

BINDURA UNIVERSITY OF SCIENCE EDUCATION
FACULTY OF SCIENCE EDUCATION
BACHELOR OF SCIENCE EDUCATION HONORS DEGREE IN BIOLOGY



**THE EFFECTIVENESS OF USING RESOURCES TO IMPROVE PASS RATE IN
TEACHING FORM 3 BIOLOGY AT ONE SCHOOL IN HARARE.**

BY
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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
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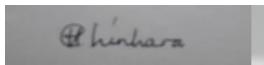
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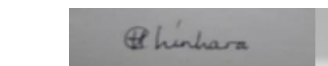
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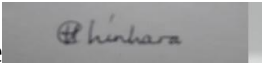
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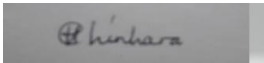
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DEDICATION

This research is dedicated to my family for their unwavering support during the period of my study.

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I would like to thank Dr. H Chinhara for his unwavering support and for guiding me during my research. I also want to extend my appreciation to Mr Tsoka our Head of School for the great support he offered to me during the period of my research and also to all my participants the form 3 Science Biology Class for providing valuable information for my research. I also give thanks to my Colleagues for their encouragements. My gratitude goes to my family for their moral support they gave me during the period of my study may God bless them for me.

ABSTRACT

The project aims to investigate the effectiveness of utilizing resources in teaching Form 3 Biology with the goal of improving the pass rate at school in Harare. The study will focus on identifying and implementing various resources, such as sample grant applications, rubrics for assessment, language objectives in content-area instruction, and the Next Generation Science Standards, to enhance the teaching and learning experience in the Biology curriculum.

In this research, a sample of 12 learners from a Form 3 Science class was selected and divided into an experimental group and a control group. Throughout the study, the learners underwent 3 pre-tests, 3 post-tests, and completed 3 questionnaires, all of which were conducted during Biology lessons to gather data. The collected data was analyzed using tables. The findings of the study indicated that the use of resources to enrich the learning experience during Biology lessons served as a source of motivation for the learners, fostering a liking for the subject and subsequently enhancing the pass rate. The study emphasized the importance of collaboration among school authorities and parents to provide adequate resources to support learners, thereby contributing to improved pass rates. Furthermore, the study advocated for the adaptation of handmade resources and models by both teachers and learners to enhance motivation and improve the pass rate.

Additionally, the incorporation of outdoor activities was encouraged to promote a learner-centered approach and hands-on utilization of resources, aiming to cultivate an enjoyable learning experience in Biology and ultimately enhance the pass rate. The research also recommended the Ministry of Primary and Secondary Education to develop clear policies for inclusive education and to allocate sufficient financial support to schools for the procurement of resources, which would in turn support both learners and teachers, leading to an improvement in the pass rate for Biology.

The research will employ a comprehensive approach, drawing on the principles of effective content area instruction, early childhood development, and the Common European Framework of Reference for language teaching and assessment. By leveraging these resources, the study seeks to address factors contributing to ineffective teaching and learning, particularly in the context of rural primary schools, and aims to improve the academic performance and pass rates of Form 3 students.

The project utilized a combination of qualitative and quantitative methods to assess the impact of resource-based teaching on student outcomes. It will also explore the dimensions and performance expectations outlined in the Next Generation Science Standards to ensure a

cohesive and comprehensive approach to teaching Biology. The Ministry of Primary and Secondary Education should design clear policies on inclusion and provision of enough financial support to all the schools for the purchase of resources so as to support learners and teachers and pass rate of Biology will improve.

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CHAPTER 1

1.1 INTRODUCTION TO THE STUDY

This chapter will establish the foundation of the entire research by discussing critical components of the study. It will encompass the background of the study, statement of the problem, as well as the aim and objectives. The background of the study will provide an overview, while the statement of the problem will expound on the underlying issue being addressed. The aim and objectives will delineate the intended accomplishments of the study. Additionally, the chapter will delve into other aspects such as research questions, assumptions, justification, and the significance of the study.

1.2 Background to the study

The high incidence of underachievement in Biology at both school and national levels may stem from a range of factors, including the absence of resources such as textbooks, educational materials, ICT tools, tangible teaching aids, and practical teaching methods in the instruction and learning of Biology. To determine the impact of resources on enhancing pass rates, the researcher conducted an inquiry to evaluate the efficacy of resource utilization in teaching O Level Biology at a school in Harare.

Table 1: O level Biology pass rate for the year 2020 to 2023 at one school in Harare

YEAR	% PASS RATE
2020	54
2021	45
2022	40
2023	38

Based on the information provided in the table, it is evident that students face challenges in achieving a satisfactory pass rate in Biology during their final year. Upon discovering the poor performance of O level Biology students, the researcher embarked on a study to assess the effectiveness of resources in improving the pass rate in a Form 3 Science Class. The

primary aim of this study is to address the obstacles encountered by students in finding success in Biology as a subject (Smith, J., 2018).

In the year 2020, the pass rate for Biology was 54%, although it was slightly low, it exceeded the halfway mark. Enhancing student performance in O level Biology is crucial for their future academic and career prospects (Dascalu, Bodea, & Bizoi, 2017). Considering the pass rate for the year 2021, the researcher deemed it necessary to conduct a survey to enhance the performance of learners and improve the pass rate of Biology in schools. To address this issue and enhance students' understanding and performance in Biology, numerous resources such as Bio viewers, Bio sets, flip charts, experimental apparatus, PowerPoint projectors, print media, and Online WhatsApp groups have been developed (Boyle & Connelly, 2016).

In November 2022, the pass rate decreased from 45% to 40%, indicating that learners struggled to comprehend experimental concepts, skills, and techniques, particularly in papers 2 and 3. Moreover, students failed to provide detailed explanations and develop their points adequately, highlighting a lack of content in Biology. Observing the heavy reliance on lecture methods due to a shortage of resources, the researcher introduced various resources to engage learners, increase their motivation, and enhance their understanding of complex biological concepts (Garret, 2014). To address the problem of textbook shortage, the researcher printed handouts for the participants in the research.

In 2023, the pass rate dropped to 38%, which was significantly lower compared to previous years. Insufficient availability and inadequate utilization of instructional materials have been identified as significant factors contributing to the effectiveness of the school system and poor student performance (Neji and Ntibi, 2019). The research conducted examined the correlation between the use of instructional materials and students' academic performance in Biology, revealing that learners taught with instructional materials performed better than those taught without them. Instructional materials play a crucial role in teaching and learning, as they stimulate learners' interests, help overcome physical limitations, and enhance the presentation of subject matter (Oakes and Saunders, 2020).

While these resources show promise in improving the pass rate in Biology, empirical evidence regarding their effectiveness is still limited (Cimer, 2012). The researcher also observed underutilization of resources for experimentation in Biology, with practical work only being conducted towards examination periods, hindering students' understanding of its essence (Manda, 2012). Additionally, the study aimed to determine the extent to which the

availability of teaching and learning resources influenced students' performance in Biology (Mukhana, 2013).

The experimental design to be employed by the researcher includes identifying dependent and independent variables, formulating hypotheses, designing experimental treatments, and assigning subjects to groups using a random sampling technique.

1.3 Statement of the problem

Learners are struggling to achieve satisfactory pass rates in Biology during their final year of study. Failure to use appropriate resources in teaching and learning Biology at O level can result in poor academic performance by students and a depressed national exam performance. Findings revealed that students taught with instructional resources materials performed better than those taught without instructional materials Awolaju, (2016).

1.4 Research questions

1.4.1 Main research question

- What is the value of resources in teaching and learning Biology in schools?

1.4.2 Sub Research questions

- How does the shortage of resources affect the teaching and learning of Biology?
- What is the relevance of resources in Biology language in teaching and learning of the subject?

1.5 Research Aim

- The aim of the research in the given context is to investigate and identify effective resources and teaching methods that can improve student performance and pass rates in Biology, particularly focusing on O level learners.
- The effectiveness of using resources to improve pass rate in teaching form 3 biology at one school in Harare.
- Additionally, the research aims to address the challenges faced by students in comprehending complex biological concepts and to determine the extent to which the availability of teaching and learning resources influences students' performance in

Biology. The overarching goal is to enhance the understanding and performance of students in Biology through the implementation of specific resources and teaching strategies, ultimately aiming to improve pass rates and academic achievement in the subject.

This aim aligns with the broader objective of contributing to educational excellence and professional development in the field of Biology, with a focus on leveraging modern research, technology, and training tools to deliver transformative insights into educational practices and student outcomes.

1.6 Research Objectives

- (a) Identify various resources which can be effectively used in order to improve the pass rates in Biology at O level.
- (b) Analyze and assess the effectiveness of using different types of resources in teaching Biology.
- (c) To identify benefits of using resources in teaching and learning of Biology.

1.7 Purpose of the study

The study seeks to investigate on the effectiveness of using different types of resources in teaching and learning of biology in schools in order to improve pass rate. The results of the study will be used as a yard stick in schools which want their learners to excel above excellence in their studies.

It is also to provide a comprehensive assessment of the importance and relevance of the research relative to individual values. This includes a discussion of how the various areas under investigation are interrelated and how the study aims to generate new insights and knowledge. Additionally, the purpose statement succinctly explains the specific intent or objective of the study, indicating the study's method and overarching goal. Furthermore, the study aims to investigate and identify effective resources and teaching methods that can improve student performance and pass rates in Biology, particularly focusing on O level learners, and to determine the extent to which the availability of teaching and learning resources influences students' performance in Biology.

This purpose aligns with the broader objective of contributing to educational excellence and professional development in the field of Biology, with a focus on leveraging modern research, technology, and training tools to deliver transformative insights into educational practices and student outcomes.

1.8 Delimitations of the study

This study had the following delimitations:

Topic - The research focused on the effectiveness of using resources to improve pass rate in teaching Biology at one school in Harare.

Respondents – The respondents of the study are the form 3 Science learners doing Biology who were randomly selected at a school in Harare.

Location – The study will be carried out at a selected high school in High Glen District in Harare Province

1.9 Limitations of the study

In this research the following aspects may hinder the researcher from gathering enough information on the matter being investigated.

1.9.1 Time

- The limited time allocated for the lessons and periods for the whole investigation would not give ample time to carry out a thorough research. The researcher had to make use of free times such as break time, lunch and after lesson delivery.
- The researcher will carry out the research during the term when she is also expected to be in class attending to her normal lessons which may be difficult to gather enough information when most of the hours will be occupied.

1.9.2 Resources

- Resources such as transport to move around collecting information may limit the researcher. Limited resources such as lap tops and a printer to carry out the research may be a hindrance resource to the researcher.

1.9.3 Money

- The researcher will be limited with money needed to make some teaching aids, handouts, printing questionnaires.
- Money is also needed for transport fare which may limit movements of the researcher as she is self-funded.
- Data may also hinder the smooth flow of the research as there is need for private Wi-Fi to carry out the research

1.9.4 Internet

- Poor connectivity might lead to interruptions in the smooth flowing of the research.
- Power cuts as well disturb the researcher to a greater extend as the lap tops need charging and also as the researcher do most of the work at night after work she needs proper lighting.

