date: 14/01/2025

(student)

This research work was undertaken under the supervision of Miss S. Bwanya

Signed : Date : 14/01/2025



APPROVAL FORM

The undersigned certify that they have read and recommend to Bindura University of Science Education of a research project titled " Barriers to effective implementation of practical lessons in rural day secondary schools in ordinary level classes in Chapanduka Cluster in Buhera District" submitted by Tinarwo Munyaradzi T. in partial fulfilment of the requirement of the Bachelor of Science Education Honors Degree Biology

PROGRAMME COORDINATOR

_____

EXTERNAL EXAMINER

_____

DATE _____

DEDICATION

This research is dedicated to my wife, who has been the light that keeps me going and my family who gave me unconditional love and support throughout this course of study.

ACKNOWLEDGEMENTS

Completion of this research project would not have been possible had it not been for the Almighty himself. I would like to thank the Lord for taking me through this process and for his mercifulness even in my weakness; you have made me extraordinarily strong.

Firstly, I would like to express sincere appreciation to Ms S. Bwanya for the outstanding supervision I received from her while undertaking this research project. My supervisor helped me through the whole survey, she assisted me in the literature review and data collection and analysis through the end of the research project. Her support was reinforced by some participants whose cooperation deserves great appreciation.

Secondly, my sincere gratitude to my wife who gave me emotional support. I also acknowledge Heads of schools in Chapanduka Cluster for permitting me to carry out my research, interviews, and observation at their institutions.

ABSTRACT

This research sought to gain insight into teachers and learners' barriers to effective implementation of practical lessons in Ordinary Level Combined Science classes in Chapanduka Cluster which comprises of three secondary schools in Buhera District which is in Manicaland Province. The researcher adopted mixed approach for data generation, analysis, and discussion. The researcher used a questionnaire guide, an interview guide and an observation guide in generating data. In this study, there were eight male teachers and two female teachers who were purposively sampled to participate. The research study reviewed that many challenges are being experienced by teachers and learners in the effective implementation of pratical lessons in ordinary level combined science classes. From the findings, the researcher concluded that Ordinary Level Combined Science teachers in rural areas are not effectively implementing practical lessons. Challenges such as lack of support from school administration, shortage of resources, costs for mantainance of available resources and large class sizes hinder them from effectively implementing practical lessons.The researcher recommends that school administrators should provide necessary equipment for effective combined science learning. Teachers should also improvise and do their duties effectively. Schools should also collaborate and buy equipment they can use as a cluster and take turns to learn.

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CHAPTER 1

Problem and its setting

1.0 Introduction

The Zimbabwe curriculum is comprised of set of secondary school learning subjects which are meant to instil skills and personal growth among the secondary school learners. One of the major subjects common in secondary schools is combined science. This subject is treated as compulsory at ordinary level as one cannot be considered as passed at ordinary level without this subject. Therefore, this learning area needs a greater attention from both the teacher and learner. This chapter focuses on the background to the research problem, the statement of the problem, research questions, significance of the study, delimitation of the study, limitations of the study, definition of terms, and chapter summary.

1.1 Background of the study

Learning of science subjects is crucial in the curriculum set up as it enhances learners with skills which would be used in day-to-day life. Baybee and Fuchs (2006) argue that, advances in science continue to have a significant impact on the way people live, consequently, many countries have acknowledged the vital importance of a well-educated and skilled workforce for

them to remain internationally competitive in the 21st century. It is therefore very important for learners to have a strong background in science education as it plays influential roles in their future. The current 5.0 education in Zimbabwe emphasizes on the use of new technologies to provide more humanized teaching, with focus on students' social and emotional development and solutions that improve life in society. By fostering a culture of adaptability, lifelong learning, and technological fluency, Education 5.0 ensures learners are not just ready for future but are also capable of shaping it. Shaping of future of learners can be achieved by the quality of science education at their school. To achieve quality in Ordinary Level science education at a school the role played by the teachers such as the methodologies in the learning process cannot be ruled out. A science laboratory and equipment at a school is also very important. Vitorino and Bessa (2018) say science laboratory has been given a central and distinctive role in science education and science educators have suggested that rich benefit accrue from using laboratory activities. Abrahams and Reiss (2012) say the centrality of laboratory in science education leads to an overemphasis of practical work. This research will provide factors affecting successful implementation of practical learning activities in ordinary level combined science classes in rural day secondary schools in Chapanduka Cluster in Buhera District. This comes after the researcher realized the importance of science subjects in life. In Zimbabwe the civil servants like nurses, teachers and police officers are required to have a pass in science subjects which include combined science. The schools in Chapanduka Cluster recorded low pass rates in combined science and large percentages in dropouts in science subjects specifically combined science in the past three years and that provoked the researcher to carry out this research. The attitude of learners towards learning of combined science facilitated by poor methodologies of teaching applied at the schools and shortage of equipment demoralized most learners and stereotyped

practical learning activities as difficult and hard to understand. As a result, schools in Chapanduka cluster recorded very poor results in combined science for the past three years. The table below shows percentage pass rate of the three schools in Chapanduka Cluster in ordinary level combined science ZIMSEC examinations.

SCHOOL	% PASSRATE IN 2021	% PASSRATE IN 2022	% PASSRATE IN 2023
X	42	36	34
Y	14	26	13
Z	20	16	15

SOURCE: Buhera District Offices fig 1.0

The table above indicate that the pass rate of combined science is going down. All the three schools are indicating that the performance of learners is going down yearly. A survey was also carried out and it indicated that there are a number of learners who are dropping combined science at ordinary level every year. The table below indicates number of learners who dropped combined science at ordinary level from 2021 to 2023.

SCHOOL	DROPOUTS IN 2021	2022	2023
X	6%	7%	7%
Y	10%	14%	16%
Z	9%	10%	9%

The findings indicate that there is a slight increase in number of learners who are dropping combined science at ordinary level at each school every year. The researcher has a strong belief that the methods which may be employed by the teachers has an influence on the number of droppers in combined science learning area. All these findings pushed the researcher to carry out an investigation on the factors affecting the successful implementation of practical learning activities in biology at ordinary level classes. The current situation in Chapanduka Cluster in Buhera District is a concern to all including the government as the cluster is not fully achieving the goal of producing scientifically literate students.

1.2 Statement of the problem

The researcher is made to investigate on factors affecting the effective implementation of practical lessons in ordinary level combined science classes in rural day secondary schools with reference to Chapanduka Cluster Secondary Schools in Buhera District in Manicaland Province. Many Ordinary level learners in Zimbabwe continue to perform poorly in science subjects. According to Nyagura (2011), research indicates that there is generally shortage of science and mathematics teachers which has resulted in the low uptake of science and mathematics subjects at advanced level and universities. After ordinary level, the learners fail to receive further education in sciences for example the transition rate from form four to form five was very low in Chapanduka Cluster Secondary Schools especially in science subjects in the previous three years. Unemployment rate is affecting these school leavers (18- 24years). The problem is exacerbated by the requirements of five Ordinary level subjects which include a Science subject to get a decent job. Unfortunately, at some schools in Chapanduka Cluster the learning of science specifically combined science practical learning activities is considered boring and unbearable. Some learners are labelling science subjects as meant for the intelligent learners. The school leavers cannot engage into unskilled jobs which require only the skills acquired from practical learning activities. If this remains unresolved the crime rates would be seen high in the country. Ordinary level school leavers would experience poor standards of living and this crumbles down the country economically. Science learning needs to reach its quality to equip learners with skills possibly they would use in real life situation.

1.3 Research questions

The purpose of this study is to propose solutions to factors affecting effective implementation of practical learning activities at ordinary level combined science classes in rural day secondary

schools in Chapanduka Cluster in Buhera District. The following research questions need to be addressed:

1. What difficulties are you facing in the teaching and learning of ordinary level combined science practical lessons at your school?

2. What are the impacts of methodologies applied by teachers in the teaching and learning of combined science at ordinary level at your school?

3. How can the implementation of practical learning activities in combined science classes at Ordinary level be improved in rural day secondary schools?

1.4 Aims and Objectives

The long-term goals of the research are to promote the teaching and learning of quality science education, to develop innovativeness in learners and to develop the nation economically. The objectives of the study are as follows:

1 To determine the types of problems faced by learners in the implementation of practical lessons in combined science at a rural day secondary school.

2 To find out best approaches in the teaching and learning of science subjects in rural day secondary schools.

3 To encourage and promote the teaching and learning of quality science in rural day secondary schools.

1.5 Significance

The researcher strongly believe that the research is of great importance to the Ministry of Primary and Secondary Education, the educators, learners and the society at large. The study will spell out the barriers to effective implementation of practical learning activities on a rural day secondary school set up as well as the solutions to these barriers

The study results will help learners to grasp science subjects' concepts at school and master the skills easily that will be fundamental base for their life. This goes in line with the current 5.0 education in Zimbabwe which its main focus is to produce a total human being who can fit into the society after leaving school. School dropouts will be reduced in rural secondary schools.

Teacher competence will also be improved. Science teachers are likely to benefit from this research as better methods of teaching science subjects are going to be proposed. Teachers are likely to improve their teaching styles from this research and this improves pass rates in science subjects in rural secondary schools. Good methods of teaching motivate learners to learn hence science subjects are treated as other subjects at school.

The school environments are also likely to improve from this research. Science laboratories which are fundamental in the teaching and learning of science subjects are going to be built. Use of laboratory in science learning promotes the good learning of science in Zimbabwe. This goes in line with the Education 5.0 which is current in Zimbabwe which its focus is rooted in Science, Technology, Engineering and Mathematics (S.T.E.M.). The 5.0 education principles are based on the idea that learning is best done when students are curious, engaged, active, confident and successful. These principles can only be achieved through the teaching and learning of quality science abided by 5.0 Education.

The Ministry of Primary and Secondary Education is going to be enlightened on the equipment and material that is required in the teaching and learning of quality science specifically practical learning activities as well as areas which needs attention in rural areas for improvement of practical learning activities. The ministry is also going to come up with supervision models which best fit rural secondary schools for improvement.

Improvement in science learning in Zimbabwe develops the country economically. Practical learning activities leads to quality science education which equips learners with skills essential in the day-to-day life especially after leaving school. Hands on approaches enable some learners to apply these skills in the industries. Good passes in science subjects results in one getting a decent job such as nurse or a medical doctor. This develops the nation at large economically.

1.6 Delimitations

The delimitation of a study refers to boundaries of the study to begin and end. The research is going to be carried out in Chapanduka Cluster which comprises of three rural day Secondary Schools. Only 10 students and combined science teachers will be selected from each school and they are going to be used as a sample of the study in order to come up with some factors which affect the implementation of practical lessons in science education.

