

BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE EDUCATION



**The Impact of Media and Technology on the Teaching and Learning of
Biology at Ordinary Level**

BY

BRENDA DIANA MLALAZI

B213873B

SUPERVISOR :MR NGWENYA

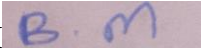
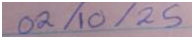
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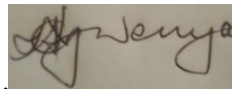
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BRENDA DIANA MLALAZI  Date: ...  ...

Student

MR NGWENYA



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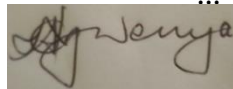
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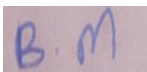
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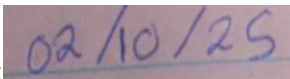
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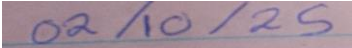
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DECLARATION

This dissertation is the product of my investigation and research, and I, Brenda Diana Mlalazi B213873B, thus declare that it has not been submitted in whole or in part for any other diploma to any other university..

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DEDICATION

This study is devoted to me; I overcame personal challenges and succeeded.

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I would want to thank everyone that helped make this research document a success. I want to start by giving thanks to the All-Powerful God for keeping me safe throughout these difficult times. In addition, I would like to express my gratitude to my tireless supervisor, Dr. R. Rusike, for his insightful advice and intellectual leadership during this project. I also appreciate the support I received from my classmates, Tendayi Marekera, Precious Ndlovu, Ronald Mabhena, and Runyararo Chikaka (members of MLC group 3). My sincere gratitude is extended to my parents for their financial assistance. I also want to express my gratitude to my friends for putting up with my nonstop busy schedule while I was pursuing this degree. I am also appreciative of Clara since she made sure that when I went home, my main concern would be my education. I also want to express my gratitude to my siblings Tamara and Tafara for their unwavering emotional support. I'm grateful, Lord. Thank you very much!

ABSTRACT

In accordance with international educational standards, media and technology use have become essential to the study of science, particularly biology. Curriculum and a great deal of schools are incorporating technology and media. The main objective of the study was to determine the effects of media and technology on biology education at the elementary school level in Mutare, Zimbabwe. Determining the function of media and technology in biology education at the ordinary level and assessing the extent of media and technology use in biology are among the study's particular goals. Data for the study were gathered through key informant interviews and questionnaires. A descriptive analysis was carried out to describe the degree of media and technology use, its functions in teaching and learning, and the effectiveness of learners utilizing media and technology in biology classes. The study's conclusions are as follows: using media and technology to teach and learn biology results in significant learning gains that are much stronger intellectually; as such, it is critical that all students use media and technology in this day and age of education in accordance with international standards. The main issue with employing media and technology in biology education and learning was considered to be the inadequate availability of computers. The study's recommendations are as follows: in order to better assist individuals with computers, more media and technological resources should be sourced in Mutare for educational purposes. Biology also provides solar power systems and generators to reduce the risk of a power outage. There is a critical need to raise the subject's pass rate with trained teachers, who can help students embrace media and technology in general and flourish in the topic by utilizing specialized monitoring systems that adhere to international educational standards.

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

The realization of the hands-on aspect of biology is significantly impacted by the use of computers in teaching and learning. As the learning process moves forward, both teachers and students get the chance to experience computer operations. The present global trends in education are aligned with the use of media and technology in education. The use of media and technology in education offers a program for teachers and students to integrate and mix in order to build a field where students' specific talents and experiences can be enhanced. Wadmany and Leven (2018). This chapter will examine the study's background, research questions, assumptions, and limits as well as provide contextual definitions for words.

1.1 Background of the Problem

Biology comprises various specialized studies that examine the morphology, physiology, anatomy, behavior, origin, and distribution of living species. Since biology teaches us about diseases and their origins as well as how excessive use of pesticides and weedicides affects living things, people have been studying biology to learn more about diseases. Students can learn more about their bodies, the functions of the organs we are born with, and how our systems operate thanks to it. These days, it is an interdisciplinary and integrative subject with subfields drawn from several social and scientific disciplines. Similarly, it gave rise to numerous new fields of research.

People talk about technology all the time these days, and in this globalized world, they are also starting to act on it. This encompasses the process of learning as well. The way students study in secondary schools is enhanced by the usage of computers (Distefano, 2022). The significance of media and technology in biology education and learning interests the researcher. Given that we live in a technologically advanced world, students ought to be familiar with computers. Therefore, a variety of arguments can be made for the significance of media and technology in secondary school biology instruction. Many schools who have the financial means to buy the necessary infrastructure or equipment have embraced media and

technology. The use of computers has an impact on every aspect of our lives. The Ministry of Primary and Secondary Education's 2016 curriculum places pressure on teachers to find legitimate and efficient ways to use computers in the classroom in light of government interest in integrating media and technology into education as well as investments in hardware and software (Elstad, 2016). This is due to the intrigue that technology has engendered for both individuals and communities. Teaching is an art, and the ability of a teacher to make a subject clear and understandable for students determines how successful they will be. Selecting a teaching strategy is dependent on the resources that are accessible, psychological.

1.2 Statement of the Problem

Many schools who have the financial means to buy the necessary infrastructure or equipment have embraced media and technology. Every aspect of our lives is being impacted by media and technology. Both educators and students lack experience using media and technology to accelerate the learning of science courses like biology at the Ordinary level. Synergy between "top-down" and "bottom up" processes is thought to determine the kind and degree of media and technology use in education. There is a lack of research on the significance of biology in urban Mutare. Therefore, the purpose of this study is to discover more about how students actually use and perceive the value of media and technology when studying biology at a regular level.

1.3 Research Questions

1. What functions do media and technology play in the ordinary level biology curriculum?
2. What parts do technology and media play in the study of biology at the ordinary level?
3. To what extent are media and technology used in biology education?

1.4 Assumptions of the Study

1. Supplying information that will allow one to understand reality

2. To investigate how media and technology are used in biology education at the ordinary level.
3. To assess how much media and technology are being used in biology classes.

1.5 Significance of the Study

It is hoped that the study would help educators understand how to embrace the role that media and technology play in helping students learn not just biology but also other topics. It is hoped that educators across the board would be inspired to make better use of the expensive computers in their classrooms and add some diversity to their instruction. It demonstrated how the study's findings will increase the use of media and technology in instruction, leading to more creative teaching methods and new subject matter. Upon completion of the study, the researcher ought to be ready to explain why so many chiefs and administrators take the computerized idea from one another.

The impact on students' theoretical and practical output will be examined by the researcher. Heads, teachers, and students may all gain from this in understanding the value of media and technology in the educational process. According to Quay & Seaman (2018), computers can be thought of as teachers in and of themselves because they give students instructions that they would not always be able to get in a large classroom setting. This will inspire students to be self-assured and eager to explore new things at their own speed. The growing usage of instructional aids has led to a progressive mechanization of the teaching process. The focus needs to be shifted from dealing with current education to "future education," which involves the transmission, distribution, and reproduction of stimulus materials, increasing the impact of teachers in the process. For the students, computers represent a cost-saving measure. Computers enable the quick updating of educational resources, cutting down on study time, dependence on an instructor, and need for pricey laboratories because encyclopedias and e-learning may be utilized instead. Thus, at the conclusion of the study, the researcher would be able to determine the degree to which computer use has improved students' performance in this practical subject Quay & Seaman, (2018).