1.9.5 Family

- The researcher may be limited as she has a family to attend to therefore if she spends most of the time carrying out the research there will be a conflict between work and relationships which hinders progress of the research.

1.10 Significance of the study

The findings from this study aims to provide information that can be of importance to schools and educators to enhance their teaching methods by using teaching resources to improve pass rate of learners. By using different resources in teaching biology educators can make their lessons more interesting and easier to understand.

1.10.1 Significance to Teachers

This study is very important to the researcher and fellow teachers in the sense that it motivates science teachers to appreciate the use of modern resources in teaching Biology lessons. A lot of teachers prefer to employ lecture method, sidelining a teacher centered method due to lack of resources in schools where the teacher may be the only one who possesses one textbook and pass the information to the learners. Where subject resources are available, more of the time should be used by learners doing their research, carrying out

activities like group and individual experiments and practical, this will promote hands on approach skills in students which promote active learning resulting in improved pass rate. Using teaching resources such as Bio sets, Bio viewers, experimental tools and PowerPoint projector make learning more interesting and easier. Learners acquire skills like being observant, being good scientific manipulation, recording skills, listening skills and they become good problem solvers. These skills are very important in all of their Biology papers. The researcher as a teacher would also benefit from analyzing the effectiveness of using different types of resources.

1.10.2 Significance to the Head of Department (HOD)

Furthermore, the study is also important in the sense that the Science Heads of Department will recommend such resources to be purchased by school authorities and the SDC as they will appreciate an increase in the pass rate of learners. The HOD will also make requests for the purchase of textbooks and scientific apparatus noticing an improvement in the Science department.

Most Heads of schools did not train to teach Science instead have trained to teach history and indigenous languages therefore they do not value Science subject such as Biology. When HODs and teachers request for resources and apparatus to be purchased they usually do not cooperate. So this study will help the Heads to comply with facilitators' requests for the improvement of pass rates of Biology in schools.

1.10.3 Significance to the Educational Administrators

The Administration team in schools is of importance as the researcher and fellow Science facilitators need disbursement of funds from them to purchase resources for the Science department. Also the SDC in schools are significant as they represent parents and they also authorize for the use of funds in schools to purchase resources needed by the Science department such as Laboratory apparatus.

1.10.4 Significance to Other Stakeholders

Other stakeholders such as the policy makers and the Regional office are of importance as well as. They are responsible for the drafting and designing of the curriculum which guide schools. The syllabuses should contain relevant information which can be exhausted normally without creating hustles for both facilitators and learners. Most of the Science syllabuses are

so much congested that it is difficult to create enough time for them on the time table and at the end they are difficult to be completed before learners sit for their final year.

1.10.5 Significance to the Parents

The findings of the research seek to encourage parents so that they become involved in the learning of their children. Children need financial support from their parents for them to acquire resources such as handouts, textbooks and cell phones. Therefore the study is of importance as it will alert the parents to contribute to the pass rate of their children in learning Biology.

1.11 Definition of terms.

Bell (1995) defines the term Resources as materials that are designed to help facilitate learning and knowledge acquisition. The materials assist learners to meet expectations for learning defined curriculum. They are materials used by teachers to supplement classroom instruction or to stimulate the interest of learners. The role of the resources is to provide a source of learning experience for learners, assisting the process of interaction between learners and teachers during teaching and learning process it helps learners to learn and increase their experience, meeting different learning needs for example handouts, textbooks, computers, projectors, microscopes, bio viewers and charts. Resources also include ICT tools which are a set of currently developed technologies that allow more efficient communication of information, which have modified the way of accessing knowledge and, in turn, human relations good examples for example are computers, printers, scanners, data projectors, and interactive teaching box.

Kasper et al (2017) defined teaching aids as resources of instructional teaching and learning they are materials which include animate and inanimate objects, they are resources that a teacher may use in teaching and learning institutions to help achieve the desired learning objectives. Instructional materials may aid a student in concretizing a learnt experience so as to make learning more exciting, interesting and interactive. They are tools used in instructional activities, which include active learning and assessment. The term encompasses all the materials and physical means an instructor might use to implement instruction and facilitate students' achievement of instructional objectives for example models and charts.

Pass rate is defined by Mayor (2019) as the proportion of candidates who succeed in passing an examination or other assessments. Pass rate can be used as a quality assurance indicator or

performance indicator by an educational institution when evaluating the quality of teaching and learning.

According to Mayer (2001), teaching refers to the process of imparting knowledge and skills from the teacher to the learners; it encompasses the activities of educating or instructing. It is a practice implemented by a teacher aimed at transmitting skills to a learner, a student or an audience in the context of an educational institution. Teaching should set out with the intention of someone learning something, experiences and needs. Teachers need to look for and create interventions which commonly take the form of questioning, listening, giving information, explaining a phenomenon, demonstrating a skill or process, testing understanding and capacity and facilitating learning activities. Teaching requires collaborative relationships and teachers must consider both the subject of what they are teaching and the people who are doing the learning.

Schwarz (2005) says that learning is the acquisition of new skills or modifying and reinforcing, existing knowledge, behavior skills, values or preference and may involve synthesizing different types of information. Robert Gagne (2002) defined learning as "A change in human disposition or capability that persist over a period of time and is not simply ascribable to process of growth" adapted from Conditions of learning. Marcia Conner et al (2020) defined learning "as the transformative process of taking in information that - when internalized and mixed with what we have experienced - changes what we know and builds on what we do. It's based on input, process and reflection. RM Smith (2021) says that Learning is used to refer to (i) the acquisition and mastery of what is already known about something, (ii) the extension and clarification of meaning of one's experience, or (iii) an organized, intentional process of testing ideas relevant to problems. In other words, it is used to describe a product, a process or a function". Susan Ambrose et al (2015) define learning as "A process that leads to change, which occurs as a result of experience and increases the potential of improved performance and future learning. "Learning involves strengthening correct responses and weakening incorrect responses. Learning involves adding new information to your memory. Learning involves making sense of the presented material by attending to relevant information, mentally reorganizing it with what you already know". "Learning is a process that occurs within nebulous environments of shifting core elements not entirely under the control of the individual, learning is also defined as actionable knowledge can reside outside of ourselves (within an organization or database), is focused on connecting specialized information sets, and the connections that enable us to learn more are more

important than our current state of knowing. In my own point of view, learning is the acquisition of knowledge and skills, accepting new information, interpret it and application of it.

Bell (1995) provides a definition of resources as materials intended to facilitate learning and knowledge acquisition. These materials are utilized by teachers to supplement classroom instruction and stimulate learners' interest, ultimately serving as a source of learning experiences. They encompass a wide range of items, including handouts, textbooks, computers, projectors, microscopes, bioviewers, and charts. Additionally, resources encompass ICT tools, which are modern technologies enabling more efficient communication of information, thereby transforming the accessibility of knowledge and human relations. Examples of ICT tools include computers, printers, scanners, data projectors, and interactive teaching boxes.

Kasper et al (2017) define teaching aids as instructional resources, encompassing both animate and inanimate objects that teachers employ to achieve desired learning objectives. These materials aid students in solidifying learned experiences, making the learning process more engaging and interactive. They are integral to instructional activities, including active learning and assessment, and may include models and charts.

Mayor (2019) defines pass rate as the proportion of candidates who succeed in passing an examination or other assessments. Educational institutions often use pass rates as quality assurance or performance indicators when evaluating the quality of teaching and learning.

Mayer (2001) defines teaching as the process of imparting knowledge and skills from the teacher to the learner, encompassing the activities of educating or instructing. Teaching involves the intentional transmission of skills to a learner, student, or audience within an educational context, emphasizing the importance of creating interventions to facilitate learning activities.

Schwarz (2005) describes learning as the acquisition of new skills or the modification and reinforcement of existing knowledge, behaviors, skills, values, or preferences. Robert Gagne (2002) defines learning as a change in human disposition or capability that persists over time and is not solely attributable to the process of growth. Marcia Conner et al (2020) define learning as a transformative process involving the intake of information that, when internalized and combined with prior experiences, alters existing knowledge and builds upon

existing skills. RM Smith (2021) states that learning refers to the acquisition and mastery of existing knowledge, the extension and clarification of one's experiences, and an intentional process of testing ideas relevant to problems. Susan Ambrose et al (2015) define learning as a process leading to change as a result of experience, ultimately enhancing performance and future learning.

In summary, these definitions collectively emphasize the pivotal roles of resources, teaching, pass rates, and learning in the educational context, providing a comprehensive understanding of these fundamental concepts.

1.12 Summary

This Chapter aims to find out the outcomes when educators utilize the available teaching resources in schools with the aim to improve pass rate of learners doing biology. When learners are actively involved by using resources through hands on experiments and interactive learning, it creates interest and motivation in learners which prompt them to study more thereby improving pass rate.

CHAPTER 2

RELATED LITERATURE REVIEW

2.1 INTRODUCTION

In this chapter the researcher discusses what other authorities say about the effectiveness of using resources to improve pass rate in relation to resources availability to learners. In a research conducted by Punnycuile (1998), he argued that quality is important in teaching learners to achieve good results in both internal and external examinations. This simply entails that for the learners to come up with good results, there is need for resources such as textbooks and imparting of knowledge should be of better quality.

According to Martin, Percival and Ellington (1995), resources refer to all devices and materials used in teaching and learning process and they are designed to facilitate learning and knowledge acquisition. They are materials used by facilitators to carry out instructions and facilitate the achievement of a learner's educational goals. These resources include textbooks, instructional videos, slides, overhead projectors, computers, photographs, models, teacher made diagrams, real objects and handouts.

2.2 Theoretical framework

The study was guided by Bandura's Social Cognitive theory and Dewey's experiential theory.

2.2.1 Bandura's Cognitive theory

Bandura's learning theory emphasizes the importance of key elements which are attention, retention, reproduction and motivation.

(Bandura, 1986), explains that the use of resources such as high quality video lectures and tutorials featuring skilled educators can capture students' attention. Such videos often use visual aids, dynamic presentations and engaging speaking styles to maintain focus. He says that games and simulations can make learning more engaging and fun, thereby holding student's attention better than traditional methods of teaching.

On retention, Bandura was explaining that repetitive nature of gamified learning makes information more memorable. Group study forums enable peer learning, where students

observe and learn from each other's queries and problem-solving methods. He explains that real life stories are often more memorable than abstract concepts.

On reproduction Bandura explains that when teachers use resources they share real world concepts which motivate students.

2.2.2 John Dewey's theory on experiential learning

(Dewey, 1938), says 'resources that connect students to real life experiences can significantly enhance understanding and retention.' He explains that teachers should incorporate resources and activities that allow students to experiment, explore and interact with the material being taught and it makes learning more meaningful and effective.

He explains that resources help learners on social interaction where students can learn from each other and gain different perspectives. Also he says that resources which connect students with the community and the environment provides experiences that are engaging and relevant for example field trips, projects and community service projects can help learners to see the importance of application of their learning beyond the classroom. He emphasized that educators should use resources to foster social interaction and active learning to improve pass rate.

2.3 RESOURCES

The researcher used various types of teaching resources in the study such as whiteboard, textbooks, bio viewers, microscope, charts and experimental apparatus. The researcher is going to discuss what other authorities say about these teaching resources.