1.7 Limitations of the study

The foreseen possible limitations in the study will be characteristics of the respondents both teachers and students. The researcher is not going to involve every member of the population but

sample of study will be selected randomly for both teachers and students. The study is conducted in Chapanduka Cluster in Buhera District meaning the results may not apply in other contexts such as the urban areas. If interviews are carried out participants may answer desirable answers which may lead to bias of the study. Students may also struggle to come up with true reflections due to peer pressure and fear. The research is also expected to be conducted in only one semester which may limit time for thorough research and effective results. Looking only at one method of teaching as cause of poor performance may not be sufficient enough to address the problem. The research may not be able to fully account for contextual factors such as local educational policies and ethical issues on use of practical lessons in teaching and learning of combined science in the schools mentioned.

1.8 Definition of key terms

Barriers – challenges that prevent progress.

Effective - ability to produce desired or intended results

Implementation- the process of putting a plan, strategy or idea into action.

Combined science- a subject offered in Zimbabwe at secondary level which is made up of physics, biology and chemistry components.

Practical lessons- hands-on activities designed to help students learn scientific concepts and principles through direct experience and observation.

Rural – area or geographic area that is located outside towns and cities.

Day school- An educational institution where children are given instruction during day, after which the students return to their homes.

1.9 Summary

The major components of the chapter were the introduction, background of the study, statement of the problem, research questions, research objectives, limitations, delimitations and significance of the study among other sections. This chapter provided an overview of the study as well as its relevance.

Within the chapter there is an introduction of the project and sequence of questions to be researched on. The relevance of this research study to educators, learners and society at large has been systematically done. Amongst its essence, the project seeks to develop learners' life skills.

CHAPTER 2

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter reviews the information already being published by other authors concerning barriers to effective implementation of practical lessons in combined science ordinary level classes in rural secondary schools. This relates to factors affecting practical learning activities at ordinary level in Chapanduka cluster in Buhera District. Caulley (2018) says, literature review discusses published information in a particular subject area and sometimes information in a particular subject area within a certain time period. The researcher gives some opinions on some of the views presented by cited scholars.

2.2 Relevance of practical lessons in combined science

After gaining independence in 1980, the education system in Zimbabwe was amongst the best in Africa (Shizha and Kariwo, 2011). During the 1990s Zimbabwe' s education system turned upside down to the extent that it was reported that it has been unsuccessful in transforming society as well as in responding suitably to the needs of the learners as far as developing skills

that are critical for survival (Zvobgo, 1999). As a result, the Presidential Commission of Inquiry into Education and Training known as the Nziramasanga Commission, was set up in 1999 to investigate Zimbabwe' s education system. Nziramasanga (1999) reported that education in Zimbabwe was far back as the colonial period was too academic and did not cater for learners' interests. Furthermore, Zimbabwe' s education system has been blamed for producing graduates who are not capable of applying the acquired hands on and critical thinking knowledge in everyday life (Nziramasanga, 1999). Additionally, Nziramasanga (1999) reported a high failure rate in science as a sign of calamity, which led them to recommend curriculum change so that the needs of the learners be catered for and that science is an essential component of the curriculum.

The Nziramasanga Commission (1999) also suggested that learners should be taught science from their cultural viewpoint. Nziramasanga (1999) believed that if a technical approach is incorporated into the science classroom, it is capable of improving the learners' performance and interest in science as well as its applicability in real life. Zimbabwe witnessed a dramatic change in the environment emanating from explosive technological growth and innovations in global communication. Schools are faced with challenges which are becoming more and more complex with time (Nziramasanga, 1999). Science and technology education are seen as vehicle for economic and social development of any country (Chrisman, 1984). Researches show that from the time Zimbabwe got independence in 1980, the government has put in place five innovative projects to improve the delivery of science teaching in schools which are Zimbabwe science project, quality education in science teaching, the science education in-service teacher training program, the better environment science teaching and business education partnership. These five innovations were geared to improve the delivery of quality science education. Nziramasanga (1999) say science is the mother of all technology hence no sustainable

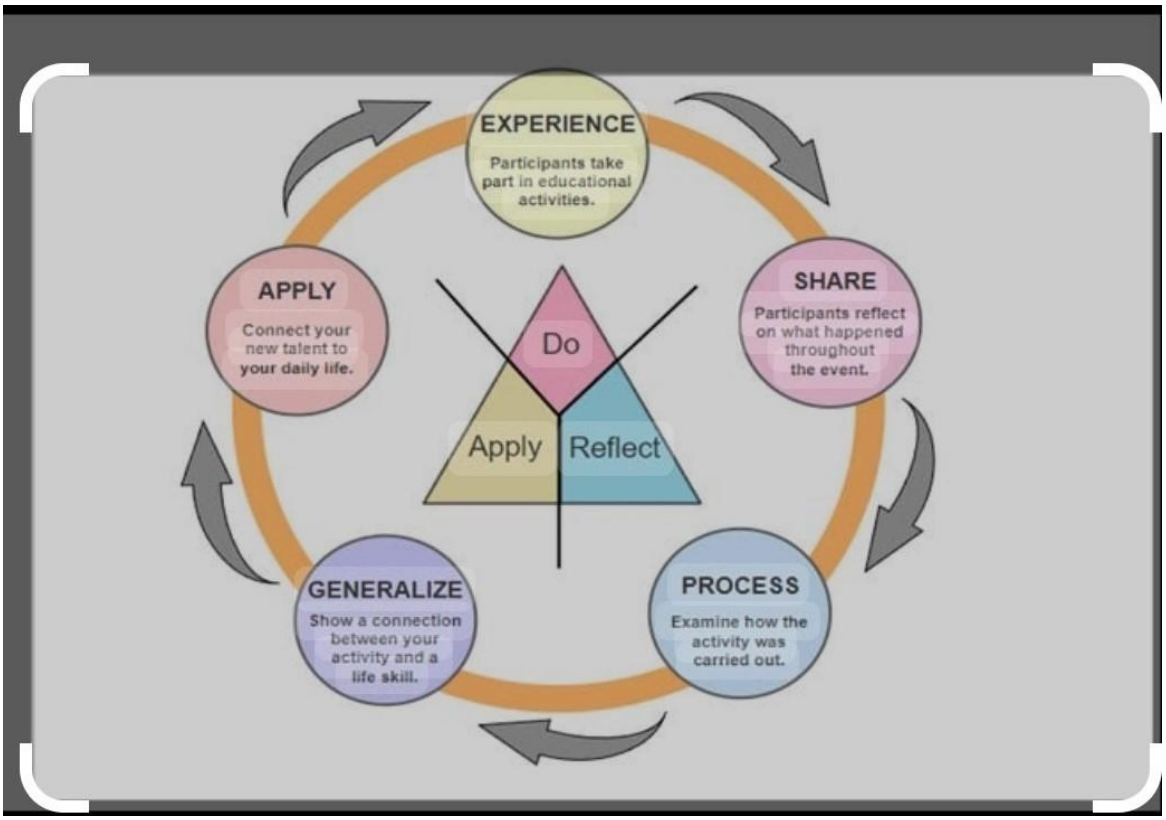
development can take place in any country without talking about science. Currently the government of Zimbabwe embraced education 5.0 which addresses quality education. This new system ushered an era of learning innovation and creativity. According to Herald (22 February 2024) the president of Zimbabwe launched his book " Redefining Zimbabwe`s Education System: ED Mnangagwa' s Vision and Transforming Leadership" , and on the launch of this book the president postulated that culture, heritage and education are important thread that weave together the fabric of Zimbabwe identity, industrialization and modernization towards economic growth, peace and poverty eradication. This goes in line with the 37th Ordinary session of African Union`s theme which argues that " Educate an African fit for the 21st century: Building resilient education systems for increased access to inclusive, lifelong, quality and relevant learning in Africa." According to these views quality education should produce a quality product who can harness local resources for innovation and industrialization. According to Heritage Based Curriculum Framework (2023-2030), the heritage-based philosophy will guarantee that young generation and communities have strong foundation upon which to build on. After completing ordinary level a learner should have a strong foundation for self-reliance and industrialization. Practical learning activities ensure that the learners are equipped with problem solving skills. Bartle (2021) argues that education 5.0 is the use of new technologies to provide more humanized teaching with focus on student`s social and emotional development and solutions that improve life in the society. Bytyqi (2022) says education 5.0 emphasizes on problem solving and value creation. Shift by government to Heritage Based curriculum is backed by its vision 2030 which eyes Zimbabwe to become an upper middle economy by 2030. To attain this schools should embrace to quality teaching and learning in science subjects which also produce quality products that is with innovative and creativity skills. The 5.0 education comes

after Zimbabwe has recorded high unemployment rate and drug and substance abuse among youths. After completing ordinary level most school leavers in Chapanduka cluster become victims of substance and drug abuse and they are citing unemployment as one of the main causes of being entangled in the net of drug and substance abuse. They cite that they spend much of their time doing nothing which indicates that they lack creativity and innovative skills. Through 5.0 education the government also aims at cultivating entrepreneurship skills especially after completing their ordinary level which reduces the unemployment rate in the country. This really can be achieved through practical learning activities as science subjects cultivates critical thinking and problem-solving skills. Entrepreneurship also create employment for others. Entrepreneurs are self-motivated and they know what to introduce and how it can fit into the society which is a skill which needs to be attained and one of the ways of attaining it is through teaching and learning quality science education. This is in line with Murapa (2022) `s views who argues that in countries like Zimbabwe, it has been noted that entrepreneurship can solve economic problems such as poverty and debt corruption. The government needs to support entrepreneurs and one way is through empowering teachers to deliver quality education which instills learners with entrepreneurship skills. Also small to medium enterprises is one way to curb the rampant unemployment and poverty in Zimbabwe as an initiative by the government. Coming up with a business idea is a necessary skill which needs to be cultivated in learners especially after ordinary level. According to Murapa (2022) small to medium enterprises in Zimbabwe create employment and support from the government from the government support these enterprises. He goes on to argue that small to medium enterprises have replaced industrialization in Zimbabwe where a large number of people were employed on one industry. In the 1980s people migrated to towns to look for jobs after completing ordinary level and people

believed that company owners were more superior and skilled than other people. It however of great importance to note that after receiving quality science education one can acquire entrepreneurship and create own business and have a better living.

2.3 THEORETICAL FRAMEWORK

The research was underpinned by experiential learning theory propounded by John Dewey (1916). He developed a unique set of theories about education and social reform, which have since come to be known as the "John Dewey Theory". His innovative ideas about education focused on the idea of experiential learning, the idea that we can learn best by actively engaging with the material rather than passively listening to lectures or memorizing facts. The following is his learning model.

