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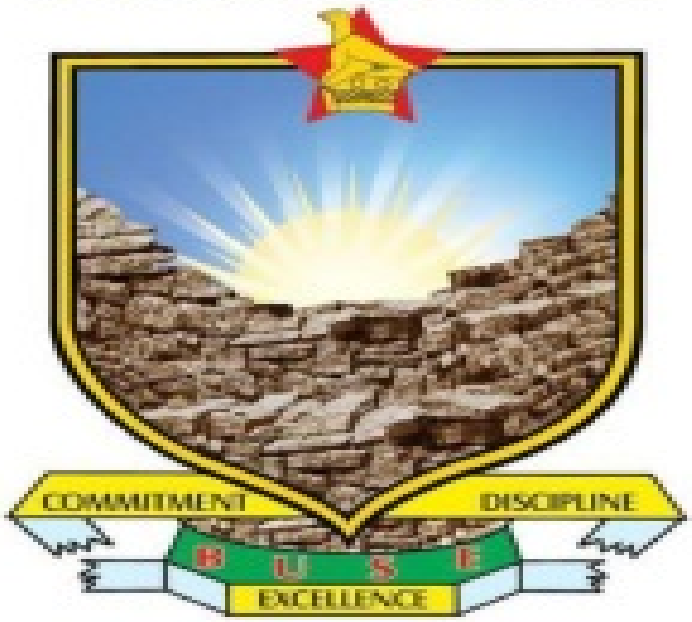

AN ASSESSMENT INTO THE FACTORS THAT AFFECT THE TEACHING AND LEARNING OF PHYSICS ORDINARY LEVEL IN CHEGUTU DISTRICT

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A RESEARCH PROJECT SUBMITED TO THE DEPARTMENT OF SCIENCE AND MATHEMATICS EDUCATION IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE BACHELOR OF SCIENCE HONOURS DEGREE IN PHYSICS EDUCATION

DECLARATION FORM

I RICHMAN MUTUNZI, declare that this research project is my original work and affirm that it has not been submitted to or any other university before, in support of any other qualification.

Signed RMutunzi Date 14/06/24..

Supervisor

I Dr N Zezekwa declare that I have supervised this thesis and I am satisfied that it can be submitted to the faculty of Science Education of Bindura University of Science Education.

Date 14/06/24

Signature

Chairperson _____ 16 /10/24 _____

Acknowledgement

Firstly, I would like to thank the almighty God for the grace and strength throughout the course of my studies. I would like to extend my sincere gratitude to the following individuals for their unwavering support throughout the course of the research, my mother was always there spiritually and emotionally, my family and friends who made it possible cheering on up to the end. God bless.

Dedication

This research is dedicated to my father Mr. P Mutunzi who died during the course of the research, I will always love him and cherish him.

ABREVIATIONS

DSI- District Schools Inspector

MOE- Ministry of Education

ZIMSEC- Zimbabwe School Examination Council

CBC- Competence based curriculum

ABSTRACT

This study investigates the multifaceted factors influencing the teaching and learning of physics at ordinary level. Utilizing the mixed method approach, data were collected through surveys, and interviews across five schools in Chegutu district. Key findings indicate that both intrinsic and extrinsic factors play a significant role. Intrinsic factors include student interest, cognitive abilities and prior knowledge whilst extrinsic factors encompass teacher expertise, teaching methodologies, availability of resources and institutional support. The study reveals a notable correlation between teacher qualifications and student performance highlighting the critical need for continuous professional development for educators. Moreover, the availability of practical equipment and modern teaching aids was found significantly enhancing student engagement and understanding. These results underscore the importance a holistic approach in addressing the challenges faced in physics education at ordinary level. Future research should explore tailored innervation strategies to optimize teaching practices and learning outcomes in diverse educational settings.

Contents

CHAPTER 1

1.0 INTRODUCTION

The chapter discusses the problem to be studied in the research by looking at the following areas: the background of the study, the statement of the problem, the objectives of the study, the research questions, justification of the study, significance of the study, scope and limitations of the study, the assumptions of the study, limitations and delimitations of the study.

1.1 BACKGROUND

The study of physics is crucial to understanding the world around us, the world inside us, and the world beyond us (Gibbs, 2003). In many respects, physics is the most basic and fundamental natural science - it involves universal laws and the study of the behavior and relationships among a wide range of important physical phenomena (Cutnell & Johnson, 2007) It is a dream of almost every kid to want to pursue physics as a subject. This is due to the various careers associated with the subject such as engineering. Zimbabwe is a developing country which still lags behind in terms of infrastructure and technology. There is still a lot to be done in order to be at par with some other nations such as South Africa. Since we are still to develop it is of a great idea that our curriculum is rich with content that would lead us to a rapid growth since we will have our own expertise. Physics therefore connects students to such noble careers that would see us through. A lot of research have been done on why students shun physics, use of ICT in physics, issues like how education of teachers affect quality of students in the classroom etc. All these were to try find ways to promote the subject area which is a very good idea. Few students pursue physics due to the myriad reasons that have been brought up by previous researchers. In recent years the government of Zimbabwe has made several efforts to expand the education system by

building schools in marginalized areas and disadvantaged urban centers. This expansion has also been accompanied by an acceleration in teacher training.

However, despite these efforts there are still factors affecting the teaching and learning of physics at ordinary level. There is nowhere physics will be successful without looking deeper into socioeconomic factors. For many years, failures in physics has been associated with many factors, for example socioeconomic and language background factors. However, there is increasing evidence to suggest that teacher and teaching quality is a prevailing predictor of students' achievement (Darling-Hammond, 2000, 2006; Darling-Hammond & Baratz-Snowden, 2005; Ell & Grudnoff, 2013; IEA, 2012). The background of most of the learners have made the subject to crumble since its resulting in lack of the adequate resources needed for them to pass. The education sector itself lacks funding resulting in most schools operating without textbooks and other resources. Teacher competency is another factor that is a hurdle to the teaching and learning of physics. The subject still lacks qualified personnel so the government end up employing teachers who are degreed but lacking the education background. Some of the teachers because of poor remuneration end up not teaching to the mark since they will be divided on being a professional and also fending for the family. Most teachers now concentrate on finding means of survival other than teaching as prescribed to them by the employer. The classroom environment is a factor that can affect teaching and learning of physics. It should be conducive for learning and promote innovation amongst the students. It should not be a hostile environment in such a way that students feel like there are being led to the slaughter when they go for the lesson. Specialist rooms have been an issue due to the economy of our nation. A physics laboratory on itself promotes learning and innovation.

The government have tried to capacitate the physics fraternity but still there are some factors that are still affecting the teaching and learning of physics. This study aims to assess the factors affecting the teaching and learning of physics at ordinary level. This may see the subject area experiencing an uplift. These factors should be critically investigated so as to sort for ways to mitigate the challenges. Solutions to these factors can mushroom up bringing an end to these factors that weigh the subject area down.

1.2 STATEMENT OF PROBLEM

Unlike researches that have been conducted in the past the study is centered on the assessment of factors that affect physics teaching and learning in some sampled schools in Chegutu and establish the problems teachers, face while teaching physics in the sampled schools and finally recommend possible solutions to the challenges teachers face in teaching physics.

1.3 MAIN RESEARCH QUESTION

To assess the factors that affect the teaching and learning of physics at ordinary level

1.3.1 RESEARCH QUESTIONS

(i) What are the factors which affect the teaching and learning of physics at ordinary level?
(ii) What challenges do teachers face in teaching physics?
(iii) What can be done to improve the teaching and learning of physics?

1.4 RESEARCH OBJECTIVES

The overall objective is to assess the factors that affect the teaching and the learning of physics at ordinary level

1.4.1 Specific objectives are

1) To identify the factors that affect the teaching and learning of physics at ordinary level

2) To investigate the impact of this factors to the teaching and learning of physics

3) To find ways to ways of counterfeiting these factors

1.5 ASSUMPTIONS

The researcher assumed that learning outcomes are directly proportional to the teaching quality and learning environment. The teacher's skills and knowledge directly influence the quality of

teaching and the subsequent learning outcomes. Prior knowledge of students significantly influences their learning outcomes.

1.6 SIGNIFICANCE OF STUDY

The study is going to benefit the Zimbabwe education system as it will bring about recommendations that would see results improving. It will also help the learner to have more knowledge in the subject area. Schools will produce graduates who are very competitive and viable in the industry. Students will not have any challenges as they soldier on with education e.g. going to advanced and colleges. Generally, the economy of Zimbabwe will be boosted since more qualified personnel will start mushrooming up from our institutions.

1.7.1 LIMITATIONS

Since the researcher is sponsoring himself, limited financial resources hinder the researcher to exhaustively pursue all avenues of getting a detailed investigation. The research is done during the school term where the researcher has to balance teaching and the study. The researcher had some difficulties in obtaining approval from the ministry of primary and secondary Education to collect data from the school.

1.7.2 DELIMITATIONS OF THE STUDY

Delimitations describes the population from which generalizations can be made and are under the control of the researcher (Simon and Goes 2013). The research is going to be carried out in Chegutu district at Pfupajena high school, Chegutu high, St Francis, New hope College and Golden Crown College. Form three and four physics learners are targeted as the respondents; the researcher is going to select samples from that population. 10 teachers who teach physics are also going to be the respondents of the research. A total of 30 students will be involved in the research.