2.4 The importance of resources in teaching Biology

Saunders (1984) emphasizes the significant role of resources in teaching biology, highlighting their ability to capture learners' attention and maintain their interest. Visual resources are particularly effective in providing accurate impressions, as they facilitate learning from the known to the unknown, familiar to unfamiliar, and concrete to abstract concepts. Therefore, resources must be accurately crafted to enhance learning effectively.

Lang (2000) explains that the purpose of utilizing teaching and learning resources in class is to assist in the presentation and transmission of educational content, achieving educational objectives, and aiding students in acquiring knowledge and developing various abilities and

values. Common goals of utilizing these resources include student motivation, developing creativity, evoking prior knowledge, and encouraging the process of understanding, decoding, organizing, and synthesizing educational content, logical thinking, reasoning, communication, and interaction.

Teaching resources play a vital role in activating and influencing motivation, as they stimulate and arouse learners' spirits to learn. The absence of learning media can result in teacher-centered learning, hindering the conceptualization of concepts. The use of media in teaching facilitates learning and extends opportunities for learning. Additionally, resources such as textbooks are viewed as assistant teachers, aiding learners in evoking pre-gained knowledge, compensating for missed content, and supporting academic performance.

Various types of resources, such as slide projectors, overhead projectors, non-projected aids, photographs, flashcards, charts, diagrams, posters, flannel/felt boards, demonstrations, specimens, and microscopes, serve as important teaching aids, reducing reliance on words and encouraging abstract thinking and imagination, thereby facilitating a better understanding of concepts and improving pass rates.

According to the American textbook Publishers Institute (1979) “a textbook is an assistant teacher in teaching and learning.” In their view a textbook is the second most important teacher which causes learners to evoke regained knowledge and acquiring new information. This was seconded by Gortside (1970) when he suggested that a teacher may deal with the fundamentals and leave the details for learners’ private study.” In this case a textbook is a source which the students can visit to compensate for what they may have missed from the teacher and during revision.

In a research conducted by Supulveda in Macgreen (1991), on the relationship between school’s inputs and students’ level of achievement, it has shown that the learners’ performance is largely determined by the quality of school inputs which include a textbook. He further argues that the quality of learners’ academic performance and the most effective and easy way of improving school efficiency is to use resources such as textbooks in learning. Shortage of textbooks does not negatively affect the learners only but it also affects the facilitators as they are expected to be the sole source of knowledge to all the learners. This cause spoon feeding of knowledge as the teacher implement lecture method and if learners become too dependent on the teacher they become lazy and reduce researching skills

and hands on approach which reduce morale of learners to like the subject. Lecture method also reduces facilitator to learner and learner to learner communication and interaction.

In Cooper's (1974) view, resources can be used for all the five educational purposes which are

- (i) To teach learners on skills
- (ii) To recognize knowledge into concepts
- (iii) To stimulate the imagination
- (iv) To develop attitudes or to change existing ones

Resources play a vital role in improving quality of education. This was supported by Macgreen and Wardal (1991) who says that resources help learners to build knowledge for themselves, developing different learning strategies as in values, attitudes and generic skills laying the foundation for the life learning process. Resources assist the process of interaction between learners and facilitators during teaching and learning process which improves quality of education. In support of this view Fontana (1988) says that relocation of resources to students increase in output in terms of pass rate, as it is of great importance to the learners and their results. Pete Lang (2000) explains that the value of resources in teaching and learning is to reach your goal as learners learn best when they are able to connect new learning with what they already know and can do. When learners interact with resources they can attain better results improving their pass rate.

Various types of resources exist, ranging from simple hand-made too complicated apparatus. Different authors have presented and discussed the classification of these resources and the materials provide important experiences for both teachers together with learners. The use of teaching resources reduces the reliance on words and helps the learners to pay full attention during their lessons. Use of resources also encourages abstract thinking and imagination, thereby facilitating a better understanding of concepts which can improve pass rate. Some of the teaching resources which are used by facilitators are discussed below.

The absence of adequate resources in schools can lead to various challenges for both learners and facilitators, impacting the quality of education and learners' academic performance. Furthermore, the relevance of resources in teaching biology language and learning is crucial for promoting the acquisition and high conceptualization of skills by learners.

2.4.1 Slide projector

According to Sampath, Panneerselvan, and Santhan (1998), slides are mostly used as instructional devices to complement verbal presentations. They project strong light through transparent slides. A slide projector is a device designed to hold and project these slides. Slides are valuable when motion in pictures is of less importance for comprehension. They require slightly more storage space than filmstrips (Holmes, 1968).

2.4.2 Overhead Projector

The overhead projector is used to display large transparencies under normal daylight conditions (Bothan 1967). Unlike slide projectors, it does not require total or partial darkness for the audience, and students can take notes as they normally would. The teacher or facilitator faces the students while the projected image or text is displayed behind and over their heads (Sampath, Panneerselvan, and Santhan, 1998). According to Brown, Lewis, and Harclerod (1997), the speaker has full control over the timing and content of the presentation when using an overhead projector.

2.4.3 Non-Projected Aids

They are the most commonly used teaching resources that do not depend on projectors to display enlarged pictures of objects or text are grouped under non-projected teaching resources. These aids are affordable and relatively less sophisticated, they are user friendly compared to projected aids resources, (Sampath, Panneerselvan, and Santhan, 1998).

2.4.4 Photographs and Pictures

A photograph is a resource which provides an accurate representation of a desired object or concept. A good photograph can efficiently and effectively convey a complete story without using verbal instructions. Photographs can be either coloured or black and white though Coloured photographs are more eye-catching (Prasad, 2005).

2.4.5 Flash Cards

In his book, Prasad (2005) suggests that flashcards can be an effective resource for teaching and learning. When introducing new words, teachers can utilize flashcards to effectively convey the meaning. Typically, flashcards contain photographs or images to represent new

ideas or words. Flashcards are often presented one by one, while the teacher explains the content verbally.

2.4.6 Charts

"Charts are widely used as resources which are visual so as to present complex concepts and ideas that are not easily understood through words alone, whether written or spoken. They consist of a mix of various types of graphics, such as pictures, diagrams, graphs, written text, or drawings. Teachers typically focus on expressing one idea per chart, ensuring that concepts are clear (Brown, Lewis, and Hacleroad, 1985)."

2.4.7 Diagrams

A diagram is a simple and explanatory drawing that shows the interrelations and explains ideas and concepts using lines, symbols, and geometrical forms. Diagrams go beyond mere representation; rather, they are self-explanatory or self-describing (Mangal, 2008).

2.4.8 Posters

A poster is a visual representation of an idea or concept, typically using bold colour to catch the viewer's attention. Posters are often displayed in public spaces to raise awareness. They are not just decorative but also encourage students to learn about different countries, historical places, science, and industries (Brown, Lewis, Hercleroad, 1985). The purpose of a poster is to grab the viewer's attention, pique their interest, and prompt immediate action, rather than to educate them.

2.4.9 Flannel / Felt Board

To create a felt or flannel board, heavy cardboard, Masonite board, or plywood panels are utilized, and fabric with a nap or texture is stretched and adhered over the surface. Graphic materials such as pictures, writing on sturdy paper, and photographs can be affixed to the flannel board using sandpaper on the backs of the materials. These are commonly known as flannel graphs (Mangal, 2008; Sampath, Panneerselvan, & Santhan, 1998).

2.4.10 Demonstrations

Demonstrations involve a teacher showing how to perform a specific task, with students observing closely and later attempting to perform the same task. When used in conjunction with other resources, demonstrations create an effective combination. The main goal of a

demonstration is to ensure that learners fully understand the entire procedure, requiring the teacher to explain each step clearly (Sampath and Panneerselvan, 1998).

2.4.11 Textbooks

According to the American Textbook Publishers Institute (1997: IV), a textbook is considered an assistant teacher in teaching. It is viewed as a source that students can visit to compensate for what they might have missed from the teacher during lessons. A study on the relationship between schools' inputs and students' level of achievement has shown that the quality of students' academic performance and the most effective and easy way of improving school pass rates is the availability of textbooks (Sepulveda in Macgreen 1991: 317).

2.4.12 Specimens

A specimen is a resource that can be a part, a sample, or a small piece of a real object that stimulates interest in learners to be motivated to learn more. For example, it can be a specimen of a leaf or bird's feather and can be very eye-catching and motivating to learners.

2.4.13 Microscopes

Microscopes are important for studying sciences, particularly Biology, as they help learners to observe complex biological processes, develop key competencies, and increase their interest in the Biology subject. They provide a base for future studies, as learners may proceed to medical school where microscopes are frequently used in laboratories.

2.5 Problems faced by learners due to lack of resources in schools

Insufficient physical infrastructure, such as laboratories, libraries, and classrooms, can lead to overcrowding and discomfort for learners. This lack of space may hinder students' concentration and engagement, while teachers in resource-constrained schools face challenges due to large class sizes and increased workloads. This situation may make it difficult for facilitators to provide individual attention to learners, offer feedback, and address challenging topics.

The academic success of learners can be hindered by the lack of up-to-date textbooks, media, and technology, leading to difficulties in understanding and applying fundamental ideas, ultimately resulting in low pass rates. Outdated or limited learning materials may not cover the full curriculum or provide up-to-date information, leading to a lack of comprehensive

understanding among learners. Additionally, the absence of science equipment or technology can impede hands-on learning and practical skill development, limiting opportunities for critical thinking, problem-solving, and creativity.

Inadequate resources may disproportionately affect learners from disadvantaged backgrounds, limiting their access to extracurricular activities, technology, additional support, and quality learning materials. This lack of resources may widen the achievement gap between learners from different socioeconomic backgrounds and restrict students' exposure to various career paths, potentially limiting their future prospects.

Furthermore, the absence of resources can create a boring and uninspired learning environment, leading to a drop in involvement in class activities, reduced learning interest, and decreased educational engagement, ultimately resulting in low pass rates. Limited resources of technology and extracurricular activities can erode students' confidence in their own abilities, potentially impacting their self-belief and self-esteem.

The relevance of resources in teaching biology language and learning is crucial for promoting the acquisition and high conceptualization of skills by learners. Visual aids, such as posters, charts, and flashcards, can facilitate the learning of biological language and develop interest in biology as a subject. Additionally, audio aids, such as radio and CD players, can improve learners' grasp of foreign and biology language, stimulating them to speak and pronounce the proper language of the subject.

In summary, the availability of material resources, such as libraries, laboratories, visual aids, and basic equipment, is essential for providing new knowledge that correctly relates to contemporary times. Additionally, human resources, such as well-trained teachers, are crucial for improving the pass rate in biology. However, the brain drain and the absence of practical skilled teachers due to insufficient resources may impact the quality of education.

2.6 Relevance of resources in Biology Language in teaching and learning

Lee and Copper (1981) elucidate that teaching resources such as visual aids, including posters, charts, and flash cards, play a crucial role in facilitating the acquisition and high conceptualization of skills by learners. Additionally, these resources enable learners to easily comprehend and learn the language specific to biology, fostering a deeper interest in the subject. Visual aids, in particular, have the ability to enhance learning environments, illuminating the meaning of verbal expressions. Simultaneously, audio aids such as radios

and CD players enhance learners' understanding of both foreign and biological language. Both visual and audio aids serve to stimulate learners, enabling them to articulate and pronounce the language of the subject accurately and to comprehend written content. For instance, well-prepared assimilations and accurately labeled charts with correct diagrams can inspire learners and cultivate skills such as drawing precise and well-constructed diagrams, which holds significance in the field of biology.