1.8 Limitations of the Study

Due to a lack of time and material resources, the researcher found it difficult to complete the investigation. Under pressure, the researcher worked to find a solution and will also look for

the necessary funding. Workplace pressure was a limitation, but the researcher managed pressure like a front-end loader tire when all else was equal. Participants' ignorance, which the researcher used as an external incentive to get them to cooperate. The researcher persuaded the participants that the information they provided would only be used for academic purposes, which prevented them from providing misleading information.

1.7 Delimitations of the Study

The researcher focused on biology instruction in Ordinary Level schools in Mutare's metropolitan area, which is also biology learning. In order to gather data for the study, the researcher worked with two biology professors in the department of scientific topics.

1.8 Definition of Terms.

The definitions are in context with the Oxford Basic English dictionary, (2012):

MEDIA – the primary medium for public outreach

Integration- it is the process of uniting into a single, comprehensive entity.

Information – This is the notification-based method of knowledge transfer.

Communication – this is the process of moving information across a channel, like media, to another location.

Technology – innovative and complex methods, as well as media communication

Computer – an electronically connected device that automatically accepts, stores, processes, and produces information unique to humans while operating under the guidance of stored programs.

Motivation – is to pique students' curiosity or motivate them to take action.

Incompetence – functioning below expectations or the standard.

BIOLOGY-is the study of living things, which is broken down into numerous specialized topics including origins, distribution, morphology, physiology, anatomy, and behavior.

1.9 Chapter Summary

The chapter mostly addressed the methods utilized by the researcher, potential issues that may arise, and potential solutions to such issues. Next, the literature review is the main topic of the chapter.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The researcher's goal in this chapter is to highlight previous studies and hypotheses in the same field on the value of media and technology in scientific education at the Ordinary level. According to a review of the research, using media and technology improved students' motivation to learn biology and increased their level of involvement (Milson & Earle, 2008). Additionally, it was discovered that motivation improved performance in topics related to practical and vocational skills.

2.1 Media and technology in relation to Zimbabwe vocational education

The word "media and technology" refers to a general term for technologies that are used to gather, store, alter, and transmit information in different formats (SER, 1997). Although the term "multimedia" is also sometimes used, a personal computer is the most well-known illustration of how media and technology are employed in education. A combination of data carriers, such as video, CD-ROM, floppy disc, and the Internet, along with software that allows for an interactive approach can be regarded as multimedia (Smeets, 1996).

The literature (SER, 1998, Moonen and Kommers, 1995, Pilot, 1998) generally describes the following purposes of the use of media and technology education. Technology and media are objects. It alludes to gaining knowledge of technology and media. Organized mostly within a certain course. What is taught varies according to the pupils' level and the kind of education they receive. Students who have an education are better equipped for using media and technology in their future careers and social lives. Media and technology as a supporting instrument. Media and technology are used as tools, for instance, when completing assignments, gathering information and documentation, corresponding, and doing research. Media and technology are usually utilized apart from the topic matter. Technology and media

as instructional and learning tools. This is a reference to media and technology as a tool for education, the medium that allows educators to instruct and students to learn. It can be found in a variety of settings, including educational networks, simulations, and drill and practice sessions. Radio, television, cell phones, computers, network hardware, and software are all included under the broad category of media and technology, which also encompasses any unified communication and the integration of devices or applications. Through the development, application, and management of suitable technical processes and resources, media and technology support the ethical practice of promoting learning and enhancing performance. Education technology, according to Percival (2008), is the application of scientific understanding about learning and learning environments to enhance the efficacy of instruction and training in a range of technical areas. Educational technology uses techniques of empirical testing in the lack of scientifically defined principles to enhance learning environments.

In order to create more effective instructions, Kumar (2013) suggests that educational technology be used in a systematic manner to design, implement, and evaluate the entire teaching and learning process in terms of particular objectives based on research on human learning and communication and using a combination of non-human and human resources. Computers are an advancement in learning theory, according to Madison (2012). It is an approach to enhance people's learning. The basics of media and technology are taught in schools in order to stay up to date with international educational standards, which is why e-learning has been implemented.

A 2018 study by the Dutch educational research agency OCTO examined the real-world application of media and technology for achieving the aforementioned goals. All educational levels were studied in a few developing nations, including the Netherlands. The focus of this work is vocational education. Although an accurate picture of the state of media and technology use in vocational education cannot be provided due to the lack of an effective response, one can get an idea of its current state. (1999, Janssen & Reinen).The majority of teachers seldom use media and technology as a (learning) objective because they rarely use it as aids or as teaching materials.

Should a computer be utilized, it is primarily for word processing and practicing the lessons. According to Janssen and Reinen (1999), it appears that the computer is specifically being used to complement more conventional educational environments. Based on our current

research and related literature, we can draw the conclusion that while media and technology offer a wide range of technical applications, their truly novel uses are not yet widely accepted in vocational education, particularly in developing countries.

2.2 How media and technology is been used in the education system

It has taken a very long time to advance from the slow, ponderous mechanical machines that took up many rooms a century ago to the current state of desktop and handheld electronic computers, as can be seen by taking a quick look at the history of media and technological advancement. According to Kumar (1996), Leibniz's German invention of the Abacus—a system of sliding beads for addition and subtraction—led to the development of a wooden machine and ultimately a larger one. It could add and subtract integers as well as multiply, divide, and extract square roots. Additionally, in 2015, computers began to use electrical switching parts in place of mechanical ones. That marked the birth of the first generation of modern computers. Technology in education and training is linked to the usage of computers in these contexts. According to Percival (2023), computers are now so widely used in all facets of education and training that it is also possible to refer to them as educational and training technology.

2.3 Impact of media and technology in learning science (biology) the pupil's performance

The use of media and technology in the classroom is well-received by both teachers and students for similar reasons, and computer technology integration benefits both parties. Incorporating corporate computers into the classroom might present challenges for teachers, as some students may not be as computer-savvy as their peers or may not stick to the assigned tasks. However, similar issues arise in all forms of learning. Regular communication with people increases not just one's English ability but also one's achievement or pass rate on tests and other evaluation activities. "There is no doubt that technology enhances learning and life," said one instructor. In a research on how students utilize media and technology to assist and enhance their learning, Rue (2014) came to the conclusion that effective use required complementing effort to promote students' development of more autonomy and self-

reflection. Teachers also required a solid awareness of the resources available to them and how to use them for pedagogy.

2.4 Impact of media and technology in the teaching and learning process.

Technology and media can be utilized to foster mastery and active learning. The learner is actively participating in this scenario as opposed to passively learning in the past. Pupils learn best when they are actively involved in the learning process, which requires them to use computers for hands-on training rather than just listening to lectures. Numerous educational applications are interactive, allowing learners to respond to inquiries, view an AL image of a specific object, solve problems, and get prompt feedback. Feedback and advancements in media and technology-based learning and teaching are positively correlated.

Using computer projectors to project lessons adds an audio-visual component to instruction and targets students whose learning styles are not met by traditional teacher lectures. This is another example of media and technology. Although some students may find it challenging, this way to teaching mathematics is appealing to all as today's pupils are highly visual learners. Through the internet, media and technology bring a plethora of educational resources into the classroom. By employing a computer projector in the classroom, educators can use the internet to find wonderful resources to incorporate into their lessons. Percival (2003) went on to say that development of any kind is impossible without the aid of media and technology. Given a nation's general struggles with development, technology must therefore be given top national priority. The biggest benefit is that kids who struggle to focus can use computer scanning as a stimulus. Because multimedia technology can integrate many media, it also stimulates the learner's mind and encourages learning through all senses. A student at a different stage of their education may have access to more material than they may have in the absence of theme death and technology. A computer's job is to identify each student's path, record their work and outcomes, and indicate any problems. Technology and media demonstrate the extent and caliber of learning. Different ways exist for information technologies to impact the teaching and learning process. On the other hand, these aid in the teachers' preparation of engaging lecture notes and enhance the students' ability to understand a wide range of ideas.