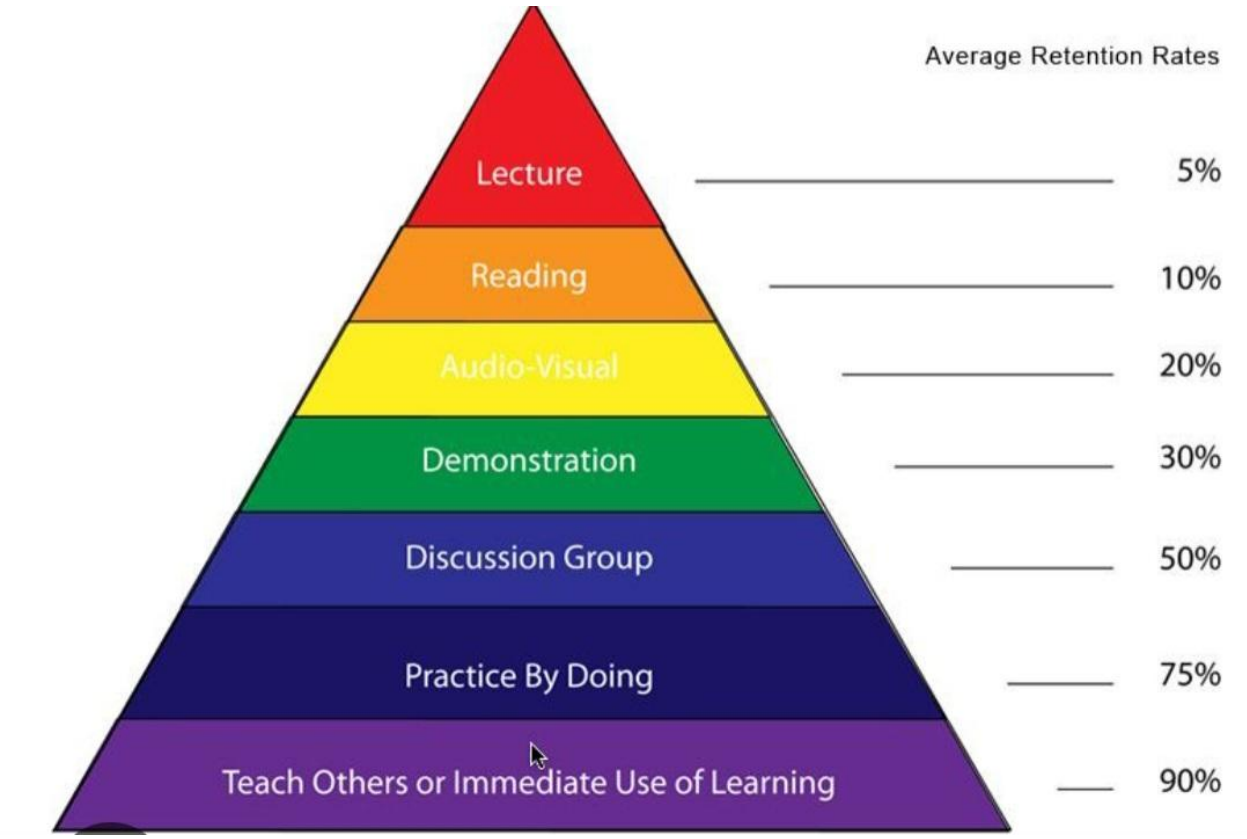


On his learning model, Dewey believed that knowledge is constructed through experiences. He argued that learning is most effective when students can engage directly with their environment, allowing them to connect theory with practice (Dewey,1916). He emphasized that learners should be active participants in their education. This means engaging in hands-on activities, experimentation, and real-world problem-solving rather than passive absorption of information. Dewey highlighted the importance of reflection in the learning process. After engaging in an experience, learners should think critically about what they did, what worked, what didn’ t, and how they can apply their insights to future situations. He viewed experiential learning as a way to develop critical thinking and problem-solving skills. By confronting real-life challenges, students learn to analyze situations, formulate hypotheses, and test solutions.

Dewey introduced the concepts of continuity and interaction in learning. He argued that past experiences shape future learning, and that learning happens through interactions with both people and the environment (Dewey, 1938). He believed that learning is inherently social. Experiential learning often occurs in collaborative settings, where students learn from each other’ s perspectives and experiences, fostering a sense of community and shared inquiry. Dewey argued that education should be relevant to students' lives. By grounding learning in real experiences, educators can make learning more meaningful and engaging, bridging the gap between school and the outside world. He also advocated for progressive methods of powerful questioning and dialogue to enable more meaningful exchange during classrooms. At the core of John Dewey's theory is the notion that human experience should be a guiding light in education and social reform. He argued that all forms of knowledge should be grounded inseparably in practical, real-world experience and that meaningful exploration and learning could only truly take place when students engaged with their material firsthand or through experimentation.

His view was that theoretical information should always be applied practically to ensure an authentic understanding of whatever is being taught. Education, for Dewey, is not only about gaining theoretical knowledge but also getting practical experience. He viewed education from a holistic perspective whereby learning is seen as a continuous process that combines knowledge with life experiences and encourages students to integrate thinking skills with tangible results. This view of education ensures students have significant experiences which are internally meaningful and contribute to their growth as learners.

John Dewey's view on pedagogy was that it should be a holistic approach to teaching and learning. He believed in using experiential learning as part of the educational process, whereby students are encouraged to combine their theoretical knowledge with practical experience. Dewey also focused on providing meaningful experiences that contribute to a student's growth as learners. He believed that this type of pedagogy could help shape a well-rounded student who is able to think critically and take tangible skills into the world. In assessing the methods of teaching John Dewey came up with the learning pyramid which shows average retention rates depending on methodology used by the facilitator as shown below.



The pyramid suggests that different teaching methods yield varying levels of retention. Generally, the more active the learning process, the better the retention. Here is a summary method of teaching and their retention percentages according to John Dewey.

- Lecture method - about 5% retention.
- Reading- approximately 10% retention.
- Audio-Visual- roughly 20% retention.
- Demonstration-bout 30% retention.

- Discussion Group- around 50% retention.

- Practice by Doing- approximately 75% retention.

- Teaching Others- up to 90% retention.

Dewey emphasized learning through experience, arguing that students learn best when they are actively engaged in the learning process. Educators are encouraged to incorporate more interactive and participatory methods to enhance learning outcomes. This aligns with Dewey's belief in the importance of real-world experiences in education.

John Dewey and many other pragmatists believe that learners must experience reality without any modifications. From John Dewey’ s academic viewpoint, students can only learn by adapting to their environment. John Dewey’ s idea about the ideal classroom is very much similar to that of the educational psychologists’ democratic ideals. John Dewey believed that not only students learn, but teachers also learn from the students. When teachers and students, both learn from each other, together they create extra value for themselves. Many educational psychologists from different countries follow John Dewey’ s revolutionary education theory to implement the modern educational system. John Dewey’ s theory concerning schooling proved to be valid for progressive education and learning.

By engaging experiential learning activities, learners can develop important transferable skills, such as critical thinking, problem solving and communication which will serve them well in future academic and professional contexts and also help to motivate students by providing a sense of ownership and control over their learning. Teachers can be helped to create a more inclusive environment for the students.

However, Chandra and Shamar, (2004) pointed out that some scholars such as Mager`s critiques point out that John Dewey' s learning theory tend to focus on its application, rather than its philosophical underpinning. After all, most of us can agree that experiential learning is an effective approach.

Part of the problem is that John Dewey' s learning theory lacks a clear structure. Unlike Kolb' s experiential learning theory, there aren' t obvious stages for your learners to move through. And without these guidelines, the theory is difficult to apply in the real world.

Moreover, creating experiential learning activities can be time-consuming and expensive. After all, your students may fail several times before they reach their objective. Experiential learning also requires well prepared teachers who are skilled facilitators experiences should be balanced and cohesive (Hattingh, 2007).

While Dewey`s theory provides a valuable framework for addressing challenges in practical combined science lessons, it is also important for teachers to be very aware of the potential limitations such as time constraints and shortage of resources.

2.4 Teacher quality and the quality of lesson delivery

Qualified teachers have got better ways of teaching and expressing themselves with the help of knowledge in psychology, sociology and philosophy which they acquire during training. Zindi (2020) teachers use psychology in classroom to aid pupils learning. The acquired knowledge and skills also help them teach effectively so that quality science education is attained. Using different teaching methods that are child centered goes a long way in motivating the learners to

develop interest in learning which may reduce high rate of dropping and stereotyping science subjects as difficult. In science subjects the use of hands-on approach is very important. The role of a science laboratory cannot be ruled out. Bell (2005) argues that a laboratory gives students an opportunity to formulate their own ideas and make them workable in the real world. Educational Psychology enables teachers to know how to present information in the class appropriately. It also helps the teacher to be able to choose suitable material for the age group one is teaching so that they become interested to learn. Learners need to be conditioned to learn like what psychologists like Pavlov argue. Lehmenris and Mehrens (2018) say teachers as facilitators of learning need to sharpen pupils' awareness, interest and skills, remove various constraints and help pupils overcome barriers which prevent them from achieving their goals. Practical learning activities should help learners to pursue their dreams.

2.5 Resource allocation

The provision of resources is important in the teaching and learning process for learners to grasp concepts in science subjects and obtain desirable results in school examinations as well as attaining life skills. Pennilie (2021) implies that there is need for enough and appropriate resources which would instill in pupils the positive attitude to learn. The shortage of textbooks and science equipment demotivates the pupils. According to Nzeyimana (2014), science teachers dominate activities in the classroom and source of content is mainly from lecturing due to shortage of equipment in some institutions. There should be enough facilities, equipment and materials allocated to each department in the school. The presence of resources motivates learners and some skills are sharpened. Fusel et al in Macgree (2019) asserts that pupils tend to rely much on textbooks for their studies instead of waiting for the teacher to come and give them what to do. Unruh and Unruh (2020) Pupils can use textbooks to do work, that is reading in

advance. In this case if all pupils have textbooks and well-equipped science laboratories failure will be reduced as learners will study ahead and continue engaged into practical.

2.6 Career guidance in teaching and learning

Children need guidance, support and encouragement from the family members, society and the school so that they have some targets to pursue in life. Franken (2020) supports that lack of career guidance makes the pupils lose interest in subjects offered at a school that leads to negative attitude towards science subjects at school. Mamwenda (2004) supports that learners should be exposed to opportunities involving self-exploration and self-assessment. Relevance of science subjects should be made known to learners. Learners should be aware that for one to get a decent job science subjects are also a requirement. Parents should tell their children the work they should be engaged in and it is essential and necessary to discuss the topic of career guidance in greater depth. The counsellors should arrange field trips and children should occasionally visit different working areas such as hospitals, industries, farms, business and ICT centers so that they can make their choices of careers they want to do. Teachers should encourage learners to attend guidance and counselling workshops that help to mold the learners in teaching and learning of science subjects at school.