2.7 Material Resources

Arriaganda in Sidhu (1974) emphasizes that material resources encompass physical elements vital for effective management, including the presence of libraries, laboratories, visual aids, and essential equipment such as chairs, tables, and whiteboards. For example, a school with a library containing outdated textbooks and numerous novels may lack essential support materials that provide contemporary knowledge.

According to Rwambiwa, Epstein, and Kounin (1983), a teaching chart is designed to accompany a teacher's verbal explanations and can significantly reduce the time spent on whiteboard preparation, especially when covering the same topic with different classes. When the teacher is demonstrating different stages or step-by-step development of a subject, a series of charts can be arranged together to form a flip chart. Flipcharts are user-friendly, particularly when using writing markers with visible colors for emphasis. They are suitable for small classes of up to approximately 30 students, but the cost of paper and pens may be a limiting factor, depending on the institution's financial resources. Moreover, using clear and legible lettering is essential for the effective use of these flip charts.

Sanders (1984), explains that the chalkboard can be utilized in various ways to suit the lesson, subject, and audience. Simple outlines and sketches drawn on a whiteboard encourage learners to engage their imagination, fostering active participation. The facilitator can encourage learners to actively participate in group work and use the whiteboard to illustrate concepts, allowing for the creation of diagrams, maps, and pictures. With practice, the whiteboard is straightforward to use and allows for the addition of new material, making it particularly useful for note-taking when learning technical terms, definitions, and keywords. However, effective use of the whiteboard requires imagination, initiative, preparation, and practice, although it is possible to overcome associated disadvantages with experience.

2.8 Human Resources

In order to improve its pass rate, the field of biology requires teachers who possess expertise and are well-trained in the subject. However, the country has been affected by a brain drain, leading to the migration of experienced science teachers to other countries in search of better opportunities. Consequently, many schools lack well-trained biology teachers who have a comprehensive understanding of the subject matter. Some teachers who are assigned to teach biology may have received training in environmental science or food science, lacking the necessary experience in teaching science techniques, such as conducting laboratory experiments, which are essential for stimulating students' interest in the subject. Due to inadequate resources, a shortage of skilled teachers capable of conducting practical experiments, and a high teacher-to-pupil ratio, some schools are unable to carry out experiments (Ramnarain, 2014). Furthermore, the financial demotivation of most teachers has a negative impact on their morale and their ability to effectively deliver lessons in the classroom, ultimately leading to a decrease in the pass rate due to limitations in human resources.

2.9 Paradigm factors

A research paradigm consists of four philosophical components: epistemology, which pertains to ideas about knowledge; ontology, concerning our existence; methodology, encompassing research design and methods; and axiology, addressing the role of values in inquiry. In this instance, the author employed a quantitative research approach.

2.10 Approach

As per Cresswell, J. (2014), research approaches encompass plans and procedures for research that encompass decisions from broad assumptions to detailed methods of data collection and analysis. The selection of a research approach is influenced by several key considerations, including the researcher's assumptions and perspectives, the nature of the research problem, research strategies, methods of data collection and analysis, and the intended audience of the study. A research approach represents the method chosen by the researcher to gather, analyze, and interpret data. There are three primary approaches to research: quantitative, qualitative, and mixed methods. In this particular study, the chosen approach is the quantitative research approach.

2.11 Summary

The aforementioned authors share a common perspective, suggesting that the utilization of teaching resources is a crucial factor in enhancing learning and improving the pass rate in biology. These teaching resources encompass projectors, textbooks, charts, whiteboards, flipcharts, bio viewers, and microscopes. Teachers are advised to consider the cost and relevance of each teaching resource within the context, as well as its simplicity, to effectively achieve objectives. Insufficient resources can make teaching and learning challenging, as emphasized by some authors. Furthermore, it is important for teachers to ensure that the teaching resources meet high standards and are of good quality. The use of standard teaching resources promotes accuracy and helps in achieving educational objectives. Moreover, the use of resources can encourage disengaged learners to develop an interest in biology.

Chapter 3

Research Methodology

3.1 Introduction

In this Chapter the researcher will outline how the research was done explaining on the methods used to collect data, the research paradigm, research approach, research design, population sample and research instruments. The researcher used an experimental method and questionnaires to collect data from respondents which are qualitative methods. For the researcher to come up with research participants, she chose a sample population of form 3 Science Class at one school. A random sampling technique was used by the researcher in the sample population to ensure that each sample unit has an equal chance of being chosen to take part in the research. Those selected were going to represent the whole population.

3.2 Research Paradigm

The researcher employed the positivism paradigm as the research framework. This paradigm prioritizes the use of quantitative methods for data collection and analysis, aiming to reveal general laws and causal relationships through scientific investigation. According to Smith et al. (2000), this paradigm asserts the existence of a singular reality that can be quantified and comprehended, with the belief that the findings of a study can be applied to comparable scenarios.

3.3 Research Approach

The researcher employed a quantitative approach for the research. According to Bryman (2012), the quantitative method places emphasis on the measurement of existing variables within the social realm. It focuses on quantifying and establishing patterns in aspects of social behavior, rather than solely seeking to understand and interpret their meanings and the changes brought about by individuals. Payne and Payne (2004) further detail that the quantitative approach entails the collection and analysis of numerical data to gain insight into a subject and to test relationships. This approach is well-suited for hypothesis testing and generating statistical results, such as in experiments, surveys, and observational studies.

3.4 Research Design

Donmoyer (2012) defines research design as a strategic framework that addresses research questions, determining how data will be collected and analyzed to ensure the validity and reliability of the study. It encompasses the methods and techniques selected by a researcher to conduct a study, allowing for the refinement of research methods suitable for the subject matter. Quantitative designs involve structured and defined methodologies for data collection and analysis, aiming to minimize bias and establish high confidence in the accuracy of collected data. Johnson (2016), highlights that the advantages of quantitative design include the likelihood of generalizing findings to an entire population or a subpopulation due to the use of a larger randomly selected sample. Additionally, Carroll and Bailey (2016) note that data analysis is less time-consuming due to the use of statistical software, and the study sample reflects a significant proportion of the population, thereby enhancing the credibility of the study. Therefore, the researcher opted for a quantitative research design to minimize bias and improve the trustworthiness of the study through the random selection of participants.

3.5 Experimental method.

Rosental and Jacobson (1968) describe the experimental method as one conducted outside in the field, involving interventions in the social world to test hypotheses by isolating specific variables. This method enables researchers to test and make precise predictions by manipulating various independent variables. Tuckman (2018) defines experimentation as a research instrument used to study and analyze phenomena in a controlled environment, involving the manipulation of variables to observe effects and establish causal relationships. Experimental research, a quantitative approach, is conducted with a scientific approach using two sets of variables, with the first set acting as the independent variable and the second set as the dependent variable. Through experimentation, researchers can test the validity of instruments or procedures by replicating elements of prior projects or the project as a whole (Wiersma, 2014).

3.5.1 Advantages of experimental method

The experimental method offers several advantages. It provides researchers with a high level of control, enabling the isolation of specific variables to determine their potential outcomes. Each variable can be individually controlled or used in different combinations to study the potential outcomes for a product, theory, or idea (Trochim, 2019).

Furthermore, the results of the experimental method yield specific and consistent conclusions, allowing for the determination of success or failure and enabling a rapid assessment of the validity of a product, theory, or idea.

Additionally, the straightforward nature of the experimental method enables other researchers to replicate the experiment, thereby promoting the validity of concepts for products, ideas, and theories. This accessibility allows for the verification of published results, ultimately contributing to the achievement of improved outcomes (Creswell, 2014).

3.5.2 Disadvantages of Experimental method

The experimental method has certain drawbacks. The results can be highly subjective due to the potential for human errors, as the method necessitates precise control of variables, making it susceptible to the influence of human error at various stages of the research. Any form of error, whether systemic or random, has the potential to compromise the validity of the experiment and the research being undertaken (Shadish, Cook, and Campbell, 2002).

Furthermore, experiments can be time-consuming, involving a lengthy process and demanding significant financial and personal resources.

In summary, while experimentation serves as a valuable research instrument by providing a structured approach to studying phenomena, manipulating variables, and collecting data to analyze and draw conclusions about relationships between variables, it is important to acknowledge and address the potential limitations and challenges associated with this method.

3.6 How to carry out an experimental design

Bhandari (2023) defines an experimental design as the methodology and procedures employed to conduct a scientific study or experiment, encompassing the structure and organization of the study, including the selection and manipulation of variables, controlling extraneous variables, assigning participants to different conditions, and measuring outcomes. The goal of an experimental design is to systematically investigate the effects of one or more independent variables.

The initial step involves identifying the independent and dependent variables. In this research, the independent variable is the resources, and the dependent variable is the pass rate. Independent variables are those manipulated or varied in an experimental study to

explore effects and are not influenced by other variables in the study. They are also referred to as explanatory variables and can be used to predict the value of a dependent variable. On the other hand, dependent variables change as a result of the independent variable manipulation and are the focus of the outcome being measured.

The subsequent procedure is to formulate a hypothesis, which entails stating the expected relationship between the variables based on existing knowledge or theories. In this research, an alternative hypothesis was used, predicting that the pass rate will improve due to the availability of resources.

The selection of an appropriate experimental design is the next step, with the researcher choosing the most suitable design for the study, such as the experimental research design in this case.

Following this, experimental treatments are designed, where the experimental group is taught using the resources, while the control group is taught using the Lecture method. Lastly, subjects are assigned to groups using a simple random sampling technique to reduce bias, ensuring that each member has an equal chance of being chosen from the population.

3.7 Population of the study

The entire population consists of 6 schools in the Highglen District that offer Biology at the O level. The sample population for this study was drawn from a single school in Harare within the Highglen District. According to Cresswell (2009), a sample population refers to the group of individuals or elements that are selected and utilized as a representative sample for a research study.

3.8 Sampling

Cresswell (2009) explains that sampling involves the researcher's selection of units or individuals from a population of interest, with the aim of random selection to enable fair generalization of results from the sample. In this study, a random sampling technique was employed, ensuring that every unit of the population had an equal opportunity to represent or participate in the study.

3.9 Sampling technique for Learners

The sampling approach involved random selection of learners from the form 3 Science class, ensuring equal opportunities for all individuals to be chosen. According to Barrett and Johnson (2007), random sampling involves dividing the population into sample groups, allowing for a comprehensive assessment and accounting for potential differences. This technique facilitates the inclusion of diverse student groups, ensuring that the findings are representative and applicable across varying academic performance levels. By employing random sampling, learners with different academic levels from the form 3 Biology class can be effectively represented. This method is utilized by researchers to select units or individuals from a population of interest, ensuring that every unit of the population has an opportunity to be part of the study.

