BINDURA UNIVERSITY OF SCIENCE EDUCATION

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LESSONS LEARNT BY ORDINARY LEVEL PHYSICS TEACHERS WHEN TEACHING PHYSICS DURING COVID-19 INDUCED LOCKDOWN IN MAKONDE DISTRICT.

BY

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A PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE DIPLOMA IN SCIENCE EDUCATION (PHYSICS)

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APROVAL FORM

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LESSONS LEARNT BY ORDINARY LEVEL PHYSICS TEACHERS WHEN TEACHING PHYSICS DURING COVID-19 INDUCED LOCKDOWN IN MAKONDE

Submitted by Mangwiro Victor

In partial fulfillment of the requirements of Diploma in Science Education.

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DECLARATION

I, MANGWIRO VICTOR, declare that this thesis is my own unaided work. It is being submitted in the fulfillment of requirements of the diploma of science education at Bindura University of Science Education (BUSE).

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ABSTRACT

This study was an assessment of the lessons learnt by physics teachers who were teaching physics during Covi-19 induced lockdowns at a school in Makonde district. In order to seek answers to the research questions, this study used qualitative research designs. Qualitative data were collected using interviews and questionnaires. A total of 5 teachers were selected from one school in Makonde district. Purposive sampling was used to select physics teachers. During lockdown physics teachers improvise on the method of teaching were they posting recorded lecture, live demonstration, providing additional interactive opportunities, offering extra help session. It was recommended that schools need to be equipped with resources so that teachers will be able to conduct online lessons like videoconferencing. This can be achieved by constructing hub which is cater for online lessons only and providing them with adequate resources.

DEDICATION

This project is dedicated to my brother and my sister. I thank you for all the support I got from you, You encouraged me to be where I am today.

ACKNOWLEDGEMENTS

First and foremost I would want to give much thanks to my supervisor Dr Mudzamiri for helping me through the journey of my project .I would like to extend my gratitude to the physics teachers at Chinhoyi high school for their assistance during collection of data. I also want to thank my parents for their financial support and they motivated and encouraged me to remain focused and determined. To the people who contributed to the fulfillment of this project .I do appreciate your contribution and to you all I thank you.

Contents

CHAPTER 1

1.0 INTRODUCTION

The study of physics enables understanding of the world around us, the world inside us and the world beyond us (Gibbs, 2003). Physics provides students with the skills that they need to solve social and economic problems in their communities and beyond (Cutnell and Johnson, 2007). This chapter starts with explaining background of the current teaching methods of physics at Ordinary level lessons learnt by physics teachers teaching during lockdown periods in Makonde District at Chinhoyi High. Also it is followed by the statement of the problems, research questions and assumptions. After that, the study presents the significant of the study, limitations and delimitations of the study and definition of terms. Finally the chapter will closed by a summary.

1.1 BACKGROUND TO THE STUDY

Physics is a branch of science concerned with the nature, structure and properties of matter and it contributes to increase the economy of any country. According to Portal et al.2007, physics play an important role in many different sectors of industry such as engineering, electricity production and transmission, construction and transport. People who are in occupations that engaged physics as a scientific discipline will be employed, thereby increasing country's economy. Modern knowledge based economies are so heavily dependent on technology, thus having a better understanding of physics and technical problem solving skills will enable people to meet challenges and demands of work place (Effandi and Zanaton, 2006; Porter, Ketals and Dalgado,2007). Information Technology revolution has brought by technological advancement therefore, it is evident that any society that will be left out of this revolution risks total isolation from the global family. In addition to that, there are economic

and social benefits both to individuals who study physics and to countries whose citizens include many individuals with extensive scientific and technical knowledge.

In teaching physics online during lockdown was characterized by many problems in many schools. In Zimbabweans schools there is shortage of resources or instructional materials. According to Falade (2006) states that teaching can be only effective when there is adequate teaching resources. Learning can become effective when there is effective utilization of resources as learners wanted to gain experience in using the school equipment. Okorie (2001) said that students learning outcomes largely depend on the appropriate utilization of resources and also learners acquire skills from using the resources. These resources include buildings, internet facilities, gadgets and teaching materials among others. Facilities play a vital role to achieve the educational goal and objectives that should be engaged by the learners. Resources are important in schools because learning takes place through discovery, exploration, and interaction with internal and external environment (Abayomi and Alukaode, 2006). Therefore, there is a shift in teaching method there is a move from teacher centered to a learner centered which acquire hands on. By using hands on approach, teachers see that learners have acquired creative and critical thinking abilities ready to face the realities of life. Teachers should be able to use the method of teaching which is clearly understood by learners and the objectives will be achieved. According to Darling-Hammond and Barata-Snowden (2005) says that learners to acquire creative and critical thinking abilities, the ability of teachers to design teaching sequences that beset them in aspects that make their learning meaningful. Teachers have the ability to create meaningful classroom interaction with student through online. More so, the types of classroom interactions created by the teacher and type of questions the teacher uses to structure the teaching play an important role in the kinds of thinking skills learners employ, the range of information to be covered and the thinking skills they may learn (Smart and Marshall, 2012). In 1996, in U.S.A., the National Research Council's National Standards put forward five assumptions about science teaching, including the belief that "What students learn is greatly influenced by how they are taught" (National Research Council, 1996,p.28). On top of that there is pedagogical shift from teacher centered to learner centered instructional paradigm. Learner centered approach is involving full interaction, collective reflection and the development of knowledge would lead to improve e-learning and attainment (Stoica, and Popescu, 2011; Smart and Marshall, 2012). The availability of resources and the proper utilization in the e-classroom will increase the achievement of the learners. More so learning without the adequate resources totally demotivate the learners since the new curriculum recommended the hands on technology approach.

