



BINDURA UNIVERSITY OF SCIENCE EDUCATION
FACULTY OF SCIENCE EDUCATION

**IMPLEMENTATION OF COMPETENCE-BASED LEARNING IN MATHEMATICS
AT THREE SECONDARY SCHOOL IN NEMANGWE AREA, GOKWE SOUTH
DISTRICT, MIDLANDS PROVINCE.**

BY
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**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS OF THE BACHELOR OF SCIENCE EDUCATION (HONOURS)
DEGREE (MATHEMATICS)**

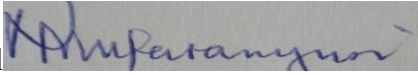
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ABSTRACT

The study sought to explore the implementation of Competence-Based Learning in mathematics. Data collection, analysis and discussion were grounded in a mixed approach. In this study, thirty learners were randomly selected, seven teachers were purposively selected from the sample, three heads of department and three heads of school participated in this study. The collected data were analyzed according to themes derived from the formulated research questions. Findings of the study showed that implementation of CBL are not effective due to a number of challenges. Whilst the CBL is the driving force in the acquisition of skills needed by the learners to be 21st century compliant in the context of education, there are a lot of issues which need to be ironed out. Implementation of CBL is being hampered by several challenges some of them are lack of resources, inadequate funding, improper infrastructure and disengagement of relevant stakeholders among others. I recommend the ministry and all those responsible to consult first prior to the implementation of CBL. Further, the ministry should engage all stake holders if the implementation of CBL is to succeed. Those responsible for curriculum development should mobilize enough funds to ensure successful implementation of CBL. In addition, enough resources should be channeled into schools and adequate training be done prior to the implementation. Teachers should desist from employing traditional teaching approaches during lesson delivery. Lastly, all stakeholders should embrace the CBL for it to be a success.

DECLARATION

I, Mufaranyuri Nyasha hereby declared that, except for references to other people's work which have been duly acknowledged, this dissertation is the result of my research and has neither in part nor in whole been presented in an education programme.

Signed 

Date: 10-07-24

(Student)

APPROVAL FORM

The undersigned certify that they have supervised, read, and recommended to the University for Acceptance and examination a research project entitled: *Implementation of competence-based learning in mathematics at three secondary school in Nemangwe Area, Gokwe South, Midlands*. Submitted by Mufaranyuri Nyasha in partial fulfillment of the requirements for the award of the Bachelor of Science Education (Honours) Degree in Mathematics.

Supervisor:

Date:

ACKNOWLEDGEMENTS

First and foremost, I offer my earnest gratitude to the Creator, my God for guiding me and protecting me throughout the entire process of my learning up this level.

I also dedicate my sincere acknowledgment with gratitude to the critical role played by my supervisor, Mr Gwizangwe for his priceless help and guidance through inspiration and encouragement during all stages of the study. He gave me constant support and motivation with patience to remain focused.

Special thanks to my wife Sithulisiwe who was always by my side supporting me financially and emotionally. I would also like to offer special thanks to my friends Brian Nyamugafata, Jonathan Zulu, and Nora Nyandoro for being my inspiration in giving me unceasing encouragement and attention throughout the course.

DEDICATION

This research is dedicated to all my family members and friends who gave me the courage throughout this research project.

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CHAPTER ONE

THE PROBLEM AND ITS SETTING

1.0 INTRODUCTION

This chapter explores the background of the study which reveals what other researchers have gathered which is similar to this study. It also explains the statement of the problem which indicates the problem under study. Also included in this chapter are the assumptions which the researcher thought will make the study to flow smoothly. Furthermore, this chapter houses the significance of the study which states the benefits of this study. This chapter also includes the research questions, limitations of the study which are the factors that may affect the smooth flow of this study and the delimitation of the study which is about the area of the study.

1.1 Background to the study

Effective mathematics teaching and learning is important not only for the reason of examination and assessment but also to empower learners so that they withstand the ever changing technology and be able to tackle real life and economic problems of the world (Sunzuma& Kakoma, 2022).Mathematics play a crucial part in human life hence a compulsory subject at Ordinary Level in Zimbabwe. This subject integrates well with other subjects like Physics, Biology and Chemistry. In Zimbabwe Mathematics is the requirement for the students to be enrolled into public institutions and for most jobs (Mupa, P, (2015). It is also an important subject in the school curriculum and has been taken to be difficult for learners. Learners' poor performance in mathematics has been causing headaches to stakeholders and educators, which resulted in researchers seeking solutions.

The current world requires that mathematics teachers furnish their learners with the necessary skills to create practical remedies to real-world problems while demonstrating how mathematics can be fully applied in their day to day lives. In doing so, learners can develop an appreciation for the importance and power of mathematics, thus fostering a love for the subject rather than a fear of it (Arseven, 2015). The 2015 world Education Forum in Incheon, in the Republic of Korea with the theme 2030 education for all, set in place global targets that were meant to ensure

inclusive and equitable quality education and promote lifelong learning opportunities for all (UN, 2015, UNESCO, 2015). The global mandated targets were put in place in order to eliminate all forms of discrimination in education by eradicating gender, disability, economic, socio-political disparities at all levels to ensure equal access to all levels of education by 2030 (Incheon Declaration, 2015). Moreover, education for sustainable development and global citizenship by 2030 dreamed of accomplishing a mission intended to ensure that all learners acquire the knowledge and skills needed to promote sustainability in development through education. In 2014 the MoPSE in Zimbabwe went on an all-inclusive comprehensive curriculum reform in order to boost the quality of education so that it meets the international standards (Juliet et al 2021, MoPSE). It is a child-centred approach, hence the competence based learning approach is the way to go. For Zimbabwe to achieve this goal, the MoPSE had to align its curriculum as outlined in the Incheon conference 2015.

Competency based learning is to guide in the development of knowledge, skills and attitudes that are vital for individual and societal development hence should be implemented in the teaching and learning of mathematics. In most rural secondary schools particularly in Nemangwe area in Gokwe South, it seems there is a wide gap between what is required by the competency based curriculum what is done by teachers and learners. Traditional methods of instruction in classroom when teaching mathematics are still dominant. These are teacher centred and learners are being drilled for examination. Most learners lack skills that are essential in tackling real life problems and also relevant for industry. Traditionally, mathematics education has relied on memorisation and repetition, drill and practice, with little emphasis on why things are the way they are or with different approaches to learning mathematical procedures. Students acquire sharp computational skills but generally poorer complex problem solving skills (Nikolas McGehee, 2021). The rising unemployment rate in Nemangwe area where these schools are situated is attributed to too theoretical education which does not develop lifelong skills for sustainable development.

In 2017, a new competency based mathematics curriculum was adopted. The emphasis was teaching and learning of mathematics be learner centred and that multi-sensory principles be applied during teaching and learning process (Sunzuma et al, 2022). With the scheme of empowering learners with skills through implementation of competence based learning approach so that they withstand the ever changing

technology and able to deal with real life problems and contribute meaningfully to the development of the nation. This means that learning is worthless until learners possess skills and knowledge to help them solve real life problems mathematically. Teachers should take the roles of being facilitators and also create conducive learner centred environments that supports learners' construction of mathematical knowledge.

Likewise, the curriculum framework for Primary and Secondary Education for the period 2015-2022 (GoZ, 2015) spells out learner exit profiles at various levels in the education system which describes the acquired skills, values, attitudes and attributes that a learner should possess as a result of their learning. Thus in congruity with the teaching Mission of Education 5.0, the Curriculum Framework (2015-2022) provides for teaching with a view to imparting knowledge and skills among others. With this predisposition towards recognising the prominence of knowledge and skills especially at secondary school level, the Curriculum Framework (2015- 2022) is compatible with the innovation, commercialisation, industrialisation and modernisation agenda as embedded in the Education 5.0. (Wuta, 2022). To achieve this, effective implementation of Competency Based Learning is a virtue especially in mathematics.

Failure of the students has been caused by various factors such as traditional instructional approaches and lack resources (Makondo & Makondo, 2020). The current competence based mathematics curriculum cherishes and prepare learners for life and work, fosters the lifelong learning in line with the opportunities and challenges of the society. It also prepares learners for participatory citizenship, peace and sustainable development (Ministry of Primary and Secondary Education [Mopse], 2015). The competency based curriculum strongly recommends teachers to desist from the idea of teaching mathematics as a set of facts and rules rather than helping learners to make sense of mathematics conceptually as well as engaging learners in mathematical practices such as justification, argumentation and exhibition. This shows that there is a puzzling circumstance in the curriculum implementation as efforts to change classroom practice failed. Whilst this was an essential change, intended to eradicate the content driven curriculum and teacher centred approach, the examinations tested for rote memorisation of facts as a result forcing teachers to stick to traditional methods in their teaching. This study intends to find out how teachers and learners implement the competency based learning approach in mathematics as endorsed in the current competency based curriculum.