3.10 Research instruments

Corona (2017) describes research instruments as tools utilized for data collection, such as experiments, questionnaires, interviews, observation, focus groups, surveys, and tests. It is crucial for the researcher to ensure that the chosen instrument is both valid and reliable, as the validity and reliability of any research project largely depend on the appropriateness of the instruments. In this study, the researcher employed research instruments including pre-tests, post-tests, and questionnaires.

3.10.1 Pre-test

A test serves as a data collection instrument structured in accordance with the Blooms' taxonomy, arranging questions in a progression from simple to complex. Its purpose is to assess whether students have comprehensively understood the previously taught concepts. As defined by Smith and Jones (2020), a pre-test consists of a series of questions that individuals must complete to demonstrate their existing knowledge of a subject before undergoing a learning process in that area.

Tests are utilized to evaluate and gauge learners' performance, enabling teachers to identify areas that require revision, improvement, or adjustments to the teaching approach. In this study, the researcher employed pre-tests as a data collection instrument to assess the outcomes when learners undertake a test without prior instruction. These tests were printed on bond papers.

The initial pre-test was administered, and the researcher employed random sampling to allocate learners into an experimental and a control group. The students who completed the test were selected as research participants. The pre-tests covered three topics: circulatory system, digestion, and diet, with questions structured in accordance with Bloom's taxonomy, encompassing recalling, comprehension, and application questions.

3.10.2 Post test

The researcher used post-tests as data collecting instruments, to see whether students have mastered well all the concepts which were taught in a stipulated period. to the experimental group, the post test was written after being taught using resources such as projector, simulations and scientific apparatus. The control group wrote the post-test after being taught on the topic using the traditional lecture method and Alternative to practical. Results from the pre-tests and post-tests will help the researcher to evaluate and assess the effectiveness of using resources to improve pass rate in form 3 biology.

3.10.3 Questionnaires

Dillman, (2000) defines a questionnaire as a tool that is used to collect information from people by asking them a series of questions. It is a specific type of instrument that consists of a set of questions designed to gather information or data from individuals or groups. The questions are designed to gather specific data or opinions on a particular topic. Antoniadou (2017) explains that the type of questions in the questionnaire should make the participants feel comfortable so that they will not have a feeling that the researcher is judging their life style, beliefs, language and behavior therefore it is advisable to pose the questions in indirectly or include them in a more extensive conversations. Questionnaires can be administered in various formats such as paper based forms, online or face to face.

3.10.3.1 Advantages of a questionnaire

Questionnaires offer the advantage of reaching a wide range of participants simultaneously, enabling the collection of information from a large number of people at once. This expansive reach allows for the gathering of data from a diverse sample, enhancing the generalizability and external validity of the findings (Fowler, 2013). Additionally, questionnaires facilitate the analysis of trends and patterns across subgroups within the population, supporting longitudinal studies and providing insights into changes over time (Rogelberg, 2003).

Anonymity and confidentiality are crucial aspects of questionnaires, allowing respondents to provide unbiased answers without fear of judgment, fostering transparency and authenticity in the data collected. Moreover, questionnaires are cost-effective, reaching a large number of respondents at a relatively low cost, and they provide flexibility through the inclusion of open-ended questions, enabling in-depth responses and the ability to modify and update the questionnaire over time (De Vaus, 2001).

Furthermore, questionnaires offer easier analysis, providing structured and standardized responses that are less time consuming and easily quantifiable, allowing for quick data processing and various analyses.

3.10.3.2 Disadvantages of a questionnaire

However, questionnaires have limitations, such as the inability to capture detailed insights from participants and the potential for biased responses, which can compromise the validity of findings. Additionally, respondents may choose not to participate or may misinterpret questions, leading to inaccurate data (Babbie, 2017).

In summary, questionnaires offer numerous advantages, including broad reach, anonymity, cost-effectiveness, and easier analysis, but they also have limitations related to depth of information, potential bias, and misinterpretation of questions.

3.11 Data analysis

The research seeks to examine the influence of utilizing different resources on the pass rate in Biology, specifically focusing on laboratory facilities, textbooks, and online resources. The researcher adopted a quantitative approach to gather raw data, which was then organized and presented using tables, pie charts, and graphs. The pass rate in Biology will be evaluated both before and after the implementation of these resources to gauge their effectiveness. Data on pass rates in Biology will be collected over a specific period before and after the introduction of the resources, providing insights into the effectiveness of various resources in improving the pass rate in Biology. The analysis will employ quantitative methods to evaluate the impact of these resources, and data on their utilization will also be documented.

3.12 Ethical considerations

Ethical considerations encompass the principles and guidelines that researchers must adhere to in order to ensure that their studies are conducted ethically, with a focus on respecting the

rights and well-being of participants and other stakeholders. This includes safeguarding the privacy of participants and protecting their identifiable information (Harris, 2017).

3.13 Credibility and trustworthiness

All participants, including learners and facilitators, were provided with clear information about the research objectives and the benefits to teaching and learning. They were encouraged to contribute information for the progress of the research while being assured that their confidentiality and privacy will be safeguarded. The data collected will be anonymous and not disclosed, with the use of codes instead of names to protect the identity and confidentiality of the participants.

3.14 Validity

The tools used to assess pass rates in Biology and resource utilization must be reliable and valid to accurately capture the effectiveness of the resources on learner performance. Diverse resources will be utilized to ensure an effective assessment of their impact on pass rates, aligning the study's objectives with the goals of education. Stakeholders such as facilitators, administrators, and educational inspectors should recognize the relevance of the research and the needs of learners.

3.15 Summary

Research indicates that the availability of resources can positively impact the success of learners and significantly improve pass rates. The presence of resources plays a pivotal role in teaching and learning, while their scarcity can negatively affect learner outcomes. Adequate resources create a motivating environment for both learners and facilitators, contributing to improved pass rates in the Biology subject in schools. Additionally, infrastructure such as laboratories and well-lit, ventilated classrooms also influences increased pass rates.

CHAPTER 4

DATA PRESENTATION, INTERPRETATION AND ANALYSIS

4.1 Introduction

In this chapter the researcher is going to focus on data presentation, interpretation, analysis and discussion. The data collected answers the topic on the Effectiveness of using resources to improve pass rate in teaching form 3 Biology at one school in Harare. The researcher used pre-tests, post-tests and questionnaire for learners to collect data. The data collected was presented in form of tables.

The data collected sought to answer the following research questions:

- 1) What is the value of resources in teaching Biology to improve pass rate in schools?
- 2) How does the shortage of resources affect the teaching and learning of Biology?
- 3) What is the relevance of resources in Biology Language in teaching and learning of the subject?

4.2 Biographical data for learners

Table 4.1 showing biographical data for learners

SEX	AGE	CLASS	SUBJECT
F	15-17	3 Science	Biology
F	13-15	3 Science	Biology
F	13-15	3 Science	Biology
M	15-17	3 Science	Biology
F	17-19	3 Science	Biology
M	15-17	3 Science	Biology
M	13-15	3 Science	Biology
M	15-17	3 Science	Biology

F	15-17	3 Science	Biology
F	13-15	3 Science	Biology
F	15-17	3 Science	Biology
M	15-17	3 Science	Biology

Female participants were 7 and the males were 5 making all 12 of them participants. Learners from age group 13-15 years were 4. Those from age group 15-17 were 7 and there was one learner from age group 17-19 years. All the participants were in form 3 Science Class and doing Biology Subject. A random sampling technique was used to select learners and place them in an experimental group and control group and each group had 6 learners. The table below presented results from pre-tests of learners in both the experimental group and the control groups.

4.3 PRE-TEST 1

Table 4.2 showing results from pre-test 1

	PRE-TEST 1	
NAME OF STUDENT	MARK	%
EXPERIMENTAL GROUP		
1	04	33
2	03	25
3	06	50
4	05	41
5	02	16
6	03	25

CONTROL GROUP		
1	03	25
2	03	25
3	04	33
4	02	16
5	05	41
6	04	33

From the table on Pre-test 1 above, the experimental group had 5 learners who got marks which were below half. One learner got 50% on the pre-test. All learners from the control group got marks which were below half.

4.4 Questionnaire 1

Question 1: Did you find any question the hardest when writing the test?

TABLE 4.3 showing learner's views on the pre-test.

NAME OF LEARNERS	YES	NO
1	√	
2	√	
3	√	
4		√
5	√	
6	√	
7	√	
8	√	

9	√	
10		√
11	√	
12	√	

10 learners out of 12 from both experimental and control group said yes they found hard questions when responding to the pre-test. 6 learners gave a reason that they the test was hard because they wrote the test without learning the topic. 5 learners said that they were not prepared to write the test and 1 learner said that he was not feeling well when he wrote the test that is why it was hard.

Question 2: Are there any specific resources which you want your teacher to use when teaching you the topic of the circulatory system?

All the learners said yes there were resources which they wanted the teacher to use when teaching. This revealed that learners really want teachers to use resources during the lessons to enhance learning

Question 3: State the resources which you prefer to be used when learning the topic on circulation of blood.

8 learners wrote that they preferred the teacher to use resources such as projectors, lap top, bio viewers and microscopes. Two learners wrote that they preferred to use cell phones in the class as their resource while the teacher is teaching. Two learners wrote that they preferred the teacher to use text books, hand-outs and written Notes to give to learners during the lessons

Question 4: Did writing the Pre-test make you want to read ahead of the topics in future?

TABLE 4.4 showing learners' responses on reading.

STUDENTS	YES	NO
EXPERIMENTAL GROUP		
1		√
2		√
3		√
4	√	
5	√	
6		√
CONTROL GROUP		
1	√	
2		√
3		√
4		√
5		√
6		√

2 learners from the experimental group and one learner from the control group making them a total of 3 responded with a Yes and they explained that they wanted to read ahead in order for them to attain higher marks when they write new topics in the future. 4 learners from the experimental group and 5 learners from the control group making them 9 learners responded with a No showing that they were not interested in reading ahead of the teacher. 4 learners explained that they understand better if they start by learning new topics at school with the help of the teacher then write the test later. Five learners explained that they would

understand better if the teacher would have used visual aids in teaching the topic to make them understand more and be prepared to write the test in the future. They explained that the teaching aids would cause them to clearly see the structures of the veins and arteries in order for them to attain higher marks in the test.

Question 5: Explain how you would want the topic to be taught for you to understand more?

10 learners explained that they preferred teaching aids such as YouTube showing the movement of blood from the heart to the blood vessels, projectors, videos of blood vessels. This shows that they preferred visual aids to understand such topics.

Question 6: Do you think you have passed or failed the test?

TABLE 4.5 Table showing learners' responses on their performance

STUDENTS	PASSED	FAILED
1		√
2		√
3		√
4		√
5		√
6		√
7		√
8		√
9	√	
10	√	
11		√
12		√

Ten of the learners responded that they have failed the test and the reasons being that the topic was not taught and they had no idea of what they were answering. They also suggested that they needed at least charts and hand-outs with pictures and drawings to observe the structures of blood vessels to make their learning easier. This reveals that learners need to be taught before being tested for teachers to have the actual outcome of results for learners. Two of the learners responded that they passed the test. One of the learners explained that he was reading at home using her sister's resources who passed the previous year. The other learner said that he passed because he uses YouTube to research on topics in the syllabus and read ahead.

Question 7: Do you think learning about the blood is important?