In lower elementary school grades, teachers and pupils can solve complex calculations with the aid of various technologies, depending on the type, capacity, and presentation of the information. For instance, computers are used in education for many different reasons because of their enormous capacity to store and retrieve data. According to Davis (2013), computers have been incorporated to enhance the effectiveness of instruction without significantly raising the expense of the students being taught. A computer has the capacity to retrieve and store a vast amount of data. Worksheets and more educational resources can be generated rapidly. By using computers, the lock step is broken, allowing each student seated at a terminal to move forward at their own speed. If students appear to be interested in the material, it can cover it more rapidly or in greater detail if they seem to already be familiar with it. Unquestionably, technology plays a crucial role in early childhood special education as a tool for communication, learning, equitable opportunity, and bringing about good changes in the classroom (Sivin-Kachala & Bail, 1996).

Computers have amazing qualities that make them very successful for teaching young children. Specifically, they are incredibly patient and forgiving when students make mistakes. Furthermore, students can experiment and discover in a secure atmosphere with the new enter active software, where there is no right or wrong response and where a child may succeed—sometimes for the first time.

2.5 Advantages of using media and technology in vocational and practical subjects.

Students study geography better when media and technology are used because they have access to a wealth of information about people, places, and surroundings. Additionally, it offers the foundation for data analysis to look for linkages and trends in a geographical context. After students have arrived at their conclusions, media and technology can assist them in organizing, editing, and presenting data in a variety of ways. Without a question, media and technology are today's mediums. It is the medium of youth, and it already has a significant impact on nearly every facet of their life. As a result, using it in a classroom setting helps to deliver geography in a way that is quite interesting.

Teachers and students have instant access to current, relevant geographic information and our globally interconnected world thanks to media and technology. When utilized properly, this dynamic medium can greatly enhance and expand one's understanding of geography and help one comprehend it like never before. Furthermore, studies have demonstrated that when given the chance to use media and technology to enhance their learning, pupils in the tenth

grade maintain concentration levels more fully. This is because contemporary technology makes it feasible to gather a vast array of geographic data for the purpose of examining physical and human patterns, distributions, and processes that would be unattainable in the absence of media and technology. Students can also gather, present, discuss, and assess data using the same technologies.

Technology and media have grown in popularity recently. It is an important field of study for many academics worldwide. Over the past few decades, their nature has significantly altered the face of education. Blaire and Kefala (2006) conducted a study in national, international, and European schools in order to gather data about the benefits and improvements associated with media and technology education. It aims to gauge how media and technology affect students' performance. The study also looked for a connection between students' exam performance and media and technology use. The results are intriguing: media and technology improves secondary school students' performance, especially in science. When compared to schools with lower levels of e-maturity, those with higher levels exhibit a faster rise in performance and scores. Furthermore, schools with enough media and technological resources outperformed those without them in terms of academic performance.

Teachers observe that media and technology support students with special needs or difficulties. Many students find that media and technology tools are very useful in helping them complete schoolwork. Because they collaborate in groups to complete tasks, it also lessens social gaps among students. When students use media and technology to arrange their work through digital portfolio projects, they also take on responsibility. Furthermore, the research indicates that media and technology have a significant influence on educators and the way they teach. Teachers are stimulated by media and technology thanks to government intervention and training seminars arranged in this regard. In fact, 90% of educators in Europe say they utilize media and technology for duties including lesson planning, activity sequencing, and classroom management. As a result, educators organize their classes more effectively. Technology and media greatly facilitate teamwork among educators and the sharing of curriculum-related ideas. Additionally, research indicates that interactive white boards and broad band are essential for improving teacher cooperation and encouraging teacher communication (Hew & Brush, 2007). It has also been demonstrated that students gain greatly from modern technologies. By working with teachers to plan and prepare resources, media and technology can be used to create higher-quality courses (Ofsted, 2002). Pupils gain new analytical abilities, which include enhanced reading comprehension

(Lewinetal., 2000). Develop your writing abilities with media and technology, focusing on spelling, grammar, punctuation, revising, and rewriting (Lewinetal., 2000). Even so, new technologies promote autonomous, active learning and students' ownership of their education (Passey, 1999). Research on media and technology usage in the classroom shows that students who use educational technology report higher levels of success, greater motivation to learn, and higher levels of self-esteem and confidence. Additionally, research confirms that a large number of children find studying in a technology-enhanced environment to be far more engaging and effective than in a typical classroom (Pedretti & Mayer-Smith, 2008).

2.6 Challenge encountered through the learning and teaching using media and technology n schools

The majority of schools in Zimbabwe have been concerned about persistent computer shortages. Some hostages progressed to the point where two students would share a single computer. Ferranti (1890) asserts that "a conducive atmosphere should prevail for a school pupil to learn successfully." Textbooks, furniture, computers, adequate e-classrooms, and resource materials—all of which Farrant lists as necessities—are common problems in most schools. Purchasing media and technology can be costly. Rao (2010) continues, "Some teachers are technophobic, and there are times when having a few highly enthusiastic people already involved in computer use is ironically linked to the underutilization of technology within the curriculum." According to Rao's (2004) theory, when technology planning is done at primary education institutions without giving particular curriculum goals any care, traditional curriculum is frequently continued from earlier years with minimal use of acquired technology. Empty computer labs are a prominent sign of this issue, when students and schools alike struggle to integrate technology into their everyday tasks. There is a lack of skilled workers to maintain and repair the media and technology problems. Power outages are another issue, as many elementary schools are without electricity. When two students use a computer or other media and technology tool, there's a risk that one of them will do all the work or will continuously be teaching others when they should be learning by doing. The worst flaws occur when a user is unable to operate a device, such as an iPod, tablet, or phone McKay, (2008).

2.7 Social attitude of teachers towards media and technology

According to Gagne (2005), attitude is an internal state that affects or modifies a person's decisions about their own behavior. According to Gagne (2005), the majority of the significant decisions we make in life are influenced by our mindset. An individual's inner feelings regarding something are their attitude. Here, the issue is the teachers' perceptions of students who use computers for media and technology versus those who do not. Teachers sometimes look down on classes that do not use computers since they need a lot more labor than the more contemporary method of using computers for e-learning. Instructors jump to the conclusion that students receiving instruction through the traditional manner have a bad attitude about homework.

2.8 Related studies done by others scholars to the use of media and technology learning and teaching science subjects (biology)

A learner-centered environment is emphasized in the National Curriculum Framework of 2005, which is defined as "paying careful attention to the knowledge, skills, attitudes, and beliefs that learners bring with them to the classroom." It is undeniable that "teaching is an art," and that a teacher's success comes from their ability to help students understand a difficult subject. As a practical subject, biology has some general and particular learning objectives that are influenced by social, political, and economic trends in the community. Instructional objectives were categorized by Bloom's taxonomy into three domains: cognitive, emotional, and psychomotor. While the effective domain objectives comprise appreciation, values, attitudes, interests, and feelings, the psychomotor domain objectives include skills, and the cognitive domain objectives include knowledge, understandings, applications, analysis, synthesis, and evaluation. These goals fall within the specific aim of teaching biology (McKay, 2008).