1.2 Statement of the problem

The teaching and learning of mathematics in most secondary schools has been characterised by teacher centred approaches which focus on memorisation and Examination scores, stressing that each activity has one, static appropriate answer (White-Fredette, 2010). Learners are not equipped with the skills, knowledge and abilities required to successfully navigate their personal journeys in learning, living and working. Learners need to use and develop competencies when they encounter unfamiliar or challenging situations life. Learners lack mastery of competences which bring together a combination of academic knowledge, critical thinking, problem solving, communication and collaboration. Teachers give learners paper –pencil tasks using text books resources and avoiding real life problems (Bethell, 2016). Since traditional methods of teaching and learning relied on memorisation and repetition, drill and practice, learners lack mathematical literacy that is the ability to apply mathematical knowledge to real life problems, hence this study will bring about critical view of competence –based learning in the mathematics classrooms particularly the implementation part to ensure proficiency in learning by learners through demonstration of knowledge, skills, values and attitudes required for dealing with real life situations.

1.3 Research questions

- 1) How does the implementation of competence-based learning in mathematics impact students' problem-solving abilities?
- 2) What are the key factors that contribute to successful implementation of competence-based learning in mathematics classrooms?
- 3) What are the challenges and barriers faced by teachers in implementing competence-based learning approaches in mathematics education?

1.4 Objectives of the study

The research objectives for this study are:

1. Explore the extent to which competence-based learning in mathematics impact learners' problem-solving abilities.
2. Examine key factors that contribute to the successful implementation of competence-based in mathematics classrooms
3. Determine challenges and barriers faced by mathematics teachers in implementing competence-based learning approaches in mathematics education.

1.5 Assumptions

The study assumes that the participants will give credible information to the researcher. Furthermore, there is an assumption that teachers have a basic knowledge about competency based curriculum, enough to enable them to respond appropriately and give useful information regarding this research study.

1.6 Significance of study

This study will help to empower teachers with pedagogical approaches that are learner centred and aligned to teaching approaches that are endorsed in the competency based curriculum. Furthermore, this study will aid to find strategies that can be employed in order for teachers to be able to implement the competence based learning approach effectively in the classroom. In addition to that, learners will be empowered with a broad range of skills beyond academic knowledge. This stud will help schools and other stakeholders to come out with solutions that will help learners to acquire lifelong skills that will help them withstand the challenges ushered in by the ever changing world demands. The learners will be helped to learn to apply knowledge in real life situations. This study will help learners and teachers to realise the benefits of the competency based approach.

1.7 Limitations of the study

This study is likely to be limited by lack of cooperation of participants. Furthermore the researcher may face challenges of lack knowledge on the part of the participants. Also, the participants may give false information about what researcher is researching about. This study may be affected by the issue time that is the time set to complete this study may not be enough. In addition to that, the researcher is also engaged in other duties assigned to him by the school authorities and this may affect this study. This study may suffer financially because it lacks funding. Also the teachers may be concerned about covering the Zimsec syllabus and they may not be interested to take part in this study.

1.8 Delimitations of the study

One of the delimitation of this study is that it is restricted to only three secondary schools in Gokwe South District, Midlands Province of Zimbabwe. The choice of these schools is strongly influenced by the proximity, familiarity and accessibility to the researcher. Therefore the researcher is familiar with the area of study and has easy access to the needed information that makes it easy to efficiently collect data. The study will be conducted with Ordinary Level learners and Mathematics teachers. Moreover, the study will focus on the implementation of competency based learning in mathematics.

1.9 Definition of terms

Competency based learning or competency based education is an outcome based approach to education to ensure proficiency in learning by students through of knowledge, skills, values and attitudes required for dealing with real life situations. It promotes the application of knowledge in real life situations. Competency-based learning emphasis on what learners are expected to do rather than mainly focusing on what they are expected to know. In principle, such an approach is learner-centred adaptive to changing needs of students, teachers, and society. (Chunga, 2020)

Competence is a general readiness to establish a connection between knowledge and a situation to form a procedure for solving a problem, some kind of separate

requirement for the educational readiness of the student. Educational competence is the student's readiness to use the acquired knowledge, skills and abilities in life or his ability to carry out practical activities. (Zikizova et al, 2021).

1.10 Chapter Summary

This chapter will present and discuss the introductory issues and background on implementation of competency based learning in mathematics. Arguments for the application of competency based approach in teaching and learning based on learners' acquisition of mathematical skills and knowledge will be presented. The statement of the problem will be developed and key concepts to be used in the study will be introduced.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

This section presents the review of related literature which is critical for understanding the implementation of competency based learning in mathematics in Zimbabwe. Competence-based learning approaches have attracted popularity among stakeholders in the education sector worldwide. However researchers have indicated that various nations which adopted the competency based curriculum based approaches to teaching and learning have met a number of obstacles which have derailed the smooth and fruitful implementation of the curriculum. Implementation of curriculum is not a new phenomenon in the world because various countries are already in their progressive stages of the same new development globally. For instance, Finland is at the core of implementing the 21st century in all schools and teacher's training institutions through a well-organised national curriculum at both local and national stages (Tiago, 2023). What seems to make an exceptional difference in Zimbabwe is that implementers (teachers) of the CBL in states such as Finland, Japan, Germany, Singapore, China and Canada are given number one priority and attention when it comes to facilitation.

2.1 Theoretical Framework

This section centres on the theories that contribute to the lens through which the issue under discussion will be interrogated. The theories that are going to be discussed are constructivist and cognitivist theories respectively. These theories contribute toward the formation of the lens through which the issue under discussion will be discussed.

2.1.1 Constructivist

Constructivist theory supports competency based learning by emphasising that learners construct their own knowledge and understanding through active participation and experience (Brame, 2016). It fosters learner centeredness in teaching by focusing on learner's needs, interests and experiences. Constructivist theory encourages active learning where learners are engaged in the learning process. It puts more emphasis on hands on experience which is reflected in competence- based learning's focus on real world applications and performances

and also encourages learners to take ownership of their learning process. By aligning with constructivist theory, competence-based learning acknowledges that learners are active participants in the learning process, constructing their own understanding and competence through experience and reflection (Sithole et al, 2021).

2.1.2 Cognitivist

It focuses on information processing by the mind. The mind is like a computer, it inputs, processes, stores and retrieves information. It involves mental representations that is learning involves creating mental models, schemas and frameworks to organise knowledge (Anderson, 2016). It also fosters active learning that is learners actively construct their understanding through experience, discovery and problem solving which is the basis of competence-based learning. Cognitivist focus on thinking, which means it encourages critical thinking, problem solving and reflection. These are also the attributes of competence –based learning. It also put emphasis on learning which means that learning is more meaningful when learners connect new information to their existing knowledge and experiences.

2.2The concept of Competence-Based Learning

Competence- based learning is a learning framework that focuses on the learning outcomes and real world performance. According to McGehee (2021), it is the learner-centred approach that blends elements of of constructivist philosophy, 20st century skills education and flexible learning models.

The CBL methods are different from traditional teaching methods in pacing, structure, and goals. The main thrust is not drilling learners for exam or prepare them for a specific career, but rather master skills that will equip fully for life ahead of them. CBL goes beyond the classrooms, teaching and learning approaches aims or life-long skills that help learners solve complex real life problems. A learner is said to be competent if they have specific skills and knowledge needed to perform real life task. (Cheptoo and Ramadas (2019).

Competence based learning in mathematics in Zimbabwe aims to improve learner understanding and application of mathematical concepts, develop problem- solving skills and critical thinking. It also prepares learners for real world applications and challenges and also

reduce the gap between theory and practice in mathematics. By adopting competence-based learning, Zimbabwe aims to produce mathematically literate learners who can solve problems, think critically and adapt to an ever changing world (MoPSE, 2017). Like various educational reform initiatives, CBL aims to promote equality in education systems and attainment gaps among learners (Evans et al, 2019), to identify and nature the unique intellectual, emotional and physical abilities of all individuals to lead prosperous lives.

2.3 Relevance of Competence-Based learning

According to MoPSE (2021) cited by Chanda and Murebwa (2023), CBL was adopted to dismiss rote learning which dominated the education fraternity from the days of colonial era. For the Ministry of Primary and Secondary, the competence-based learning was the driving force to facilitate the development of lifelong learning habits and accession of relevant real life skills required by industry and commerce. In Zimbabwe, the main thrust of competency based learning is to establish strong scientific, mathematical and technological oriented learners that adapt to the demands of the ever changing global village. According to Walde, (2016) the adoption of this initiative necessitates the teaching and learning in the classroom to reflect on and cope with the societal developments that cherish hands- on application of knowledge, skills and competences as per the demands of the industry. Furthermore, competence based learning is the best option for providing skills that advance the requirements of the skills agenda and life in the 21st century(Cheptoo and Ramadas, 2019). It is apparently clear that the significance of the competence-based learning cannot be contested as it was adopted to address the weaknesses of the content based curriculum whose products are too academic, lacking skills and knowledge in it applicability as required by the skills agenda and life in the 21st century (Mugabe 2015, cited in Chanda and Murebwa ,2023).