All the learners agreed that learning about blood is important by ticking a Yes. There was no learner who said No. 8 of the learners suggested that they need to pursue on the medical field therefore they need to know more about the circulation of blood as they will cover the topics in their carrier. 4 of the learners suggested that they need to study more on the circulation in order for them to pass their O level and proceed to A level. All of them responded that they will proceed with the studies in their future therefore they need to be taught in a manner that they will pass their final exams.

Question 8: which method of teaching do you prefer your teacher to use when teaching you the topic of the circulatory system?

6 learners said that they prefer learner centred as a way of learning where learners are actively involved in the learning activities and at times outside the classroom more than the teacher talking over and over teaching in Class. 4 learners said that they prefer presentations where learners will go and research and come to give feedback to other classmates during the lesson. 2 learners suggested that they prefer class discussion where the whole class will be giving their contributions towards a topic and the teacher will give their conclusions. All learners proved that they needed learner centred activities which are not fully controlled by the teacher.

4.5 PRE-TEST 2

TABLE 4.6 Pre-test 2 Table showing results on pre-test 2

	PRE-TEST 2	
NAME OF STUDENT	MARK	%
EXPERIMENTAL GROUP		
1	06	50
2	04	33
3	04	33
4	05	41
5	03	25
6	04	33
CONTROL GROUP		
1	05	41
2	06	50
3	04	33
4	05	41
5	05	41
6	04	33

On Pre-test 2 only one learners from the experimental group got 50% whilst all other 5 learners got marks which were below half mark. From the control group all learners got marks which were below half mark. The lower marks obtained by the learners is an indication that they had not covered anything which they wrote in the Pre-test.

4.6 Questionnaire 2

Question 1: how do you rate your performance on the pre-test?

TABLE 4.7 Table showing performance of learners

STUDENT NAME	GOOD	POOR
EXPERIMENTAL GROUP		
1		√
2		√
3	√	
4		√
5		√
6	√	
CONTROL GROUP		
7		√
8		√
9		√
10		√
11		√
12		√

Only 2 learners from the experimental group said that they had a good performance of the test as they studied the topic using the internet on their cell phones. All the other 10 learners said that they had a poor performance on the pre-test which they wrote.

Question 2: What contributed to your performance in above?

Learners who said that they had a good performance said that they use the internet from their homes to research and to read. Those who said had poor performance they suggested that the test came to them as a surprise as they were not prepared to write any test. They said that failure to know about the test has also demotivated them leading to their poor performance. Learners need to be taught and be imparted knowledge using the correct methods of learning so as to improve their performance where theorist Vygotsky, (1978), says that when appropriate resources are provided learners can perform higher.

Question 3: Did you find anything specific that was challenging when you were writing the pre-test on digestion?

All the learners responded that the topic was challenging and the reason being that the topic was new and not in class in by the teacher. 8 of them said that they were discouraged as they were inadequately prepared for the test and they fear they have failed. This can lead to negative test taking experiences and can hinder the ability to demonstrate their knowledge and understanding of the material. The other 4 wrote that they felt frustrated and discouraged when they wrote the test without given the opportunity to learn and they are expected to pass

Question 4: In your own opinion what needs to be done before learners write a test?

6 of the learners suggested that they want their teacher to teach the material first so as to have a better understanding of the topic. This means that teachers need to take their time to elaborate topics clearly engaging the learners to make learning more exciting. The other 4 learners suggested that they want to be given time for revision using study guides in preparation for the test before they write. The other two students said that they need to be told before the day of writing the test so that they get prepared and revise preparing for the test

Question 5: do you need any extra support from the school to improve your pass rate in your Biology subject?

All the learners said that they need support from the school so as to improve their pass rate when learning Biology. This shows that learners also have their expectations which need to be met for them to perform better.

Question 5: What type of support do you need from the school in your Biology learning?

5 learners wrote that they need the school to build other laboratories to avoid scrambling for the Lab when they want to carry out their experiments. 2 learners suggested that they want

the school to provide them with enough apparatus so that they are able to do experiments in the Lab. The other 2 learners suggested that they need the school to install Wi-Fi so that they are able to use the internet for their research and study. The other 2 learners suggested that they need a Science Club in the school which help them to display their talent in the subject. One learner suggested that they should have a career guidance especially at form 3 so that they choose their subjects properly which link to their future careers.

Question 6: Have you thought of plans on how to approach your study on the topic of digestion in the future?

Table 4.8 table showing responses on approach to learners' studies

NAME OF STUDENTS	YES	NO
1		√
2		√
3		√
4		√
5	√	
6	√	
7	√	
8	√	
9	√	
10	√	
11	√	
12	√	

8 of the learners responded with a Yes that they have a plan on how to study in the future. They gave reasons such as they need their parents to support them by buying them cell

phones to use for their research and study. 2 of them said that they need their teacher to give them hand-outs with short Notes which are easy to grasp. 4 learners responded with a No saying that there should be given a chance to be introduced to a new topic by the teacher and then they will plan knowing where they are going with the new topic. This shows that learners also need to be given their rights to learning.

Question 7: How do you want your teacher to teach the topic on Digestion?

10 learners suggested that they need the teacher to use videos on the projector which show the movement of food in the digestive system. The other 2 learners suggested that they need hand-outs with coloured pictures to be provided which are clear and easy to observe the digestive system.

4.7 PRE-TEST 3

TABLE 4.9 Table showing results for pre-test 3

	PRE-TEST 3	
NAME OF STUDENT	MARK	%
EXPERIMENTAL GROUP		
1	05	41
2	04	33
3	04	33
4	05	41
5	03	25
6	05	41
CONTROL GROUP		
1	03	25
2	04	33

3	05	41
4	04	33
5	04	33
6	05	41

All the learners from the experimental group and control group got marks which were below half mark in the pre-test. The test was out of 12 marks and no one could get 6 out of 12.

4.8 Questionnaire 3

Question 1: Did writing the pre-test caused you to be eager to want to carry out the experiments on food tests?

TABLE 4.10 showing responses on learners' interests on experiments

NAME OF STUDENTS	YES	NO
EXPERIMENTAL GROUP	√	
1	√	
2		√
3	√	
4	√	
5	√	
6	√	
CONTROL GROUP		
1	√	
2	√	

3	√	
4		√
5	√	
6	√	

10 Learners from both groups the experimental and the control group said yes they are eager to carry out experiments on food tests. Only two learners said No to the question

Question 2: How do you feel when you are carrying out an experiment in the laboratory during Biology lessons?

10 learners suggested that they feel excited when carrying out experiments as they feel engaged in hands on approach. They wrote that they feel anxious and eager to explore and discover new concepts when carrying out experiments. 2 learners said that they feel uncomfortable during experimental activities in the Lab and the reason is because of potential hazards which can occur in the lab such as handling of toxic chemicals, use of gas burners with fires and use of glass apparatus which can break if handled without care such as glass beakers.

Question 3: Are there any specific resources which you prefer to use when learning the topic of diet?

All the 12 learners responded with a yes showing that they have resources which they prefer during teaching and learning

Question 4: State the resources which you need to use when learning the topic on diet

Learners stated resources such as cell phones, projectors, videos, bio viewers, scientific apparatus and lap tops when learning Biology lesson on diet. This shows that learners prefer hands on approach and learner centeredness during teaching and learning of Biology. Teachers are advised to use these resources so as to motivate learners to be interested in learning and if they are motivated the pass rate of Biology will improve.

Question 5: Do you feel you have passed or failed the Pre-test?

TABLE 4.11 showing learners' responses on performance of pre-test

NAME OS STUDENTS	PASS	FAIL
EXEPERIMENTAL GROUP		
1		√
2		√
3		√
4		√
5	√	
6		√
CONTROL GROUP		
7		√
8		√
9		√
10		√
11		√
12		√

Only one learner from the experimental group said he has passed the pre-test. All other 11 learners said that they failed the pre-test as they were not prepared to write the test and since the topic was new.

Question 6: Explain how you felt after writing the pre-test?

9 Learners wrote that they felt demotivated when they wrote the pre-test without learning the topic. They also said that they felt demoralised as they felt they have failed to perform well in

the test. 2 learners wrote that they felt disappointed by writing an unknown test which caused them to perform dismally. The other learner said that she felt frustrated by writing what was not taught by the teacher which led to her poor performance of the pre-test.

Question 7: Do you have anything more to say concerning the pre-test you wrote and its outcome?

All the 12 learners responded with a Yes showing that they were eager to express more to the teacher on how they felt after writing the pre-test.

Question 8: Explain what you think will make the biology lesson exciting and motivational to learn.

The 12 learners suggested that they wish if the teacher could carry out experiments all the time when necessary for them to understand better. They suggested that lecture method makes them more dependent to the teacher and lazy. 2 learners highlighted that they enjoy lessons when the learners are involved in the learning where they do group discussions and presentations. Two learners also suggested that they wish to be engaged in outdoor activities such as field trips. This shows that learners as youngsters need to play and learn to avoid boredom and repetition of daily routines during lessons. Therefore Teachers are advised to use resources during teaching and learning to improve on pass rate in Biology subject. Modern resources are most encouraged because the learners use them in their everyday life which makes it easier for them to understand concepts using things which they use such as cell phones, internet, videos, YouTube, microscopes and projectors.

4.9 POST TESTS 1

TABLE 4.12 SHOWING RESULTS FROM POST-TEST 1

	POST TEST 1: The Circulatory System	
NAME OF STUDENTS	MARK	%
EXPERIMENTAL GROUP		
1	12	100

2	11	91
3	12	100
4	12	100
5	11	91
6	10	83
CONTROL GROUP		
7	7	58
8	6	50
9	7	58
10	8	66
11	5	41
12	6	50

The Experimental Group was taught on the lesson of the Circulatory System using a projector showing the movement of blood from the heart to the body and from the body back to the heart. The projector also showed the structures of the arteries and the vein showing all the parts such as the lumen, the valves, and the muscles. Three learners from the experimental group totalised and got 100% whilst two learners scored 91 % from the test and one learner scored 83%. All the participants had high marks from the test. The Control group was taught using the traditional method of Lecture method. It is a method which is teacher cantered and the teacher is the only one who is actively involved and the learners will be seated listening to the teacher. Learners from the control group got very low marks where the highest had 66%. The other 4 participants had 50 and above % and only one learner had 41% which is a mark below half. This can prove that when teachers use resources when teaching Biology pass rate can improve. Gardner, (1999) explains that resources provide opportunities for students to learn in a variety of ways, catering for individual strength whilst lecture based instruction often fails to address the multiple intelligence of learners. Mazur, (2014) also adds on saying

that interactive resources such as videos and interactive exercises can be highly effective in promoting student engagement and understanding. He goes on to say that these allow students to actively participate in the learning process and receive immediate feedback on their progress.