Selecting an instructional approach is influenced by a number of factors, including the setting, psychological needs of the students, and most importantly, the practicality of the plan. A few of the more widely used techniques are the Socratic or question-answer approach, the descriptive method, the observation method, the regional method, and the lecture method. The National Curriculum Framework of 2005 recognizes this and places a strong emphasis on creating a learner-centered environment, which entails paying close attention to the information, abilities, attitudes, and beliefs that students bring to the

classroom. Challenges abound in this environment of unavoidable change, and the idea of the global village in the digital era is solidly taking root. Nowadays, knowledge is widely available to everyone and is no more the exclusive domain of any one person or organization. The implementation of new technology in education is crucial to addressing this predicament. Technology and the media are the answer. Within the context of education, it encompasses mass communication mediums like radio, television, computers, the Internet, phones, and more input and output technologies. Merchant and Davies (2009).

For a long time, radio and television shows have been used in schools as supplemental instruction or as a temporary direct substitute for teachers. The widespread usage of satellite technology in education has made it feasible to use this medium effectively. One such initiative, Interactive Radio Instruction, aims to partially replace classroom instruction. Africa, Latin America, Thailand, Bangladesh, and Indonesia in Asia have all effectively adopted this (Davies & Merchant, 2019).

The computer is the driving force behind the paradigm change in education from teacher-centered to learner-centered pedagogy. Of all the subjects, geography is the one where this may be incorporated the most effectively. Numerous pre-made educational CDs are accessible. Individuals with creative sensibilities and familiarity with sophisticated drawing software, such as "Adobe Photoshop," can create presentations using stunning maps, diagrams, and images for efficient instruction in the classroom. According to Hennessey et al. (2015), it is also the most appropriate tool for self-directed learning.

The Internet is a global network of millions of computers that provides access to a tremendous amount of information. The information can be applied in a variety of ways to the delivery of classroom teaching. The easiest way to use it is to search for data, information, pictures, movies, animations, and so on. Another approach to use it is to present a topic in the classroom in an engaging way utilizing standard teaching techniques like lecture and discussion. Three primary categories of online search tools exist, including: Lookup platform: It is beneficial to conduct as many searches on www.google.com and www.msn.com as you can. (Kay, 2018).

There are many resources available, including government publications, research papers, databases, photos, films, and maps. A few very well-known websites include Wikimapia for maps, Google Earth for location searches, Google Images for photos, and others for various types of videos.

Further Internet also provides audio and video connectivity which is facilitating virtual classroom in far off places. Educational games and puzzles available online or the option to download has played a vital role in teaching school children some of the elementary concepts easily like the location of places on map. Through Internet one can contribute video to YouTube, article to Wikipedia or present messages to blog pages Davies & Merchant, (2009).

2.9 Summary of chapter

It is evident that a large number of researchers in the past have focused their studies on the use of computers as a teaching and learning aid in secondary education. Lack of computers in educational institutions and a lack of electricity are two of the many limitations they encounter. However, by expanding the number of media and technology professionals and computer specialists in training institutions including schools, colleges, and universities, some of the knowledge gaps can be filled (Chitiyo & Harmon, 2009). Since many schools are receiving assistance from donors and others are buying their own equipment, the problems can now be resolved. In order to protect against power outages, schools are required to purchase a solar system or generator. After completing this, the research methodology chapter follows, detailing the search strategy the researcher will employ.

CHAPTER THREE

RESEACH METHODOLOGY

3.0 Introduction

The study site, research design, population, and sample techniques that would be employed for the study are the key topics of this chapter. The chapter begins and ends with a discussion of the research design and the demographics from which the respondent samples were drawn at random. It then looks at the research tools that would be utilized to collect data as well as the methods for acquiring, presenting, and analyzing data. A brief analysis is conducted on the research instruments, which consist of the questionnaire and the interviews. There is discussion of data collection methods, data display strategies, and data analysis processes.

3.1 Research design

A plan of action is referred to as a research design (Murimba & Moyo, 2011). Thus, this indicates a research strategy. In its most basic form, design refers to the assembly of different research study components in order to improve the validity of a study. Survey research, both quantitative and qualitative, would be the methods used for this project. According to Cohen & Marion (2009), the survey technique is defined as the procedure of collecting data at a specific moment in order to characterize the nature of the current situations. According to Leedy (2019), a descriptive survey method can make use of interviews, questionnaires, and direct observations. By using the survey, the researcher can ask students and teachers about the usage of media and technology in the classroom and how much of it they use on an ordinary basis. This will make it feasible for the researcher to economically gather as much data as possible from a sizable population for the study (Wiesmar, 2019). Noting that the

research design is also seen as authoritative is crucial. Tuckman (2020) suggests using the descriptive survey approach to look into current conditions, prevalent behaviors, prevailing points of view, held attitudes, ongoing processes, and levels reached. Tuckman (2020) adduces that this approach contains built-in processes.

The quantitative and qualitative research designs were selected by the researcher for the study's nature. According to Given (2022), quantitative research is a methodical approach that characterizes relationships and investigates the causes and effects of many variables. Additionally, more relevant data analysis that makes data interpretation easier is a component of quantitative research. Because the quantitative approach is more objective and dependable, the researcher selected it. In highly controlled situations, quantitative research can establish cause and effect by examining the correlations between variables. Furthermore, quantitative research saves time because the researcher knows exactly what he is looking for. In this instance, the researcher was solely focused on the value of media and technology in biology education at the Ordinary level at Eastside Academy. Last but not least, the researcher chose quantitative research since it makes use of statistics to generalize findings, making them much simpler and easier to comprehend.

3.2 Target population and sample size

The target population, according to Chikoko and Mhloyi (2018), is a clearly defined set of people or other entities to whom our findings are intended to apply. Considering this definition, it can be inferred that the researcher is particularly interested in a particular group of people. A population, according to Best and Kahn (2017), is any group of people who the researcher is interested in because they share one or more traits. In this study, the term "target population" refers to students, instructors, and stakeholders like parents and the Ministry of Primary and Secondary Education (SDC). Thirty students in total make up the sample size for this research, with computers and biology serving as the practical subjects. The population that the researcher actually wants to generalize the study to is known as the target population; on the other hand, the population that the researcher has access to is known as the accessible population. It is significant to remember that a sample of the researcher's study group will be chosen. The students of Eastside Academy in Mutare were the study's target group. Owing to the sheer size of the population, the researcher employed random sampling to remove a portion of it while maintaining equal opportunities for everyone to take part in the study.

Mutare was selected as the study area due to its accessibility, as the student works there, as well as the fact that some secondary schools now have access to media and technology development work is concentrated in this part of the district. In addition, despite having abundant natural resources, large land, and beautiful geography, the community is ranked as the poorest in both the district and the province. In these circumstances, one would think that Mutare would be among the better developed areas, yet the reverse is actually true. This has led the investigator to investigate the functions of mutare and their degree of use in the study of biology at the Ordinary level.

3.3 Sampling procedures

A sample is a subset of the entire population that demonstrates the traits of the population it is meant to represent. According to Frankel and Wallen (2016), sampling is the process of choosing participants for an observational or question-based study. Through the use of a random sampling technique, teachers and students enrolled in ordinary biology classes made up the sample of the target population. Each component has an equal chance of being included in the research study, therefore selecting one component does neither increase or decrease the chances that the other components will be selected for the investigation.