2.4 Implementation of competence- based learning in mathematics

In unison with the government's Nziramasanga Commission of 1999, the Ministry of Primary and Secondary Education was authorised to look into the secondary and primary education structures to match the targets of education in the context Zimbabwe Agenda for Socio-Economic Transformation(ZimAsset) which is the national obligation of the

government of Zimbabwe (Gondo et al, 2019). Therefore, the main thrust was on the implementation of the CBL to achieve the set goals. School curriculum is all about experiences needed of a learner for all round development (Lopez, 2016). It is a certain type of specification about the practice of teaching and learning and is not about content coverage rather application of what has been learnt (Esau and Mpofu, 2017). In addition, curriculum is a specification about the practice of teaching which includes learners' experiences. Experience contains knowledge of or skills of something or some events gained through engagement in or exposure to that event. Curriculum developers have argued that curriculum making either at the level of development, design, implementation or reformation needs the inputs of all critical stakeholders.

According to Gondo et al, 2019, it is important to note that, it is one thing to design a curriculum and also another thing to implement it effectively and efficiently. It is observed that no matter how good a curriculum is planned, designed and documented, proper implementation is of great importance. For the CBL to be fully implemented, the following but to mention a few 2015-2022 curriculum objectives should be achieved: encourage long-life learning, develop young Zimbabweans who re knowledgeable, can think critically, and have leadership skill and able to communicate effectively, integrate and reinforce a strong scientific and technological bias and foster life-long learning and prepare learners for participatory citizens for the development of Zimbabwe (MoPSE, 2017).

To achieve any of the above stated objectives, effective implementation of CBL cannot be over emphasised. This demands powerful efforts from end users for effective implementation at all levels in order to achieve the desired goals. According to Kurasha and Chabaya (2023) cited by Gondo et al (2019), curriculum implementation is putting curriculum into work for attainment of goals for which the curriculum was designed. This means the transition of objectives of the curriculum from paper to practice. Lastly, based on Maba (2017) curriculum implementation is the process of putting all that have been planned as curriculum document into practice in the classroom through the combined efforts of teachers, learners, school administrators, parents as well as interaction with physical facilities, instructional materials, psychological and social environment.

2.5 Challenges faced in the implementation of competence based learning

Like many countries in the world, Zimbabwe has challenges to be faced by stakeholders in the implementation of the CBL. The relevant literature is in agreement with the above statement and Zimbabwean schools are likely to encounter the same challenges faced by other African countries and beyond.

In the context of Ghana, Acquah et al (2017) asserts that implementation of competency based learning had put up vastly to the training of graduates with skills and knowledge needed in the industry. In addition to that, the study pinpointed that in spite of the noted positive results, this initiative had not been effectively implemented in some of the training institutions due to inadequate funding, lack of infrastructure development, insufficient training on CBL, and deficiency in policy guidelines. The results from this study imply that implementation of CBL can be challenged by a number of factors in schools, therefore, there was need for a research to be conducted in Zimbabwe to unpack the challenges that hinder implementation of CBL in schools.

According to Chanda and Murebwa, there was a clear proof that the teachers didn't fully comprehend the competence- based learning although they had started using it in their teaching. The common position was that are not completely directed on the way to go although they are theoretically accustomed to the concept. They made their way clear that they were not comfortable with the practice because of unavailability of resources, large class size and unclear manuals on how to implement competency based learning. Furthermore, there is clear evidence that the competence-based learning was imposed and hastily implemented in Zimbabwe Primary and Secondary schools with little groundwork having been put into place leading to a lot of confusion among stakeholders. Finally, it has become clear that teachers have little or no knowledge to implement the competence based learning and still struggling to make the ball rolling. The other challenge is lack of proper guidance and no strict monitoring. The research done by Ndongwe et al (2024), pointed out inadequate in-service training as one of the major obstacles. Another challenge to the implementation of competence based learning is unavailability of resources. There are no CBL material and enough teachers. The shortage of teachers is forcing teachers to teach subjects they are not trained to teach and having overcrowded classes is another challenge. Poor understanding of assessment methods was also highlighted as another barrier.

This is in consistency with Sithole et al (2021) when he stated that teachers were not ready to implement competence-based learning because it was imposed on them without consultations being done. Ali and Ajibola (2015) shows that teachers are not included when decisions on matters concerning their welfare are made. Teachers could not properly implement the competence-based learning since they lack guidance and knowledge on how to implement this new development. Findings revealed that the other challenges in implementation of competency based learning in Zimbabwe was too many activities were made and this crippled the smooth start of the program. Literature agrees that teachers are overloaded and this negatively impacts the implementation of this initiative. The introduction of competence-based learning in Zimbabwe was discouraged by lack of both human and material resources. Results reveals that poor schools were the worst affected and they lack funding therefore incapable of funding teachers for attending workshops and as well as increased load on both teachers and learners. This incited resistance to the implementation of the competence based learning. Dube and Jita, (2018) agree that teachers had problems in syllabus interpretation lacked resources hence not equipped to successfully implement competence based learning.

Studies done in Tanzania to evaluate the implementation of competence-based teaching and learning have proved that there is very little use of this teaching approach (Komba and Mwandaji, 2015, Makunja, 2015). The following defects were revealed in the implementation of competence-based teaching and learning in Tanzania. To start with, quite a number of teachers (more than 80%) do not possess proper comprehension of the concept of competence-based teaching and learning. Furthermore, many of the teachers proceed to use traditional knowledge-based teaching and learning methods. Also, the way they assess learners is still biased towards knowledge-based teaching and learning that is pen and paper. The other issue is that teacher-centred methods of instruction are still used. The implementation of competence-based in Tanzania is derailed by several obstacles mainly, overcrowded classrooms, poor infrastructure, pregnant curriculum, teachers resistance to change, teachers not well versed with the competence-based curriculum, lack of career choices at early stages of education, teaching and learning facilities are scarce, low morale on the part of teachers and lack of flexibility of the education policies and guidelines. This concurred with Gondo et al. (2019) when studied issues surrounding the competence based curriculum in Zimbabwe and found that infrastructure scarcity was a barrier skidding fruitful implementation of competence based learning.

The research conducted in Uganda by Charles (2023), noted same challenges as those in Tanzania's schools. The study identified obstacles that hamper the implementation of competence based teaching and learning, teachers not trained on the curriculum, text books for the new curriculum were in scarce hence hindering the implementation of competence – based curriculum. The findings n shows that teacher –learner ratios were unbearable, 1: 70 in one classroom hence a threat to the implementation. Teacher training and professional development, availability of resources, lack of funding, lack of stakeholders' involvement, inadequate monitoring and supervision, lack of infrastructure and resistance to change were also noted as challenges to the implementation of the CBC. The review also highlighted the significance of efficient leadership, teacher incentive, and engagement of learners during teaching and learning in promoting fruitful implementation. The review identified the need for collective effort to cheer CBC implementation in Uganda, specifically through targeted training and support for teachers and stakeholders and raised investment in resources and infrastructure. According to the results, it recommended that all secondary schools and the government guarantee that teaching and learning resources are there at the school premises, prudent training of personnel to promise comprehensive implementation of educational policy and the engagement of all stakeholders and the part and responsibilities should be explained in a simple and understandable manner. This agrees with Murangamwa , (2017) when he observed that the implementation of the competence-based learning in schools promoted disorder among teachers since it was done in a hurry by the government.

In 2015, Ministry of Education in Rwanda announced an introduction of a new curriculum to be implemented in primary and secondary schools from 2016. According to Mutsinzi et al (2017), competence-based learning emphasises creativity and application of knowledge and skills instead of acquiring and accumulating them. The researchers studied how teachers receive CBC and interpret it into the lessons. The results from five mathematics lessons under the case study show that the teachers laid down the objectives, planned activities and expected competences in their lesson plans in line with the CBL guidelines. However, the activities by teachers diverted from mastering prerequisite knowledge, understanding and skills used to develop competencies. The analysis signalled that more questions were connected to task presentation and giving instructions. There were few regarded essential for nourishing mathematical thinking or attitudes. Ndayambaje (2018) highlighted that all teachers were trained on how to implement the CBL but some were resisting change. Consequently, they continued using the old materials and approaches. Further, he pointed out

inadequate teaching and learning materials as another hindrance to effective implementation of CBL in Rwanda.

In a study on the successes and challenges of implementing the CBL in Kenya, Owala (2021) pointed out that Kenya implemented the CBL in 2016 to equip her citizens with appropriate knowledge, skills, values and attitudes, however insufficient learning and teaching material were very serious issues affecting the implementation of CBL in Kenya. This is in agreement with Momanyi and Rop (2019) in their research conducted in Bomet East Sub-County which aimed at establishing obstacles encountered by educators in implementing CBL. The outcomes indicated that teachers are deficient in knowledge and skills on ways to implement the CBL, which was a huge factor hampering fruitful implementation of the CBL. The study by Sifuna and Obonyo (2019) looked into the barriers derailing successful implementation of CBL in Kenya. It was confirmed that the CBL was not carried out in a haphazard manner. There was partial training of teachers on the CBL. Further, it was pointed out that inadequate instructional material and shortage of participation of stakeholders in the curriculum process.