Besides challenges that are mentioned above there is the most problem faced by Zimbabwean schools and in Makonde District which is lack of IT gadgets. The lack of ICT gadgets has a strong bearing on the academic achievement of learners. If a particular school does not have a proper ICT learners at that school does not achieve the goal. ICT and e-learning can enhance the quality of higher education through innovation methods by increasing the students 'motivation, interest and engagement by facilitating the acquisition of skills and by enhancing teacher

training which will eventually improve communication and exchange of information. Physic teacher is a guide or a scaffold of the learners, therefore effective learning of physic is described as a type of learning in which learners take responsibility for their own learning through active construction and reconstruction of their own concept, events, experiences and phenomena (Brass, Gunstone, and Fensham, 2003).

In Zimbabwe the Science and Technology did not seem to paying dividends and doing justice to the growth of the economy against the growth of the population and at the same time proved slow in alleviating the country's developmental problems (Shizha and Kariwo, 2011) and the STEM curriculum was commenced in 2016. The deputy Minister of Higher and Tertiary Education, Science and Technology Development, Dr Gandawa, alluded that necessary skills are needed to improve the living standards of the Zimbabweans inhabitants via modern technology (Sunday Mail 14/2/16). Many policies have been designed which encompass the STEM tracts and motives such as the ZIMASSET Blue print program has been viewed as a solution to some if not all of the developmental problems hence it has been designed to start from as early as primary schools. This builds a technological immune in all pupils thus they will always stay in-line with the changing global world (Parawira, 2016).

1.2 STATEMENT TO THE PROBLEM

There is global concern about learning physics online during covid 19 induced lockdown. Physics education plays an important role in the development of science and technology which improve the quality of life of people in the country. Beside the importance of physics in human race development, this study looks at lessons learnt by physics teachers who were teaching physics during covid 19 induced lockdown periods and they are currently using them.

1.3 PURPOSE OF THE STUDY

The purpose of the study is lessons learn't by physics teachers who were teaching physics during covid 19 induced lockdown periods in Makonde District in Chinhoyi. Also the study is focusing on the solutions faced by these methods teachers were using during lockdown in the learning process.

1.4 RESEARCH QUESTIONS

This research seeks to answer the following questions:

1. What are the lessons which the physics teachers learnt in teaching and learning of physics during lockdown periods?
2. How were the teachers perceiving the lessons.
3. How can the lessons be adopted in the teaching of physics at secondary school level

1.5 RESEARCH OBJECTIVES

1. To identify lessons learnt during covid 19 induced lockdown.
2. To identify the teachers' perceptions on the lessons learnt.
3. To propose the ways in which lessons learnt can be.
4. Challenge faced in relation to lessons learnt by teachers.

1.6 ASSUMPTIONS

The respondents are going to give honest answers

Respondent are going to interpret questions on the questionnaire correctly

1.7 SIGNIFICANT OF THE STUDY

This study was an attempt to explore the lessons learnt by physics teachers in physics during lockdown. The study try to survey the actual lessons learnt through e-classroom or online teaching and learning in order to have on spot evidence about how teaching and learning of physics takes place through online lessons. Teachers will able to choose the teaching method which suit the cognitive level of learners. Teacher can plan fully on how to deliver information to the learners which in turn allow the participation of the learners. Teacher use the study to improve their teaching method so that the teaching and learning of physics online will be fruitful.

1.8 LIMITATION OF THE STUDY

The respondent fail to interpret questions on the questionnaire as they are written in English which may be a barrier.

The respondent may fear of known to give honest answers.

The school under study may have different challenges.

1.7 DELIMITATIONS OF THE STUDY

Even though the study was focused on the lessons learnt by physics teachers in Makonde district but only one school was selected to provide the physic teachers. The study will involve many physics teachers to be interviewed. The school that is chosen is the nearer to the researcher. The researcher only use three method of data collection which are observations, interviews and questionnaires

1.8 DEFINITION OF TERMS

Teaching- is a system of action, involving an agent, an end view and a situation (Smith, 1969).