1.8 DEFINITION OF TERMS

Teaching

According to Rajagopalan (2019) teaching is an intimate contact between a more mature personality and a less mature one which is designed to further the education of the latter. He further explains that it is an interpersonal influence that that is aimed at changing the potential of another person.

Learning

Gray and MacBlain (2015) define learning as the acquisition of knowledge

1.9 ORGANISATION OF STUDY

The study is divided into five (5) chapters. Chapter one of the study general introduction which includes the background of the study, the statement of the problem, objectives of the study, research questions, significance of the study, the scope of the study, limitations and organization of the study. Chapter two (2) is the literature review which evaluates the works of the other researchers, their approaches as well as the criticism. Chapter three (3) deals with the methodology used in the research i.e. the research design, population and the sample as well as the instruments used in collecting data and the data analysis procedure. Chapter four (4) will look at the analysis and data presentation. This will be done in form of tables and graphs and discussion of results from questionnaires and interviews and the interpretation of the tables. Finally, chapter five (5) will deal with the summary, conclusions, recommendations and suggestions to the study.

SUMMARY

In the chapter a background of study was given, the chapter aim was to outline the emphasis of the research which is to assess the factors that affect the teaching and learning of physics at ordinary level. The statement of problem was spelt out together with the objectives. Research

questions were clearly outlined. The chapter was wound up by highlighting the definition of terms.

CHAPTER TWO: LITERATURE REVIEW

2.0 INTRODUCTION

The chapter will review into the theoretical framework, how teachers conduct their teaching, it will look at the factors that affect the teaching and learning of physics, it will further look at the challenges faced by teachers in the teaching and learning process. Lastly the chapter will look at what should be done to improve the teaching and learning of physics.

2.1 DEFINITIONS

TEACHER

A teacher is a person who helps others to acquire knowledge, competences or values. Teacher is a designation for the office, position, and profession for someone who devotes himself in the field of education through patterned educational interaction, formal and systematic. UU No. 16 Year 2005 on Teachers and Lecturers (Article 1) states that: "The teacher is a professional education with the primary task of educating, teaching, guiding, directing, train, assess and evaluate learners in formal education, in primary education and secondary education". The teacher is a figure of the greatest role in determining the quality of learning in an educational institution called school. Teachers are the most important component in the event education of students. As good as any educational program contained in the curriculum without the role of teachers who cultivate into material that can be understood, it will not mean anything for learners. According to Ngalim (2003:84) Teachers who can understand the difficulties of the students in terms of learning and other difficulties beyond learning problems, especially those that can inhibit learning activities of students. He said a relatively permanent change in behavior that occurs in a result of training or experience

LEARNING

Learning is the process by which human beings acquire a vast variety of competencies skills, and attitudes. Learning begins in infancy with the baby's acquisition of a few simple skills to adulthood, which individual is expected to have mastered specific job tasks and other functional

skills. The competencies of human acquired in a very wide range of settings, both formal and informal, ranging from the relative confines of a school classroom, to the wide open spaces of the countryside or a quiet corner where a chance conversation led to deeper understanding of some topic or another. Learning is not exclusive to the domain of an education system. Learning begins a very long time before school; continues for even longer after school; and happens rapidly, and in parallel with school, in a great number of different ways and settings. Learning proceeds in a number of different ways, and has been described and explained by many different interested researchers and opinion-makers over many years. In English Dictionary as proposed by Hilgrad and Bower (1977, in Fudyartanto, 2002), etymologically definition of learning is 1) to gain knowledge, comprehension, or mastery of the trough experience or study, 2) to fix in the mind or memory, memorize; 3) to acquire trough experience, 4) changed from in forme of to find out. By definition, learn has a sense of acquiring knowledge or have acquired knowledge through experience, recall, mastering the experience, and get information or find. Etymologically learn have a basic meaning is the activity or activities, and mastery of something. Etymologically the definition of learning is very brief. Therefore, necessary to define learning in the terminology. It helps to understand more deeply about the sense of learning. In terminology, many experts defined learning, among them is Cronbach. (1954) stated "Learning is shown by change in behavior as result of experience". According to Cronbach, the best learning is through experience. In having the students use all five senses. This opinion is in accordance with what was proposed by the Spears (1955), which states " Learning is activities to Observe, to read, to imitate, to try something themselves, listen to follow direction.

TEACHING

“Teaching is intimate contact between a more mature personality and a less mature one which designed to further the education of the latter”. Morrison (1934), Dewey (1934) expressed this concept of teaching by an equation. “Teaching is learning as selling is to buying”. In the words of John Brubacher (1939), “Teaching is arrangement and manipulation of a situation in which there are gaps or obstructions which an individual will seek to overcome and from which he will learn in the course of doing so”. Smith (1963) defined teaching as “Teaching is a system of actions

intended to induce learning". According to Gage (1963), "Teaching is a form interpersonal influence aimed at changing the behavior potential another person". Smith in 1963 further extended the definition of teaching, Teaching is a system of actions involving an agent, an end in view and a situation including two sets of factors those over which the agent has no control (class size, characteristics of pupils, physical facilities, etc.) and those which he can modify (such as techniques and strategies of teaching

2.2 FACTORS AFFECTING TEACHING AND LEARNING OF PHYSICS

TEACHER COMPETENCE

In the Law of the Republic of Indonesia Number 14 of 2005 on Teachers and Lecturers, "Competence is a set of knowledge, skills and behaviors that must be owned, internalized and mastered by teachers or lecturer in performing the duties of professionalism". In conjunction with educators, competence refers to actions that are rational and meet certification particular in implementing the tasks of education. Educator is the teacher. Teachers must have the adequate competence in order to doing a good job. According to Suparlan (2006: 85) found "competence teachers are doing a complex combination of knowledge, attitudes, skill and values that showing by teachers of the context of the performance given to him ". It' means competence is knowledge of teachers' performance. According to Sudrajat (2007:120), "The competence of teachers is a picture of what a teacher should do in carry out its work, either in the form of activities in the act as well as the results intended". It means that teachers should sharpen their abilities because competence comes from teachers' abilities, to handle the learning activities, teacher should be competent. These credentials are frequently developed to authorize individuals to teach when they have entered with credentials from other states or are in the process of completing minor coursework and test requirements. Emergency licenses are often granted to those with teaching licenses in another category and who have a bachelor's degree, upon request by the school district due to a shortage of licensed applicants. Some states provide provisional nine-months certificates for those who meet the requirements for a regular teaching, school service, or administrative certificate in another state, and who hold bachelor's degree (or higher). According to Sudjana (2002: 17), "The competence of teachers is the basic capabilities

which must be held by teachers". Based on the above can be interpreted as a teacher competence ability / skills a teacher in the form of knowledge, skills, attitudes and values acquired through education and training so as to do their job properly. According to Sumitro et al (2002: 70), "Schools need teachers have the competence to teach and educate innovative and creative enough time to pursue professionalism, able to maintain its authority in the eyes of learners and society so as to improve the quality education". The ability to teach is the essential ability to be owned by teachers, not least because the main task is to teach. In learning process, teachers face the students a dynamic, well as a result of internal dynamics that comes from within students and as a result of the demands of environmental dynamics are a bit much effect on students. Therefore, the ability to teach must dynamic as well as the students' demands is inevitable. Teaching capabilities of teachers is actually a reflection on competence. This competence is comprised of various important components. Sudjana (2002: 17), Cooper cites the opinion that there are four competencies required of teachers, namely:

1. Having knowledge about the study of human behavior.
2. Having the knowledge and control of cultivated fields of study.
3. Have the right attitude about themselves, school, peers and cultivated fields of study.
4. Have the ability of teaching techniques Teacher competences is a various competence required in transferring knowledge to their students include pedagogical competence, personality competence, professional competence and social competence (pp.No.19 of 2005). It means the teacher competence is an ability knowledge basic of a personal characteristic that is deciding factor in success or failure of a person.

CLASSROOM ENVIRONMENT

School climate contributes towards school effectiveness. Guffey (2013) notes that school climate has an impact on the effectiveness of teachers in the school. It is argued that the way an individual or a person in an organization performs is determined by the organizational setting, in

this case its climate. In a school where there is no bridge between school leadership and teachers the climate is conducive for effective teaching and learning. Where there is dialogue between the head, teachers and the pupils a healthy school climate prevails. Schools where communication is considered as the lifeblood of the organization breed effective teaching and learning environments. Indeed, learning environment plays a major role in shaping the quality of academic achievement in physics (Tella, 2010). It seems there is perceptional consistency among physics scholars about learning environment and the student's cognitive and effective outcome (Lizzio, 2012). It was observed that the learning is optimal when body, soul and spirit are in accord; otherwise learning will be ineffective (Frenzel, 2010)). Hence, clean, quiet and comfortable environment are important components of learning environment. And for a learning environment to be ideal, learning components such as furniture, ventilation, and thermal comfort must be provided (Bosque & Dore, 2010). In addition, Fraser and Fisher, (2012) examined the normal learning climate. They proposed 680F to 740F as the required learning temperature. Although Lizzio, (2012) noted that optimal learning climate varies from region of a country and with seasons of the year. So, the usage of actual learning environment varies according to different type of schools and society. The school physical facilities in most secondary schools have not been in good shape. In some cases,

students sit on the ground to receive lessons, also many of the classrooms, laboratories, libraries, playing grounds are in a terrible state of despair (Mutiu, 2014) and Ahmed (2013) showed that in most of the nation's secondary schools, teaching and learning take place under a most uncomfortable environment, lacking basic materials. Physical conditions refer to those things that must be available in the working place for effective work to take place. In the context of the school system, they are those things that enable the teacher and students to be able to carry out the teaching/learning process effectively and contribute to the achievement of the school goals and objectives without fatigue and distraction (Ijaduola, 2010). As opined by Felix (2014), a good school organization must have appropriate physical conditions (aesthetic beauty, availability of instructional materials, location) necessary for effective teaching/learning. According to Subair and Awolere (2016), there should be maximum presence of physical conditions such as lighting,

ventilation, good building constructions, location, instructional materials, sufficient windows, doors, vents and fans to cool the heat during hot season. All these improve work and health of both the teachers and the learners.