4.9.1 POST TEST 2

TABLE 4.13 SHOWING RESULTS FROM POST TEST 2

	POST TEST 2: Digestion	
NAME OF STUDENTS	MARK	%
EXPERIMENTAL GROUP		
1	11	91
2	11	91
3	12	100
4	12	100
5	12	100
6	11	91
CONTROL GROUP		
7	8	66
8	7	58
9	6	50
10	5	41
11	5	41
12	6	50

The topic on Digestion was taught using simulations which showed the movement of food in the gut. They also showed the structure of the villi and its adaptations to absorption. Learners also had discussions giving feedback. Three learners from the experimental group got 100% and the other three got 91%. The control group was given Notes by the teacher and they wrote in advance and the teacher later came to explain using lecture method and they were allowed to write the post-test. Learners from the control group had very low marks where the highest from the Control group had 66% followed by one with 58%, two had 50% and the other two had 41%. The results from the learners show that use of resources can enhance learning and may lead to increase in Biology pass rate. Marzano, (2009) explained that resources are particularly valuable for providing students with differentiated learning experiences and supporting individualized instruction. Hattie, (2009) further explains that resources often have a higher impact on student achievement than lecture- based instruction. Therefore use of resources to enhance learning cause learners to become excited, self-motivated and confident and that will contribute to the increase in pass rate of Biology.

4.9.2 POST TEST 3

TABLE 4.14: SHOWING RESULTS FROM POST TEST 3

	POST TEST 3: FOOD TESTS	
NAME OF STUDENTS	MARK	%
EXPERIMENTAL GROUP		
1	12	100
2	12	100
3	12	100
4	12	100
5	12	91
6	11	91
CONTROL GROUP		

7	6	50
8	6	50
9	6	50
10	7	58
11	8	66
12	5	41

The experimental group was given scientific apparatus and they carried out the experiments to test food samples for the presence of starch, proteins, glucose and fats. They observed the colour changes and wrote down their observations and they later responded to a post test. Participants in the experimental group performed very well where 4 learners totalised the test and the other 2 learners got 91%. The Control group had an Alternative to practical where they answered questions without carrying out an experiment. The highest had 66% followed by one learner with 58% then three other learners got 50%. The least was 41% from another student in the control group. Hofstein and Lunetta (2004) argue that experimentation is often a fundamental aspect of teaching biology as it allows students to have a direct, hands-on experience with the subject matter. It can help them develop critical thinking skills, enhance their understanding of scientific concepts. Theorist Dewey, (1938) emphasised the need for experimental learning and the use of relevant resources to create meaningful learning experiences.

4.10 Summary

The researcher managed to collect data from the participants using post, pre-test and questionnaires as data collecting instruments, the researcher presented data in form of tables and analyzed it.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This Chapter gives a summary, conclusion and recommendations with respect to the study findings. The data was presented, interpreted and analysed in line with the research objectives.

5.2 Summary

The research aims to investigate the impact of utilizing various resources, including laboratory facilities, textbooks, and online resources, on the pass rate in Biology. It employs a quantitative approach to collect raw data, which is then categorized and presented using tables, pie charts, and graphs. The study will assess the pass rate in Biology before and after the implementation of these resources to determine their effectiveness. Most of the authors highlighted that the resources used in teaching and learning such as visual and audio visual aids arouses student's interest making the learning process more real and simplified.

Ethical considerations, credibility, and trustworthiness are emphasized, ensuring the protection of participants' privacy and confidentiality. The research also highlights the importance of using valid and reliable tools to assess the impact of resources on learner performance. Overall, the study underscores the positive impact of resource availability on the success of learners and the improvement of pass rates in the Biology subject.

Copper (1974) explains that teaching resources can be used for five educational purposes which are to teach, to present facts, to recognize knowledge into concepts, to stimulate imagination and to develop attitudes or to change existing ones. Teaching resources are very important in the teaching and learning of Biology because they are most effective tools for developing flawless communication and interaction between learners and teacher.

Teaching resources are very important in the teaching and learning of Biology because they are most effective tools for developing flawless communication and interaction between learners and teacher. These resources do not only help to save the time of facilitators but also assists in developing and arousing curiosity creativity and motivation.

In gathering information experimental research and questionnaires were used. Form 3 Science Biology students were the researcher's population target in which she randomly selected the research sample. The sample comprised of only 12 students. Pre - test and post - test were given to compare the performance of students through an assessment of the use of Resources in teaching and learning process. Findings of the research project which came from the pre- test, post-test and questionnaires were presented in statistical information in form of tables.

5.3 Conclusion

Basing on literature review and information gathered from the pre- test, post-test and questionnaires, the researcher managed to assess the effectiveness of using Resources such as such as projectors, computers, microscopes, bio viewers and smart phones.

The conclusion of the research emphasizes the importance of resource availability in positively impacting the success of learners and improving pass rates in the Biology subject. It underscores the need for ethical considerations, credibility, and trustworthiness in research, ensuring the protection of participants' privacy and confidentiality. Additionally, the study highlights the significance of using valid and reliable tools to assess the impact of resources on learner performance. Overall, the conclusion emphasizes the positive influence of resource availability on teaching and learning outcomes.

The results of the post-tests demonstrated that it was more important and effective to use teaching Resources in teaching and learning process of Biology so as to improve pass rate. This was evidenced by greater improvement in performance when teaching Resources were used to the experimental group, as reflected in the learners' post-test results. In addition responses from the participants in the given questionnaire showed that resources were very effective in the teaching and learning process. 90% of the participants had a positive attitude towards the use of resources and they highlighted that their performance had improved due to the use of the resources.

5.4 Recommendations

The researcher recommends that:

1. Educational institutions should prioritize the allocation of resources such as laboratory facilities, textbooks, and online resources to enhance the pass rate in Biology. Adequate provision of these resources can significantly impact the success of learners.

2. Researchers and educational institutions should adhere to ethical considerations, ensuring the protection of participants' privacy and confidentiality. Clear communication about the research objectives and the benefits to teaching and learning should be provided to all participants.

3. It is crucial to use valid and reliable tools to assess the impact of resources on learner performance. This ensures that the data accurately captures the effectiveness of the resources in improving pass rates.

4. Facilitators, administrators, and educational inspectors should recognize the relevance of research and the needs of learners. Their involvement and support are essential for the successful implementation of resource-based interventions.

These recommendations aim to promote the effective utilization of resources, ethical research practices, and the use of valid assessment tools to enhance the pass rate in Biology and improve the overall learning outcomes

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APPENDICES

5.6 Appendix 1: PRE TEST 1

THE EFFECTIVENESS OF USING RESOURCES TO IMPROVE PASS RATE IN TEACHING FORM 3 BIOLOGY AT ONE SCHOOL IN HARARE.

TOPIC: THE CIRCULATORY SYSTEM

Answer all questions

- 1) The diagram below shows a group of specialized cells



- a) Identify the specialized cells above _____ (1)
- b) State any 3 ways in which these cells are specialized for their function
-

(3)

c) State the part where the coronary artery is found

(1)

d) explain the function of the coronary artery

(2)

2) Outline the structural differences of an artery and a vein (6)

Artery

Vein

5.7 APPENDIX 2: POST TEST 1

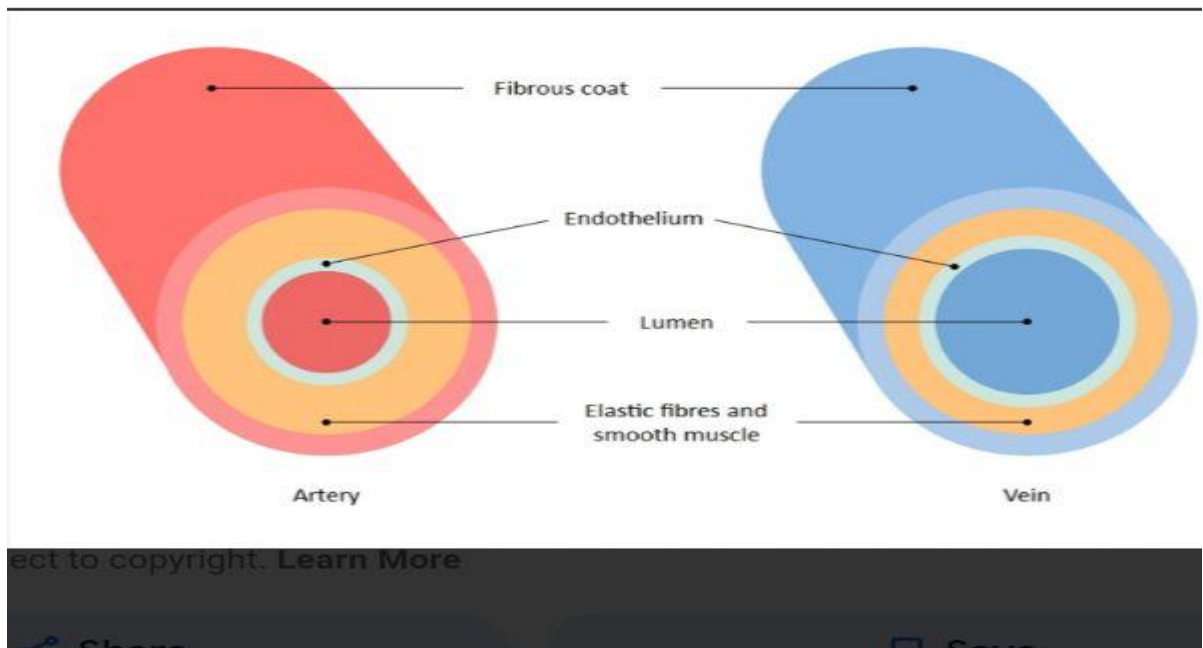
THE EFFECTIVENESS OF USING RESOURCES TO IMPROVE PASS RATE IN TEACHING FORM 3 BIOLOGY AT ONE SCHOOL

TOPIC : CIRCULATORY SYSTEM

- 1) Give 3 functions of the blood

(3)

- 2) Below is a diagram showing two blood vessels



- 2a) Name the blood vessels

(2)

- 2b) Outline 3 structural differences between the two blood vessels

(6)

- 2c) Explain the functions of the valves in the blood vessels

(2)

5.8 APPENDIX 3: PRE TEST 2

THE EFFECTIVENESS OF USING RESOURCES TO IMPROVE PASS RATE IN TEACHING FORM 3 BIOLOGY AT ONE SCHOOL IN HARARE

TOPIC: DIGESTION

1a) Define the term balanced diet

_____ (1)

b) List 4 components of a diet

i) _____

ii) _____

iii) _____

iv) _____ (4)

2a) Define the term Chemical digestion

_____ (1)

b) Name 3 substances which are absorbed from the ileum into the blood stream

_____ (3)

b) Explain the importance of chemical digestion during the process of
digestion _____

_____ (3)

5.9 APPENDIX 4: POST TEST 2

THE EFFECTIVENESS OF USING RESOURCES TO IMPROVE PASS RATE IN TEACHING FORM 3 BIOLOGY AT ONE SCHOOL IN HARARE

TOPIC: ANIMAL NUTRITION – DIGESTION

1a) Define the term digestion

(1)

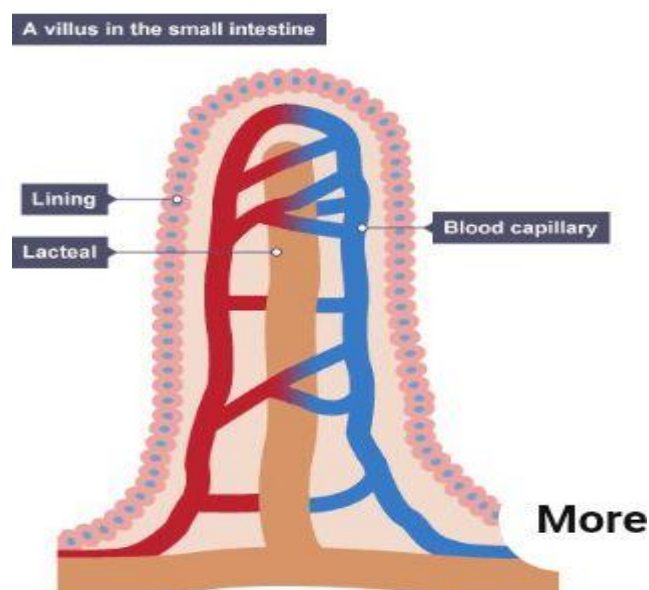
b) Explain the digestion of proteins in the alimentary canal

(3)

b) Plan a main meal for a manual worker including four components of a diet needed for a healthy living

(4)

2) The diagram below shows part of the villi of the small intestines



- a) Describe the structural adaptation of the small intestines which make it easier for absorption of digested food.

