BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE EDUCATION

DEPARTMENT OF EDUCATIONAL FOUNDATIONS

EXPLORING THE EFFICACY FOR TEACHING COMBINED SCIENCE AT FORM THREE LEVEL, IN THE COMPETENCE –BASED CURRICULUM: A CASE OF THREE SCHOOLS IN ZVISHAVANE URBAN.

BY

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DECLARATION

I, Dzingira Benedicter: B1646458 hereby declared that except references to other people's work which have been duly acknowledged, this dissertation is the result of my own research and has neither in part nor whole been presented in another education programme.

Signed: Dzingira Bendicter …….Date

(Student)

This research work was undertaken under the supervision of Dr. Chinhara H

Signed: ……. Date:

DEDICATION

This research is dedicated to my mother Lydia Zhou who has given me the opportunity of an education from the best institutions and support this far, and to my dearest life partner, loving husband Elvis Baramasimbe who has been there for me throughout this course.

Dzingira Benedicter (B1646458)

Signature:  **Date:**

APPROVAL FORM

The undersigned certify that they have supervised, have read and recommend to the University for acceptance and examination a research project entitled: **Explore the efficacy of teaching combined science at form three level in the competence-based curriculum. A case of three schools in Zvishavane Urban**, submitted by Dzingira Benedicter (B1646458) in partial fulfilment of requirements for the award of Bachelor of Science Education in Chemistry Honors Degree.

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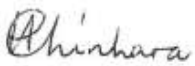
Supervisor Signature  **Date: 25/03/2025**

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ABSTRACT

The study explored the efficacy of teaching combined science at form three level within the competence-based curriculum (CBC) in Zvishavane urban. The study aimed to assess the effectiveness of the CBC approach in fostering scientific understanding and practical skills among students. The study employed a mixed –methods approach utilizing qualitative data collection techniques. Qualitative data was gathered through semi- structured interviews with teachers and students to gain insights into their perceptions of the competence based curriculum approach had a positive impact on students learning outcomes with significant improvement observed in their knowledge and practical skills. Teachers reported that the CBC approach promoted active learning, critical thinking and problem –solving abilities among students. However, challenges such as a lack of adequate resources and teacher training were identified as potential barriers to the effective implementation of the CBC. These challenges were identified in the implementation of CBC. These included a lack of adequate resources such as laboratory equipment, chemicals as well as shortage of qualified teachers. Additionally, the large class sizes and limited instructional time hindered effective implementation of the curriculum. The study concludes that the CBC approach holds promise for enhancing science education science education in Zimbabwe but further efforts are needed to address the identified challenges and ensure its successful implementation.

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CHAPTER 1

GENERAL INTRODUCTION

1.1 Introduction

This research focuses on exploring the teaching efficacy of combined science at the form three level within the competence-based curriculum framework in Zvishavane. The investigation aims to provide a detailed evaluation of how the competence based curriculum is transforming science education at form three level in Zvishavane, with the ultimate goal of enhancing educational quality and student outcomes by putting the problem under investigation into context through outlining background to the study, statement of the problem, significance of the study, limitation of the study, delimitation of the study, definition of key terms and chapter summary.

1.2 Background to the study

The shift from traditional educational approaches to the competence- based curricula has sparked significant interest and debate among educators, policy makers, and researchers globally as this is a new curriculum paradigm. Competence- based education emphasizes the development of specific skills, knowledge and attitudes that learners need to effectively perform in real-life situations (Mulder, 2017).

In Zimbabwe, the adoption of a competence-based curriculum was part of a broader educational reform aimed at aligning the education system with the country's socio-economic needs (Zvobgo, 2019). The competence based curricula was designed to foster critical thinking, problem-solving and practical skills among students with the expectation that these competencies would better prepare them for the demands of the modern workforce (Chinyani, 2020). The introduction of this curriculum has been met with both optimism and skepticism, particularly in the teaching of science which requires not only theoretical understanding but also practical application. Teachers are not understanding how to develop the competences, as required by the syllabus. Meanwhile it schools lack the resources that are need to develop the skills.