3.4 Research instruments

A testing tool used to measure a specific phenomena is called a research instrument (Chawawa, 2018). A variety of tools are available to a researcher to get information from the intended audience. Interview guidelines and questionnaires were employed by the researcher. The investigator used surveys and interviews to get feedback from students, instructors, SDC, and important informants in order to compile data necessary to understand the significance of media and technology in biology education at the ordinary level. The triangulation of the necessary data from several sources was made possible by the research instruments.

3.4.1 Questionnaires

A questionnaire is defined as "a document containing questions designed to solicit for information appropriate for analysis" by Chikoko and Mhloyi (2018). Information that can be transformed into both quantitative and qualitative data can be gathered using it. According to Oppenheim (2017), a questionnaire is often thought of as a data collection tool that includes rating scales for projective techniques, attitude scales, and checklists. Teachers and students are the major informants in this study that are being targeted. Since they are the ones who use media and technology most frequently to learn biology, they will have an impact on the study's findings. The utilization of a questionnaire in data gathering is responsible for the following: respondents can finish the questions at their convenience and return them later. The expense of administration is lower. It is highly durable, allowing the researcher to analyze the data in the future. The format of the questions is standardized, making it simple to follow their flow. Because respondents complete them in their own private area, they are free from interview bias. Participants may choose to remain anonymous. Questionnaires are flexible since they can be made for a specific purpose. When using a questionnaire, there is more prejudice. It is not too difficult to gather vast volumes of data from a huge number of individuals. The questionnaire was specifically designed for teachers in this study due to their work schedules, which make it extremely challenging to interview them because they might not have time during working hours. The researcher also has obligations at work. After filling out the questionnaires, the responders returned them. The researcher distributed the questionnaires directly, outlining the requirements necessary for the study. The surveys were distributed to SDC, education inspectors, instructors, and students as key informants. Table 3.1 provides an illustration of the questionnaire response rate.

The following are some drawbacks of using questionnaires for research: responders will provide incorrect information if the questions are not well-structured. Higson and Smith (2016) claim that respondents may omit awkward or challenging topics, ruining the entire questionnaire. The researcher avoided unclear questions and utilized brief, explicit questions to guard against the drawbacks of a questionnaire. The researcher noted that it was difficult to reduce a questionnaire's drawbacks despite their best efforts. Many of the surveys that were sent out were never returned, and some vanished completely, so the presumptive drawbacks materialized.

Table 3.1 questionnaires distributed and the response rate

Respondents	Questionnaires Sent	Questionnaires Returned	Questionnaire response Rate
Learners	10	10	100%
Teachers	5	4	80%
Parents (SDC)	3	2	66.6%
Stakeholders (MPSE)	2	2	100%

Teachers and students enrolled in the Ordinary Biology course replied to the surveys and interviews. Parents of the SDC who represent the community were also sent the surveys. A total 100% of the learners' ten questionnaires were filled out and returned. Out of the five surveys given to teachers, four were returned, accounting for 80% of responses. Three questionnaires were sent to SDC, and two of them were returned, yielding a response rate of 66.6%. The Ministry of Primary and Secondary Education, on behalf of the stakeholders, received 100% of the responses.

3.4.2 Purposive sampling

The selection of individuals with specific qualities that are pertinent to the study is known as purposeful sampling (Mugambiwa, 2020). Since educators and students are the ones who see the significance of media and technology in biology education at the ordinary level, the researcher purposefully focused on them. In order to specifically target students, teachers, SDC, and education inspectors, the researcher purposefully picked a sample of expectant parents from those communities who possessed the necessary knowledge and experience. For qualitative research, the primary technique employed was likewise purposeful sampling.

3.4.3 Interviews

The shortcomings of a questionnaire are compensated for by the use of interviews. Instead than having each respondent write, the interviews in this study provide them an opportunity to speak. Interviews are described as "a face-to-face confrontation between an interviewer and a respondent" by Wiesmar (2018:275). In a face-to-face interpersonal role-playing

scenario, one person acts as the interviewer and asks another person questions intended to elicit responses relevant to the research issue. The benefits of using interviews as research tools are listed below.

Among the many advantages of an interview are the following: it is utilized when in-depth information is needed. Because more details could surface during the interview, the researcher has the opportunity to delve deeper and gather more data than they had planned. As the interview goes on, the interviewer might be able to pick up some information without making the questionnaire longer. In a one-on-one interview, challenging topics that would go unanswered in a mail or post interview can be addressed directly (Best and Kahn, 2017)

It takes a long time for the interview. In order to prevent this, the interviewer will ask concise, direct questions while also keeping an eye on the interviewee's facial expressions. The interviewer will utilize brief and targeted inquiries in order to prevent taking up other people's time. Respondents might not completely cooperate if they don't trust others with any private information they could provide. By reassuring the participants that research ethics would be followed and that the study's academic goal will be pursued, the interviewer will win their trust before the research begins (Best and Khan, 2017). The majority of respondents might perceive the researcher's interview as flawed because they are aware that the researcher works as a teacher in the nearby school.

3.7 Data Presentation and Analysis

Quantitative information was gathered, categorized, and analyzed based on the responses of specific groups of people, including parents, teachers, students, and stakeholders like the Ministry of Primary and Secondary Education. The process of coding entails locating themes within particular texts, which may include the respondents' attempts to express their views, experiences, and ideas. Data was cleaned and entered into a spreadsheet after coding before being subjected to data analysis. Error detection was done to make sure the process produced dependable results. This would guarantee the responses' internal consistency, quality control, and completeness. Because of its efficiency and versatility, Microsoft Excel was employed for data processing as well as quantitative data analysis. For qualitative data, descriptive or qualitative methodologies were applied. Tables and bar charts, two statistical tools, were used to illustrate the results or findings. In order to guarantee the validity and dependability of the

findings, this study used both qualitative and quantitative data analysis. Furthermore, it has provisions for both quantitative measurements in the form of figures and quality of life measurements.

3.8 Ethical Consideration

According to Leedy (2019), ethics are the proper conduct guidelines required when conducting research. The researcher ensured adherence to ethical guidelines throughout the study to safeguard research participants and mitigate any possible dangers. While anonymity only describes a means of maintaining secrecy, confidentiality is one of the fundamental ethical principles. By not using the research participants' actual names or personal attributes, the researcher ensured that the information they provided remained cryptic. Additionally, the researcher ensured participant anonymity throughout the study by omitting their names from the questionnaire, which encouraged the participants to have confidence in the researcher. According to Tuckman (2020), informed consent is a legal process that guarantees a research participant is aware of the goal, methodology, and duration of the study. The participant's ability to ask questions and receive clarifications was facilitated by the researcher's careful attention to providing them with all the information they needed throughout the study.

Research participants shouldn't be tricked or mislead, according to Wiesmar (2018). The investigator ensured that participants were solely informed the truth and that no dishonesty occurred. Research volunteers may be exposed to financial, emotional, physical, social, and psychological risks during the study. The investigator ensured that all research participants were protected from potential danger during and after the study. The researcher exclusively collaborated with participants who gave their consent to participate in the study; no one was coerced or made to feel under any kind of duress. Furthermore, the researcher made it abundantly evident that subjects would be allowed to leave the study at any time if they felt uncomfortable enough to stop taking part in it.

3.9 Summary of the Chapter

The methodology, which covered research design, population, sample research tools, data collection techniques, and data analysis, was the main emphasis of the study. It dealt with the

analysis and judgment. The capacity to provide pertinent, trustworthy, and legitimate results in the constrained amount of time the researcher had was the basis for the methodologies used for data collection and analysis. The data presentation, analysis, and interpretation of the research findings based on the research design and methodology will be the main topics of the previous chapter.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.0 Introduction

The analysis and presentation of the research findings were the main foci of this study. Data must be scanned, arranged, and summarized using tables and graphs. These are arranged in accordance with the factors of the developed research hypothesis. Thematic regions are used to show and analyze the research findings.