SOCIOECONOMIC FACTORS

The socio-economic background of students plays a major impact on their performance at school. Literature argues that materials factors such as income play a part in determining levels of education. The lower social classes may lack the money to provide their children with same educational opportunities as middle and upper class parents. This then means that some pupils from low status families fail to perform effectively despite the fact that schools are adequately equipped with resources (Hill, 2014). Caro (2009) is also of opinion that some pupils do not perform well as a result of being constantly send home to collect fees. Consequently, these pupils cannot be in a position to do well although schools have relevant and adequate resources to be utilized for the successful accomplishments of targeted goals and objectives. Matimbe (2014) is of the view that lack of instructional materials such as syllabi and textbooks to use during teaching and learning process negatively affects effective teaching. Najumba (2013) asserts that ineffective funding and budgetary cutbacks is visible in the erosions of standards of teaching. It results in declining library standards; it is argued there are certain home conditions that affect pupils' school achievements. Children who lack provision of reading materials perform poorly in schools. A pupil who does not have his background which has resources like books sometimes perform poorly at school although she/he is taught by high qualified teachers. paucity of new text references books and journals. Chingos & West (2010) are of the view that the level of education and occupational positions of parents are important determinants pupils' achievement. Some pupils from lowly educated parents do not perform well at school because they lack motivation and parental support that even if teachers are qualified still those pupils fail. Delvin, Kift & Nelson, 2012) also add that ineffectiveness on the part of pupils are higher

from families of low socio-economic status no matter which particular factors are used to measure socio-economic status. This should indicate that inadequate materials such as textbooks within the home background and lowly educated parents should not be regarded as a total effect in pupils' poor performance in rural primary schools. The diverse individual aptitude of pupils should also be taken into consideration. Within the poor background may be born a genius. In addition, it is not always only the performers from low income families who tend to be ineffective as far as academic achievement is concerned. Some children from even rich families may also perform academically poor due to other factors though poor performers among children from well to do families are rare. Poor maintenance and ineffective ventilation systems lead to poor health among students as well as teachers, which lead to poor performance and higher absentee rates (Fraser 2015). These factors can adversely affect student behavior and lead to higher levels of frustration among teachers, and poor learning attitude among students. Denga (2013) revealed that a significant number of secondary school physical environments are not conducive for learning. He states that to achieve improved performance by the students, there should be conducive physical environment for students in the secondary schools. Unfortunately, some of the urban and rural schools lack adequate infrastructural facilities like classroom blocks as some of the students learn under shade of trees (especially the newly established ones). And where the classroom blocks exist, one discovers that most of their roofs are blown off by rain storms. Other schools have pot-holes in the greater portions of their classroom begging for repairs or renovation. Worst still, a greater percentage of the students sit and write on the bare floor for insufficient classroom seats. This situation doubtless, cannot promote students learning ability and subsequently better performance in their class work including examinations. Beyond the direct effects that poor facilities have on students' ability to learn, the combination of poor facilities, which create an uncomfortable and uninviting workplace for teachers, combined with frustrating behavior by students including poor concentration and hyperactivity, lethargy, or apathy, creates a stressful set of working conditions for teachers (Smiths, 2011). Because stress and job dissatisfaction are common pre-cursors to lowered teacher enthusiasm, it is possible that the aforementioned characteristics of school facilities have an effect upon the academic performance of students.

2.3 CHALLENGES FACED BY TEACHERS WHEN TEACHING PHYSICS

Negative Attitude toward Physics Students' negative attitude toward Physics subject was also cited as a challenge teachers experienced in the teaching and learning of physics at ordinary level. One teacher said, "Students' belief that physics is a very complicated subject reduces students 'motivation for leaning the subject." This challenge was also reported in the study conducted by Ryan and Guido (2013.p. 2087) who stated that "Students perceived physics as a difficult subject during high school days and it becomes more evasive when they reach in the colleges." In addition, they confirmed that the beliefs of students that physics is tough, leads to lack of students' motivation to learn the physics subject.

Shortage of Time

Shortage of time is one of challenges reported by the participants of the study. Particularly, one of the respondents held that "the use of student based teaching and learning is time consuming compared to the time allocated to a given unit." A study conducted by Gutulo and Tekello (2015) for the purpose of assessing the challenges associated to teaching and learning of physics in the schools of Wolaita and Dwuro Zones, including secondary and post-secondary schools, reported limited time for making discussions as one of main challenges faced by physics teachers in their physics teaching. Furthermore, they reported that due to the shortage of time allocated for each unit, some physics teachers preferred to use teacher centered method of teaching instead of using child centered methods

Lack of Teachers 'Skills and Knowledge

Most of the teachers lacked knowledge as they were teaching the subject out of experience of being a science teacher for a long time without having the right qualifications to do so. They lack the right expertise and knowledge to administer the lessons effectively. The new curriculum needs people who can really understand the concepts for better results

Insufficiency of Teaching- Learning Materials and Infrastructures

The respondents reported the lack or insufficiency teaching- learning materials and infrastructures as a challenge they faced when implementing competence-based curriculum. One participant, for example reported that “lack of appropriate textbooks and infrastructures such as laboratory, classrooms and smart classrooms are challenges which affect my physics teaching using the inquiry based teaching and learning approach.” These findings were in harmony with previous research findings.

The most successful teaching methods are those who have proven track record of success in employ the maximum number of the above criteria's, while each of them engages students in different ways, each has its advantages depending on the information they teach. Knowing the differences between these methods will help to select the technique that is best for particular class of study, and to define a particular teaching style. The following characteristics of the most common teaching methods, as described in many related literatures, (Pat, 1992) beside the above model will certainly help in choosing the right teaching and learning method.

Teachers should make use of the following teaching methods as they may help ease some certain factors that affect the teaching and learning of physics. Adopting these different approaches may help improve the classroom environment and also stimulate interest thereby planting a good attitude in the students towards the subject.

Lecture

It is one of the teaching method in which the teacher is the main roller, learners represent the passive elements, while the speaker represents the active one. He delivered a prepared talk or verbal presentation to an audience on outline of points to cover in one batch. Audience participation is minimal and usually confined to a brief question-and-answer session after the talk. In this method effort and time are saved.

Characteristics

Strengths

- Save time and efforts.
- Suitable for detailed subject like history, literature... etc.
- Presents factual material in direct, logical manner.
- Contains experience which inspires.
- Stimulates thinking to open discussion.
- This method is economical and useful for a large group of students.
- Material can be covered in a structured manner and the teacher has a great control of time and material.

Weakness

- Boring for learners.
- Concentrate on information rather than learners.
- Experts are not always good teachers.
- Audience is passive.
- Learning is difficult to gauge.
- Communication in one way.
- Do not differentiate between learners.

Preparations

- Needs clear introduction and summary.
- Needs time and content limit to be effective.
- Should include examples, anecdotes.

3.2 Discussion and dialogue

It is the method of dialogue and discussion by using questions and answers to reach specified fact. This method goes to Greek philosopher Socrates, when he used the method to make his followers reach the truth. This method depends on three elements: the sender, the receiver, and

the message. The message represents the subject of dialogue, while the sender can be the receiver and vice versa at the same time. Discussion is different according to its aim. Some discussion could be closed around teaching subjects, or could be free to go around general subjects related to human life, or human problems. Discussion and dialogue represent ides trial between learners and between learners and teacher.

Aims of discussion and dialogue

- This method tends to increase the self-confidence among the students.
- Increase the ability of proving and convincing.
- Increase the tendency for the subject of study.
- Increase the focusing and concentrating.
- Organize the thinking process.
- Discover errors and correcting them.
- Make students more active and powerful.
- Provoke thinking within dialoguers, which let them criticize their answers and the answers of the others.
- Discussion helps in interpreting information and makes it clear and understandable.

Teaching methods employed by teachers during the teaching and learning process

- It increases the ability to create constructive questions.
- Increase the opportunities of participating that enhance the ability of correlating and resolving problems.
- Enhance the ability of oral expressing, and the use of correct linguistics.
- Help in providing students with social needs like friendship and acceptance of others, and other good ethics.
- To achieve the goal of the discussion, following remarks has to be considered:
- Teacher should throw the question to all students not to a particular one.
- Question should be within the course of the aim and within the teacher plan.
- Question should motivate students to produce ideas, questions, trial and discussion.