2.7The role of science laboratory in practical learning activities

Science laboratory plays a very crucial role in the teaching and learning of combined science. Active learning improves learners` understanding and remembering of information and helps them to develop problem-solving and critical thinking skills. Science laboratory fosters curiosity. Students usually have an innate curiosity about the world around them. Vitorino and Bessa (2018)

argue that science laboratory has been given a central and distinctive role in science education and science educators have suggested that rich benefit accrue from using laboratory activities. The science laboratory encourages this curiosity because it gives students a chance to test and experiment with their surroundings. As they investigate and discover new things, they develop their thinking skills and gain knowledge about the world around them. Students in a science laboratory are encouraged to come up with hypotheses and experiments around a particular topic. This teaches them how to solve problems and think critically. It also encourages creativity, as they have the opportunity to use their imagination during experiments. Science laboratories allow students to direct their own learning because the experiments are usually open-ended. Students have an opportunity to test out theories, ask questions and make observations. They can then use the information from these experiments in future studies or projects. Experiments learnt from the laboratory are very important for the future of the learners. The learners would use these se experiments in the real-life situation which is the main thrust of quality education. Practical learning activities should instill learners with the skills which make one suit very well in the society after school. These skills include creativity and problem-solving skills.

2.8 The role of parents on practical learning activities

The interest in learning certain subjects might be influenced by parents expressed wishes for certain professions and their status that may lead to learners stereotyping science subjects as difficulty and dropping out these subjects at ordinary level. Mwamwenda (2020) supports that parents tend to have certain types of jobs they prefer and encourage their children to work towards getting employed in such jobs. Barzer (2021) adds that in nearly all matters pertaining to their children, the right of parents to have the final say is always paramount. However, children

must be allowed to choose what they want to do and parents must encourage and guide them to do their best in their studies. A negative attitude towards schooling contributes to poor performance and failure in science subjects. In this regard Fontana (2019), argues that a child can be motivated to learn by creating a conducive environment for him or her to learn. A learner from a highly educated family can attain better grades and can be better at science subjects. Parents should pay up their school fees in time as a way of motivating their children. Parents should also play their roles in providing stationery and learning material required in the teaching and learning of quality science at a school for example they can provide labor in the building of a science laboratory at a school which help in promoting the learning of science subjects at a school. Parents play an influential part in the education of their children. Parental approval or disapproval in terms of children' s career path and aspirations plays a critical role in the education of their children. Mwamwenda (2020) states that children should be taught that career development involves choice and that must be made at an appropriate time in their education. As part of career guidance, the parents must bear in mind that the focus should be on career awareness.

2.9 Challenges faced by teachers in implementing practical lessons

Various researchers disclosed that large class size, inadequate learning and teaching materials, inadequate time, shortage of teachers and poor student attitudes towards Biology practical learning activities as the major factors hindering implementation of practical learning activities in ordinary level biology classes in rural day secondary schools.

2.9.1 Large class sizes

A higher number of students in classroom tends to affect teacher-learner interactions and can also prevent peer exchanges during discussions in the classroom. It makes it difficult for the

learners to engage into practical work. Ogunmade (2006) says the quality and adequacy of pedagogical approaches used by teachers has a direct impact on quality science learning in schools which in turn depend upon class size and subject content knowledge. Due to large class sizes and lack of resources teaching becomes tedious and demanding for teachers consequently students are less involved in hands-on practical activities. Therefore student-teacher ratio has to be considered always because they are a way to measure teacher' s workloads and resources as well as the individual attention a student receives from the teacher because it involves some skills subjects.

2.9.2 Inadequate learning and teaching materials

Educators are faced with a problem of shortage of resources to use for implementation of practical learning activities like quality of textbooks available is a challenge because they do not match the requirements and the technological innovations. Ill-equipped laboratories or no science laboratories is common in rural day secondary schools. According to Uammisse (2015), laboratory equipment and learning materials are in short supply due to lack of funds. This really affects the implementation of practical learning activities in rural day secondary schools as poor methods of teaching would be employed in teaching and learning of science subjects. Most rural secondary schools have no any source of electricity which is an essential component in a science laboratory and connections to the internet for researches for both teachers and learners. Nyagura (2011) argues that in some area teachers travel a long distance from their schools to access internet for calls and studies.

2.9. 3 Inadequate time

Rural secondary school teachers face challenges of in adequate time to prepare for the practical lessons for their learners. Class sizes consume most of their time for example they take much of their time marking large amounts of exercise books. Uamusse (2015) says rural teachers face the challenge of inadequate time for preparation and teaching due to a heavy workload and large classes. Additional activities like Continuous Assessment Learning Activities are time consuming. Seems like now teachers have a lot of work to do that is academic and non-academic records of each learner in addition to the previous records such as schemes of work that were there initially (Amunga et al., 2020). This kind of working conditions and additional workloads make teachers not have enough time to give learners the much, needed personal attention that would help them acquire the competencies required.

2.9.4 Shortage of science teachers

Shortage of manpower in science department is one of the challenges faced by rural secondary schools. Only the newly recruited in the district are given the vacancies outskirt town and after a period of time they quickly transfer to better schools. Nyagura (2011) argues that rural secondary schools often face a critical shortage of qualified and experienced teachers. This can be attributed to factors such as remote locations, limited access to resources and professional development opportunities and lack of incentives or amenities to attract and retain skilled educators in rural areas.

2.9.5 Poor student attitudes towards science practical work

The basic premise underlying any teaching is that the learner has the capacity to learn. Bad attitude of learners towards science subjects affects the quality of science education. Due to shortage of learning resources in rural areas most learners tend to stereotype science practical

learning activities as difficult to understand. Most learners drop out the subject at O level despite its relevance in their future. Mahlaba (2006) argues that lack of adequate science teaching and learning resources not only denies students the opportunity to develop scientific skills, but lead to loss of interest in science-based disciplines hence students develop negative attitudes towards subject. Parents and teachers have a role to motivate learners to build positive attitude towards science subjects.

2.10 Suggested solutions to challenges encountered in the implementation of practical lessons in rural day secondary schools.

Various researchers who carried out surveys on the challenges that are encountered in the implementation of quality science education suggested many possible solutions. Research proves that there are five innovations geared by the government to improve the delivery of science education in schools and these are as follow:

2.10.1 Zimbabwe science project

To improve the teaching and learning of science education in rural schools where there is no electricity the government launched the Zimbabwe science project. This project sent to schools some science kit which were complete with basic science equipment. This enhanced rural secondary schools with sustainable participation in in the science education. Nziramasanga (1999) argued that the project received wide acclaim internationally to the extent that the world bank used it in its educational redevelopment projects in other countries for example Botswana used the same model using the kits that were purchased in Zimbabwe.

2.10.2 Quality Education in Science Teaching (QUEST) Project

This was designed to decentralize in-service training courses and empower teachers to make decisions about issues that affect them at school level. QUEST thus provide teachers with an opportunity to share ideas and discuss problems. Nziramasanga report says that there are seventy-seven science district resource centers were established. Resource persons manning districts resource centers train heads of departments. These teachers in turn train teachers in their departments.

2.10.3 The Science Education In-service Teacher-Training Program (SEITT)

SEITT is another staff development organ which caters for science and mathematics teachers. SEITT has established resource centers managed by science advisors. The advisors have a diploma in education awarded by the University of Zimbabwe. SEITT offers a forum for teachers to interact, share ideas and in most cases solve problems faced by isolated science teachers, Nziramasanga (1999).

2.10.4 The Better Environment Science Teaching (BEST)

This is a bedrock of science teaching at primary level. This program led to the writing of new primary science syllabus and in-servicing of teachers, heads, district Education officers and Education Officers. Its advantage is it uses the environment as a laboratory for biological and physical sciences. However adequate steps have not been taken to secure local funding when the donor was moving out as it was donor funded.

2.10.5 Business Partnership of Zimbabwe (BEPAZ) Program

BEPAZ is a partnership between Ministry of Education and the business community to promote technical vocational education in school systems. Business contributes money to enhance

teaching and training areas with a technical-vocational bias. This is done through projects such as schools on the shop-flow and teacher placement which are intended to expose both secondary school students and their teachers to the world of working and to a new technology.

The government should also look into the welfare of learners and teachers. Schools should maintain the required optimum class sizes to ensure quality learning since large class sizes are an impediment to quality learning (Sithole, 2021). Reducing class sizes enable teachers to be more effective. Effective science teaching is characterized by learner-centered activities. Reducing class sizes would make management of practical work easier. Teachers find it difficult to follow up tasks given due to workload in marking so if the class sizes are reduced there would be ample time to make follow ups and cater for individual differences.

Government has to ensure improved funding to schools in order to enable schools get enough teaching and learning resources at the same time the government should ensure that physical infrastructures like large classrooms are built in schools to help provide enough space for the facilitation of these new competencies (Ministry of Primary and Secondary Education, 2022). Provision of equipment at school enhances the effectiveness of science learning at school. Building of a science laboratories is very important as the science laboratory play a central role in the teaching and learning of science. According to Hackling (2009) students in a science laboratory are encouraged to come up with hypotheses and experiments around a particular topic which teaches them how to solve problems and think critically. School administrators should make it a priority that they have a science laboratory at their schools to enhance efficiency science teaching.

There is also need to train and retrain science teachers so as to develop teachers' knowledge and capabilities for science teaching. Ainley (2008) argues that science teachers require new pedagogies, knowledge and commitment in order to undertake innovative science teaching. Professional development is also critical for maintaining continuous improvement in science teacher quality. Currently the government of Zimbabwe through the Teacher Capacity Development Program is funding the science teachers at different universities in Zimbabwe.

2.11 Chapter summary

The researcher noted that practical learning activities are defined in education 5.0 which its main thrust is to produce a total human being who after ordinary level would suit into the society. For a child to do well at school particularly in science subjects there is need for qualified personnel, motivation, good resource allocation, career guidance and monitoring from a teacher who has no much workload. A science laboratory is also very crucial in the teaching and learning of science as it promotes creativity and hands on activities. If this is looked at then the pass rate is expected increase in science subjects in rural areas hence, innovativeness and creativeness in young generation.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter will focus on the procedures which were used by the researcher in the collection of data. The chapter will also focus on the essential components of research notably the research design, research instruments, population, the sample, sampling methods, data collection procedure; and analysis.