Learning- is a process of acquisition of knowledge by an individual.

Challenges- the oxford dictionary define a challenge as a call to someone to participate in a competitive situation but in this research challenge is a problems that could be a barrier for the achievement of the goals in the learning process.

Physics- a subject that deals with fundamentals of the structure of matter and its motion through space and time along with related concepts such as such as energy and force.

Instructional materials- these are resources used in teaching and learning of a subject

Online lesson-is a course conducted over the internet.

1.9 SUMMARY

This chapter was exploring the background to the study and the statement of the problem. The chapter also mentioned the research questions, assumptions and significance of the study. Limitations and delimitation of the study were discussed in this chapter. Finally definition of term were highlighted and the chapter was closed by a summary.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This Chapter will examine many literatures written by other physics researchers and educationist on the lessons learnt by teachers who were teaching physics during the Covid19 induced lockdowns. And related situations. Also the chapter looks at literature related to the teachers' perceptions on the lessons learnt and ways the learned lessons by teachers can be effective to during hard times of covid19.

2.2 LESS0NS LEARNT IN RELATION TO THE RESOURCES USED DURING INDUCED COVID 19 LOCKDOWN FOR THE LEARNING PROCESS OF PHYSICS.

During induced Covid 19 lockdown periods physics teachers tend to use online lessons, so there are so many resources used to make e-learning effective. Understanding of the subject result from using necessary resources and effective learning will be noticed. There are many lessons learnt in relation to resources used during covid 19 which are needed in the teaching and learning of physics online so as to promote learners achievement in the subject. Text books are another resource which promote teachers in their teaching and learning process. Teachers learnt that they should upload textbooks for their classes on the internet so that students can access textbooks online. Text books help teachers and learners to understand the scientific concepts.

Also during the induced Covid 19 lockdown the physics teacher learnt that the most important resources they learnt is the use of ICT tools. ICT can be defined as anything which allows us to get information, to communicate with each other, or to an effect on the environment using electronic or digital equipment. The use of ICT tool is associated with many advantages. According to the presentation done at recently ended conference held at Bindura University of science education, use of digital technologies has increase digital teaching and learning practices amongst Zimbabwean schools. Teachers and learners benefit from using digital tools and these are advantages of digital teaching and learning where outlined during the conference and these were: improve students' motivation from engaging content and game based strategies. Digital teaching and learning allow distance learning creating new opportunities

worldwide. It allowed students to progress at their own rate. Digital teaching and learning also promote individualization and customizing learning by level and modality.

All in all instructional materials are useful in the learning process of physics online during lockdown. Momoh (2010) conducted a research on the effects of instructional resources on the students' performance in West Africa School Certificate Examination (WASEC). He correlated material resources with academic achievements of students in ten subjects. Momoh (2010) concluded that school resources have important role in teaching and learning of each subject. Resources facilitate the learning of abstract concept ideas, keep learners busy and active thus, increasing the participation in the lesson.

2.3 LESSONS LEARNT IN RELATION TO TEACHING METHODS USED BY PHYSICS TEACHERS DURING INDUCED COVID 19 LOCKDOWN.

Physics education allows learners to acquire problem- solving and decision making skills that provide ways of thinking. Physics is an important subject which is advised by the ministry of education to be done by most learners to improve socio- economic of the country. Therefore this study is going to investigate into lessons learnt by physics teacher who were teaching physics during lockdown.

These physics teachers during hard times of covid 19 lockdown they learnt that they can use constructivism as a method of teaching whereby they share information from one person to another. Constructivism is characterized by the view that knowledge is transmitted directly from one person to another, but is actively build up by the learner (Cobern, 1998; Driver et al 1994). Cobern (1998) believes that constructivist classroom is the one in which people are working together to learn. Constructivist classroom is learner centered environment which acknowledges and brings to the fore the past experiences of students (Conner, 2014b). In the constructivist classroom learning is reflective, interactive, inductive and collaborative and questions are valued as a source curiosity and focus for finding out information. Conner

(2014b) says that in constructivist classroom teacher acts as a facilitator or a mediator of learning rather than someone who only takes the role of imparting knowledge.