The competence based curriculum in science focuses on developing students' practical skills, critical thinking and ability to apply scientific knowledge to real- world problems. This approach emphasizes hands- on learning. Vygotsky (1978) theory of social constructivism suggests that knowledge is constructed through interaction with the environment and peers, which is central to the CBC approach. Due to experiments and practical work, Hofstein and Lunetta (2004) argues that laboratory work is essential for learning science as it allows students to engage with the material directly and develop a deeper understanding of scientific concepts. Practical work also encourages students to apply theoretical knowledge to real-world scenarios. Secondly Development of core competencies, these include collaboration and communication, creativity and innovation and digital literacy. Tytler (2007) emphasizes that science education should include opportunities for students to work in groups and communicate their findings. This prepares them to collaborate in scientific endeavors and articulate complex concepts clearly.

In addition, real-world application of knowledge, interdisciplinary learning and STEM integration, Assessment of competence and Differentiated learning ensuring that students are well-prepared to navigate the challenges of 21st century. According to Sanders (2009) argues that integrating STEM subjects allows students to see the interrelationships between scientific principles and technological application. This interdisciplinary approach equips students with the skills needed to thrive in a technology-driven world The CBC moves away from traditional exam based assessments towards more formative and performance based assessment which evaluate students competences in real world contexts .Continuous assessment in CBC allows teachers to assess students' understanding and application of scientific concepts over time rather than relying solely on final exams whilst according to Gulikers et al.(2004) suggests that performance based assessment is where students demonstrate their skills through projects, experiments or presentations. This can provide a more accurate reflection of their competence. Lastly, Tomlinson (2001) advocates for differentiated learning approaches where teachers adapt their methods to suit the individual needs of students. In science this might involve using a variety of teaching techniques such as visual aids, hands on experiments and digital tools to accommodate different learning styles.

Moreover, science education plays a crucial role in developing a nation's capacity for innovation and technological advancement. However, the effectiveness of implementing a competence-based approach in science education has been questioned especially regarding

whether it meets the rigorous demands of scientific inquiry and experimentation (Mungwini, 2018). Given the resource constraints and varying levels of teacher preparedness in Zimbabwean schools, it is critical that such a study is carried out to establish what is on the ground with regards to how teachers, school administrators do their duties in the competence-based curriculum. The efficacy of teaching science under competence-based curricula framework remains uncertain because there are many questions than answers. These are some of the challenges which include funding or financial resources, human resources and lack of teachers knowing combined science.

The case of three schools in Zvishavane urban which are Mandava High, Zvishavane High school and Bestview collage provides a valuable context for exploring these issues. Zvishavane, a small mining town in the Midlands province of Zimbabwe presents unique challenges and opportunities for educational innovation schools in this area often face resource limitation such as inadequate laboratory facilities and shortage of qualified science teachers which could hinder the effective implementation of competence-based curricula (Mavhunga and Rollnick, 2016). Despite these challenges some schools have shown promising results in adapting to new curriculum making them interesting case studies for understanding the factors that contribute to impede the successes of the competence-based science education.

To a larger extent this study aims to explore the efficacy of teaching science within the competence based curricula framework in these three schools by examining both successes and challenges encountered. The research seeks to provide insights that could inform future policy and practice not only in Zvishavane but also in other similar contexts. The findings of this study are expected to contribute to the ongoing discourse on the best approaches to science education in Zimbabwe and beyond.

1.3 Statement of the problem

The implementation of Zimbabwe's competence-based curriculum in combined science at form three level faces significant challenges, compromising student competence and scientific literacy. Research indicates that inadequate teacher training (Spardy, 1994; Wiggins, 1998) and limited resources (Machingambi, 2019) hinder effective curriculum delivery. Additionally, the integration of scientific concepts across combined science poses

difficulties for students (Bloom, 1956). This study aims to investigate the efficacy of teaching combined science under the CBC in Zvishavane urban, addressing the knowledge gap in teacher experiences, student outcomes and strategies for improvement. Here below is a sample table of contents for the pass rate analysis for form three students of five schools in Zvishavane (2022).

Table 1.3.1 pass rate analysis of Zvishavane selected five schools.

SCHOOL	**PASS RATE %**	**NUMBER OF STUDENTS**
Zvishavane high	85.2	120
Munyati secondary	78.5	100
Goerge chipadze secondary	75.6	90
Nyaradzo high	88.3	110
Chivizina secondary	92.1	150

1.4 Research questions

From the main research question the following sub-questions were derived

1. How is the competence-based curriculum being implemented in science classrooms in the three selected schools in Zvishavane urban?
2. How do resource constraints affect the teaching and learning of science under competence-based framework?
3. What type of assessment are being used to promote students competences in science under the competence based curriculum in the school?