In agreement, Akala (2021) emphasises that there were gaps in the preparations of books and again delays in the publication of books and it was hard to find books for certain classes hence worked negatively on the implementation of competence-based learning. Further, it frustrated both learners and teachers who were in dire need for such materials. This makes it relevant to this study since the same problems may also apply to the schools in Zimbabwe. The study recommended the Ministry of Education in Kenya to create an adequate framework for training teachers, mobilizing resources and engaging all stakeholders. A research conducted by Sitenei (2020) looked into how school based factors affected implementation of CBL in schools in Kenya. The findings reveal that teachers received inadequate training on the new curriculum. The other obstacle met was that the time was not enough for the CBL lessons given large class sizes. It was reported that most schools had no or insufficient resources for implementing the curriculum. Further, the findings revealed that the public schools were overcrowded in Kenya since the teacher learner ratio of 1:80 was a burden for teachers hence difficulties in managing learners discipline, teaching and learning as well as methods of instruction.

In the context of Zimbabwe, studies conducted by Shoko (2022) pointed out that school heads were astonished by the announcement to introduce CBL since they saw no need to

introduce it. They expressed ignorance about this initiative. The heads noted that the demands of the CBL were a burden on their schools which were already struggling with funds. They felt that the exercise was done in a haste therefore no proper planning was done for the fruitful implementation of the CBL. This is in agreement with Muranganwa (2017) when he observed that government's haste in implementing the competence-based learning in schools created confusion among teachers. Zhangazha (2017) asserted that the ministry's approach to educational planning negatively affected the implementation of the CBL. The studies conducted by Gondo et al (2019) on issues surrounding the updated secondary school curriculum in Zimbabwe revealed that infrastructural provision was a big hindrance derailing successful implementation of competence-based learning in Zimbabwe. Therefore, it relevant to carry out this study in the school under study sine the same findings by other researchers may be the same with the outcomes from this study.

2.6 Chapter Summary

Chapter two introduced the theoretical base on which the study took reference. The study also looked at the implementation process of the CBL as well as challenges faced during the course of implementation. The following chapter looks at the research methodology used to provide answers to the formulated research questions.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 INTRODUCTION

This chapter presents and describes the research methodology that was used in this study. The study was championed by a mixed method approach and a pragmatist philosophical paradigm. Mixed methods incorporate both qualitative and quantitative research and data in a single study. This alliance of two dominant research genres has the power to overcome the shortcomings that comes with one single method and therefore offers more validity and reliability of findings of the research (Hafsa, 2019). The study outlines research design, instruments, population, sample and sampling techniques, and data collection procedures and data analysis.

3.1 Research Design

This research engaged a mixed method research to explore implementation of competence based learning by mathematics teachers in their teaching and learning. There are many types of research designs, but the one which is employed for this study is a case study research design. According to George (2023), mixed methods harnesses elements of quantitative and qualitative research can help to get more complete picture than a single qualitative or quantitative research as it unites benefits of both methods. Hafsa (2019) asserts that mixed methods is a union of the two dominant research genre and has a potential to overcome the one single method hence offers more validity and reliability of the findings of the research.

The purpose of the mixed methods research is to give a more strong understanding of a research problem than can be attained when they are employed in isolation. Mixed methods research aims to provide a full and detailed comprehension of the research problem, allowing researchers to get more valid and true conclusions, make more informed decisions develop more effective interventions and policies (Hassan, 2024). The main advantages of the mixed methods research are flexibility, addressing limitations, validity, generalizability and triangulation.

3.2 Instruments

Interviews, questionnaires, document and observations were the instruments which were used in this research study. The questionnaires were for collecting data from learners, interviews were for collecting data from teachers.

3.2.1 Interviews

Interviews have long been the most common technique for qualitative research that are normally used in case studies because many of them are human matters that can provide insights into a multifaceted situation. In this research study, unstructured (open ended questions) were used. The reasons are that they are flexible since they help to gather detailed information on the implementation of competence based learning in mathematics. The respondents feel more at ease and can collect rich qualitative data (George, 2022).

3.2.2 Questionnaires

Questionnaires stand as a versatile and simple tool for quantitative data gathering across research domains. In this study, learners completed the questionnaires. They have advantages: their structured format facilitates standardised data collection, organisation and analysis. Cost effectiveness, accessibility and ability to reach broad and diverse population (Kaphanga (2024). Questionnaires are preferred in this study because they are a relatively simple way to collect data and reduce time and resources as well as being simple for a larger group (Berkovic (2023). In addition to that, questionnaires were used because they are the best to provide information about views, attitudes, motivation and opinions about how learners' perspectives about competence based learning. Open-ended questions had their share in the questionnaires since they have no definite responses and answers were recorded in full. The advantage of open ended questions is the potential for richness of responses and some of which might not have been anticipated by the researcher. Furthermore, the use of questionnaires in this study made it feasible to use different categories of items that were open and closed on the same questionnaires; this facilitated the provision of rich data as well as obtaining both qualitative and quantitative data. More so, response choices in closed reduced ambiguity, and participants answered questions that the researcher really wanted them to answer. Questionnaires are faster to complete and therefore more efficient, as a result they produce quick results.

3.2.3. Observations

Observation is a type of qualitative research method which not only included participants but also covers ethnography and research work in the field. It is a type of research tool where the behaviour of individuals or groups in their natural setting are observed and recorded. It is a process of collecting and recording data by observing and noting events, behaviour and phenomena in a systematic and objective manner (Satapathy, 2023). In the observational research design, multiple study sites are involved. During the course of this study time was allocated for observations. The researcher observed learners and mathematics teachers during teaching and learning sessions to find out if competency based learning is integrated in learning activities and attitudes of learners toward mathematics. Observations have their own advantages. They are direct and can collect data at the time they occur. They are also useful for framing hypothesis and testing accuracy. Furthermore they help in situations where there are language barriers.

3.2.4. Document analysis

Document analysis is a systematic procedure used in qualitative research to review and interpret the information embedded in written materials (Kautsyuruba, 2023). During the course of this study, data was collected through documents. Some of the documents which were examined are national mathematics syllabus, Mopse curriculum framework 2015-2022 handbook, schemes of work, text books and learners exercise books to find out if emphasis on competency based learning is being honoured. According to Hassan (2024), document analysis provides additional evidence to support or challenge the findings of the study. Document analysis enhances the validity of the research and provides physical evidence. It also offers valuable information. Document analysis unveils the richness and depth of the information housed in the documents, providing a unique dimension to research findings. Its purpose is to generate actionable insights.

3.3.1 Study Population

To explore the implementation of competence based learning the participants were drawn from the entire unit of people to be considered for the research (Villegas, 2020). The participants for the study were about 300 Form 4 learners and 9 mathematics teachers at three secondary schools in Nemangwe area. Mathematics teachers have the requisite knowledge in the teaching and learning of mathematics, since they are all trained to teach mathematics. Both the teachers and some of learners had the chance to participate in the curriculum review that took place recently as a result they have a glimpse of competency based- learning.

3.3.2 Study sample and sampling techniques

Studying every person in the study population more or less impossible, hence there is need for sampling (Mcleod, 2023). The sample in this study was seven teachers and thirty O-level learners.

3.3.2.1. Quantitative sampling techniques

Stratified random sampling were employed to select 5 mathematics teachers and 30 form 4 learners. According to Jain and Chetty, (2020), there are two types of stratified sampling that is proportional and disproportional sampling techniques. In the proportional stratified sampling which was employed in this study, the numbers of participants to be selected was proportional to the sizes in the population. Proportional stratified random sampling was employed in this study to assure the mathematics teachers and all Form 4 learners in the sample have the equal chances of being selected so that the research results be could be generalised from the sample of the population (Thomas, 2023). Stratification made it possible to stress some control over the choice of the sample so as to assure the inclusion of vital participants. For this study, gender was stratification variable, teachers were divided into a group of all females and males respectively. Based on this view, random samples of mathematics teachers were drawn from each of the two group (male and female) using random sampling technique with the aim to explore the implementation of competence based learning in mathematics.

The lottery method was employed in this study and is one of the ways to draw simple random samples (Thomas, 2023). To create a sample, numbers are picked randomly, with each number corresponding to a subject or item. Each teacher within the female group and also those in the male group will be assigned a number. The numbers were placed in the two gender- based boxes and the same applied to the learners. The blind folded researcher picked the numbers from the box and those whose numbers were picked were the sample. The compilation of the two random samples constituted the stratified sample of seven teachers (all male) and 12 male learners and 18 female learners. The other category of participants constituted three heads of school (one female and two males) and three heads of department (all male). A random stratified sample is valuable combination of randomisation and categorisation that allows both qualitative and quantitative methods of research to be employed. (McCombes, 2019).

3.5 Data collection procedures

On the data collection procedure, I obtained an introductory letter from Bindura University of Science Education, Faculty of Education. The introductory letter enabled me to seek permission from the Ministry of Primary and Secondary Education to carry out research on selected schools. I then went to the selected school and sought for the permission to carry out the study at their school and was granted. Then I used the stratified random sampling technique to select the willing participants. Interviews, questionnaires, observations and document analysis were used to gather data. Before the commencement of the study, issues to do with research ethics were spelled out.

3.6 Data presentation and analysis procedures

According to Junyong and Lee (2017), data are usually gathered in a raw form and thus inherent information is difficult to understand. There raw data need to be summarised, processed and analysed. In this study, the techniques of data presentation were in the form of text, tables and figures. A detailed analysis which reveals both quantitative and qualitative analysis was compiled. Text is the principal method of explaining findings, outlining trends and providing contextual information. A table is best suited for representing individual information both quantitative and qualitative information. The text, tables, and figures for information data and information presentation are very powerful communication tools. They can make an article easy to understand, attract and sustain the interest of the readers and efficiently present large amounts of information.