• Reduce the no. of questions with (Yes) or (No) answers and increase the no. of questions that start with (Why), (How), (What).
• Increase the no. of questions that are related to the life and the living environment of the student.
• Help the students to stay within the subject of discussion, and direct them toward the aim of the plan.
• Listening to the student's answers and help in correlating between them.
• Aware the students with importance of the good listening.
• Encourage the students to create questions.
• Control and manage the time.
• Encourage and motivate students to critical thinking and searching.

Characteristics

Strengths

• Suitable for all subjects of study. Subjects that are more suitable to be taught by discussion and dialogue; are those which related to social studies and social problems like; smoking, revenge, drug addiction and alcoholic.
• Pools ideas and experiences from group.
• Effective after a presentation, film or experience need to be analyzed.
• Allows everyone to participate in an active process.
• Provide enthusiastic and enjoyable atmosphere among participants.
• Participants gain communication and interaction skills, especially expressing and talking skills.
• Treats well the differences among learners.

Weakness
• Need time and efforts (time consuming).
• Need skills in questions construction and in question throwing.

• Not suitable for detailed topics (can get out of the track).
• Few people can dominate (other may not participate).
• Not practical with more than 20 people.
• Class may get out of order.

Preparations
• Require careful planning by facilitator to guide discussion.
• Require questions outline.

3.3 Practical demonstration

Practical demonstration considered as one of the general teaching methods which is effective in teaching skills of using tools, lab experiments in sciences, and training on giving speech and so on. Teacher shows and performs the skills in front of the students in an optimal way, and he may repeat many times, or let the students express the skills under his supervision. Although the success of this method depends highly on the teacher and his personal skills, this method still important because some skills can't be learned without providing real demonstration.

Characteristics

Strengths
• Real-world (three dimensional).
• Sometime inexpensive and readily available.
• Experience may be tactile/auditory as well as visual.
• Avoided the risk that might occur when the students perform the skill by themselves.
• Allow everyone to participate effectively.
• Provide enthusiastic and enjoyable atmosphere. • Treat well the differences among learners.

Weakness

- Needs a skilled instructor to perform the skills.
- Not suitable for detailed subject.
- Class may loss order.
- Sometime difficult to handle.
- Usually out of natural environment.

Preparations

- Sometime require in advance preparation.
- Safety measurement should be available.
- Spare equipment and instrument should be available.

3.4 Group learning

Group forming by the teacher is one of the foundations of the success of group learning. Studies show that the learners get more academic and social benefits when the members of the group are heterogeneous. Groups that are formed by the teacher in the class from different standard of student gave them the opportunity to learn from each other and also to assess each other. Researches results show that the strongest group is that group which consist of students with different levels of skills. This method depends on dividing learners in a semi homogenous groups, teaches separately with different learning situation. Each group consist of five to eight learners to obtain the goal. Members of the group can be categorizing as:

Reader: read the task to the group loudly.

Registrar: register the answers. Write names.

Checker: make sure that all members understand their work and he ask for explanations and the method of solution.

Materials collector: collect all related materials and file them.

Coordinator: presents the project and also the performance of the individuals.

Observer: observe the level of the noise in the group, and try to direct the team toward their work through time watching.

3.5 Investigation

Investigation in language means reaching the aim, while investigation as a method of teaching means overcoming the problems by going through many systematic steps until achieving the aim and the result. As a definition investigation is a try to discover a new idea or a new meaning through studying a number of ideas, phenomenon's and cases. Investigation considered as a very effective method for developing scientific thinking for the students by implementing many scientific operations such as; investigation, observation, experimentation, categorization, prediction, interpretation, etc. So by this method learner study a number of phenomenon's, facts, and information to reach to a new thing by themselves.

Characteristics

- Student is the center of the method, so his role will be positive not negative.
- Teacher is a director not a brain feeder.
- Helps the students to develop their mental and scientific skills like, observation, measurement, experimentation, prediction, interpretation, analyzing, and evaluation.
- Develop the scientific thinking of the students.
- Helps students in developing positive directions like: self-confidence, self-dependent, and corporations

...etc.

- Increase the enthusiasm of the student toward learning processes, and tackling problems and find

solutions by him-self.

3.6 Problem solving

What is a problem?

Problem is unwanted situation faces a person or a number of persons. This new situation is due to a change in the processes of work or because of external factors (Morgan, 2001). This situation needs to be solved or corrected, but before we start the process of solving we should know what causes the problem, what has been changed, and what the consequences are, then we propose suitable solutions that lead to correct the situation or to reach an acceptable result. Teaching through problem solving is not always easy, since many of us taught by remembering facts, whether or not they were related to each other, or whether or not we were interested in the subject. In fact, many teachers may say that problem solving in their practical subject area is not possible, not helpful, or only possible in limited part of the subject matter. However, everything that can be taught may be taught from problem solving point of reference. We learn through the model of solution that involves:

- Understanding the problem and what has been changed.
- Categorise it depending on our past experience and experimentations with the help of the historical information (historical problems, solutions, results ... etc).
- Compares between expected results and the aims.
- External criticism.
- Comparing with similar situation.

Characteristics

- Motivate student toward learning, problem will be a challenge for research and investigation, to discover unknowns.
- Student can learn by exposing to many concepts through the process of solution.
- Students learn though their works wither their assumption is correct or not.
- The cheerful feeling, which provided when the solution is achieved.

CHAPTER 3: METHODOLOGY

This chapter provides a detailed description of the design, instruments and procedures that were used to gain insights into the factors that affect the teaching and learning of physics at ordinary level. The section is therefore organized under the following sub-headings: research design, population, sample and sampling technique, instruments for data collection, method of data collection and method of data analysis.

RESEARCH DESIGN

The study followed a mixed method design using both survey and case study techniques. Specifically, the convergent parallel design (Creswell & Clark, 2011) was employed for this study. The design involved two stages in which mixed methods were used to
collect data. The framework for the design is shown below

DESCRIPTION OF THE DESIGN

The convergent parallel design (also called convergent design) involves the use of concurrent quantitative and qualitative data collection, separate quantitative and qualitative analysis and the merging of the two data sets (Creswell & Clark, 2011). It has been observed that if a study uses different research methods, for example quantitative and qualitative, it has the advantage of helping the researcher to gain a deeper understanding of certain issues pertaining to the problem under investigation (Best & Kahn, 2005; Cohen, Manion, & Morrison, 2007; Taylor, 2004).
The use of multiple data sources and cross comparisons to gain understanding of a phenomenon

ensures trustworthiness and credibility of interpretation of data collected (Creswell, 2007). A survey method was used in the first stage in which questionnaires were administered to physics

teachers and physics students of some selected secondary schools in Chegutu. The teachers' survey was intended to identify their views of initial teacher education, typical practices in curriculum delivery, their perceptions of the factors affecting the teaching and learning of physics and ways to improve upon the situation, if any. The students' survey was designed to gather students' views about their interest in physics, curriculum implementation, their own competencies and challenges, and what would motivate them to be trained as physics teachers. The second stage of this study was designed to examine the realities of the matter under investigation in more detail to provide depth of information through specific case studies. This part of the study was meant to move beyond the perception based data (Creswell, 2007). The operational word here is "describe", that is, describing as accurately as possible the phenomena that is the subject of this study, refraining from any pre-given framework and remaining true to the facts (Groenewald, 2004). I was concerned with the lived experiences (Cohen et al., 2007) of physics teachers and students who are involved in the issue under study; hence a case study method was adopted for this second stage. Heitzmann (2008) asserts that the case study method provides "many opportunities and strategies to gain insight into events that occur within the school and classroom" (p. 523). Bogdan and Biklen (2007) assert that a case study is useful for inquiry which entails "detailed examination of one setting, or a single subject, a single depository of documents, or a particular event" (p. 59). Creswell (2007) however, views a case study as both a methodology and a product of inquiry iwq3n which the researcher investigates one or multiple cases "over time through detailed, in-depth data collection involving multiple sources of information" (p. 73). Yin (2009) also defined a case study as an "empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context" (p. 18). The embedded multiple-case study design (Gray, 2009; Yin, 2009) was specifically adopted for the second stage. Multiple-case designs make it possible to replicate a case under review in one study. Moreover, independent conclusions arising from two or more cases are more trustworthy than those from a single case (Yin, 2009). The second stage was however, carried out in two phases. Phase one involved collection of quantitative data from students and classroom observations. As noted by Cohen et al., (2007), observation enables the researcher to understand the situation being described, see things that might otherwise be unconsciously missed in the first stage and d iscover

things that respondents might not freely talk about in the questionnaire and interview situations. Observation also provides specific examples of teaching and learning in action. Cohen et al. extolled that observations enable the researcher to gather data on: "physical settings (e.g. the physical environment and its organization); the interactional setting (e.g. the interactions that are taking place, formal, informal, planned, verbal, non-verbal etc.); and the programme setting (e.g. the resources, pedagogy styles, curricula and their organization Phase two of the second stage involved focus group interviews with physics students and individual interviews with high school physics teachers and physics teacher educators. The purpose of this was to investigate qualitatively, and delve deeper into issues that were not possible to obtain from questionnaires (Fraenkel, Wallen, & Hyun, 2012). Also, interviews were conducted with other stakeholders who have an influence on science education in Chegutu. The stakeholders' interviews were intended to obtain a national perspective as far as the study is concerned. It was also designed to obtain direct information about their experiences, knowledge and opinions about factors that affect teaching and learning of physics in secondary schools.