Table 4.1 below lists the strategies used in the teaching of biology to students at the ordinary level utilizing computers vs the methods used in the media and technology.

Table 4.1 Students and performance in Biology classes of Ordinary Level

Number of pupils in the class	Pupil : computer ratio	Current teaching method being used	Pupil's performance	
33 pupils	8:1	1)Exposition 2)Group work especially during practical's 3)lecture method 4)discussion	First term Second term Third term	Below average Below average Below average

36 pupils	9:1	1)Drill and practice 2)Group work for both theory and practical lessons (interface with the computer) 3)Discussion 4)Discovery learning Demonstration	First term Second term Third term	Fair Very good Very good
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Two biology teachers in form four at Eastside Academy were interviewed. There were thirty-three students in form four A1, compared to thirty-six in the other class. The student-to-computer ratio was nearly identical, with form four D1 registering an 8:1 ratio compared to form four D2's 9:1 ratio. The ratio's notable variations clearly demonstrate the scarcity of computers at the institution.

Four D1 teachers reported that they frequently employ the exposition, group work during hands-on instruction, lecture, and discussion methods in their instruction. On the other hand, four D2 instructors emphasized that, in contrast to form four D1 teachers, she primarily employed the drill and practice, group work in both the theory and practical lessons, discovery learning, and the discussion teaching approach. By displaying their work plans to the researcher, both educators demonstrated how they used these techniques. The ZIMSEC: "O" Level Syllabus Computer Studies (704) provided support for this in chapter two by stating that distinct teaching approaches are required when utilizing media and technology.

Additionally, the teachers emphasized their students' performance and even gave the researcher their progress logs and report cards. Fewer than half of the students in 4D1 performed academically below average, earning fewer than 50% of the possible points each term. On the other hand, 4D2 outperformed the other class. In the first term, half of the class passed, and in the subsequent terms, more than half of the class passed. The two teachers' differing pedagogies may have contributed to the disparities between the two courses.

4.1 Problems encountered in the teaching and learning of Biology using media and technology.

Table 4.2: Responses showing adequacy of computers in schools using media and technology in Biology

Adequate	Not adequate	Total Response
2	28	30

The media and technological resources—such as computers—that are inadequate for teaching and learning biology in Mutare Secondary Schools are displayed in the above table. Twenty-eight of the thirty students who answered the surveys indicated that they were aware of the inadequate school, and just two students said they were unaware of the deficiency. This finding may indicate that students' learning is also impacted by the shortage, particularly in practical classes where students must share computers in groups of eight or nine. This does not align with ZIMSEC (2020) criteria, which mandate that media and technology-equipped institutions make sure the facilities and equipment offered are suitable for applicants.

In some parts of Mutare, such as Danganvura, Sakubva, and Chikanga secondary schools, the inadequate use of media and technology in biology education is made worse by a lack of computers (one laptop per school) and, worse still, by a lack of power (electricity) because these schools are still satellite campuses that are located far from e-learning centers and the transmission grid. The Minister of Primary and Secondary Education in Zimbabwe initiated the full use of media and technology in all schools, according to UNESCO (2018), however isolated and rural areas would still be unable to adopt media and technology in the same way as their urban counterparts because

4.2 Learner's response on choice of media and technology teaching methods used.

The research's teachers' chosen manner of instruction has a significant impact on how media and technology are used. A selection of media and technology-based teaching strategies for biology are presented in Table 4.3. The results are summarized as follows: original data as a source.

Table 4.3: learner's response on choice of media and technology teaching methods used.

Class	Choice of teaching method	Number of responses	Total number of responses
4D1 Agriculture	Group work during theory lessons	10	15
	Discussion	9	15

According to the study's findings, students in form 4 D1 indicated that they preferred utilizing computers to study biology when they employed just two of the teacher's suggested approaches. Ten of the fifteen students in the sample size of the entire class said that they learned topics more effectively or enjoyed learning in groups when their teacher used this teaching strategy. Nine students in the class selected the discussion method, which is the other approach in which they demonstrated interest. The students in Form 4D1 selected only these two approaches. According to the findings, Skinner's assertion that "show me and I will remember and I will not forget" is backed by the usage of such interactive approaches. Thus, this result may indicate that students learn more effectively when they are actively participating in their education than when they are instructed through teacher-centered techniques.

Table 4.4 Responses on choice of media and technology teaching methods used.

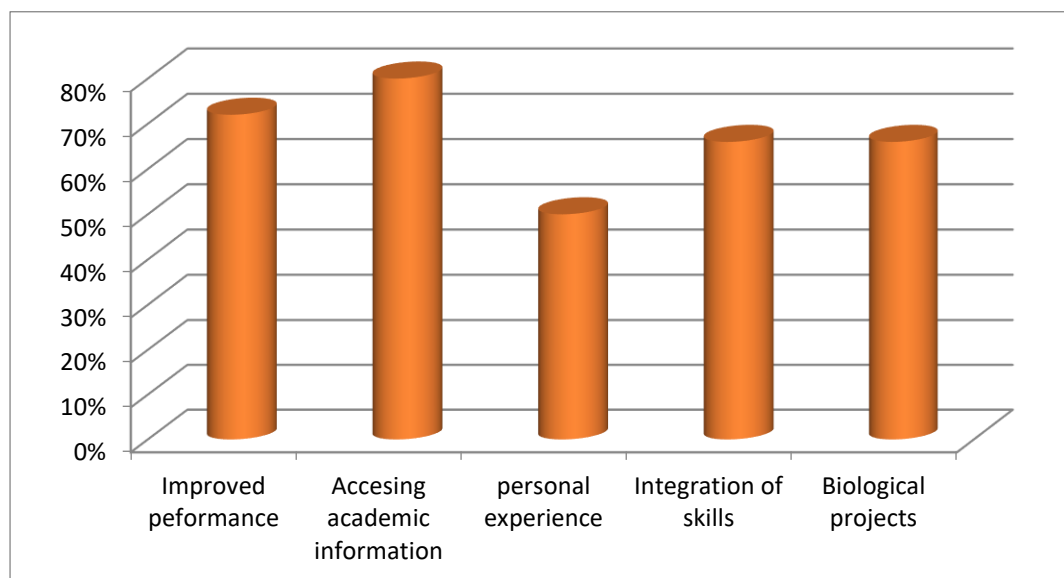
Class	Choice of teaching method	Number of responses	Total number of responses
4D2 Biology	Guided discovery	15	15
	Drill and practice	12	15
	Demonstration method	11	15
	Discussion method	15	15
	Group work method	9	15

The biology class 4D2 used a variety of instructional strategies, including group work, guided exploration, drill and practice, demonstration, and discussion. Of the fifteen students in the class, fifteen selected the guided discovery and discussion approach, twelve selected drill and practice, eleven selected demonstration, and nine selected group work. According to the teacher's reaction during the interviews, the results demonstrate that the students in this class are far more at ease with the majority of the teaching strategies that their teacher employed to aid in their learning. The majority of the teaching strategies in this class were student-centered, which may have contributed to the students' enthusiasm in them. The implementation of these strategies fosters a great deal of student participation in the learning process, which improves conceptual understanding. This is demonstrated by the students' success in this class.