In teaching and learning of physics, teachers learnt that they should use the theories of cognitive development where by students can work as a group online while sharing information Cognitive development theories (Piaget, Vygotsky and Brunner) have been implemented in different instructional models in learning environmental. Piaget indicated that social interactions create disequilibrium to encourage growth in knowledge. Piaget emphasized that constructed their own knowledge through the process of adaptation and assimilation (Eggen and Kauchak, 2013). According to Piaget social interactions can reinforce this mechanism but it is the learner themselves who play the major role in developing their knowledge. Vygotsky promoted the dominant influence of social interactions. Vygotsky said that social interaction leads to continuous step by step changes in learners thought and behavior that can vary greatly from culture to culture (Hoy, 2010). Vygotsky believed that when learners interact with peers they can actively participate in dialogues, discover how others think about their experiences and then incorporated the way others interpret the world into their own way of thinking. By this way, learners are able to develop their own knowledge towards more complex and sophisticated structures (Eggen and Kauchak, 2013 Hoy, 2010). The principle of progressing towards a higher level of thinking process has two prominent application which spiral curriculum and discovery learning. Cahyadi (2007) spiral curriculum is when the concepts are developed from a simple form involving concrete objects and experience to a high level of abstraction and discovery learning is where learners work together from examples to find general principle on their own. The ideas in the cognitive theory are in line with constructivism in the sense that learners construct their own knowledge for a better understanding rather than knowledge being transmitted by someone else. Constructivist theory is more related to the instructional methods as it encourages learners use of active techniques for example experiments, real world and problem solving skill to create knowledge (Keser et al., 2010). Cognitive Apprenticeship model advised that learners should be exposed to the teaching methods that allow students to observe, engage in and discover expert's strategies in context (Berryman 1991). The teacher must be a scaffold or a mediator.

The interactive teaching approaches which are supported by constructivism theory and cognitive development theory are peer instruction, photonic explorer and visual interactive computer software programs. Peer instruction is a widely used pedagogy. It engages learners in the class through activities that require each student to apply the core concept being presented and then explain those concepts to their fellow learners. Unlike the formal practice of asking questions during lesson which typical engages only a few highly motivated student. Peer instruction structured question involve all learners in the lesson (Crouch and Mazur; 2001). Lasry et al. (2008) measured learners' conceptual understanding of Newtonian mechanics using the force concept inventory in both peer instructor and traditional courses at John Abbott College and Harvard University. The results showed that peer instruction taught students demonstrated better conceptual learning and similar problem solving abilities than traditionally taught students.

Photonic explorer is another teaching method which is specifically designed to cover the topics that are in the curriculum in order to help the teacher and student to achieve the educational targets- the use of hand on experiments in an inquiry- based learning context (Cords et al., 2012). The photonics explorer projects offer well prepared resources which help the teacher to make the use of time (Cords et al., 2012).

Visual interactive computer software program is another teaching method which helped learners to understand the main concepts of the phenomenon. It can be used at any curriculum by anyone and helped the learners to develop conceptual understanding of complex ideas with problem solving in Physics Education Technology (PhET) (Wieman et al., 2008). All the interactive approaches mentioned above aim to encourage learners' interaction in physics classroom and to focus student attention on fundamental concepts. Learners were active in the lesson through these interactive teaching methods are likely to improve learners understanding of physics concept (Cahyadi, 2007; Lasry et al., 2008; Mazur and Hilborn, 1997; McKagan et al., 2008).

2.4 LESSONS LEARNT IN RELATION TO CHALLENGES FACED BY TEACHERS DURING INDUCED COVID 19 LOCKDOWN IN TEACHING OF PHYSICS ONLINE.

Teaching physics during covid19 induced lockdown is associated with many challenges that affect the achievement of physics. The researcher is going to explore the lessons learnt in relation to challenges they face during covid19 lockdown in teaching physics. Lack of instructional materials or resources is the most challenges that are associated with teachers in their learning process. Resources are important in the sense that it helps the teacher to clearly deliver the information to the learners for clearly understanding the concept. For example shortage of text books is another challenge faced in the learning process of physics. If there is lack of online textbooks, teachers and learners do not understand scientific concept. According to Yore (1991) textbooks continue to have a high profile as they have a considerable influence on what and how teachers teach and on what and how students learn. There is a challenge faced by many African schools especially Zimbabwe, there is shortage of qualified. If teacher don't have the skill to scientific resources poor results will be produced. Unskilled workforce will determine the failure or pass of the learners. Qualification and skilled of the teacher help choose the methodology which suit the cognitive level of learners. Okwori (2006) asserts that expertise in technical, mechanical managerial, social and other areas potentially availability for utilization constitutes human resources so teachers learnt the importance of qualified personnel. Also these physics teachers learnt that in developing country such as Zimbabwe have poor economic standards some schools does not afford to by electronic gadgets for e learning thereby reducing the creativity of learners as they do not know how to use internet.

2.4 POSSIBLE SOLUTIONS

Ministry of education and teachers were accompanied to find the solutions to overcome lessons learnt in relation to challenges that were faced by teachers who were teaching during induced covid 19 lockdown in the learning process. In the issue of shortage of qualified science teachers, BUSE is now training the science teachers even online to improve the knowledge of learners in the sense that qualified teacher can use his or her creativity to improvise when there is shortage of resources. Therefore teacher use local and cheap resources as instructional material so that learners clearly understand the concept. Improvisation is an act of designing a replica of standard equipment to play the role it is designed for hence understanding of learners will be promoted.