(4)

5.10 APPENDIX 5: PRE TEST 3

THE EFFECTIVENESS OF USING RESOURCES TO IMPROVE PASS RATE IN TEACHING FORM 3 BIOLOGY AT ONE SCHOOL

TOPIC: DIET – FOOD TESTS

1) What colour is iodine solution and Benedict's Solution?

a) Iodine solution _____(1)

b) Benedict's Solution _____(1)

2) Write colour changes which are observed when

a) iodine solution is added to a piece of bread _____(1)

b) Biuret test is carried out to an egg albumen _____(1)

c) What colour change is observed when iodine solution is added to a piece of banana
_____(1)

d) Explain your observation to your answer in (c) above
_____(2)

3) Name 2 nutrients contained in milk

_____(2)

4) Plan a meal for lunch which contains starch, proteins and vitamins

_____(4)

5.11 APPENDIX 6: POST TEST 3

THE EFFECTIVENESS OF USING RESOURCES TO IMPROVE PASS RATE IN TEACHING FORM 3 BIOLOGY AT ONE SCHOOL IN HARARE

TOPIC: DIET – FOOD TESTS

1a) Write the colour changes that are observed when iodine solution is added to

i) Water _____ (1)

ii) Bread _____ (1)

b) What conclusions can you draw from the results you wrote above -

_____ (2)

2) A Biology learner carried out an experiment of unknown substances and recorded the results in the table below.

Food substances	1.Test for starch	2.Test for glucose using Benedict's solution	3. Testing for Proteins using Biuret reagents	4. Test with ethanol and water
Solution A	Brown	Blue	Purple	Cloudy white
Solution B	Black	Orange	Blue	colourless
Solution C	Brown	Red	Purple	colourless

a) Which solution A,B or C contains the most glucose? _____ (1)

b) Explain your answer that you gave in (a) above

_____ (1)

c) List the foods present in Solution A

_____ (2)

d) Name the nutrients which are contained in Solution B

_____ (2)

5.12 APPENDIX 7: QUESTIONNAIRE FOR PRE-TEST 1

My name is Patience Chisuva: I am currently studying for a Bachelor of Science Education Degree in Biology with Bindura University of Science Education, Department of Science and Maths Education. As part of my Degree Program, I am currently carrying out a research on the Effectiveness of using resources to improve pass rate in teaching form 3 Biology at one school in Harare Province.

QUESTIONNAIRE FOR LEARNERS

May you fill in the questionnaire to the best of your knowledge on how you feel about the use of Resources to improve pass rate in Biology. May you answer these questions as accurately as possible. Your participation in the Study is voluntary and the information you give will be treated as private and confidential. Your cooperation is highly appreciated.

Information provided is confidential AND will only be used for the purpose of this study

Questionnaire Number: ...1.....

A. DEMOGRAPHIC DETAILS

A.1. Gender: Male ☐ Female ☐ (Tick where appropriate)

A.2. Age of the student (indicate by a tick in the appropriate box)

13 – 15 years	15 – 17 years	17– 19 years	19 – 21 years	>21 years
---------------	---------------	--------------	------------------	-----------

A.3. Grade level

Form 1	Form 2	Form 3	Form 4
☐	☐	☐	☐

When did you start doing Biology (Please tick in the appropriate box)

Since Form 1	Since Form 2	Since Form 3	Since Form 4
☐	☐	☐	☐

A.6. Type of school (Tick where appropriate)

Day school	Boarding school	Pvt school	Others (specify)
☐	☐	☐	☐

B. 1. Did writing the pre - test on the topic of blood circulation help you to gauge your understanding of the topic? Yes [☐] No [☐]

2. How did you feel after completing the test?

3. Did the pre-test help you to identify any specific areas of confusion on the topic on circulation of blood?

Yes [] No []

4. Can you describe any specific topics or concepts that you found particularly challenging while writing the pre-test?

5. Did writing the pre-test make you feel more prepared for future discussions or assessments on blood circulation? Yes [] No []

6. Explain how you will study the circulation of blood from the heart to the body for the topic to be easier to understand.

7. State the resources which you prefer to be used when learning the topic on circulation of blood.

8. Did you find any question the hardest when writing the test? Yes [] No []

9. What do you plan to do so that you will understand the topic more?

10. Do you think learning about the blood is important? Yes [] No []

11. May you explain your answer

12. Do you feel more prepared to study the topic on the blood circulation? Yes [] No []

13. What method of teaching do you prefer your teacher to use when teaching you the topic of circulation of blood?

14. Do you think you have passed or failed the test? Pass [] Fail []

15. Can you explain anything else you felt after writing the test on blood circulation

5.13 APPENDIX 7.1 : QUESTIONNAIRE FOR PRE-TEST 2

My name is Patience Chisuva: I am currently studying for a Bachelor of Science Education Degree in Biology with Bindura University of Science Education, Department of Science and Maths Education. As part of my Degree Program, I am currently carrying out a research on the Effectiveness of using resources to improve pass rate in teaching form 3 Biology at one school in Harare Province.

QUESTIONNAIRE FOR LEARNERS

May you fill in the questionnaire to the best of your knowledge on how you feel about the use of Resources to improve pass rate in Biology. May you answer these questions as accurately as possible. Your participation in the Study is voluntary and the information you give will be treated as private and confidential. Your cooperation is highly appreciated.

Information provided is confidential AND will only be used for the purpose of this study

Questionnaire Number:2.....

A. DEMOGRAPHIC DETAILS

A.1. Gender: Male ☐ Female ☐ (Tick where appropriate)

A.2. Age of the student (indicate by a tick in the appropriate box)

13 – 15 years	15 – 17 years	17– 19 years	19 – 21 years	>21 years
---------------	---------------	--------------	------------------	-----------

A.3. Grade level

Form 1	Form 2	Form 3	Form 4
☐	☐	☐	☐

When did you start doing Biology (Please tick in the appropriate box)

Since Form 1	Since Form 2	Since Form 3	Since Form 4
☐	☐	☐	☐

A.6. Type of school (Tick where appropriate)

Day school	Boarding school	Pvt school	Others (specify)
☐	☐	☐	☐

B. 1. Did writing the pre - test on animal nutrition cause you to measure your preparedness on the topic? YES [☐] NO [☐]

2. What do you think was your performance on the written Pre-test?

3. Did the Pre-test motivate you to want to learn more on the topic of animal nutrition?

YES [☐] NO [☐]

4. What type of resources do you prefer your teacher to use to teach the topic on animal nutrition?

5. Did you find anything challenging when you were writing the pre-test on animal nutrition?

YES [☐] NO [☐]

6. Which area did you feel unprepared when you were writing the Pre-test?

7. Are there any specific areas you need additional support on the topic of animal nutrition?

YES [☐] NO [☐]

8. What strategies do you prefer your teacher to use when teaching the topic of animal nutrition?

9. Do you have plans on how to approach your study on the topic of digestion?

YES [☐] NO [☐]

10. How will you study on the topic of digestion for you to excel in your exams?

5.14 APPENDIX 7.2 : QUESTIONNAIRE FOR PRE-TEST 3

My name is Patience Chisuva: I am currently studying for a Bachelor of Science Education Degree in Biology with Bindura University of Science Education, Department of Science and Maths Education. As part of my Degree Program, I am currently carrying out a research on the Effectiveness of using resources to improve pass rate in teaching form 3 Biology at one school in Harare.

QUESTIONNAIRE FOR LEARNERS

May you fill in the questionnaire to the best of your knowledge on how you feel about the use of Resources to improve pass rate in Biology. May you answer these questions as accurately as possible. Your participation in the Study is voluntary and the information you give will be treated as private and confidential. Your cooperation is highly appreciated.

Information provided is confidential AND will only be used for the purpose of this study

Questionnaire Number: ...3.....

A. DEMOGRAPHIC DETAILS

A.1. Gender: Male ☐ Female ☐ (Tick where appropriate)

A.2. Age of the student (indicate by a tick in the appropriate box)

13 – 15 years	15 – 17 years	17– 19 years	19 – 21 years	>21 years
---------------	---------------	--------------	------------------	-----------

A.3. Grade level

Form 1	Form 2	Form 3	Form 4
☐	☐	☐	☐

When did you start doing Biology (Please tick in the appropriate box)

Since Form 1	Since Form 2	Since Form 3	Since Form 4
☐	☐	☐	☐

A.6. Type of school (Tick where appropriate)

Day school	Boarding school	Pvt school	Others (specify)
☐	☐	☐	☐

B. 1. Did writing the pre - test caused you to be eager to want to carry out the experiments on food tests? YES [☐] NO [☐]

2. How do you feel when you are carrying out an experiment in the Laboratory during other Biology lessons?

3. Are there any specific resources which you prefer to use when learning the topic on diet?

YES [☐] NO [☐]

4. State the resources which you need to use when learning the topic on diet

5. Do you now feel more prepared to learn more on Diet? YES [☐] NO [☐]

6. Which method of teaching do you prefer your teacher to use when teaching the topic of Diet?

7. Do you feel you were prepared to write the Pre-test? YES [☐] NO [☐]

8. How have you performed in the Pre test

9. Do you think learning about diet is important? YES [☐] NO [☐]

10 Explain the importance of learning the topic on Diet to learners.

5.5 Appendix 7.3 Permission Letter for Research

SAMED

P Bag 1020
BINDURA
ZIMBABWE

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



BINDURA UNIVERSITY OF SCIENCE EDUCATION

Date: 10-05-24

TO WHOM IT MAY CONCERN

NAME: CHISUNA PATIENCE REGISTRATION NUMBER: B225574 B
PROGRAMME: HBSC Ed BZ PART: 2.2

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

The student has to undertake research and thereafter present a Research Project in partial fulfillment of the requirements of the HBSC Ed BZ programme. The research topic is:

THE EFFECTIVENESS OF USING RESOURCES TO
IMPROVE PASS RATE IN TEACHING FORM 3
BIOLOGY AT ONE SCHOOL IN HARARE

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

Your co-operation and assistance is greatly appreciated.

Thank you

Z/Ndemo (Dr.)
CHAIRPERSON - SAMED