4.3 Role of media and technology in teaching Biology in schools

Teachers emphasized the roles that media and technology play in biology education. They claim that using computers to simplify tasks for students and facilitates learning because they help them understand the material better and can remember it later. They even suggest creating a folder to store all the information that students may need to refer to at a later time. From the interviews, it was fascinating to learn that, in contrast to a situation without media and technology, learners can more quickly and practically understand all the concepts by using pictures and illustrations of a ruminant digestive system that show how feed moves from the stomach up to the rectum. This ultimately gets better

Figure 4.1: roles of media and technology in learning Biology at Ordinary Level.



The findings illustrate how respondents saw media and technology. Fifty percent of respondents said they have personal experience utilizing media and technology, meaning they had a lot more experience using it now than they did before. The percentage of media and technology skills that were integrated was 56%. Among the interwoven roles and talents of media and technology were those of drawing and designing. Some said that because to media and technology, they can now use Microsoft programs to create sigmoid graphs, bar charts, and even Pearson square diagrams. Since the ZIMSEC Ordinary level exams involve written projects, 60% of the projects demonstrate how media and technology are used to prepare students for these tests. In contrast to the past, when projects were completed manually, students can now use Microsoft Word for their projects thanks to media and technology. It is intelligent, tidy, presentable, and correct. Every responder thinks that employing media and technology in the classroom is the right course of action. Eighty percent of the respondents said that using media and technology to get academic content was helpful for learning biology. Students emphasized that they have access to scholarly resources on the internet via computers, including biological journals, information on scientific advancements available worldwide, previous exam questions, websites, information on agricultural research, the biology of plants and animals, as well as biological engineering and agribusiness information.

Their academic works incorporate this information to raise pass rates and enhance knowledge and abilities.

4.4 Level of use of media and technology in the learning of Biology

According to the research's findings, despite the "starry night" effect, which causes case studies to concentrate only on successful initiatives while disregarding those that were deemed to have failed or did not yield the same level of benefits from media and technology, 50% of schools have so far reached levels of media and technology learning. The degree of validity and use of media and technology in biology was found to be correlated with the ability of a teacher to carry out biological lessons, such as creating enterprise budgets and using computers to create graphs that show the growth rate of broilers from one day old to six weeks, but based on weekly measurements. In spite of the high caliber and volume of professional development, half of the students said that they were no longer as hands-on with computers as they once were, negating the high student-to-computer ratio and making them more pragmatic than they were when learning biology through media and technology. This demonstrates the efficacy of the instructor instead of the educational technology under consideration.

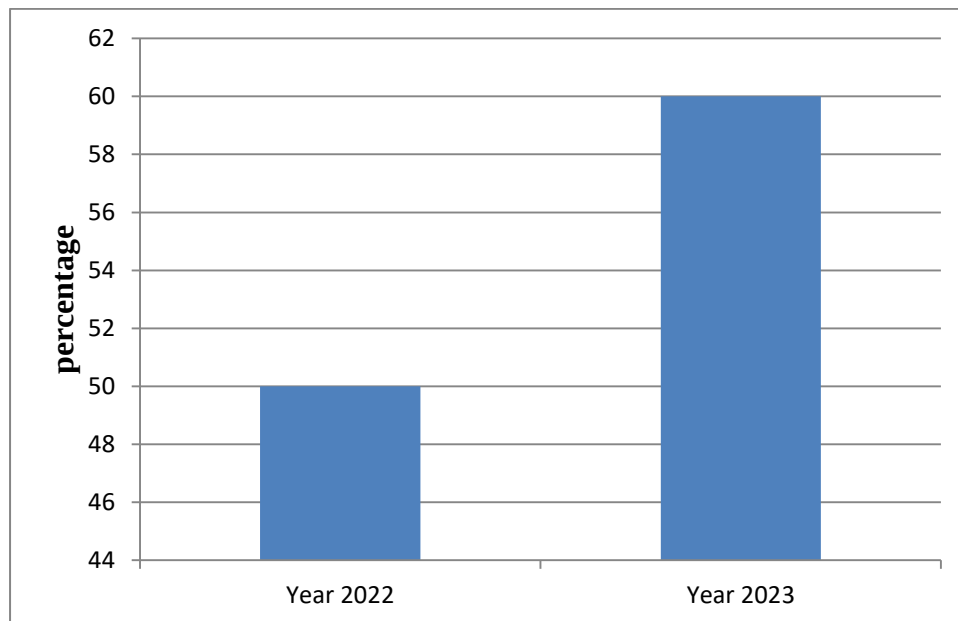
For Biology students to improve their literacy when working on projects for continuous assessment at the Ordinary level, media and technology are essential. Nowadays, ZIMSEC mandates that all proposals be typewritten and submitted. All students agree that utilizing a printer as an output device helps their work look smarter and more professional, even if they only print something out. Learners emphasized word processing, excel programs, power point presentations, and internet research as the primary functions of media and technology.

4.5 Responses on pupil's performance with media and technology learning

According to the research's findings, the teachers who were interviewed also shared their thoughts on the passing rate in biology classes since the advent of media and technology to their classrooms. In 2022 and 2023, the school also experienced a rise in the pass rate. There was a 10% increase from 2023 to 2022, when the percentage pass rate was 50%, and 60% in 2023. The same students who are enrolled in computer studies as an Ordinary level course may also be responsible for these results. The pass rate would have grown if there hadn't been

a severe computer scarcity at the school, but it is now badly impacted by the high demand placed on the few computers (1:8). This implies that the amount of time allotted to biology students might not be comparable to that of students engaged in computer studies. The % pass rate for each year is displayed in the bar chart below.

Figure 4.2 Media and technology learners performance in Biology



Given the aforementioned, the District Education Inspectors (DEI), who oversee education, report that there is a notable disparity in the pass rate of schools where information and communication technology is utilized extensively compared to those where it is hardly used at all. With the former, there would presumably be a good hidden support structure in the form of being able to discuss and practice it even after hours, as well as good explicit support structures in the form of technical support and professional development for both teachers and students. These help students become more accustomed to the concepts and strengthen their grasp of them; practice makes perfect. These results are consistent with those of Leven and Wadmany's (2018) investigation of the successful integration of media and technology in educational settings.

4.6 Summary of chapter

The data presentation and interpretation of the research findings were the main foci of the investigation. The ratio's notable divergence indicates that while there is a computer scarcity

at the school, students like using media and technology to learn biology. Additionally, students pick up new abilities and information. Utilizing media and technology helps students study more easily since it helps them comprehend the tasks at hand and allows them to save material on their laptops for future reference.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

The research findings were presented, examined, and given interpretations in the previous chapter. This chapter provides a summary of the study's research findings and offers suggestions in light of them.

5.1 Summary

The goal of the study was to determine how crucial media and technology are to the ordinary biology education in Mutare. The study's findings show that media and technology play a significant role in helping students and teachers alike understand biology as a practical topic at the ordinary level. The results of the completed questionnaires and conducted interviews made it abundantly evident that while biology is necessary to understand, its constituent parts are insufficient to address the anomaly of mutare, where its utilization is still relatively low. Secondary source literature indicates that the usage of media and technology enhances student achievement and reduces teacher workload because it offers a variety of application options. Only in biology-focused schools can universal education through the use of media and technology be accomplished through a collaborative strategy, in which media and technology content is procured and well dispersed throughout all schools to reach high levels of utilization and homogenous teaching technology. Donors can be found through the SDC's effort, empowering schools to take charge of their own future rather than being passive recipients of growth that is universally advised for all students in schools.