3.7 Chapter Summary

The researcher described the research design which explains how the research is going to be conducted. Furthermore, the research instruments which will be employed to collect data are all included and the procedures to be used to collect data are there in this chapter. An estimate of the study population and samples is also well described. The sampling techniques are also given and explained in detail. The researcher gives a detailed explanation on how the data to be collected is going to be presented and analysed.

CHAPTER 4

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.0 INTRODUCTION

This chapter focuses on data presentation, analysis and discussion. The purpose of this mixed method was to explore the implementation of competence based learning in mathematics. Three heads (two male and one female) were interviewed. Six male teachers were interviewed and observation of the methods of teaching and documents used and learners' exercise books was done. Thirty learners (twelve male and eighteen female) completed the questionnaires. As alluded to in chapter 3 and consistent with the ethics in research, privacy was observed except for one HOD from one school who didn't bother about privacy. Therefore, the categories of participants were coded SAH, SBH, SCH (for school heads from three schools A, B and C), SAHOD, SBHOD and SCHOD (for heads of department from schools A, B and C), SAT, SBT and SCT (for teachers from schools A, B, and C), SAFL, SBFL and SCFL (for female learners from schools A, B and C) and SAML, SBML and SCML (for male learners from schools A, B and C). The research findings presented below came from the analysis of two data sources which are questionnaires (open ended questions) and interviews. After a qualitative data analysis methods were used to gather data as indicated in chapter three the two data sets were joined and three themes that emerged are indicated in Table 4.1.

Table 4.1: Themes and sub-themes

Main themes	Sub-themes
1. How does the implementation of competence-based learning impact students' problem solving abilities	-Significance of competence based learning in mathematics on students' knowledge and skills -Specific competences developed through competence based learning -The extent to which competence based learning address diverse learning needs and abilities of learners -Assessment of learners
2. What are the key factors that contribute to	-What support systems do teachers need to

successful implementation of competence based learning in mathematics classrooms	successfully implement competency based learning -What resources and infrastructure are needed to support competence based learning
3.What are challenges and barriers faced in implementing competence based learning in mathematics	--Systematic and structural barriers to implementing competence based learning -How familiar are you with competence based learning -What is the average teacher-learner ratio in class.

4.1 Characteristics of the participants

Analysis of generated data was done using thematic approach in which data is grouped in terms of sub-questions. This section looks at the demographic characteristics of participants, which is the FORM 4 learners, teachers, Hods and heads of school

Table 4.2 Demographic characteristics of selected learners (n= 30)

Attributes		n	%
Sex	Female	18	60
	Male	12	40
Age range(yrs)	15-16	10	33
	17-18	16	54
	19+	4	13

Table 4.3 Demographic characteristics of selected teachers (n=7)

Attributes		n	%
Sex	Female	0	0
	Male	7	100
Professional qualifications	Diploma in Education	2	29
	Degree in Education	5	71
Teaching experience(yrs)	0-5	2	29
	6-10	2	29
	11-15	2	29
	15 +	1	14

Table 4.4 Demographic characteristics of HODs (n=3)

Attributes		n	%
Sex	Female	0	0
	Male	3	100
Professional qualification	Certificate (semi-skilled)	1	33
	Degree in Education	2	67
Years in that position	1-10	1	33
	11-20	2	67

Table 4.5 Demographic characteristics of Heads (n=3)

Attributes		n	%
Sex	Female	1	33
	Male	2	67
Professional qualification	Degree In Education	2	67
	Masters in Education	1	33
Year in that position	1-10	2	67
Years in that Position	11-15	1	33

4.3. To what extent does the implementation of competence- based learning in mathematics impact students' problem solving skills?

4.3.1 The significance of competence based learning in mathematics on students' knowledge and skills.

Teachers, Heads of department and Heads of school stated that the impact of CBL on students' problem solving skills is improving transfer of learning i.e by focusing on application of mathematical concepts to real life problems. Students develop the ability to transfer their learning to new situations.

SBHOD had this to say:

In addition, another participant highlighted that:

CBL facilitate the development of lifelong learning habits and acquisition of appropriate real life skills (SCH).

In the same vein, another participant had this to say:

The aims and objectives of CBL is to equip learners with skills and knowledge for real life situations (SAT).

Another participant gave a different response:

I'm not yet taught about the aims and objectives of competence based learning (SBT3).

The responses given by the Heads, hods and teachers reveal that they partially understood CBL although they can state the expected objectives of the CBL. This is in line with UNESCO (2015) competence based learning is the driving force through which a nation can equip her people with skills, knowledge and values that will help them cope with the demands of the global village which is characterised by advancing technology. In addition, IBE-UNESCO (2017) highlighted that CBL makes learners to perform practically and measurably, using the skills acquired through learner centred approach. In a related development, Owala (2021) pointed out that Kenya introduced the CBL in 2016 for her citizens to get relevant knowledge, skills, values and attitudes through education with an aim to give learners the power to get, improve and apply knowledge, values to real life situations.

4.3.2 Specific competences developed through competence based learning

The learners, teachers, Heads of department and Heads of schools could identify some competences in CBL.

SAML3 stated this in the questionnaire:

Competences developed through competence based learning are critical thinking and problem solving skills.

This was in agreement with another SBFL5 who pointed out this in the questionnaire:

Competences developed through competence based learning are critical thinking and problem solving skills.

The findings show that learners know the competences developed through CBL although they stated on one of the core competences. This is in agreement with Mugo and Kariuki(2020) where they asserted that the CBL is purposed towards developing critical thinking, problem solving, communication, and collaboration skills among learners.

In addition, SBH had this to say:

Communication skills, creativeness and use of ICT are some of the competences developed through competence based learning.

The response by the head above reveals that they have an idea on CBL and could identify some of the competences. This is in unison with Nkambwe et al (2019) when he pointed out that CBL's thrust development of soft skills such as teamwork , communication and leadership.This was supported by Kabita et al (2017) when he stated the core competences of CBL which are communication and collaboration, critical thinking and problem solving, creativity and imagination among other competences.

The other SAMI highlighted that:

I have never heard of this thing.

The response by the learner shows that the learner is not aware of the curriculum they are doing. This means that the learners were not informed about the curriculum. This may be due to lack of knowledge on the part of the teachers.

SCT indicated in his scheme the competences developed through competence based. Below is part of his scheme:

WK ENDIN G	TOPIC/ CONTEN T	ASSUMED KNOWLEDG E	OBJECTIVES Learners will	METHODOLOG Y/ ACTIVITIES	CROSS CUTTING THEMES	COMPE TENCE S	MEDIA	SOM	EVALUATION
11	SIMULTANEOUS EQUATIONS	Solving equations	-Solve simultaneous linear equations using elimination method	-Tr introduces and demonstrate solving simultaneous linear equations using elimination method. -Learners solve equations in groups -Feedback -written work	ICT -Communication -Gender -Values	analysis -critical thinking	Work cards	Syll pg 46 Ngn 3 pg	The lessons were conducted as per schedule. Substitution method was done well by most learners.
12	Elimination method	Solving simultaneous equations Elimination method	-Solve simultaneous equations with fractions using elimination method	-Recap of previous lesson -Tr demonstrates solving simultaneous equation with fractions -Learners work in groups -Feedback -Written work		-critical thinking	w/ cards	Syll pg 46 NGM 3 pg	Elimination method was a little bit difficult to most of the learners. Tr will give extra work to learners for practice. Substitution very easy to most of the learners and they did well.
13	Substitution method	Elimination/substitution	Solve simultaneous equation using substitution	-Recap of the previous lesson -Tr introduces substitution method					

Fig4.1 Part of scheme-cum plan

4.3.3 The extent to which competence based learning address diverse learning needs and abilities of the learners

SBH had this to say:

To a larger extent. The attributes of this initiative are that it fully equips learners for the future, fosters creativity, and promotes, self-directed learning as well as enhancing collaboration.

The findings above echo Muchira et al (2023) who found out that the CBL resulted in improved problem solving skills, lifelong learning skills, self- efficacy and autonomy in learners. Empirical evidence suggests that CBL utilises pedagogical techniques that encourage collaboration among learners, inquiry by learners, reflective and analytical thinking, creativity and problem solving (Katiba and Ji, 2017).

SCHOD had this to say:

To a lesser extend because the idea is just on paper and lacks the practical part of it. Nothing is being done on the ground. This was just imposed on us.

The response by the HOD reveals that the teachers were not engaged when this initiative was planned and introduced. This also confirms Mataka et al.'s (2022) findings that CBL in Zimbabwe have multiple insufficiencies regarding attending to learners' needs and abilities because teachers are constrained in many ways. Furthermore, the data points to a top-down coercive approach in which the Mopse through its different wings, imposed the implementation without engaging the teachers. This is in consistency with Sithole et al (2021) when he stated that were not ready to implement competency based learning because it was imposed on them without consultations being done.

Still in the same vein, SAHOD was in line with the above participant:

To a lesser extent since the initiative is just but a formality. There is no effective implementation on the ground. Teacher centred approach is still dominating in the classroom.