There are two types of assessment which are summative and formative assessment, therefore it is the duty of the teacher to choose the method of assessment which match the intended purposes. Formative assessment is diagnostic in nature (Black, 1998) since it is intended to provide teacher and learner with feedback about teaching and learning process. The results from formative assessment inform the teacher about students' performance abilities in the teaching and learning process and teacher use the information to reform his or her teaching (Atkin et al., 2001; Conner, 2013; Shepardson and Britsch, 2001). Summative assessment is specifically type of assessment provide information for certification, qualification, promotions and accountability purposes (Atikin et al., 2001; Black, 1998; Black and Wiliam, 1998), whereas formative assessment involves participation and close relationship between teacher and learners (Hackling et al., 2001). Therefore, classroom assessment mostly requires the use of multiple assessment sources (Shepardson and Britisch, 2001) so that teachers ought to be skillful at using various strategies and tools.

2.5 SUMMARY

The chapter reviews the numerous literatures about lessons learnt in relation to resources, teaching methods, challenge**s** faced and used during induced covid19 lockdown in teaching and learning of physics and finally possible solutions to challenges.

CHAPTER 3

METHODOLOGY

3.0 INTRODUCTION

This chapter discusses the methodology and explanation of the research design, target population, sampling techniques used in data collection and data analysis. The instrument that will be used in data collection will also be discussed. Procedures of data collection, data presentation and analysis will also be outlined. The chapter will be closed by summary.

3.1 RESEARCH DESIGN

Leedy (1997:195) defines research design as a plan for a study, providing the overall framework for collecting data. Mac Millan and Schumacher (2001:166) define it as a plan for selecting subjects, research sites, and data collection procedures to answer the research questions. They further indicate that the goal of a sound research of a sound research design is to provide results that are judged to be credible. A research design constitutes a blue print for the

collection, measurement and analysis of data. It is very clear from the above information that a researcher must carefully choose the research design so that the results, conclusions and recommendations made from the research may be valid and reliable to the reader since the method affects the results. The objectives and purpose of the study and the nature of a problem may help the researcher to choose an appropriate method that addresses the problem.

A descriptive research design was used in this study. In this study, the researcher was tried to investigate and describe the lessons learnt by physics teacher who were teaching physics during lockdown. Descriptive research design was appropriate in the designing of study in the sense that it concerned conditions that exist, practices that prevail, processes that are going on, attitudes that are held or trends that are developed (Best 1970).

This research was both qualitative and quantitative in nature. This was the only way found the by researcher to minimize or reduce weaknesses of using one method hence improving validity and reality of the results (Carvalho and White, 1997). Also mixed method allow the researcher to use qualitative work to identify the issues or obtain information on variables that not obtained by quantitative surveys. Mixed method generates hypotheses from qualitative work to be tested through the quantitative approach there by providing more insightful understandings. The researcher verifying or rejecting results from quantitative data using qualitative data (or vice versa). The research was qualitative in the sense that it carried out in its natural setting and the use of words in the description of results. In the same research there was the use of numbers which determine it's quantitative in nature. The researcher started by assessing teacher's inventory to observe the availability of teaching resources. Then it was followed by marking observations. The professional documents were used to observe common teaching methods that are used by teachers. After observation made, the researcher interviewed the physics teachers.

3.2 POPULATION

In this study, the population involves all teachers who were teaching physics during lockdown in Makonde district in Chinhoyi. There are more schools that are offering physics in Makonde district at O level. Only one school was chosen to be the targeted population. Five physics teachers were used. There were five physics teachers and two physics teachers were female teachers and three were male teachers.

3.3 SAMPLE AND SAMPLING PROCEDURES

The researcher used one of the probability sampling methods which was simple random sampling. As with all probability sampling methods, simple random sampling allows the sampling error to be calculated and reduces selection bias. Also it is the most straightforward method of probability sampling and it is easy to understand. Purposive sampling is non-probability sampling. It is also known as selective or subjective sampling. This technique relies on the judgment of the researcher when choosing who to ask to participate. Judgment sampling is time and cost effective to perform whilst resulting in a range of responses.

3.4 INSTRUMENT USED TO COLLECT DATA

Researcher used three instruments to collect data which were questionnaires guide, interviews guide and observations.

3.5 INTERVIEW FOR TEACHERS

Kumur.S,(2010) define an interview as an act of people's reaction and feeling of issues they have experienced. Interviews demands oral communication between the researcher and respondent. The interview is an important data gathering technique involving verbal communication the researcher and the subject. According to Mays and Pope (2000) types of interviews are structured, semi structured and unstructured interviews. In this research structured interviews were used. It was a face to face interview. Face to face interviews are very labour intensive, but can be the best way of collecting high quality data. The researcher used this type of interview because it offers a greater degree of flexibility compared to other methods of data collection. There is high probability of correcting misunderstanding questions. Also the interview can able to clarify the questions so that the respondent can get the sense of the questions (Pascual, 2017). Also the researcher was able to follow up on new ideas in a way that was not possible with other methods. Demands of the interview were about teacher qualification on teaching physics online. Teacher's experience in teaching, common methods of teaching physics online and availability of resources in teaching physics online.