RATIONALE FOR THE DESIGN

The study sought to assess the factors affecting teaching and learning of physics in secondary schools in Chegutu. That is, to identify typical practices in curriculum implementation, factors limiting quality teaching and learning, and ways to improve upon the situation. Again, the study sought to gather students' views about their interest in physics, their own competence and work attitude to physics. To do this, it is practically sensible to gather data from a population of physics teachers and physics students and also delve deeper into the data obtained in order to adequately, describe the state of the matter under investigation. To meet this expectation, survey and case study methods were found as most appropriate for the study. They were capable of providing a more complete understanding of the topic under investigation through validation and corroboration of findings from the quantitative and qualitative measures (Creswell & Clark,

2011). In choosing one method or the other for research work, Burgess (1984) argues that one should be guided by two main things: the kinds of information relevant to the problem of interest to the researcher and the kinds of methods relevant for the topic under investigation. Burgess discusses that there is no best method for conducting educational research and that the method one chooses and uses should be suited to the issue or topic being explored. Likewise, Vulliamy, Lewin, and Stephens (1990) have indicated that the approach to social research does not stem from fundamental philosophical commitments only. Thus, other significant considerations, such as the particular purposes of the research and the practicality of various strategies given the circumstances in which the inquiry is to be carried out, must be taken into account, i.e. context in which the observations are made is important. The survey was used in this study because surveys are useful for gathering factual information, data on attitudes and preferences, beliefs and predictions, behavior and experiences – both present and past from a wide range of participants to ascertain more general perceptions and behaviors (Cohen et al., 2007; Fraenkel et al., 2012; Sarantakos, 2005). Fraenkel et al. (2012), for example, noted that surveys have the potential to provide a lot of useful information from the subjects of the study. Nworgu (2006) also noted that surveys make it possible for many subjects to be studied at one time.

In actual fact, no single approach, either survey or case study methods, can be perfectly effective (Burgess, 1984; Vulliamy et al., 1990) and therefore each method can be improved significantly through triangulation of data from various sources (Bogdan & Biklen, 2007; Gray, 2009; Keser et al., 2010; Yin, 2009). Data from many sources can contribute multiple views better in a study than single sources (Bogdan & Biklen, 2007; Yin, 2009) because multiple sources lead to a fuller understanding from different perspectives of the topic under investigation (Keser et al., 2010). Gray (2009) also noted that "people may articulate a particular view, but in practice behave differently" (p. 221). Keser et al. (2010) further uphold that data collected from a survey should be used as a springboard for further data collection using different research methods, including interviews and classroom observations. Keser et al., (2010) emphasized that triangulation helps researchers to "secure an in-depth understanding of the learning environment" (p. 7). Case studies therefore allow for in-depth research of particular teachers

and situations, produce first-hand information, and allow employment of a variety of methods and sources for triangulation to see how well what teachers say they do matches what they actually or are observed to do (Sarantakos, 2005). Case studies are also useful for researching contemporary events in which direct observations of events as well as interviews of people in real life contexts to yield deeper understanding of a phenomenon (Cohen et al., 2007; Sarantakos, 2005, Yin, 2009). These approaches (survey and case study) and the methods outlined above were relevant to this study in that they helped me to triangulate and corroborate findings from teachers, students, documents and stakeholders in order to describe thoroughly the topic under investigation.

Potential Limitations

The survey and case study approaches, for this study, presented above have the advantage of describing thoroughly how physics is taught in the secondary schools for specific teachers and situations. However, there is no method that is free of problems (Sarantakos, 2005) and there are inherent challenges which I have tried to address (refer to the section on limitations, Chapter 7).

First of all, survey questionnaires are difficult to construct and secondly, the success of using questionnaires lie in getting respondents to answer questions thoughtfully and honestly (Fraenkel et al., 2012). Another significant drawback is the time and effort of delivering and collecting the questionnaires and getting sufficient numbers of participants to respond (Gray, 2009). The main drawback of the case study method is that the subjectivity of respondents, their opinions, attitudes and perspectives together contribute to a degree of bias (Ampiah, 2004; Creswell, 2007). More so, results are also related to the unit of analysis and do not allow "inductive generalization" (Sarantakos, 2005, p. 216). In this study, the case study was used to substantiate and expand the findings from the quantitative measures. Though case study findings were not meant to b generalized, they serve as indicators of what might be happening in other places.

Addressing the Issue of Credibility and Trustworthiness Lincoln and Guba (1985) have explained that credibility and trustworthiness in research are established through data collection, analysis and reporting. The authors have proposed four constructs – credibility, transferability,

dependability and conformability, which should be considered by researchers in pursuit of a trustworthy study. The constructs have been considered extensively by Shenton (2004) who suggested provisions and strategies that researchers may want to employ to meet the demands of their studies. There are different strategies to ensure credibility (Creswell, 2007; Fraenkel et al., 2012; Hackling et al., 2001; Sarantakos, 2005; Shenton, 2004; Yin, 2009), however, (Creswell, 2007) has recommended the use of at least two of those All secondary schools in Chegutu had the chance to participate in the study. The population for the study comprised of physics teachers and form 3 and 4 students who sit for the ZIMSEC examinations. As the purpose of the study is concerned, students from these year groups formed a better population for the study. Therefore, it was appropriate to find out from these students whether they would like to take further studies in physics and/or become physics teachers or not and their reasons for doing so. Stakeholders of physics education, i.e. initial teacher educators and secondary science coordinators also formed part of the population for the study.

SAMPLE AND SAMPLING TECHNIQUE

The sample size for the study comprised both physics teachers and students of Chegutu secondary schools and stake holders of education. 3 state high schools and 2 private colleges from Chegutu were purposefully sampled as a convenience sample for on-going observation (Creswell, 2007) and used as case studies. Reasons for selecting these schools included easy accessibility and willingness of school leaders and staff to engage with the researcher. Physics teachers of these schools were interviewed and observed while teaching physics. One private (fully independent) co-educational school, was purposefully selected as an additional and alternative case study.

The sample size for the students' population was guided by the table for estimating sample size from a given population developed by Krejcie and Morgan, as cited in Sarantakos (2005, p. 173). Based on the students' population from the selected schools, respondents (students) from these selected schools were invited to participate. A total number of 70 physics students started

the survey and 50 students responded to questions. Purposeful sampling technique was also employed to select ten teacher educators of physics who participated in the study. The reason for selecting these physics teacher educators was mainly due to their interest in the study and their willingness to participate.

INSTRUMENTS

The research instruments used for data collection for this study were: survey questionnaires for teachers and students, interview protocols, classroom observational guides and situational analysis of documents, including units and lesson plan

QUESTIONNAIRE

Two forms of both closed and open-ended questionnaires were developed and used for data collection. These were the Physics Teachers' Questionnaire (PTQ) and Physics Students' Questionnaire (PSQ). It has been noted that closed and open-ended questionnaires are useful to elicit both quantitative and qualitative data (Best & Kahn, 2005; Fraenkel et al., 2012). Also, many people's opinions can be elicited through questionnaires and participants can respond in a place and time convenient to them (Gray, 2009). Both the PTQ and PSQ were adapted from existing surveys for evaluating secondary school's science and mathematics classrooms (Angell et al., 2004; Hackling et al., 2001; Ogunmade, 2005; Weiss et al., 2001). The items selected were modified to suit the purpose and context of this study. Particular attention ensured that the items constructed were unambiguous, unbiased, unloaded and relevant (Fraenkel et al., 2012; May, 2001; Sarantakos, 2005), and also appropriate for the culture and context of ZIMSEC. Both the PTQ and PSQ were structured into sections to reflect the research questions

INTERVIEW

Semi-structured interview protocols were designed for physics teachers and students. The semi-structured interview is suitable for probing views and opinions and permits respondents to develop and expand on their own responses (Gray, 2009). The semi structured interview protocols were designed to gather data in the participants' own words (Fraenkel et al., 2012) so that greater insight could be gained about the teaching and learning of senior physics. The semi-structured method of interviewing allows the interviewer to have more opportunities to probe beyond the answers. As May (2001) noted: "the interviewer can seek both clarification and elaboration on the answers given and thus enter into a dialogue with the interviewee" (p. 123). The semi-structured method also allows the researcher to raise issues of particular concern to the study (Fraenkel et al., 2012). Further questions, which were not expected at the commencement of the interview, could be also be asked as new issues arose (Gray, 2009). Items on the interview guides were centered on the main research question formulated to guide the study. Gray (2009) and Cohen et al. (2007) advise that the issue of validity for both structured and semi-structured interviews is addressed by ensuring that questions are related to the research objectives. In order to achieve rich and constructive discussions, the interviewees (especially the teachers and the teacher educators) were provided with the focus questions to afford them the opportunity to think about their responses before the commencement of the interviews, as Hackling et al (2001) advise.