The findings above coincide with the studies that were done in Tanzania to evaluate implementation of competence- based teaching and learning have proved that there is very little use of this teaching approach (Komba and Mwandaji, 2015, Makunja, 2015). The following defects were revealed in the implementation of competence-based teaching and learning in Tanzania. To start with, quite a number of teachers(more than 80%) do not possess proper understanding of the concept of competence-based teaching and learning. Furthermore, many of the teachers proceed to use traditional knowledge-based teaching and learning methods.

SAT had this to say in agreement:

To a lesser extent. Lack of resources is fanning the fires of failure in the implementation of this CBL.

The response by the teacher shows that there is nothing in line with CBL being done in most schools because of lack of resources. Dube and Jita, (2018) agree that teachers had problems in syllabus interpretation because of lack of resources hence not equipped to successfully implement competence based learning.

SCT stated this in unison with the previous participants:

I can't measure the extent because nothing in line with this initiative is being done here. The old system is still in full force and is always being favoured by most educators due to large numbers of learners in the classroom.

The response by the teacher above reveals that the teachers have little knowledge on the implementation of CBL. The teacher produced his record of marks to support his argument of large number of learners in classes. The record of marks had 35 girls and 27 boys to make the total number of learners in one class to 62. This finding is also in line with Momanyi and Rop (2019) who found that teachers lack adequate knowledge and skills on how to implement the curriculum. The findings concur with Ndayambaje (2018) when he highlighted that all teachers were trained on how to implement CBL but some are resisting change. Consequently, they continued using the old materials and approaches. Further, he pointed out inadequate teaching and learning materials as another hindrance to effective implementation of CBL in Rwanda. This was supported by KNUT (2019) which established that there was minimal implementation of CBL in schools due to large numbers of learners in a class.

4.3.4 Assessment of learners

SCT pointed out that:

Learners are being assessed through exercises and tests. I have not seen any practical lessons here in mathematics. Furthermore, even calas are being copied which expose them to plagiarism and done theoretically although they demand the practical aspect.

The findings above concur with the Sunday News. The other notable challenge is related to plagiarism. When learning tasks are not given enough time, learners may find people to do the work for them and pay them. (Sunday News, 2022). There is lack of supervision of work being done by learners. Despite the curriculum's emphasis on inquiry-based learning, like competence-based curricular there is still a strong focus on high-stakes secondary school exit examinations. Moreover, while most curriculum reforms emphasize relevant learning outcomes (competencies), like critical thinking, public examinations in Africa tend to be limited in terms of the knowledge and the skills they assess (Barrett & Bainton, 2016); tend not measure skills associated with application, analysis and synthesis; and rarely assess the knowledge and skills that students need in their everyday lives after school.

SAHOD had this to say in agreement:

Teachers use traditional methods of assessment due to lack of resources and resistance. Even if the tools are there, they prefer theory to practical.

The response above shows that the negative attitude towards CBL is as a result of lack of resources and resistance. This finding is in consistence with Carl's (2017) observation that teachers require appropriate resources to effectively implement the initiative. In some countries, like South Africa, school-based continuous assessments are combined with public examinations, in which the data contributes to the grade students are awarded in an exit public exam (Tikly et al. 2018). However, these school-based assessments are not very effective because of the influence and the focus on standardised public examinations, which does not align with the curriculum reform objectives. KNUT (2019) reported that the assessment rubrics had unclear guidelines hence teachers found it unbearable to assess learners' competences and learning progress.

SCH highlighted that:

Teachers use teacher centred methods in their teaching because the methods are not demanding.

The head's response revealed that teachers dislike the CBL because it's demanding and requires a lot of commitment. This corresponds with Ahukuma et al.(2017). Continuous assessment demands the teacher's time, initiative and patience among other skills. This alone is enough to justify why teachers resort to teacher centred methods. Yet another research by Berhe and Embiza (2015) in Nigeria showed the same results as teachers use traditional methods of assessment as a result of overpopulation in public schools. It gives them a lot of work. This was supported by Emehinola (2020) in his findings that revealed that educators across the countries under study have a positive perception of the usage of competence-based approaches but are deficient in professional training and support. They recommended that teachers move further away from the traditional levels of assessment and perfect good proxies of academic skills that support learners' acquisition of 21st century skills such as problem solving, creativity and critical thinking in assessing learners' competences.

4.4 Key factors that contribute to successful implementation of competence-based learning in mathematics classrooms

4.4.1 What support systems do teachers need to successfully implement CBL

SAHOD noted that:

The ministry should consult the stake holders prior to the implementation of the CBL. The other important things are funding of the programme, infrastructure provision, reduction in teacher learner ratio.

This was supported by SBHOD when he said:

Involvement of all stakeholders and consultations are key factors to the successful implementation of the CBL.

The responses by the HODs reveal that teachers want the ministry to engage consult the stakeholders before implementation of CBL. This was supported by Charles et al (2023) in their findings recommending proper training of personnel and involvement of all stakeholders. In addition, there should be engagement of all key stake holders such as teachers and parents.

SCT had this to say:

The ministry should fund this project for its successful implementation. In addition to that, it also have to employ more teachers to curb the issue of teacher learner ratio.

The response the teacher above reveals that for successful implementation of the CBL, the ministry should channel more funds into the initiative. This is in line with the research by Makuvire et al. (2023). The study by Charles et al (2023) also agree with SCT. Their findings indicate that teacher pupil ratios were too high. Furthermore, they found that several factors influenced the implementation of CBL, including teacher training, provision of resources both human and material and adequate funding.

SBT 1 noted that:

The ministry should conduct in-service training to teachers on how to implement the CBL.

SAT had this to say:

The ministry should fund the workshops on the implementation CBL and all stakeholders should fully participate in those workshops.

The response by the teachers above shows that for a full implementation of CBL, funding is the key factor. This will facilitate the in-service training of teachers and in the conduction of workshops. This concurs with Carl (2017), when he highlighted that teachers need appropriate continuous assessment knowledge and skills through workshops and seminars.

Furthermore, this was supported by Sifuna and Obonyo (2019) when they pointed out that there was minimal training of teachers on the initiative and recommended that the Ministry should provide more in-service training for teachers and also engage relevant stakeholders in the curriculum reform process.

4.4.2 What resources and infrastructure are needed to support the successful implementation of CBL?

SBML4 mentioned this in the questionnaire:

The ministry should provide infrastructure and resources to curb the issue of large numbers in the classrooms also to facilitate meaningful learning especially in remote areas. ICT tools are scarce in these areas.

The same sentiments were raised by SCFL4 when she noted that:

The school should provide infrastructure and learning material for successful implementation of CBL. There is shortage of classrooms and new curriculum learning material.

SAFL1 stated this on the questionnaire:

Provision of learning material and resources is the driving force to the successful implementation of CBL. We are still using old curriculum books, there are no ICT tools to facilitate learning.

SCT had this to say:

For successful implementation of CBL, provision of both material resources and human resources is crucial. The syllabus alone is not enough. We need books and classrooms. Interactive boards are the way to go in the digital world, projectors and ICT gadgets.

The responses by teachers and learners show that the provision of infrastructure, learning material, human resources are key drivers in the successful implementation of CBL. The issue of integration of technology in the teaching and learning was also mentioned. This concurs with Charles and Khaing (2023) in their findings recommended that all secondary schools and government ensure that instructional materials are available at the schools, adequate training of personnel to ensure effective implementation of educational policy, and the involvement of all stakeholders and their roles explained clearly. Still in the same vein,

Wambi et al (2024) echoed the same sentiments they recommended that those in authority should allocate adequate resources including text books, teaching materials, technology equipment and infrastructure to support the implementation of the CBL.

4.5 Challenges and barriers faced by teachers and learners in implementing competence based learning in a mathematics classroom?

4.5.1 Systematic barriers to implementation of competence based learning in mathematics

Teachers, hods and heads complained about lack of funding, lack of adequate training and consultations.

SCH had this to say

There are no consultative meetings held prior to the implementation of CBL. We were just informed of the new development at the implementation stage and on social media. This initiative lacks funding.

SCT has this to say:

We were just told to embrace the new curriculum and no compromise about it. I did attend any workshop on the implementation of CBL because by the time it was introduced I had no exam class and the one who had exam class was selected to attend a three day workshop and that was the end of the matter. As I'm speaking I don't understand what it is all about, I receiving finished calas from whats app groups, that's how we operate.

The responses by the teacher and the head above show that they have little knowledge about the CBL. They were not consulted and did attend any workshop on the implementation of CBL. The issue of involvement of teachers and other relevant stakeholders was presented by most respondents whereby teachers claimed not to have been consulted in the curriculum reform, yet they are the main implementers of the curriculum. This is in agreement with the findings by Koo (2020). Furthermore, teachers needed clarification on instructions on how to implement CBL. Still in the same vein, Muchira et al (2023) found out that by-passing teachers in the curriculum development process impedes effective implementation of a CBL. Thus, it is important to engage teachers throughout the implementation stages.

SAFL3 stated this in the questionnaire:

I don't know anything about the CBL. No-one ever told me about this new development.