3.2 Research design

Mathevhula (2014) asserted that a research design is a comprehensive plan that is used to infuse various elements of a study in an orderly and logical manner. In addition, a research design

provided the researcher with a map that outlines the steps on how research will be conducted (Cohen, 2011). Qualitative research design was incorporated in this research. Qualitative research relates to ideas, perceptions, opinions or beliefs of the person being studied and all of them cannot be measured by numbers. Creswell (1994) defines qualitative research as an inquiry process of understanding a social or human problem based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting. This technique was also necessary because the researcher may need to look at strategies that can be used to on reducing these challenges. Qualitative approach provides answers to who, where, what and how questions in other words it helps in answering the research questions the researcher opt for this approach as it offers first-hand information from the learners, (Burns & Groove, 2005).

3.3 Population

Gay (2020) defines population as the group of people that is of interest to the researcher when conducting a study. Pilot and Hungler (1999), defines population as an aggregate or total of all objects or members that confirm to a set of specifications is the total possible of groups of people from whom data could be collected. In this case the researcher' s population was 30 learners. 10 learners were from each school of the cluster and these comprised of 5 girls and 5 boys. The population of this research was constituted by 30 learners from the cluster and 10 combined science subject teachers from the cluster. 4 teachers were from same school while the other three

were from the same school and the other three from another school in the cluster. These individuals made up a total of 40 as population for the research.

3.4 Sample and sampling procedures

Hargedon (2020), asserts that a sample is smaller representation of the whole population. Haggarthy (2022), defines sample as to test a small amount of something in order to get information about the whole thing or to use a group of people in order to get information about the larger group or about the whole population. In this case, the researcher used a sample of 30 learners selected purposefully from the cluster he had to use for his research. The population that would be utilized as a part of this study are combined science subject teachers in Chapanduka Cluster. The researcher used purposive sampling to select participants that are most likely to yield appropriate and useful information, (Kelly, 2010). In addition, it' s a way of identifying and selecting cases that will use limited research resources effectively (Palinkas et al., 2015). According to Creswell (2012), population is a group of individuals who have the same characteristic. The sample comprised of 10 combined science teachers at Ordinary Level who provided answers to the research questions in chapter 1. Patton (in Saunders et al., 2007) asserts that in purposeful sampling, it is important to choose information-rich cases so that the sample is suitable for the requirements of the study.

3.5 RESEARCH INSTRUMENTS

In this research, an instrument is the term that the researcher used for a measurement device. It can be interviews for learners and teachers, teachers and learner' s questionnaire and observations. These are the methods for data collection. The researcher used interviews to

learners and teachers, teachers and learner' s questionnaires and observations as a way of collecting information.

3.5.1 Questionnaires for learners and teachers

A questionnaire is a method of data collection which is completed by the respondent in written format. According to Marshall (2005) questionnaire is a popular research instrument, but designing a questionnaire to yield high quality usable data and achieving a high return rate is not as easy as it may, at first, appear. Indeed, this needs careful planning and design and an effective method of distribution. Before opting for a questionnaire, the research needs to be planned. The researcher consulted with the literature and experts in the field to decide what they need to know and what are the research questions. Only then it was decided that questionnaires are the most appropriate tool, which will provide the information required. According to Potthoff and Eller (2000), if in the planning and reviewing the literature phase it is found that little is known about a particular area, a qualitative approach is best used first for example a focus group (where respondents are assembled as a group to answer questions on the research area of interest) and using the information gained may then be appropriate to develop a questionnaire. Jones et al (2008) argue that an important factor in searching the literature is to establish whether there are already validated questionnaires that explore the research topic. The use of a validated questionnaires saves time and resources, allow comparison with data derived from other studies. Questions used were short and focused starting from low order to higher order. According to Jones et al (2008), once the questions have been written it is essential that the questionnaire is " user friendly" to the respondents. Good questionnaires should ideally not challenge

respondents' knowledge, but if this is essential this must be done in a non-threatening manner. Thus, the researcher used the validated questionnaires to find out the challenges faced by the day secondary schools in Chapanduka Cluster in the teaching and learning of science subjects. Questionnaires were prepared in line with the combined science facilities at schools, science teaching staff, equipment and time allocated for combined science at schools in rural areas.

Advantages of questionnaires

With careful planning, questionnaires can yield high quality usable data, achieve good response rates and provide anonymity, the latter encouraging more honest and frank answers, than other data instrument methods, (Pattern :2016). This can help to reduce bias. Fry et al (2017) suggest that a questionnaire is a useful data collection tool where the conditions such as the target audience, even if geographically spread, can be clearly defined and identified, the majority of respondents know what is asked of them and the focus of the analysis is are met.

Disadvantages of questionnaires

Questionnaires, as other data collection tools, have certain disadvantages. They are unsuitable for subjects with poor literacy, visual impairment and non-English speakers unless translated, (Pattern: 2016) The researcher generally has no idea if the questionnaire was filled in by the respondent it was meant for; if there are confusions caused by the questionnaire the researcher cannot clarify these. There is little flexibility for respondents to present their own perspective on issues unless there are several.

3.5.2 Interviews

Interview is asking questions from the research and getting answers from participants in a study, (Creswell 2014: 25). According to Opdenakker (2006), interviews are a research methodology used to collect data through conversation or discussions with individuals or groups. The

researcher used semi-structured interviews where the interviewer uses a set of predetermined questions and the participants answer in their own words. Semi-structured interviews offer flexibility and depth, providing valuable insights into participants' thoughts, feelings and experiences, (Oltimann: 2016). Semi- structured interviews encourage two-way communication and provides an opportunity to interviewers to learn answers to their questions and gain the reason behind the answer. The interviews were set in order to find out the impacts of the methodology in the teaching and learning of science subjects by asking the teachers the methods of teaching they employ in the teaching and learning of science subjects. Also, learners were inquired of how they learn science subjects, what motivate them in the teaching and learning of science subjects and some strategies they think would help them in the teaching and learning of science subjects at their schools.

Advantages of interviews

Interviews provide an in-depth information. According to Hoppner et al (2022) they provide detailed, rich and contextualized data. The interviewee`s feelings and experiences are captured as there is a discussion between interviewer and interviewee. Interviews also allows for follow up questions and probing. This is very crucial for immediate clarification of responses. If interviews are properly conducted valid information is obtained.

Disadvantages of Interviews

Interviews need to be handled properly so as to obtain valid information. Interviewer characteristics may influence the respondents leading to biased information. This data collection instrument requires effective interviewing and active listening skills.

3.5.3 Observations

Observation are studies that involve the systematic recording of observable phenomena or behavior in a natural setting. Castellano et al (2008) define observation as the systematic description of events, behaviors, and artifacts in the social setting chosen for study. Observations enable the researcher to describe existing situations using the five senses, providing a written photograph of the situation under study (Erlandson, et al., 1993). Dube and Nkunda (2015) say observations allow the researcher to gauge real actions rather than when people give information on their own. The researcher used structured observation which was defined by Fry et al (2017) as the process of gathering open-ended firsthand information by observing people and places at a research field. This observation was guided by the following themes: Impacts of practical learning activities education in Zimbabwe, the role of a science laboratory in the teaching and learning of science subjects and measures taken in schools to implement practical lessons.

3.6 Data generation procedure

The researcher obtained an introductory letter from Bindura University of Science Education, from the Faculty of Education. The introductory letter enables the researcher to seek permission to carry out the study on the selected schools and to collect data. The participants were selected purposively and the researcher personally provided questionnaires, interviewed and observed the participants. The researcher orally explained the participants how the processes were going to be conducted.

3.7 Data analysis

Creswell (2012) identifies four essential steps for this phase that is preparation of data, analyzing data, report results and interpret the results. During the preparation of data, researchers transfer qualitative data into a form conducive for analysis, in this case that is data collected through

interviews and observations. Thematic analysis is the process of identifying patterns or themes within qualitative data. Braun and Clarke (2006) suggest that it is the first qualitative method that should be learned as it provides core skills that will be useful for conducting many other kinds of analysis. A further advantage, particularly from the perspective of learning and teaching, is that it is a method rather than a methodology (Clarke and Braun, 2013). Braun and Clarke (2006) distinguish between a top-down or theoretical thematic analysis, that is driven by the specific research questions and the analysts focus, and a bottom-up or inductive one that is more driven by the data itself. In this study use of observations and interviews were used by the researcher to obtain qualitative data.

3.8 Research integrity

In this study research integrity was based on trustworthiness of the study and ethical considerations that are discussed in detail below:

3.8.1 Trustworthiness of the study

Trustworthiness or truth value of qualitative research and transparency of the conduct of the study are crucial to the usefulness and integrity of the findings (Cope, 2014). Trustworthiness or rigor of a study refers to the degree of confidence in data, interpretation and methods used to ensure the quality of a study (Pilot and Beck, 2014). In this study trustworthiness of the findings was ensured through questionnaires, interviews and observation with the view to extract valuable information on the factors affecting the implementation of quality science education in Chapanduka cluster. Thus, trustworthiness was gained through thorough questionnaires, prolonged interviews and observations.

3.8.2 Ethical issues

Ethical issues deal with the respect and the protection of participants during data collection. Opdannaker (2006) asserted that ethics refers to what is socially and morally prescribed as right and wrong by the society. Chiromo (2009) suggested that information that is collected from participants should be used for the purpose of research only and should not be publicized. The investigator ensured confidentiality by making sure that the information that was collected from participants was used in the study only. To maintain confidentiality participants were not asked to state their names. Chiromo (2009) suggested that the researcher must also inform the participants the purpose of the study before involving them in the investigation. During the study the researcher informed the participants that their participation was voluntary and they can withdraw anytime if they no-longer want to be involved in the study.

3.9 Chapter summary

The chapter focused on methodology that was centered on the population, research design, trustworthiness, ethical issues and data collection procedures. The chapter explained the advantages and disadvantages of three data collection methods that were utilized by the researcher during data collection. In this chapter the researcher clearly defined the population and the sample. The next chapter will focus on the data presentation, data analysis and data presentation.

CHAPTER 4

Data analysis and presentation

4.1 Introduction

The chapter looks at what was found from the study. It presents analyses and interpreting of data collected by the researcher with aid of tables pie charts and graphs. The chapter presents analyses and interprets data collected by the researcher from science teachers from three school and ordinary level science learners (10 teachers and a sample of 30 learners of which 15 pupils were girls and 15 were boys. Data from teachers and learner' s questionnaires, interviews and observations will be summarized and analyzed so as to draw sound conclusions.