3.6 OBSERVATIONS

Observation has been documented as a tool for collecting data in many years ago and is the systematic description of the events, behaviors and artifacts of a social setting (Marshall and Rossman, 1989). Observation produced rich data and also allowed the researcher to be the leader of the group. Therefore lessons learnt in relation to challenges faced in Makonde district schools were observed through teacher's record of marks, teacher's inventory. The researcher observes the physics resources, methods of teaching and whether the environment was conducive to learning or not. The major advantage of observation is that it collect data where and when an event is happening and it does not rely on people's willingness or ability to provide information Taylor et al (1996)

3.7 PROCEDURES OF DATA COLLECTION

In this study triangulation format was used to collect data. Triangulation is an attempt to map out, or explain more fully, the richness and complexity of human behavior studying it from more than one standpoint (Kennedy and Patrick 2009). Triangulation facilitates validation of data through cross verification from more than two sources. According to Carvalho and White (1997) said that triangulation is not about validation only but about deepening and widening one's understanding. It can be used to produce innovation in conceptual framing. Yin (2003)supports by said that triangulation help the researcher to investigate whether the data collected with one procedure or instrument is similar to that collected using another different method. This ensures high probability of validity and trustworthy of the obtained data. The researcher triangulated the results from questionnaire, interviews and observation. The researcher started by administered questionnaires then interview for physics teachers.

3.8 DATA PRESENTATION AND ANALYSIS OF PROCEDURES

The researcher used bar graph, frequency tables to present data. Qualitative data was presented in words which were the responses from the interview question that were asked to the physics teachers.

3.9 SUMMARY

This chapter summaries the research design as a descriptive survey using O level physics teachers who were teaching physics during induced covid19 lockdown at Makonde district school. Questionnaire, interviews and observations are instrument used in the collection of data. Targeted population, sample and sampling techniques were also stated.

CHAPTER 4

4.0 DATA PRESENTATION AND ANALYSIS OF RESULTS

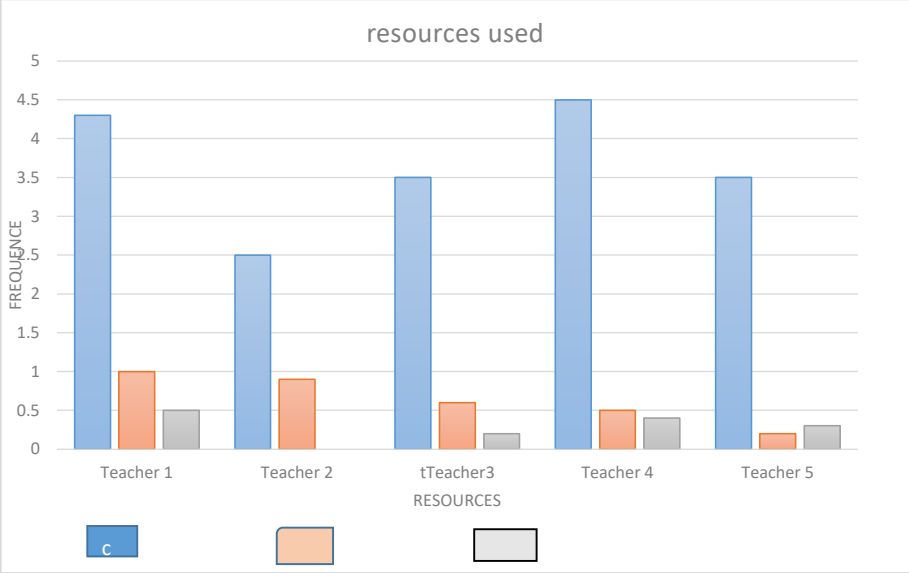
4.1 INTRODUCTION

In this chapter the researcher was concentrating on the presentation of data obtained using the above mentioned data collection instruments.

4.2 RESOURCES FOR THE LEARNING OF PHYSICS DURING COVID 19 INDUCED LOCKDOWN.

Data from research tools were triangulated and pooled together to answer the research questions. Data was collected from 5 teachers. Teachers done the interview and finally the researcher done his research.

The diagram below shows the resources that was used at the school by teachers. The availability of the major resource from the school will be presented on the histogram below which is fig 4.1



Major Resources fig 4.1

Commented [e1]:

The results on the histogram indicated that there was a crisis on school resources. Most physics teachers learnt that they do not have enough resources during induced covid19 lockdown. The researcher noticed that teachers were not doing hands on approach due to unavailability of resources.