SCML1 highlighted this in the questionnaire:

This CBL is all about Cala.

Another participant who is a SBT stated that:

Lack of funding is the main challenge to the implementation of competence based learning. This new curriculum needs a lot of funds for it to be viable.

SBHOD had this to say:

I have limited knowledge on the implementation of CBL which is a major barrier. The workshops were hastily done and for a few days therefore I failed to pick anything of value in this initiative. Even the facilitators of this CBL were also confused and proved to have little to no knowledge of the CBL since they failed to explain the new development.

SBFL2 highlighted this in the questionnaire:

The head and the teachers are failing to embrace technology and let alone to integrate it into teaching and learning. As learners we are not allowed to bring cell phones to school.

Teachers, HODs and Heads complained that there was no training for example, seminars on CBL and this made them unable to understand CBL and its requirements. Most teachers in this study seemed to lack good pedagogical skills and knowledge towards CBL and this also affects learners.

4.5.2 Structural challenges and barriers to implementation of competence based learning in mathematics

SBT2 had this to say:

The large number of learners in each class and lack of infrastructure and learning material is a challenge to implementation of CBL.

SBF4 FL mentioned this in the questionnaire:

Lack of resources such as text books is a challenge here. We need a lot of books in order to have a meaningful learning

SAHOD had this to say:

Lack of learning material, large classes and lack of infrastructure are barriers to implementation of CBL. We still use old and outdated text books at our school.

The SAHOD produced the old curriculum book which they use and the part of the book is shown below:

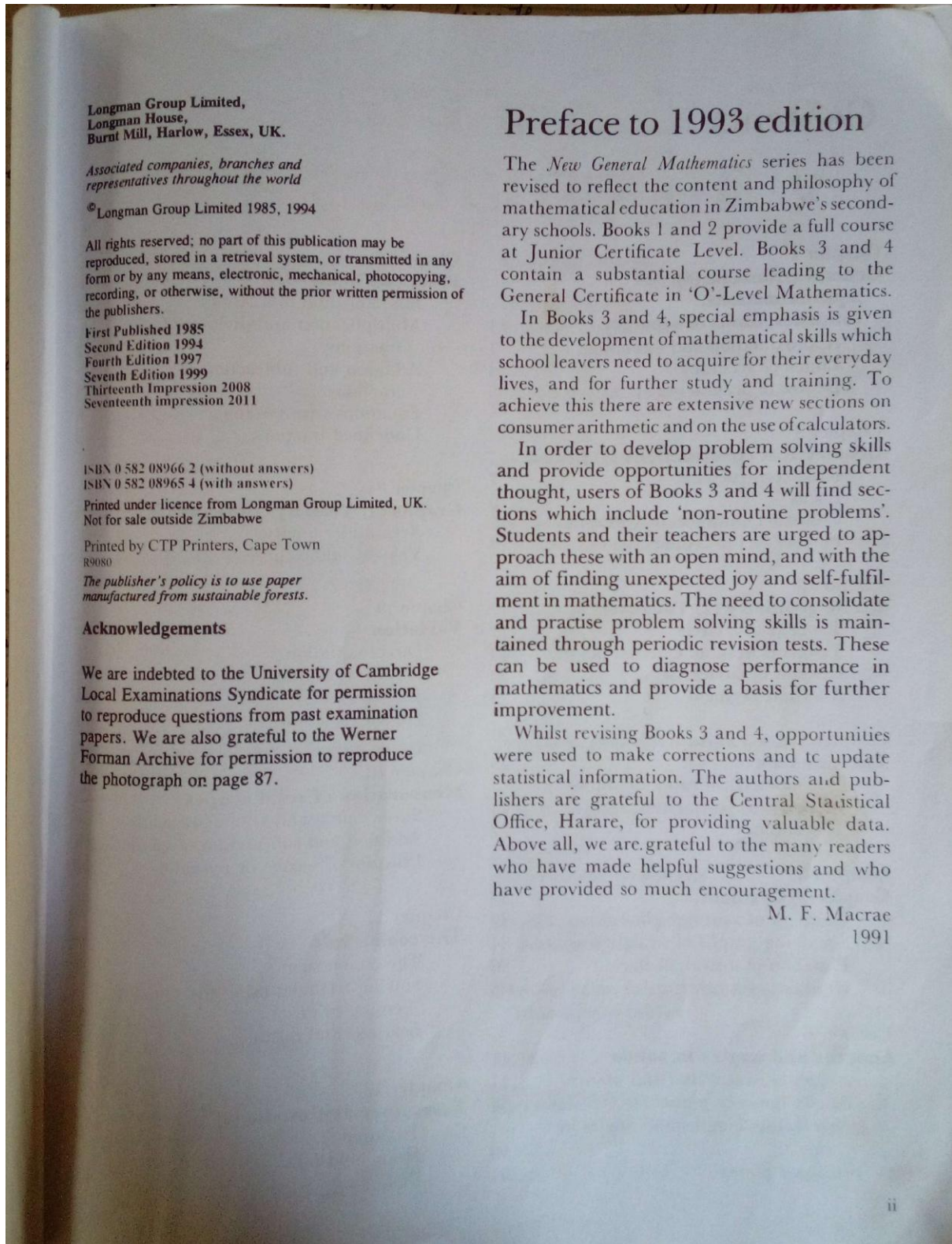


Fig 4.4 Part of the text book

SCH has this to say:

Lack of infrastructure and learning material is a challenge. CBL needs a lot of resources and they are expensive. We need projectors and interactive boards for successful implementation of CBL. Here at our school the only media that our learners know are the chalk and the blackboard. Human capital is also a challenge as a few teachers are trained to implement this initiative.

The key setback to the successful implementation of the CBL in schools is insufficient resources. Most respondents in the study claimed that there was high shortage of textbooks, ICT gadgets and other resources. The findings above reveal that lack of resources is a major hindrance to the effective implementation of CBL. This is in agreement with Ndayambaje' 2018 study which pointed out that lack enough teaching and learning material is an issue blocking the successful implementation of CBL. This implies that allocation of enough learning resources is important for successful implementation. This was supported by Timothy et al. (2024) in their case study which explored the relationships between a school's profile and their capacity to implement CBL. Their findings reveal that insufficient teaching and learning resources and lack of infrastructure are barriers. Hwende and Mpofu (2017) concensus with Manokore and Chiwiye (2021) postulate that a curriculum is bound to suffer a still birth if there are insufficient resources to implement it.

4.6 Observations

I observed that all three schools have almost similar challenges. Teaching and learning material is scarce, classes are so large that it is difficult to use child centred approach. I observed SAT teaching probability in a Form 4 class and these are the findings: There was no media used during the lesson of picking without replacement, the number of learners in the class was 70, the seating arrangement cannot be described, it was haphazardly done and could not find a way to the front of the class, the book which was used was outdated NGM 1993 edition, the syllabus was the but in tatters. The syllabus demanded CBL but what was on the ground was a different thing. Wambi et al (2024) echoed the same sentiments and recommended that those in authority should allocate adequate resources including text books, teaching materials, technology equipment and infrastructure to support the implementation of the CBL. Schools are incapacitated. The teaching approach was teacher centred and the teacher was like someone preaching.

The other challenge I observed is that the teacher did not know all of his students and there was a lot of difficulties in trying to engage learners during the lesson. The work given to learners was not enough due to large numbers.

4.7 Chapter summary

Chapter four analysed, presented and discussed data generated through, questionnaires, interviews document analysis and observations. In addition the researcher attempted to provide answers to research questions raised in chapter one. The next chapter will provide a summary of the study, general conclusion and recommendations.

CHAPTER 5

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

In the previous chapter, data was analyzed and discussed. This current chapter focuses on the following: summary of the project, conclusion, recommendations, areas for further study, and chapter summary.

5.2 Summary of the project

In chapter 1, the researcher looked at the problem and its context where the focus was on the background of the study, statement of the problem, the research questions, and research objectives, assumption of the study and significance of the study, limitations of the study, and delimitation of the study as well as definition of key terms. Chapter 2 outlines the theoretical framework through which the gaps in the consulted literature were interrogated. Chapter 3 highlighted the strategy for data generation, presentation, analysis, and interpretation. Furthermore, in chapter 4, the researcher looked at the data presentation, data analysis, and discussion. The findings of the research were presented and analyzed based on the research questions. This chapter came up with the following major findings:

- The CBL is partially known by the participants at the schools under study and they could state some of the aims, objectives and competences in line with the impact of the CBL in developing students' problem solving skills.
- The CBL is just on the paper but what on the ground is opposite as this is revealed by findings from the observations done, interviews, questionnaires completed and the document analyzed. These proved that nothing is done that shows successful implementation of CBL.
- The implementation of CBL is marred by multiple challenges which were categorized as systematic and structural barriers to the implementation of CBL.
- The participants proposed the following solutions: the government through MOPSE should consult all relevant stakeholders prior to the implementation, the ministry should channel enough funds to hold enough workshops on the implementation of CBL and should provide all required resources that is both material and human for the successful implementation of CBL.

5.3 Conclusion

From the gathered, analysed data and interpreted data, I reached the conclusion that the implementation of CBL at selected schools was derailed by multiple factors such as insufficient knowledge, inadequate infrastructure, and lack of funding and scarcity of resources among others. This is so despite the implementation of Competence-Based Learning in Mathematics for a practical and hands on approach which demands all support for it to be successful.