VALIDATION OF INTERVIEWS

First and foremost, care was taken to ensure that items on the interview guide were directly related to the purpose of the research (Cohen et al., 2007; Gray, 2009). In addition, a "member checking" (Fraenkel et al., 2012, p. 458) process was used to validate all interviews. Member checking is a process whereby respondents/interviewees are asked to verify the accuracy of the research report (Fraenkel et al., 2012). In this study, all interviews were audio recorded and

transcribed. After the recordings were transcribed, a copy of the transcript was forwarded to the respondents and they were requested to verify the accuracy of the information. Respondents were also asked to modify, revise and/or amend the transcript if and as necessary before any part of the transcript was used in the study.

DATA ANALYSIS

Data from teachers and students' survey questionnaires were analyzed using descriptive statistical methods (including percentages, means, standard deviations and graphs where appropriate) and inferential statistics – independent samples test and multivariate analysis of variance.

Qualitative data gathered during interviews and observations were used to substantiate findings from the survey data. Audio recordings from the interviews were transcribed. Nvivo 10 for Windows (QSR International Pty Ltd. Version 10, 2012) was used to organize the materials by coding them into nodes which provided easy retrieval of the themes that emerged. Where quotes are used within the body of this thesis, they were chosen because they were representative of the statements of most of the respondents. The production of accurate and verbatim transcripts was integral to establishing the credibility and trustworthiness of the data. Detailed descriptions of classroom observations/practices were also recorded as a reference for indicating what actually occurred. A cross-case analysis approach (Yin, 2009), also called comparative analysis (Schwandt, 2001) was adopted for this purpose. A detailed report of the individual case studies was presented, and using comparative analysis, the similarities and differences between the cases were discussed as indicated previously, the embedded multiple-case study design (Yin, 2009) was chosen for the second stage of the study. The purpose of this was to determine whether similar or contrasting outcomes would be produced. Yin (2009) has stated that "analytic conclusions independently arising from two cases will be more powerful than those coming from a single case alone" (p. 61). The comparison was helpful to identify how

different contexts and individual expertise affect policies and practices regarding physics teaching and learning in high schools.

SUMMARY

The chapter focused on the research design and its validity it went on to describe the population and sample. The sampling techniques were also explained in the chapter. Methods of data analysis was the last the discussed in the chapter

CHAPTER 4: DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter presents data analysis and discussions of the findings on the assessment of factors that affect the teaching and learning of physics at ordinary level in Chegutu District. This chapter also presents the demographic details of the respondents for this research and guidelines to the characteristics of the whole target population. Findings were from the research instruments, which were questionnaires, interviews and observations. The data is presented using mainly tables and pie charts.

4.2 Biodata

This section is a presentation of the Biodata of the respondents of this study. Biodata is a term used to relate to the biographical and demographic information about individuals participating in the study. Tables and pie charts presenting biodata for the participants are given under each subheading of each group of participants. The biodata specifically for this study are names and gender. Biodata for physics teachers is presented on the tables. The biodata for physics teachers emanated from interviews that were carried by the researcher. Biodata from learners across the 5 schools were also represented.

4.2.1 Biodata for physics teachers

Ten teachers across the 5 schools participated in this study. seven teachers were males whereas three were female. Of the seven male teachers who were interviewed only three were degreed the rest had diplomas. Two holders of diplomas were not educated in the physics discipline there

were teaching using their high school background knowledge. The two male teachers were teaching in two separate private colleges that were part of the research. Of the three females one was degreed and the other two had relevant diplomas to teach the subject.

Table 4.2 a**) biodata for physics teachers**

school	participant	code	age	gender	Professional qualification	Teaching experience (years)
A	Teacher 1	T1	28	F	BSc PH	4
	Teacher 2	T2	32	M	BSc PH	7
B	Teacher 3	T3	40	M	DipSciED PH	12
	Teacher 4	T4	44	F	DipSciED PH	8
C	Teacher 5	T5	38	M	DipSciED CH	13
	Teacher 6	T6	55	M	DipSciED PH	30
D	Teacher 7	T7	34	M	BSc PH	10
	Teacher 8	T8	37	M	DipSciED AGRIC	6
E	Teacher 9	T9	40	M	BSc PH	11
	Teacher 10	T10	47	F	DipSciED PH	15

Biodata for physics learners

The learners who participated in this study were doing physics at ordinary level. They comprised of a total number of 30 across all the schools involved in the study. 15 students were doing form 3 and the other 15 doing form 4. The students were selected from 3 government schools and 2 private colleges. All the schools were found in the urban Centre but school E is a private boarding school. The learners who participated had an age ranging from 15 and 17. Tables 4.2) b,4,2 c),4,2 d) ,4,2e) and 4.2f) summarizes biodata for learners from the 5 different schools respectively. In

place of their names students were coded to protect their identity. 6 students were selected from every school.

Table 4.2 b**) physics learners' biodata for school A**

School	participant	code	age	gender	class
A	1	A1	15	F	F3
	2	A2	15	F	F3
	3	A3	16	F	F3
	4	A4	15	M	F3
	5	A5	17	M	F3
	6	A6	15	M	F3

Table 4.2 c) **biodata for physics learners at school B**

School	participant	code	age	gender	class
B	1	B1	16	F	F4
	2	B2	16	F	F4
	3	B3	17	F	F4
	4	B4	16	M	F4
	5	B5	17	M	F4
	6	B6	16	M	F4

Table 4.2 d) **biodata for physics learners at school C**

School	participant	code	age	sex	class
C	1	C1	15	F	F3
	2	C2	16	F	F3
	3	C3	15	F	F3
	4	C4	15	M	F3
	5	C5	15	M	F3
	6	C6	17	M	F3

Table 4.2 e) **biodata for physics learners at school D**

School	participant	code	age	sex	class
D	1	D1	17	F	F4
	2	D2	16	F	F4
	3	D3	16	F	F4
	4	D4	17	M	F4
	5	D5	18	M	F4
	6	D6	18	M	F4

Table 4.2 f**) biodata for physics learners at school E**

School	participant	code	age	sex	class
E	1	E1	16	F	F3

	2	E2	15	F	F3
	3	E3	15	F	F3
	4	E4	15	M	F3
	5	E5	15	M	F3
	6	E6	15	M	F3

4.3 Perceptions from research questions

This section presented and analyzed the data that was collected from participants of this study through interviews on physics teachers and physics learners across the 5 school involved in the study. The perceptions of participants of the study were analyzed under emerging themes in line with research questions.

4.3.1 perceptions from interviews on teachers

The perceptions of teachers that were collected from interviews were critically analyzed. these were analyzed according to the themes emerging from the research findings in line with the research questions.

4.3.1.1 perceptions on the factors affecting the teaching and learning of physics at ordinary level

The interviews from physics teachers indicated that a lot of factors affects the teaching and learning of physics at ordinary level. It really showed that if no measures are taken against these factors the subject will experience a nose dive.

Teachers were able to give and state out the factors that they thought affected the teaching and learning of physics.

T2 said

Teaching experience is a major factor that affects the teaching and learning of physics

T3 and T4 concurred to the above fact they all said teaching of physics needs experience since most of the concepts are complex. Wisdom comes with experience T1 alluded also to the same sentiments. Having taught the subjects for many years t6 had enough of an experience to understand the kind of questions that come in examinations. He had experience over the right methods of approaches to certain concepts. He boasted to the fact that he learnt through his mistakes over the years.

T7 said *the classroom environment is a factor that affect the teaching and learning of physics at ordinary level*

This was echoed almost by everyone that was interviewed. If the classroom environment is not conducive no effective teaching and learning takes place. The school administrators were supposed to assist the physics teachers by giving financial support so that students get the right equipment to carry out experimental questions. Most of the schools that the researcher visited during the research had no physics laboratories. T8 complained about not having resources to supplement his teaching. Hands on practices cannot be done since there are no apparatus. At the end of the day he explained that most of the work is lectured. This creates boredom having the same thing over and over again. T7 agreed that boredom can cause frustration and eventually dropping out of students from the physics class.

T1 said *one major factor that affects the teaching and learning of physics is the socio economic factor*

T10 concurred with T1 in that lower social class do not have adequate resources to send their children to do science subjects in general since the school fees are exorbitant especially for the discipline. Rural schools struggle to implement the sciences because of the resources needed. Mostly physics is taught at boarding schools and urban schools where most rural parents cannot afford. This results in low turnout of the students in such a discipline.

4.3.1.2Perceptions on the challenges faced by teachers when teaching physics

T3 said *time is a hurdle when teaching physics since the school uses hot seating so there is limited face to face lessons with the students*

T4 and T9 supported the notion of the shortage of time insisting that it was too little for child centered teaching methods. They outlined that in order to have more time with the learners one has to cross sessions. They will not have access to the laboratory since it will be in use with some other pupils. This issue of limited time has prompted some teachers to settle for teacher centered teaching insisting that pupil centered methods needed more time to be implemented.

T5 said *the school has a challenge of teaching personnel especially physics I am the only physics teacher being helped by some other teachers who are not in the discipline.*

6 teachers agreed with T5 stating that they were less qualified personnel to teach physics even in government schools. This is a very big challenge since the schools will end up trimming students to suit the number of teachers present. At the end of the day few students will end up pursuing the subject. The new curriculum was also a challenge to the teachers available. T6 explained that they were finding it difficult to implement the new curriculum since they lacked skills to do that.