4.2 Demographic characteristics of the selected teachers were recorded on the table below

Sex	Females	2
	Males	8
Professional Qualification(s)	Certificate in Education	0
	Diploma in Education	4
	Degree in Education	1
Teaching Experience (years)	0-7	2
	8-14	0
	15-25	2
	Above 25	1

Table above presents the distribution of participants according to sex, professional qualification and teaching experience. There were both male and female teachers but however, female teachers were fewer than male science teachers meaning that there is still a gap in male dominance as far as science subjects are concerned. The researcher noted that the participants' qualifications ranged from diploma in education to degree in education and teaching experience ranged from 3- to more than 25 years. Most of the participants have been in the teaching fraternity for less than 20 years. This is a clear indication that they may lack experience required for them to implement quality science education. Biography data for learners who were involved in the research was captured and tabled below

ATTRIBUTES		TOTAL	PERCENTAGE
SEX	Male Female	15 15	50 50
AGE	16 Years	3	10

	17 Years 18 Years 19 Years	21 5 1	70 16.7 3.3
FORM	3	30	100

The table shows the distribution of participants according to their age and sex. 15 males and 15 females participated in the research process. Among the participants 3 were aged 16 making up 10% of the population, 21 were 17 years old making up 70% of the total population, 5 were 18 years old making up 16.7% of the total population and 1 participant was 19 years old which constitutes 3.3% of the population. The table also show their level of education and all were in form 3.

4.3 Teachers' and learners` challenges in effective implementation of practical lessons.

The researcher sought to highlight challenges teachers and learners are experiencing in the implementation of practical learning activities at rural day secondary schools at Ordinary Level.

4.3.1Teachers` challenges in the implementation of practical learning activities in ordinary level combined science classes in rural day secondary schools

The researcher used some questionnaires to find out the challenges faced by teachers in the implementation of practical learning activities at ordinary level in rural day secondary schools in Chapanduka Cluster in Buhera District. One of the participants highlighted that:

There is shortage of equipment and poor resources in science department for example we do not have a science laboratory here, we only rely on science learning kits so how can I carry out practical work with my learners effectively (participant1)

The other participant viewed that:

Parents are not fully supporting their children for example we had a trip to go to another school which has a fully equipped laboratory for a practical lesson, most parents did not pay for the trip. We also wanted to buy equipment for improvisation for a practical lesson at one time, again most parents did not pay fee required. (Participant 2)

The other participant said:

We are facing challenges of failing to maintain the laboratory equipment here. Our ill-equipped laboratory is not secure so once an equipment is misplaced it becomes difficult to replace it because science laboratory equipment is expensive. (participant 3)

Another participant highlighted that:

Labelling is affecting the learners at our school. Learners are graded according to their academic abilities starting from form 3 and this demoralize those who are academically low and begin to stereotype science subjects as difficult. Actually, they develop negative attitude towards science subjects and even hate practical work. (Participant 4)

Another participant had the following views:

Our classes are too large to manage. You would find it difficult even to use the few sciences kits which are here. You spend most of the time marking books. You cannot manage four classes each having more than seventy learners alone Rather l would choose to spot areas of interest in examinations than going outside for an experiment. I would simply go straight to the point. (Participant 7)

Another participant also highlighted that:

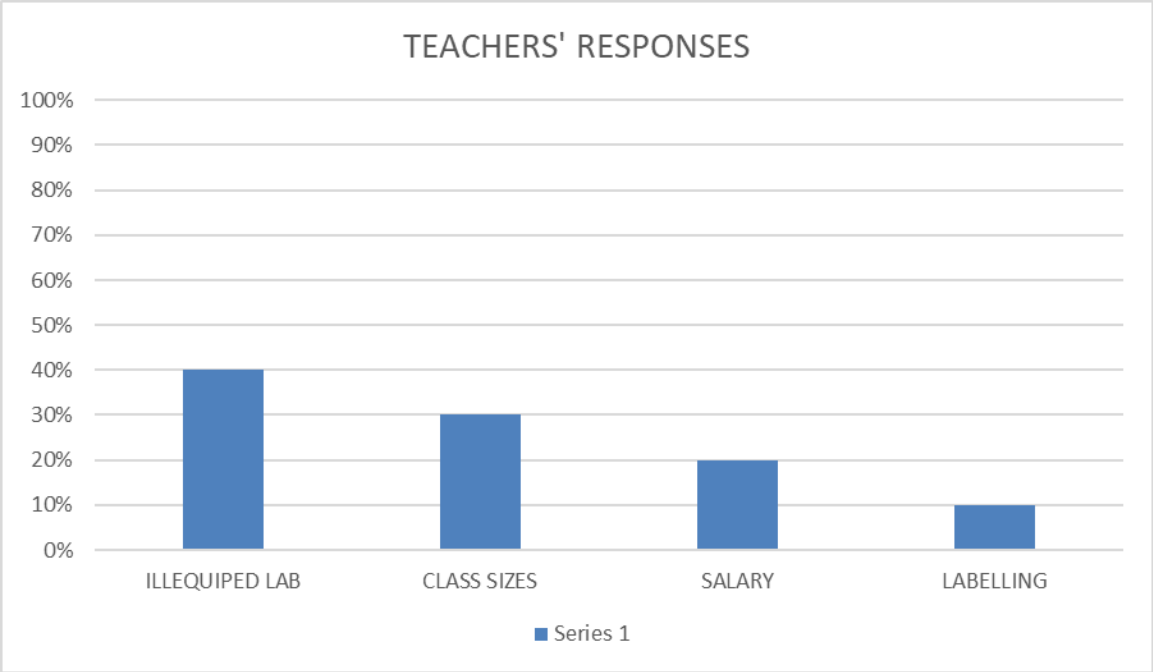
We are not getting enough support from the school administration. The school administration wants to strike balance between science department and other departments at school not taking into consideration that science subjects require a lot of attention for hands on activities. (Participant 8)

In addition, another participant views that:

Our salaries are very poor nowadays. It cannot meet the demands of day-to-day life so we are most of the time engaged in informal activities such as entrepreneurship for our families to survive so we find improvising for practical lessons as time consuming. (Participant 10)

Teachers were asked to highlight what they considered as the main challenges which hinder the practical lessons at their schools and the following data was gathered and interpreted.

CHALLENGE	Shortage of equipment	Class sizes and shortage of time	Poor Salary	Labelling
NO OF TEACHERS	4	3	2	1



The graph indicates that practical work in most rural schools is not done due to shortage of resources and failure to maintain the available resources for use in the future. Also, the workload of teachers is disturbing teachers to do practical work. Teachers are finding it difficult to manage more than 70 students in each class. This is worsened by the Continuous assessment learning activities which also require a lot of supervision. Some challenges like poor salary and labelling as well as poor attitude by learners also hinder the implementation of practical work.

4.3.2 Learners` challenges in the teaching and learning of practical lessons in combined science at ordinary level

The researcher carried out some interviews to find out the challenges being experienced by learners in the implementation of practical learning activities in rural day secondary schools. The following findings were gathered;

One of the participants argued that:

Our teachers are demanding a fee for extra lessons they do during the weekends and holidays and operate in no money no extra lesson policy. That is when they even sacrifice to improvise for practical lessons and this is a disadvantage to those who did not afford to pay for the lessons.

The other participant views that:

My parents are just peasant farmers, they cannot afford to pay an extra fee which is sometimes demanded to buy equipment and material which may be required for a practical exercise to be done.

In addition, one of the participants views that:

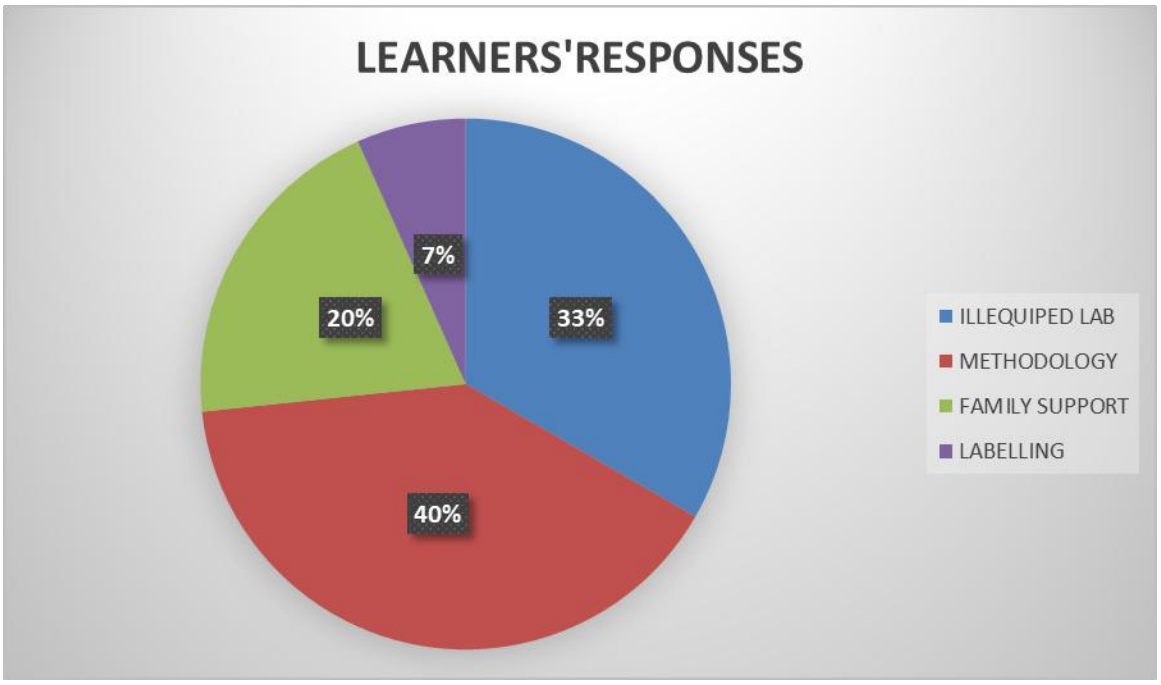
Our teacher never planned for practical lessons. One student is sometimes sent with a note book and we are told copy the notes. Those notes would not be explained by the teacher on time so at times you would not understand the topic due to the method of teaching applied.

Another learner also argues that:

We are graded here at form 3 level. The best learners are put in their class. This demoralises me even when the teacher took us to the laboratory, I won't be thinking that I will make it because already we have been labelled as dull.

The learners were also asked each to identify what they consider to be major challenges which affect the implementation of practical lessons. Data was gathered and interpreted. The pie chart

below percentage of learners who strongly agree to a major challenge to their teaching and learning of practical lessons at school.



After being examined 40% of learners argued that the methodology prioritized by the teachers in the teaching and learning of combined science is a major barrier to effective implementation of practical learning,33% strongly argued that they have ill-equipped laboratories, 20% of the learners argued that they lack family support to engage into practical activities at school and 7% argued that labelling affected them. Among other barriers these ones were highlighted by learners as major ones.