From the graph, the blue represents smart phones, brown also represents television or laptops and finally grey represents whiteboards. All five teachers' shows that they all have smart phones also these teachers have laptops and teacher 1 and 2 mostly are the ones who mostly uses laptops as compared to other three teachers. Finally teacher 1, 3, 4 and 5 they all have whiteboards which they use during induced covid 19 lockdown to workout examples while projecting the lesson, teacher 2 did not use or didn't have the whiteboard. So the results from histogram shows that there was no adequate resources at the school.

4.3 TEACHERS' VIEW FROM INTERVIEWS

Teachers' interview were questions which was about availability of the learning resource. The responses were coming from five selected physics teachers. The questions were listed down and teachers give the responses of each and every interview questions. Teachers indicated that they don't have much access to internet therefore do not do their own research. Teachers try to fig out the importance of internet at school even at home as she said absence of internet reduce interest of the subject since now day learners learn by seeing. Also teachers improve in using computers in science lessons online. One teacher out of five teachers learnt that some of the equipment are available at school but lack of knowledge on how to use it on doing physics online. Teachers' responses indicated that internet is very important at school especially in physics lesson in the sense that student can do their physics research on their own and come up with their solutions. Due to use of computers teachers become creative and logical thinking to solve their problems.

4.4DATA FROM OBSERVATIONS

It was observed that most of the school don't have well equipped materials for conducting online physics lessons during lockdown. Also physics teacher are over utilized because there are few qualified physics teachers. Also from the results observed above, teachers learnt that there was inadequate resources at the school so that they can conduct online lessons like teacher 1 did not have the whiteboard at all and all physics teachers have mostly a smartphone so the smartphone was the main resource which was there at the school.

4.4 TEACHERS' VIEW ON

The researcher gave interview to teachers on teaching methods and it was indicated from teachers' responses that most of teachers used Whatsapp method. Also they use pre-recorded method which promote visualization for every student. It was noted that the most methods used by the teachers in their physics lesson during covid19 lockdown do not allow student to interact as they were to send only feedback to the teacher. Especially lecture was not recommended by the ministry of education because the method seems learners as an empty vessel thereby not promoting curiosity to the learners. Videoconferencing, pre-recorded notes and constructivism were not much used in the learning process but these methods were recommended by ministry of education because they allow learners to think outside the box.

4.5 DATA PRESENTATION AND ANALYSIS FROM OBSERVATION

The observations were made different towards the teaching methods that were used by the teachers. The researcher used schemes of work and lesson plans to identify methods used at school as shown at the table below.

Teaching Methods	
Pre-recorded videos	It was pre used the first month and during practical lessons.
Email	Didn't used it at all
Video conferencing	They tried but was not successful
Whatsapp	Frequently used platform because every student managed to have the gadget and is a cheaper way.

Table 4.1 showing observation file at school

It was noticed that the school used the whatsapp method. In each and every scheme of work and in most lesson plans whatsapp method was used and videoconferencing was only used when there is an experiment. Videoconferencing was rare used at school because it is expensive method to use regularly. Whatsapp method was most used because there was shortage of resources. It results in poor performance of learner since whatsapp method did not acquire learners' participation. Constructivism was not used at all.

From the observation above the physics teachers learnt that email can assist students with literacy and language learning using mail exchange and online writing exercises. The authentic learning provided by collaboration with peers get students excited about school. When students use email it can also increase motivation through self-directed and collaborative learning. Also

4.6 DATA PRESENTATION AND ANALYSIS OF TEACHER'S VIEWS FROM INTERVIEW

Most teachers indicated that there was a lack of instructional materials which made the concept clear and easy to be understood by learners. Also there was lack of qualified teachers which lead the overutilization of the available teacher.

4.7 DATA PRESENTATION AND ANALYSIS FROM OBSERVATION

The researcher observed that at the school there was a problem of shortage of qualified physics teachers and resources for online lessons. The researcher observed that physics resources for online lessons are too expensive therefore the school cannot afford to buy it. This can force the teacher to use whatsapp method for example there is no touch pads at school so teacher can't do a videoconferencing almost every day to demonstrate during practical times.

4.7.1 POSSIBLE SOLUTIONS

For the analysis done by the researcher into lessons learnt by physics teacher who were teaching physics online during lockdown. The researcher indicated that they need adequate instructional materials that are able to be used during online learning process of physics. To do physics online there is a lot needed by both teacher and learners like touch pads, creation of email addresses even data so that lessons will be effective. Also there was shortage of internet bundle for school and learners the government should provide these services for free to schools

and pupils. . On the issue of qualified teachers, government should keep on training the science teachers with knowledge on how to teach physics online like being done at Bindura University of Science Education so that the overutilization avoided.