T7 said *the main challenge at this school is shortage of teaching materials and challenges*

This proved to be the biggest hurdle to the teaching of physics. All the respondents were able to support this sentiment since it affected d all of them. Some of the schools that were teaching physics had no standing physics laboratory. Practical are done in classrooms which prompted poor results because of the unavailability of the right equipment. Most of the schools lacked sufficient equipment for the implementation of the competence based curriculum.

4.3.1.3 perceptions on what should be done to improve the teaching and learning of physics

Government should create programs which help improve workforce in the field of physics(T1)

T3 shared the same view as T1. He echoed that the government should provide bursary or scholarships that train more physics teachers in order to rectify the issue of shortage of qualified personnel. Due to the current economy it is difficult for people to send themselves to school so with the help of the government numbers would increase in the teaching industry. T4 was on an idea that the government should source funds in order to buy science equipment which would be used in schools at a low price.

Physics should be allocated the right time as prescribed by the syllabus just like any other subject T3

School administrators should not allocate time for subjects according to their school timetable but should rightfully give the time as according to the syllabus. Compromising the time allocated has been a challenge most of the people who participated in the research outlined. Putting the above into implementation will see the issue of time allocation collapsing.

4,3.2 perceptions from the questionnaire for the students

4.3.2.1 perceptions on the factors affecting physics teaching and learning

Of the 30 students that participated in the study 17 were of the perception that socio economic factor affected the teaching and learning process. This means 57% agreed that social and economic factors affected the teaching and learning process. Many students either dropped out of school or were hanging by a thread due to financial constraints. Many schools are not able to effectively teach the subject due to the shortage of resources.

About 7 students out of 30 were of the perception that teacher experience affected the teaching and learning process. This constitutes to about 23% of the respondents. This maybe as a result that some teacher might have struggled to deliver concepts or to solve problem. The data collected from interviewing teachers tallies with this perception since some of the teachers teaching the subject were not qualified to teach that discipline.

18 out of the 30 students were of the perception that the classroom environment was a major factor affecting the teaching and learning of physics at ordinary level. This constitutes to about 60%. From the interviews conducted on the teachers it can be noted that most of the teachers

agreed to the fact that they had limited face to face lessons with the students. This results in them employing the same method of teaching which may become boring to the students and ruining the classroom environment. Once students are bored no effective learning will take place.

5 out other 30 respondents agreed to the fact that time allocated for the subject too short. The interviews also echoed the same sentiments since some teachers pointed out that the time allocated for the subject was inadequate.

4.3.2 perceptions on teaching methods being employed

80% of the respondents cited that the lecture method was the one that was mostly used at their school. 55 percent of the respondents were used to classroom discussion and presentations. About 11% were allowed to explore on their own. This value shows that the teaching methods used at the school were teacher centered.

4.4 challenges and barriers in the factors affecting physics teaching and learning at ordinary level

This section will present and analyze data findings on the challenges and barriers that participants raised. Whilst the perceptions of participants indicated quite a number of benefits during the research study, they also indicated the challenges and barriers that they considered to affect the physics teaching and learning at ordinary level. These challenges and barriers will be discussed under emerging themes in relation to the findings from the responses gathered from all the two research instruments that were employed in this study. The data on the challenges and barriers

associated with the teaching and learning of physics gathered from interviews and questionnaires was carefully categorized under relevant themes and carefully analyzed.

4.4.1 Time allocation is a major challenge in the teaching and learning of physics. A3 said.

Students echoed that they had limited face to face time with their teachers so it was difficult to catch up if one was trailing behind. There was not enough time to revisit concepts that were difficult for them. Teachers were rushing in order to finish the syllabus other than making students understand. From interviews with the teachers they pointed out the issue of time as a major challenge that affected the teaching and learning of physics. Time allocation weighed the teaching and learning down instead of enhancing the process.

4.6 Discussion

In this section of this study, the researcher combined real-world findings and academic insights on blended learning in high school physics. The project, "An Assessment on the factors affecting in the teaching and learning of physics at ordinary level," examines into how the teaching and learning of physics would be improved. Data from a thorough literature review was used to shape this discussion. The literature review was used as a guide showing the researcher the possible avenues that might have been left by previous researches. Previous researches guided this quest till the very end. A lot of problems and hurdles were met along the way but solutions also loomed from the respondents who gave their all. Research will also suggest ways to solve these problems, based on what the literature says and what has been found in this study. Research questions were kept in mind to guide this discussion

Research question 1

Comparison of research findings and related literature

4.6.1 Factors affecting the teaching and learning of physics at ordinary level

4.6.1.1 Teacher competence

There was clear convergence between literature and the research findings. From the research findings it really showed that some teachers were not competent enough in delivering effectively the knowledge to the learners since some were not educated enough on the subject. Literature alludes that in learning activities the teacher acts as a facilitator, leader, and manager (Mustafa, 2013). Teachers also have a double duty that as a teacher and educator. As teachers they should provide assistance and guidance to the students. The purpose of supervision is to form students' whose characters are appropriate and decent, civilized, and being creative and active and independent in the future (Akhyak et al., 2013). In this era of growing current with advances in information technology and communication, we need qualified teachers that have high competence. The era of globalization, teachers are required to further improve their competence, because the quality of education is largely determined by the ability or professional competence of a teacher.

4.6.1.2 Classroom environment

Students complained much about the classroom environment some saying it was the main reason why they were underperforming. From researches made below the classroom environment was not only a culprit but it determined performance of the students. The first finding of another study revealed that there is significant influence of school environment on teaching and learning of Physics in public secondary schools. This finding agrees with the views of Megan (2012), whose research on school environment in high-risk urban environments indicates that a positive, supportive, and culturally conscious school climate can significantly shape the degree of academic success experienced by urban students". This result is in line with the findings obtained by Olasunkanmi (2014), who in his research on the influence of school l environment on students' academic achievement in Lagos State, found out that students from

rural areas tend to perform poorly while those within the urban areas tend to perform better due to the availability of modern educational facilities.

The second finding also revealed that there is significant impact of infrastructural facilities on teaching and learning of Physics in public secondary schools. This finding is in consonance with the opinion of Hallak (2010) who states that facilities form one of the potent factors that contribute to academic achievement of students in the school system. They include the school buildings, classroom, accommodation, libraries, laboratories, furniture, recreational equipment, apparatus and other instructional materials. He went further to say that their availability, relevance and adequacy contribute to academic achievement of students. He however, quickly added that unattractive school buildings and overcrowded classrooms among others contribute to poor academic achievement of the students in primary and other levels of education.

4.6.1.3 Socio economic factors

It can be noted from the research that most of the students cited social issues the most as a factor. Physics is a subject that is too demanding even to resources. Some school did not have any laboratories due to the economic levels of the school. Literature argues that materials factors such as income play a part in determining levels of education. The lower social classes may lack the money to provide their children with same educational opportunities as middle and upper class parents. This then means that some pupils from low status families fail to perform effectively despite the fact that schools are adequately equipped with resources (Hill, 2014). Caro (2009) is also of opinion that some pupils do not perform well as a result of being constantly send home to collect fees. Consequently, these pupils cannot be in a position to do well although schools have relevant and adequate resources to be utilized for the successful accomplishments of targeted goals and objectives. Matimbe (2014) is of the view that lack of instructional materials such as syllabi and textbooks to use during teaching and learning process negatively affects effective teaching. Najumba (2013) asserts that ineffective funding and budgetary cutbacks is visible in the erosions of standards of teaching.

Question 2

4.6.2 Challenges faced by teachers when teaching physics

4.6.2.1 Insufficiency of teaching and learning materials

Students were able to agree with the teachers on the above mentioned challenge. It was clearly evident even when the researcher was moving around the schools that some of the schools did not have standing laboratories. A study conducted by Nsengimana (2021) regarding opportunities and challenges of CBC implementation in Rwanda reported the absence of laboratory apparatus and lack of teaching and learning materials as the main challenge faced by CBC implementation.

4.6.2.2 Negative attitude towards physics

From the outcome of the questionnaires it really proved that students were not really into physics. Students' negative attitude toward Physics subject was also cited as a challenge teachers experienced in their implementation of physics competence based curriculum using inquiry-based teaching and learning. One teacher said, "Students' belief that physics is a very complicated subject reduces students 'motivation for learning the subject." This challenge was also reported in the study conducted by Ryan and Guido (2013.p. 2087) who stated that "Students perceived physics as a difficult subject during high school days and it becomes more evasive when they reach in the colleges." In addition, they confirmed that the beliefs of students that physics is tough, leads to lack of students' motivation to learn the physics subject.

4.6.2.3 Shortage of time

The issue of time was a challenge both mentioned by students and teachers. The issue of hot seating made it impossible to give enough time to the subject. The syllabus is big it needed more time than the one stipulated by the schools. A study conducted by Gutulo and Tekello (2015) for the purpose of assessing the challenges associated to teaching and learning of physics in the

schools of Wolaita and Dwuro Zones, including secondary and post-secondary schools, reported limited time for making discussions as one of main challenges faced by physics teachers in physics teaching. Furthermore, they reported that due to the shortage of time allocated for each unit, some physics teachers preferred to use teacher centered method of teaching instead of using IBTL.