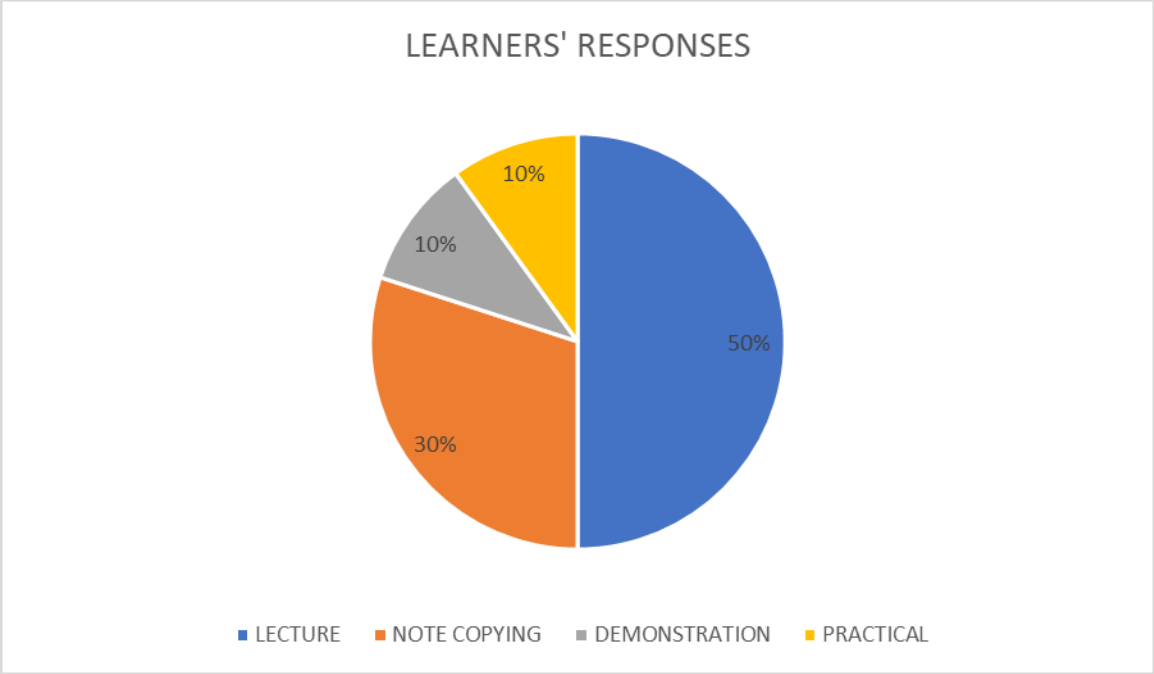
The findings concur with Ogunmade (2006) and Chiromo (2010) who found that many secondary schools have inadequate science teaching and learning resources with their laboratories ill-equipped lacking appropriate apparatus, equipment and reagents. Hamilton et al (2010) has noted the importance of learning facilities in the provision of quality science

education. Mahlaba (2006) views that lack of adequate science teaching and learning equipment not only denies students opportunity to develop scientific skills, but lead to loss of interest in science-based disciplines hence students will develop negative attitudes towards the subject. The findings are also similar to Rees, (2020) who said that the whole idea of labelling is to identify and categorize learners according to their abilities and learning difficulties. The findings on the forms of labelling at school view different scholars and researchers. For instance, Samdal, et al (2014) argued that labelling affects teachers' attitudes towards learners. The findings also support Hallahan and Kaufman (2017) who argued that labelling promotes the classification of children and may lead teachers to ignore other learners. Omorogbe and Ewansiha (2013) who note that poor remuneration demotivates teachers to manage large classes they would be teaching. Analysis shows it that teachers are using some of the time they should spend at work doing their own businesses as a way of supplementing their salaries they claim to be meager. Teachers are also demanding extra lessons fees to supplement their salaries which is disadvantaging the less privileged learners. Learners need a serious career guidance to stop them from dropping out science subjects. Economic challenge is one of the major factors affecting the implementation of quality science education in rural day secondary schools.

4.4 The impacts of the methodologies applied by teachers in the implementation of quality science education in rural day secondary schools

Learners were asked to state methods of teaching employed by their teachers in an interview and data was gathered. The researcher carried out some interviews to learners to find out the impacts of the methodologies applied by teachers in rural day secondary school in the implementation of quality science education. The findings of the study reveal that 50% of combined science

teachers use lecture method mostly,10% use demonstrations mostly, 10% use practical and 30% use note copying as a method for their teaching in rural secondary school teachers in Chapanduka Cluster in Buhera District. Most teachers are using the traditional methods as shown on the pie chart below



The findings indicates that lecture method is mostly used by teachers. Learners argue that they spend most of their time during lessons copying notes from the teacher or the learner assigned by the teacher to do so while practical lessons are rarely done by science learners. Some practical again are limited to teacher demonstrations. As a result, learners do not benefit from the type of methods being employed.

The table below shows the frequency of learning activities identified by learners in Chapanduka Cluster.

Item	Once per term	Once a month	Once a week	Nearly every lesson
Teacher demonstrations			Yes	
Note Copying				Yes
Practical	Yes			
Class and group discussions			Yes	

The frequency of activities identified by learners show that practical can be done once per term or they are rarely done in rural secondary schools in Chapanduka Cluster. Teachers' demonstrations and class group discussions are done at least once every week. Note copying and explanations from the teacher is done nearly every lesson. This concurs with Sun et al (2014) who say science classroom environments are characterized by students having limited opportunities for participating and engaging in learning as science teachers are dominant in classroom talk. Omrogbe and Ewansiha (2013) argue that the classrooms are characterized by few hands-on practical activities, few demonstrations and when in use it is often teacher

demonstration which makes students passive. The traditional lecture method has dominated the science classrooms which leave the learners being taught without any skills. This could be laziness of teachers.

Learners were asked about the methods of assessment normally used at their schools and the results were shown on the table below.

Method of assessment	**Percentage of teachers who use it**
Written exercises	100
Written tests and examinations	100
Research assignments	20
Practical exam	10
Investigations	0

The investigations reveals that most teachers use written exercises, tests and examinations as their assessment tools. Research assignments and practical are used by few teachers as methods of assessment at end of term examinations. The findings agree with those of Ogunmade (2006) who notes that written exams, tests and quizzes are the most commonly strategies used by science teachers and that practical exams and investigations are the least commonly used assessments. Abrahams and Miller (2008) noted the importance of practical work in promoting engagement and interest of students as well as testing important skills of inquiry and conceptual

understanding. This could be ignorance from teachers as well as lack of proper monitoring from the Ministry of Primary and Tertiary Education.

4.5 How implementation of practical learning activities can be improved in rural day secondary schools

The researcher used questionnaires to find out how effectively practical lessons can be effectively implemented in combined science classes in rural day secondary school. Information was recorded and analyzed.

One participant cited that:

Class sizes should be reduced as well as workload. Government should recruit more teachers to bridge the gap. This allows teachers to have enough time for preparation and implement practical lessons.

Another participant argues that:

Teachers need to be professionally developed to improve their teaching methods and teaching skills.

One of the participants has the view that:

Teachers need to be motivated through better remuneration.

Another participant had the view that:

School administration need to support science department at school. There is need for building school science laboratories and provide materials for teaching and implementation of practical lessons.

Another participant cited that:

Parents need to support their children by paying fees needed on time.

Learners were also interviewed on the ways of improving the learning styles in combined science in their schools and they came up with different ways.

One participant argues that:

Our combined science teacher should improve his method of teaching and desist from a method of just sending notes and leaving them unexplained. We need also to do practical rather than simply meeting practical on the final exam.

Other learner views that:

We should not be graded at form three because it makes one have negative attitude on practical lessons thinking that he/ she will never make it.

One of the participants views that:

Extra lessons should be banned so that all the learners move at the same pace. Teachers who practice such a way of teaching should face heavy penalties.

Observations made by the researcher reveal that there is need to improve on science laboratories for practical lessons. Two of the schools have ill-equipped laboratories and the one has no a science laboratory at all. Observations also reveal that there is shortage of science teachers in

schools as compared to number of learners. Government needs to look into the matter and recruit teachers to bridge the gap of this shortage. Non-governmental organizations such as CAMFED which sponsor the less privileged girl children should also consider to help both sex and improve its criteria on selection so that the talented benefit from this donation. Observations reveal that the schools in Chapanduka Cluster have a sour relationship, if not so they could have come together and buy combined science equipment collaboratively. The Ministry of Primary and Secondary Education as well as school administrators should strictly monitor the educational practitioners so that they stick to best methods of teaching.

The findings of the study concur with those of Ainley et al (2008) who highlight the need to train and retrain science teachers so as to develop the teachers` capabilities knowledge, pedagogy and dispositions for science teaching. Reducing class sizes and recruiting teachers is very essential to reduce workload for better performance of teachers. Pia (2015) argues that large classes are characterized by teacher-centered with low student participation. The teaching and learning of science require the provision of equipment and laboratory facilities. As viewed by Hamidu et al (2014) good laboratory enables high quality of practical work to be carried out in a pleasant environment motivating and inspiring teachers and students alike.

4.6 Summary of the chapter

The chapter has analyzed, presented and described the findings that had been gathered. The results have clearly answered how effective practical work can be fully implemented in science education and how it can be improved. The opinions of the teachers were on this method of teaching were highlighted. In the next chapter, the researcher is going to summarize, conclude and highlight the recommendations.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

After the presentation of data, data analysis and discussion of the findings in the previous chapter, this chapter gives a brief summary of the whole project. Conclusion are also drawn from the findings of the study. Recommendations pertaining the research finding were suggested in order to give possible solutions to the identified barriers to effective implementation of the practical lessons in rural day secondary schools.

5.2 SUMMARY OF CHAPTERS

Chapter 1

Chapter one focuses on introduction, background of the study, statement of the problem, research questions, aims of the study, delimitations of the study, limitations of the study as well as definition of key terms. The background outlines an overview of the issue under investigation that is the barriers to effective implementation of practical lessons to ordinary level learners in rural day secondary schools. It critiques the traditional lecture method, emphasizing the need for experiential learning approaches such as practical lessons. The researcher was pushed to carry out research after a series of poor results and high rate in number of dropouts in combined

science in the cluster. The researcher strongly believed that the failure by learners is a result of poor methods of teaching being employed by teachers in the cluster. The value of hands-on experiences is supported by existing research which indicates that these methods enhance understanding and retention of combined science concepts. The statement identifies the lack of practical lessons in many rural secondary school' s pin pointing shortages of resources, ill-equipped laboratories and high-cost maintenance of science learning materials. Three research questions are stated and they give direction of the investigation. The study aims to find out the main barriers to effective implementation of practical lessons in rural schools, the impacts of methodology applied by rural school teachers in the teaching and learning of combined science as well as the solutions to these barriers in rural day secondary schools. Objectives of the research are also outlined in this chapter giving it direction and focus. Limitations and delimitations were explained as well as the definition of key terms. The summary concluded chapter one giving the structure of the research detailing the contents of subsequent chapters.