5.4 Recommendations

I propose the following recommendations to ensure successful implementation of Competence-Based Learning in Mathematics:

5.4.1 The ministry should engage all relevant stakeholders prior to the implementation of the CBL.

5.4.2 There should be fund set aside to facilitate workshops on the implementation of Competence- Based Learning.

5.4.3. The issue of lack of infrastructure and resources both material and human should be resolved first before the implementation.

5.5 Areas for further research

As the study was only three secondary schools in Gokwe South District, it will be necessary to carry out a wider study to other districts and provinces in Zimbabwe.

5.6 Chapter Summary

In this chapter, the research study was summarized, the conclusion was articulated, recommendations were made and the area for the study was identified.

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APPENDICES

APPENDIX 1: BUSE RESEARCH PERMISSION LETTER

P Bag 1020
BINDURA
ZIMBABWE

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

SAMED


BINDURA UNIVERSITY OF SCIENCE EDUCATION

Date: 09 APRIL 2024

TO WHOM IT MAY CONCERN

NAME: MUFARANSURI
NJASHA

REGISTRATION NUMBER: B1440363

PROGRAMME: HBSCED MATHS

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.

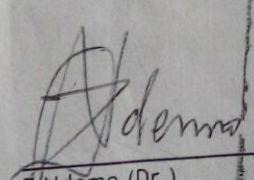
The student has to undertake research and thereafter present a Research Project in partial fulfillment of the HBSCED MATHS programme. The research topic is:

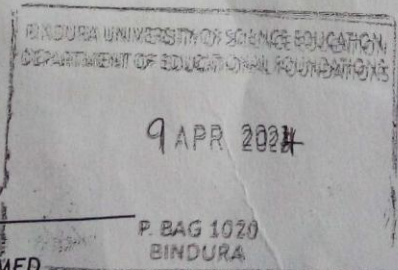
Implementation of Competence-Based Learning
in Mathematics

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

Your co-operation and assistance is greatly appreciated.

Thank you


Z. Ndemo (Dr.)
CHAIRPERSON - SAMED


9 APR 2024
P. BAG 1020
BINDURA

APPENDIX 2: HEAD OFFICE RESEARCH PERMISSION LETTER

All communications should be addressed to the
Secretary for Primary and
Secondary Education
Telephone: +263 242 794 509
Toll Free: 317



Ministry of Primary and Secondary Education
88 Kwame Nkrumah Avenue
Queen Lozikeyi House
P O Box 121
Causeway, Harare

Reference : C/426/3

27 May 2024

Mufaranyuri Nyasha
Tare Secondary School
P. O Box 890
Gokwe South

**RE: PERMISSION TO CARRY OUT A RESEARCH IN MIDLANDS PROVINCE:
GOKWE SOUTH DISTRICT: NEMANGWE; TARE AND NYOKA SECONDARY
SCHOOLS**

Reference is made to your application to carry a research from the above mentioned district schools on the research title:

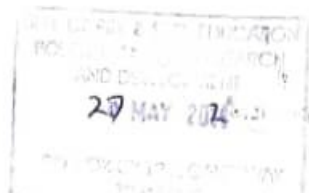
**"IMPLEMENTATION OF COMPETENCE-BASED LEARNING IN
MATHEMATICS."**

Permission is hereby granted. However, you must liaise with the Provincial Education Director of Midlands Province, who is responsible for the schools which you want to involve in your research. You should ensure that your research work does not disrupt the normal operations of the schools. Where students are involved, parental consent is required.

You are also required to provide a copy of your final report to the Secretary for Primary and Secondary Education.

Musingarimi H

**Py : A/Deputy: Director Research Innovation and Development
For SECRETARY FOR PRIMARY AND SECONDARY EDUCATION**



@MoPSEZ



<https://www.facebook.com/MoPSEducationGovZimbabwe>



<https://www.mopse.co.zw/>



<https://www.linkedin.com/company/ministry-of-primary-and-secondary-education-of-zimbabwe/>

APPENDIX 3: QUESTIONNAIRS FOR LEARNERS

I'm Mufaranyuri Nyasha a student from Bindura University of Science Education and studying towards HBSced Mathematics. I'm conducting a research on the Implementation of competence based curriculum in mathematics. The research is expected to contribute to an understanding of how competency based learning impacts learners' problem solving abilities.

Your participation is voluntary and your contribution will remain private and only used for educational purposes. For privacy sake, don't write your name on this questionnaire.

1. State your gender (Put a tick where applicable)

Female [] Male []

2. State your age.....

3 In what Form are you?

4How do you view mathematics as a subject?(Tick where applicable).

Simple []

Difficult []

5 Do you enjoy mathematics at school? Yes () No []

State the reason for your response

6) Have ever heard about the Zimbabwe New curriculum? Yes { } No { }
}

If your answer above is yes state any one aspect of the Zimbabwe curriculum.

7) Did you participate in the just ended curriculum review programme? Yes{ }
No { }

If yes, state any one component of the curriculum that was discussed on the day.

.....
.....
.....
.....

8) How familiar are you with the competence based learning?

9) What do you think should be done to make competence based - learning fruitful?

10) Can you identify any two competences to be developed through competence based learning?

11) State any one challenge that affect successful implementation of competence based learning in your class.....

APPENDIX 4: INTERVIEW GUIDE FOR TEACHERS

- a) I'm Mufaranyuri Nyasha, an HBScED Mathematics student from BUSE. I'm conducting a research on implementation of competence based learning in mathematics. This research is expected to benefit the entire education fraternity and your participation is received with much appreciation.

b) Questions

- 1) Have ever heard about competence based learning?

- 2) Did you undergo any training on competency-based learning?

- 3) State any aims and objectives of competency based learning.

- 4) In what ways has competency based learning been implemented in your class?

- 5) What changes have you noticed in your teaching approach since the introduction of competency based learning?

- 6) Can you identify any specific competencies that you have developed through competency based learning.

- 7) How do you assess the progress of learners in competency based learning?

- 8) What challenges have you encountered in the implementation of competence based learning?

9) To what extent does implementation of competence based learning in mathematics address diverse learning needs and abilities of learners?

10What do you think should have been done for the fruitful implementation of competence-based learning in Mathematics?

APPENDIX 5: INTERVIEW GUIDE FOR HEADS OF DEPARTMENT

- a) I'm Mufaranyuri Nyasha, an HBScED Mathematics student from BUSE. I'm conducting a research on implementation of competence based learning in mathematics. This research is expected to benefit the entire education fraternity and your participation is received with much appreciation.

b) Questions

1) What is your area of specialisation?

2) Have you ever heard about competency-based learning?

3) Did you undergo any training on competency-based learning?

4) State any aims and objectives of competency based learning.

5) In what ways has competency based learning been implemented by your teachers?

6) What changes have you noticed in your assessment approach since the introduction of competency based learning?

7) Can you identify any specific competencies that you have developed through competency based learning.

8) How do you assess the progress of your teachers in competency based learning?

9) What challenges have you encountered in the implementation of competence based learning?

10) To what extent does the implementation of competence based learning in mathematics address diverse learning needs and abilities of learners?

-----11) What do you think should have been done for the successful implementation of competence-based learning in mathematics?

APPENDIX 6: INTERVIEW GUIDE FOR HEADS OF SCHOOL

a) I'm Mufaranyuri Nyasha, an HBScED Mathematics student from BUSE. I'm conducting a research on implementation of competence based learning in mathematics. This research is expected to benefit the entire education fraternity and your participation is received with much appreciation.

b) Questions

1) Have you ever heard about competency-based learning?

- 2) Were there any consultative meetings held before the implementation of the implementation commenced?

- 3) Did you undergo any training on competency-based learning?

- 4) State any aims and objectives of competency based learning.

- 5) What is your role in the implementation of competence based learning in the school?

- 6) Did you conduct any staff development workshops on implementation of competence-based learning within your school?

- 7) In what ways has competency based learning been implemented by your teachers?

8) What changes have you noticed in your assessment approach since the introduction of competency based learning?

9) Can you identify any specific competencies that you have developed through competency based learning.

10) How do you assess the progress of teachers in competency based learning?

11) What challenges have you encountered in the implementation of competence based learning?

12) To what extent does the implementation of competence based learning in mathematics address diverse learning needs and abilities of learners?

APPENDIX 7: OBSERVATION GUIDE

OBSERVATION GUIDE						
ITEM OBSERVED	SCORES					COMMENTS
	UNSATISFACTORY	SATISFACTORY	ADEQUATE	GOOD	SUPERB	
1.CLASSROOM ENVIRONMENT						
-Number of learners						
-Seating arrangement						
-Class management						
2.ATTITUDE AND BEHAVIOUR						
-Tr- learner rapport						
-Learner engagement						
-Class activities						
3.COMPETENCE DEVELOPMENT						
-Teaching methods						
-Assessment methods						
4.RESOURCES AND MATERIAL						
-Syllabus						
-Media						
-Documents						
-Text books						

-Exercise books						
5. LEARNING OUTCOMES						
-Skills developed						