4.6.2.4 Poor English language for students

English communication is a challenge to the teaching and learning of physics as evidenced by the failure of certain students in actually failing to respond correctly on the questionnaire. Delivering the subject in English is a barrier to many since there are used to their vernacular languages. a study conducted by Lo and Macaro (2012) in Hong Kong secondary schools revealed that poor English did not allow learners to share ideas during the teaching and learning process that caused the lessons to be teacher-centered rather than being student-centered.

Question 3

4.6.3 Ways of improving the teaching and learning of physics at ordinary level

The researcher through this research was able to get hold of a variety of ways in which physics learning and teaching could be improved. Both the teachers and students were able to outline their ways to improve. Amongst them teachers were supposed to vary their teaching methods to stimulate interest amongst the students. The different teaching methods are clearly discussed in chapter 2. Teachers are supposed to marry physics to day to day problems so that students feel the need to study and relate the concept. Students on their side also wanted approaches that put them at the center of the learning. They wanted to interact with themselves and learning in the process. Literature agreed with these strategies. Peer instruction is a cooperative learning technique that promotes critical thinking, problem solving, and decision-making skills (Rao and DiCarlo, 2000). Research shows talking to peers forced them to organize their thoughts and reminded them of the concepts they had difficulty recalling on their own (Gok, 2012). Peer Instruction is an interactive approach that was designed to improve the learning process

(Rosenberg, Lorenzo and Mazur, 2006). This method has the advantage of engaging the student and making the lecture more interesting to the student. It also has the tremendous importance of giving the teacher significant feedback about where the class is and what it knows. For any method to be able to bring good result in the present age, it should be a method that promote maximum social interaction. Social interaction between students and between teacher and student plays a crucial role in learning (Nguyen, Williams, and Nguyen, 2012). These authors further stressed the need for the students to be provided with a supportive, open and interactive environment as this could help them discover knowledge.

In summary the findings of this research are very much in line with literature. They complimented each other so much. Factors affecting the teaching and learning of physics at ordinary level were clearly outlined and ways to improve the teaching learning were provided. The discussion reflects a harmonious blend of the research findings with the related literature, reinforcing the potential of improving the teaching and learning of physics thereby transforming physics education at the ordinary level.

CHAPTER 5: SUMMARY, CONCLUSSIONS AND RECOMMENDATIONS

5.1 Introduction

In this concluding chapter, the most important findings are highlighted, and some recommendations are offered to improve upon the teaching and learning of physics at ordinary level. The study focused on high school physics education in Chegutu. It sought insight into policies and practices that might promote excellence in physics teaching and also improve the number of students (and possibly teachers) involved.

5.2 General Summary

The study looked at the challenges of integrating a leaner centered approach in the teaching area and learning of ordinary Level Physics in Chegutu district.

The study was organized into five chapters. Chapter one constitutes the introduction to the study contains the background information problem statement with relevant research questions objectives of the study and significance of the study.

Chapter two of the study reviewed relevant literature involving the examination of key concepts like principles of learner-centered, perception on learner-centered approach, teacher's role in learner-centered teaching, learner centered techniques, challenges faced during the use of the leaner centered methods of teaching of teaching a d learning and possible ways of overcoming the challenges preventing the implementation of the learner-centered methods.

Chapter three dealt with the methodology of the study and contains the research design, population, sample of the study, sample of the study, sampling techniques, data collection methods, design and administration of research instruments, data analysis procedure and research ethics.

Chapter four presented data collected from primary sources were presented and analyzed with regards to the research questions of the study. Chapter five dealt with the summary of the research findings, research conclusions and recommendations.

5.2.1 Conclusion on the factors affecting the teaching and learning of physics at ordinary level

It has been noted from the research and from literature that physics is detoured by a lot of factors that weighs it down. Teacher competence is a major factor which needs to be examined and dealt with. A lot of physics teachers are not competent enough for effective delivery of concepts to happen. Some appear like the whole syllabus is new. Some incompetence is rising from the fact of remuneration which is peanuts as some would want to call it. The current economic status of our nation is also putting its claws into the teaching and learning of physics. Schools lack adequate resources for effective delivery. The issue of social classes is affecting the physics learners as well as schools. Urban schools are better off in this regard compared to rural school which are far behind in terms of infrastructure and even support from other stake holders like parents. The classroom environment is a factor that was exposed during the research if it is not properly handled it may cause students to lose interest in the subject. A lot of problems emanate from the classroom growing into something bigger and not expected. Teachers held to the same approach of teaching in order to cover up the issue of time. This creates a lot of problems such as monotony.

5.2.2 conclusion on the challenges faced by teachers in teaching physics at ordinary level

A lot of challenges face teachers as they conduct their day to day business in the classroom. Poor English from the side of students is a serious hurdle as pupils cannot understand the language used for instruction. Inadequate resources stretched teachers beyond their limits. This results in them lecturing not engaging students to carry out a hands on approach. Students end up developing a negative attitude towards the subject. Time allocated for physics lessons is not adequate so that the syllabus can be exhausted.

5.2.3 Conclusions on the ways in which the teaching of physics can be improved

A lot of positive responses were given which really gives us hope that the teaching and learning of physics can be improved. Most are given as recommendations in this research.

5.3 recommendations to policy makers

1. The current assessment practices and high teacher workloads should be reviewed so that teachers can spend more time 'teaching' and helping students to learn physics. The subject could be made less demanding by reducing the number of topics/concepts required to be covered in the senior levels.
2. Education providers and other stakeholders of education should make a concerted effort to support and educate more physics graduates for working in the classroom. Part-time pathways could be considered for this purpose.
3. Professional learning programs should be implemented on a regular basis to support teachers in deepening both their content and pedagogical content knowledge to make learning for their students more interesting and relevant.

Recommendations for teachers

1Teachers should employ teaching methods that engage students more so that they learn through hands on

2 It is recommended that, as far as possible, physics teachers integrate mathematics within the physics course to enhance students' understanding and interest in the subject.

3 Physics teachers have the potential to make a significant impact on student numbers participating in further physics studies. How they engage students by connecting with student interests and how they share their passion for curiosity about physics can make a difference to students. The teachers therefore have a responsibility to reflect minds on approaches to teaching and learning in which students can learn and appreciate the beauty of the physics.

4 physics teachers should attend workshops organized by different higher learning institutions so that their proficiency and understanding off physics can be improved

5.4 Recommendations for students

1 Students should involve themselves much during lessons so as to understand concepts better

2 They should read widely in order to enhance their English

3 they should team up in order to practice and to develop problem solving skills

5.5 suggestions for future research

The scope of the study was confined in Chegutu district therefore it is recommended that an extension to other districts would enhance comparative findings that would give more reliable detail

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APPENDICES

PHYSICS STUDENT QUESTIONNAIRE

Dear student

This questionnaire seeks your opinions and concerns on the factors that affect the teaching and learning of physics at ordinary level. The questionnaire is part of a project being completed at Bindura university of science education. Your response will be treated confidentially and will be used for research purposes only. No person or school will be identified in any reports. Thank you for completing the questionnaire. Your cooperation is greatly appreciated.

Please make a tick in the box beside your selected response. Where there are no options given write your response in the spaces below the question

Gender

male	
female	

School type

Private	
Government	

What is your level of study?

Form 3	
Form 4	

Do you agree that the following factors are affecting the teaching and learning of physics? Tick where applicable

	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Teaching experience					
Socio-economic factors					
Classroom environment					

Time allocated for the teaching and learning					

From the teaching approaches below tick where appropriate how there are used in your class.

	Always	Most of the time	Sometimes	Not often	Never
Lecture method					
Discussions and presentation					
Exploring methods					

How do you rate your love for physics out of 10?

……

What do you think should be done to the teaching and learning of physics for it to be more effective?

……
……
……
……
……
……

INTERVIEW PROTOCOL FOR PHYSICS TEACHERS

1) Could you please introduce yourself –your name, school, your personal and educational background

2) What are the factors you think affect the teaching and learning of physics at your school?

3) How do you think physics should be effectively delivered?

4) What do you think should be done in order to mitigate these different factors affecting the teaching and learning of physics?

5) What do you think should be done to improve the quality of physics taught?

SAMED

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BINDURA UNIVERSITY OF SCIENCE EDUCATION

Date: 04/06/24

TO WHOM IT MAY CONCERN

NAME: MUTUNZI RICHMAN REGISTRATION NUMBER: B1130179

PROGRAMME: HBSCIEA-PH PART: 2.2

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

The student has to undertake research and thereafter present a Research Project in partial fulfillment of the HBSCIEA-PH programme. The research topic is:

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

Your co-operation and assistance is greatly appreciated.

Thank you

BINDURA UNIVERSITY OF SCIENCE EDUCATION
DEPARTMENT OF EDUCATIONAL FOUNDATIONS
9 APR 2024
P BAG 1020
BINDURA

Z Ndemo (Dr.)
CHAIRPERSON - SAMED

RELEASE FORM

I understand that the written material and testimonial statements of me are for free and unrestricted use by Bindura university of science education web, media and research activities including but not limited to library etc.

Project title	An assessment in the factors that affect the teaching and learning of physics at ordinary level
Project owner	Mutunzi Richman
Context/purpose	research
Project date	June 2024

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