Chapter 2

Chapter two focused on related literature review. Under this chapter the researcher found out other scholarly views on relevance of practical work in combined science subject at ordinary level, theoretical framework, teacher quality and quality of lesson delivery, career guidance in teaching and learning, the role of a science laboratory in implementing practical lessons, challenges faced by the schools in the implementation of practical work and some solutions to these challenges. The chapter outlines one major theory guiding the research which is the theory of experiential learning by John Dewey (1916). John Dewey emphasizes on the importance of learning by doing. He argues that learners quickly reflect what they learn practically. According to John Dewey learners quickly retain what they learn if they learn by doing. On his retention

pyramid John Dewey argues that if learners learn by doing there approximately 75% retention rate of what he or she learns. Importance of practical work were mentioned. These include motivation, transference of theory to practice, personal and social development, varied instructional method, enhancing student engagement and enriching the curriculum. Challenges and barriers to implementation of practical lessons were also outlined in this chapter. This chapter focused more on the role played by the government from 1980 to promote quality science education in Zimbabwe also outlines challenges faced in implementing these experiential learning opportunities setting the stage for chapter three on research methodology.

Chapter 3

Chapter three focuses on research methodology employed to investigate the barriers to effective implementation of practical lessons in ordinary level classes in rural day secondary schools in Chapanduka Cluster. It defines research design as a comprehensive plan that is used to infuse various elements of a study in an orderly and logical manner. In addition, a research design provided the researcher with a map that outlines the steps on how research will be conducted. The research used a mixed method approach under the interpretivism paradigm which included tools like interview, questionnaires and observations. Participants were selected using purposive sampling to ensure representation. The research population consists of students and combined science teachers from three secondary schools in Buhera District. A diverse group of 30 learners and 10 teachers were sampled. Data collection involved obtaining permissions followed by interviews, questionnaires and observation to gather qualitative data. Ethical considerations were prioritized throughout the data generation process. Thematic analysis was used to identify patterns and themes from the data collected through interviews and questionnaires. This involved familiarization, coding and categorizing responses based on participant feedback. The study

employed triangulation to enhance credibility and ensure a comprehensive understanding of participant’ s experiences. Informed consent was sought first before getting data from participants. Participants personal information was kept confidential. Data was securely stored and used solely for the research purposes. Chapter three paved way for chapter four which looked more into data analysis and interpretation.

Chapter 4

Chapter four indicates all findings which the researcher acquired during the research. The researcher acquired information on the barriers to effective implementation of practical lessons in ordinary level classes in Chapanduka Cluster in Buhera District, impacts of the methodologies applied by teachers in the cluster in the teaching and learning of combined science as well as ways of solving some barriers to the implementation of practical work in rural day secondary schools. The chapter was also focusing on the interpretation and discussion of gathered data. The analysis was conducted using thematic analysis aimed at deriving meaningful conclusions from the perspectives of students and teachers. The study included 10 teachers and 30 learners. The demographic data revealed a higher number of male teachers compared to female teachers, with most participants holding diplomas. Accordingly, knowledgeable and experienced people were involved in the research. 30 ordinary level learners who constituted of 15 boys and 15 girls were purposively sampled and used in the research. Their ages ranges from 16years - 19 years.10 % of the learners were 16 years old, 70% were 17 years old while 16.7% were 18 years and 3.3% was 19 years old. Several barriers were identified, including financial constraints, lack of teacher competence, time limitations and inadequate resources. Participants expressed concerns about student behavior during trips and logistical challenges organizing fieldwork. Participants suggested various strategies to address barriers such as reducing workloads, providing in-service

training and avoid labelling. and better alignment of field trips with the curriculum. The importance of planning and organization for practical lessons was emphasized. Key findings indicated that practical lessons significantly enhance student understanding and interest in combined science. The chapter concluded that effective implementation requires teacher preparation, student interest and administrative support.

5.3 Summary of the project

Chapter 1 of the research was the definition of the problem, background of the study, statement of the problem, research questions, significance of the study, limitations, definition of key terms and summary of the chapter. Chapter 2 looked at literature review which provided literature on the impacts of practical lessons in ordinary level combined science classes and challenges faced by teachers in effectively implementing practical lessons. Chapter 3 was the research design, methods/tools, sample and sampling procedure, data analysis, data generation and research integrity. In addition, in chapter 4 the researcher looked at data analysis and discussions. This chapter will review:

-Practical learning activities in science subjects are a significant indicator to learner performance in schools that guides them to make preparations for examinations as well as equipping them with knowledge and skills that will help them make knowledgeable decisions of career choices and further studies.

-Findings indicate that science laboratory plays a central role in the teaching and learning of science as it provides the learners with hands on approaches which leave learners with fully equipped skills.

-Practical lessons in teaching and learning of science subjects is an essential part of daily classroom teaching and an important tool to guarantee quality teaching and learning if administered properly.

5.4 Conclusion

From the analyzed and discussed data, it can be concluded that, the effective implementation of practical lessons in Ordinary Level Combined Science classes in rural day secondary schools is not successful. The findings showed that teachers are lacking supervision and motivation from the employer. There are many challenges the teachers encountered in implementing practical lessons effectively like lack of motivation, shortage of enough resources to use, lack of support from school administration and large instructional workload, therefore there is need to address these challenges first for effective learning of science subjects in rural day secondary schools.

5.5 Recommendations

The findings from the study revealed that there are some challenges which teachers faced in effective implementation of practical lessons at Ordinary Level Combined Science and the researcher recommends that:

- There is need for schools to have better learning facilities such as the science laboratories for learners to learn science subjects effectively.
- There is need to train and retrain Combined Science teachers at Ordinary Level on how to implement the quality learning activities.

- School administration should provide manuals, textbooks and equipment to use in time and in adequate quantities so that schools will not be left behind on the methods of teaching.
- There is need for thorough supervision of teachers from the employer and to ensure that all learning activities are implemented effectively.
- Teachers should improvise for enhancement of practical lessons at schools.
- Government should recruit more science teachers to bridge the gap of shortage of science teachers in rural areas.
- Labelling should be avoided at school as this may dishearten learners.
- Schools should engage into fundraising projects which sustain them and help them to buy science equipment.
- Closer secondary schools can buy science equipment collaboratively and use together to lessen the costs.
- The school administration should find ways of motivating parents so that they help them to build facilities such as a science laboratory.

5.5 Areas of further research

The study was limited to one method of teaching so therefore there is need to investigate at challenges being faced by Combined Science teachers at Ordinary Level on implementing other methods of teaching. This will give insight to the policymakers and other stakeholders on how to overcome these challenges.

5.7 Chapter summary

In this chapter the researcher concentrated on the conclusions from data obtained from the findings of the study. The researcher summarized the previous topic. Conclusions were made and

the researcher proposed recommendations to the challenges and revealing further areas of research.

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Research instruments

Questionnaire guide for teachers

This questionnaire is used for educational purpose for a research project for Tinarwo Munyaradzi T. who is currently a student at Bindura University. Your cooperation is greatly appreciated. Your personal and school details will not be disclosed.

SECTION A: PERSONAL DETAILS

NAME IN FULL……

SEX……

STATION……

PERIOD AT STATION……

NUMBER OF YEARS IN SERVICE……..

PROFESSIONAL QUALIFICATION……..

SUBJECT SPECIALISATION……

SECTION B

Answer given questions on the spaces provided

1Which science subjects are taught at your school at each level?

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2. What is the average number of learners do you have per class?

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3. Do you have a well-equipped science laboratory at your school? If you do not have, how do you carry out practical lessons?

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4. What challenges do you encounter in the implementation of practical lessons in combined science subject at ordinary level at your school?

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5. Which strategies would you recommend as solution to the challenges you raised and what areas do you think need immediate attention?

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6. What role is being played by the school administration in promoting quality science education at your school?

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7. Do you have any partner which support and promote the implementation of quality science education at your school? If you have any, how does it promote and support?

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8. Can you comment on the learners` attitude towards science subjects at your school?

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9. Are the parents playing their role in supporting their children in teaching and learning of science subjects? Which role are they playing?

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10 Among the challenges you face in the implementation of practical lessons in combined science, which one would you consider the major challenge?

Thank you for your cooperation

INSTRUMENT 2

INTERVIEW FOR LEARNERS

This interview is done for educational purpose. It is a research project for Tinarwo Munyaradzi T. who is currently a student at Bindura University. Feel free to answer any question. If you feel you do not want to answer some question you are free to do so. A cellphone shall be used to record the conversations we are going to do. All personal and school details will not be disclosed.

PERSONAL DETAILS

NAME IN FULL……

FORM……

SCIENCE SUBJECT……..

INTERVIEW GUIDE QUESTIONS

1.Which science subjects do you learn at ordinary level at this school?

2.How many lessons are allocated per each subject per week?

3.Which methods of instructions are used by teachers in the combined science classroom?

4.Are the methods of teaching employed by teachers in teaching combined science subject helping you in grasping the concepts taught? Why do you say so?

5.Do you have any challenges in the implementation of practical lessons in combined science subjects at your school?

6.What do you think are the solutions to the challenges you meet in the implementation of practical lessons in combined science?

7.Do you have any career guidance sessions at your school? What are you taught during these sessions?

8.Which assessment methods are used by combined science teachers to measure the level of their learners in at your school?

9.Do you enjoy learning practical lessons in combined science? What makes you enjoy?

INSTRUMENT 3

Observations

Structured observation guided by the following themes:

Is there a school science laboratory?

Is there evidence of practical lessons done?

What are the measures taken by the school administration to improve implementation of practical learning activities at the school?

Chapanduka Secondary School

Private Bag 988

Murambinda

14 November 2024

The Head of Department

Bindura University of Science Education

P Bag 1020

BINDURA

ZIMBABWE

Dear Sir/Madam

RE: PERMISSION TO CARRY OUT A RESEARCH

Tinarwo Munyaradzi T Ec number (5213537) has been granted permission to carry out research at our school on, “ Barriers to effective implementation of practical lessons in rural day secondary schools in ordinary level classes in Chapanduka Cluster in Buhera District"

Yours faithfully

Madziturera P (Head)

Phone no (0714162869)