5.2 Summary of five chapters of the results

According to the study's findings, using media and technology in the classroom improves student learning significantly. Since this approach is sounder intellectually, it is crucial that all students use media and technology in this day and age of global education standards. According to the aforementioned facts, technology and the media increase pass rates and have no boundaries because learners may access the most recent biological knowledge and new inventions are constantly being created. In terms of how media and technology are used to teach biology, they are complementary. For example, when teachers use PowerPoint presentations, it makes their jobs easier and allows them to reach a wider audience of students than when the information is presented directly to the class. As a result of accessing additional information from the internet, learners are able to quickly understand concepts related to media and technology. This information can be presented in a variety of ways, including diagrammatical, pictorial, visual (video), audio, and word form with practical examples, as biology is a subject that is relevant to the workplace.

In Mutare, the use of media and technology in biology education is only quite high, especially in the schools that have more computers and e-learning capabilities. Schools located distant from the transmission system, where electricity is difficult to acquire, utilize extremely little electricity. When the student to computer ratio is high, the degree of utilization decreases significantly. It is not possible to improve the degree of media and technology consumption by relying on an 8:1 ratio. The use of media and technology in education creates an environment that allows students and teachers to work together more closely and increases the potential of each student's unique skills and life experiences.

5.3 Recommendations

In the view of the findings the researcher recommends that:

Therefore, it is crucial to increase the computer to student ratio by obtaining additional technology and media resources in Mutare for biology classes and emphasizing the subject's significance. Generators and solar power systems can also be used to reduce the risk of power outages. A little increase in the pass rate from year to year has also been revealed by research findings. It is imperative to raise the subject's pass rate with trained teachers so that students

will enjoy biology in general and do exceptionally in it thanks to specialized monitoring systems that adhere to international educational standards.

5.4 Areas of further study

A lot of research ought to be done on the degree of media and technology proficiency among teachers as well as the relationship between media and technology usage in classrooms and the passing rate of practical disciplines like biology. An important focus should be on how much media and technology are embraced by rural and urban schools alike.

REFERENCES

- Best, J., & Best, J. (2018). Social problems. New York: WW Norton & Company.
- Bingimlas, K. A. (201). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia Journal of Mathematics, Science & Technology Education*, 5(3).
- Chanake, C. (2017) Stragies for Poverty Alleviation in Zimbabwe; *Journal of Development Studies in Africa*.
- Chikoko, v and Mhloyi, L. (2018) Introduction to Educational Research: Module EA3D301, Harare, Centre for Distance Learning.
- Chitiyo, R., & Harmon, S. W. (2019). An analysis of the integration of instructional technology In pre-serviceteacher education in Zimbabwe. *Educational Technology Research and Development*, 57(6), 807.
- Cohen and Marion, (2019) Sustainable Rural Livelihoods; What country can we make? London: DFID.
- Creswell, J. W., approaches. Sage publications.& Creswell, J. D. (2017). Research design: Qualitative, quantitative,and mixed methods
- Davies, J. A., & Merchant, G. (2020). Web 2.0 for schools: Learning and social participation (Vol. 33). Peter Lang.
- Davies, S. (2018) Poverty Traps and Development. The Equity-Efficiency Trade; Off Revisited. Manchester: European Development Nework.

DFID, (2020) Making Work for Poor People: Building State Capacity; London: DFID.
Drenze, M. and Sen, E. (2019) The Good Research Guide for Small –Scale Social Projects;
Buckingham: Open University Press.

Ellis, D and Biggs, (2020) Evolving Theme in Rural Development 1990s- 2010s; Oxford:
Oxford University Press.

Elstad, E. (2016). Educational Technology in Schools. In Digital Expectations and
Experiences in Education (pp. 47-57). SensePublishers.

Esman, D and Upholf, H. (2019) Development Aid and Institutions of Development in
Africa; Polokwane: Churchil print.

FAO (2022) Achieving Millennium Development Goals; Rural Investment and Enabling
Policy FAD: Rome.

Frankel D (2016). ICT in the classroom: is doing more important than knowing? Education
information technologies, clower Academic publishers. Manufactured in the
Netherlands. .

Gagné, M., & Deci, E. L. (2015). Self-determination theory and work motivation. Journal of
Organizational behavior, 26(4), 331-362.

Give, J.M. (2008) Development through Good Governance: Lessons for developing
countries, Haydn, T., & Barton, R. (2007). ‘First do no harm’: developing teachers’ ability to
use ICT in subject teaching some lessons from the UK. British Journal of Educational
Technology, 38(2),365-368.

Hennessey, S., Ruthven, K., & Brindley, S. (2005). Teacher perspectives on integrating ICT into subject teaching commitment, constraints, caution, and change. *Journal of curriculum studies*, 37(2), 155-192.

Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. *Educational technology research and development*, 55(3), 223-252.

Higson M and Smith S. (2006). Globalization information technology and education. Institute for educational development and technology smart schools. Tehran, Human Development Report, (2009) African Development under spotlight; Pretoria: Mose rints.

Kahn T. (2007). The role of ICT in science education. *Cambridge Journal of Education*, Volume

Leedy, P.D. (2009) *Practical Research Planning and Design*. New Jersey, Prentice Hall.

McKay, E. (2008). The human-dimensions of human-computer interaction: Balancing the HCI equation (Vol. 3). Ios Press.

Mugambiwa, M. (2010) *The Relevancy of Policy to African Development*. Harare: Harare press.

Murimba B and Moyo C. (2011) Perspectives on technology and educational research. Lessons from the past and present. *Journal of Educational Computing Research*, 23(1), 5–14, (2003). 15.

Oppenheim F (2007). Offering conceptual model of curriculum planning based on information and communication technology and its system of assessing the appropriateness of curriculum planning programs. *Journal of curriculum studies*. third year. number one.

Oxford Dictionary (2012). The definitive record of the English language. Oxford University Press. Retrieved February, 28, 2012

Palfrey, J. G., & Gasser, U. (2011). Born digital: Understanding the first generation of digital natives.

Quay, J., & Seaman, J. (2013). John Dewey and education outdoors: Making sense of the 'educational situation' through more than a century of progressive reforms.

Springer Science & business Media.

R. Distefano Oliver.(2002). The role of ICT in higher education for the 21 century ICT as a change agent for education'',Austvatia :Cowan University.

R. Gersten . (2010). Factors enhancing sustained use of research-based instructional practices. *Journal of Learning Disabilities*, 33(5), 449–451,

Rundell, M. (2002). *Macmillan English dictionary: for advanced learners*. Macmillan.

Siemens, G.,&Tittenberger, P. (2009). *Handbook of emerging technologies for learning*. Manitoba, Canada:University of Manitoba.

Somekh B (2003). *Impact—pupils' and teachers' perceptions of ICT in the home, school and Community*. London: British Educational Communications and Technology Agency.(2003).

T. Leven and R. Wadmany (2008) . *Teachers' views on factors affecting Effective integration of information Technology in the classroom: Developmental scenery* *Journal of Technology*.

Tuckman, J. (2009) *Conducting Educational Research* 4th EDITION New York, Harcourt Brace College UNESCO (2018)

Wiesmar, W. (2008) *Research Methods in Education: An Introduction* 4th Edition; Longman.

Wikan, G., Mølster, T., Faugli, B., & Hope, R. (2010). Digital multimodal texts and their role in project work: Opportunities and dilemmas. *Technology, Pedagogy and Education*, 19(2), 225-235.

Winston, M., & Edelbach, R. (2011). *Society, ethics, and technology*. Cengage Learning.