4.8 DISCUSSION OF FINDINGS

The findings obtained were very much related to the literature reviewed in the sense that other literatures said that there were no adequate resources and and trained personnel who are able to teach online. This indicated that most schools in Makonde district indicates that there are not well equipped. The researcher observed that the schools allocated to be paid cannot afford to buy science equipment since the equipment were needed in large quantities and they are too expensive. According to Oyeniran (2003) laboratory equipment provides students with an opportunity to see and make observation of what they are taught. Laboratories are one of the important instructional materials which are needed to make understanding of learners easier. Isola (2010) supports this by said instructional materials are the objects or devices which help a teacher to make a lesson much clearer to learners. Physics teaching should include more student interactive approaches. One notable feature of these approaches is providing an environment where students are motivated to construct knowledge by themselves, rather than knowledge being transmitted to them by their instructor as in traditional approach(Hake; 1998). For example, according Soko et al. (2007) demonstration is designed to engage students in the learning process by converting the usually passive-student lecture and recipe lab environment to a more active one. Other literatures noted that lack of instructional materials affects the performance of students. Hassana noted that school resources are lacking in learning process which caused learners to be demotivated by the subject and learners and up

drop the subject. Teacher used limited teaching methods that do not promote understanding of learners therefore, Angels (2004) argues physics requires learners to employ a variety of methods of understanding.

From the teachers' interview indicated ICT was not used in physics lessons to both learners and teachers.

4.9 SUMMARY

The chapter summarized as it looked on data presentation and analysis of tool used to find data and finally closed by a summary.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMANDATION

5.1 INTRODUCTION

The chapter was looked on the summary of the whole study, give the conclusion about the research findings and analysis. The chapter also looked on discussion done in chapter 4 and the recommendation on how to overcome the problem.

5.2 SUMMARY

The researcher was tried to investigate into lessons learnt by physics teachers in teaching and learning of physics online during lockdown in Makonde district. Chapter 1 was about the background of the study, statement of the problem, research questions, and assumptions significance of the study to teachers. Also the chapter looked on limitations of the study, definition of terms and closed by summary. Chapter 2 was about literature review written by

other researchers on lessons learnt in relation to challenges faced in the learning process of physics. Chapter 3 looked on the methods used to collect data. These methods are questionnaire, observations and interviews. Descriptive survey was used in this study the results found indicated that most of schools have inadequate school resources. Also qualified teachers are very few in the district and these teachers were not using interactive teaching approaches also there were shortage of resources. Chapter 4 looked on data presentation and analysis of data using tables and bar graph. Finally chapter 5 looked on the summary of whole study. Conclusion and recommendations are looked in this chapter.

5.3 CONCLUSION

The research was done on one school in Makonde district. It was noted that many lessons learnt in relation to challenges affecting online learning process of physics at O level and the challenge are coming from shortage of school resource and the teachers learnt a lot. Teachers end up using posting recorded methods because there was a shortfall of instructional material in school. Also there was shortfall of qualified teachers to who lacking technological support therefore some were have the skill to improvise in their lessons.

5.4RECOMMENDATIONS

The researcher recommends the use of interactive approaches so that learners will be motivated by the subject in their learning process. As it was indicated in chapter 4, that most teachers use whatsapp methods are not promoting high quality education. Also most teachers

do not use e-learning style due to absence of internet in the school. On the shortfall of qualified teachers, the researcher recommends that universities and colleges must train many science teachers on technology like currently use of internet and they will be able to improvise. The researcher recommends the STEM program to continue so that each and every learner access to ICT learning which motivates learners thereby increase performance of learners. Researcher recommends that science teacher should go to workshops and conference so that they will be updated on different changes that happen in learning process.

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APPENDICES

CATEGORY 1

INTRODUCTION

Mangwiro Victor is my name l am a student at Bindura University doing Diploma in Science Education (Physics). I am carrying out a study investigating lessons learnt by physics teachers who were teaching physcis online during lockdown.I am kindly seeking for your help in doing this study. Thank you in advance for your cooperation.

Category 2---availability of learning resources

KEY

1-agree. 2 strong-agree. 3- Strong disagree. 4 -disagree. 5 agree

1. Availability of online gadgets
2. Are you able to do to teach online
3. Frequency use of computers
4. Access to the internet
5. Availability of qualified teachers

Category 3---- teaching methods

1. Pre recorded lessons
2. Videoconferencing
3. Email
4. Discovery learning

Appendix 2: Teachers' Interview Questions

Category1

1. Is teaching physics online possible.
2. What challenges did you face when you adopt from face to face to online
3. Which method is suitable for you to deliver good lesson for students to understand.
4. Did you do an educational tour for online lessons.
5. Are students able to adapt for online lessons?

Category2 –learning resources

1 Are online resources there at your school?

2 What are the most used teaching methods at your school?

3 Do you have computers in teaching and learning of physics?

4 What lessons do you draw from these resources used during induced lockdown?