1.5 Significance of the study

The significance of this study lies in its potential to promote the effectiveness of teaching methods that teachers can use to teach combined science within the CBC framework by fostering on three schools in Zvishavane. The research study uncovers the challenges and opportunities presented by the competence based approach. This may offer valuable insights for policy makers, science teachers, curriculum developers and researcher contributing to enhancement of science education ensuring that students acquire necessary competences for future study.

1.6 Policy makers

The findings of the study will offer evidence-based insights into the effectives of the competence based curriculum in the context of science education. These insights can be used by policymakers to refine and improve the curriculum by identifying the strengths and weakness of the current implementation. This research helps to shape the future curriculum reforms, ensuring that they better meet the needs of both teachers and students. Moreover, it can provide specific recommendations for resource allocate and teacher training, which are crucial for the successful implementation of the competence based curriculum.

1.7 Zimbabwe School Examination Council

They can utilize the findings of this research to solve the factors influencing competence based curriculum in the teaching and learning of science and even in other subjects. They can use the research as secondary data for other forms of research that are of interest to the organization.

1.8 Science Teachers

Teachers will provide practical insights into challenges and opportunities associated with teaching science under the competence based curriculum, understanding the specific difficulties teachers face such as resource limitations and the need for professional development. They can lead to the creation of targeted interventions to support teachers. Additionally by examining successful strategies and practices. This research can offer guidance on how to effectively integrate competence-based teaching methods into science education.

1.9 Learners

The learners will be preparing for the world of work and equipped with the relevant skills and knowledge which will enable them to provide solutions to current and future problems. The learners will also be encouraged to be responsible for their learning and hence self-confidence will develop for future citizens

1.10 Researcher

This study sharpens the research skills of the researcher around science education as well as in other future study areas. It enables the researcher to fulfill the educational research requirement of Bindura University of science education

1.11 Limitation of the study

This study likely to have several limitations to the effectiveness of teaching science in the competence based curriculum for example money, resources and also distance supervisor, potential disruptions for example exams, teacher turnover or absenteeism and also time constraints. This curriculum's focus on competence may sometimes overshadow the importance of scientific knowledge and understanding. Also lack of resources and infrastructure in the three schools may hinder the implementation of competence based curriculum effectively. Lastly, the limited training and support provided to teachers may also impact the quality of science

1.12 Delimitation of the study

This study focuses exclusively on combined science which integrates various scientific disciplines such as combined science. The research is limited to form three students, this level is chosen to assess the effectiveness of the curriculum at a critical stage in secondary education. The research will include science teachers those who are directly involved in teaching combined science to form three students, HODs the individual responsible for overseeing the science curriculum and its implementation within the schools, SDC the members who influence decisions regarding educational strategies and resource allocation.

1.13 Definition of key terms

Exploring

According to Creswell (2014), explain that exploring often involves a systematic investigation aimed at discovering new insights or understanding a particular subject. It is a process of inquiry and examination.

Efficacy

Bandura (1997), states that efficacy refers to the capacity to produce a desired effect or outcome under ideal conditions. In educational contexts, it often pertains to the effectiveness of teaching methods or curricula.

Teaching science

This involves the pedagogical methods and strategies used to impart scientific knowledge and skills to study. It encompasses both the content and the process of teaching science (Bybee (2010).

Competence-based curriculum

According to Rychen and Salganik (2003). A competence-based curriculum focuses on the outcomes of learning, emphasizing the acquisition of specific competences or skills necessary for students to succeed in real-world scenarios.

Case of three schools

Yin (2014), states that in research a case study is an in depth examination of a particular instance or examples such as three schools in this context, to draw broader conclusions.
Zvishavane Urban

It is a geographic location, studies in specific locales examine the contextual and environmental factors that may affect educational outcomes.

1.14 Chapters Layout

In chapter one the issue under investigation was put into context, chapter 2 expose gaps in current literature, chapter 3 outlines the data generation, analysis and interpretation strategy, chapter 4 focuses on presentation, analysis and interpretation of the findings and chapter 5 outlines the conclusion and recommendations.

1.15 Chapter summary

In this chapter the problem under investigation was put into context through the discussion of the following: background to the study, statement of the problem, research questions, and limitation of the study, delimitation of the study and definition of key terms. In the next chapter will focus on review of related literature.

CHAPTER 2

REVIEW OF RELATED LITERATURE

2.1 Introduction

The shift towards a competence-based curriculum (CBC) has sparked considerable interest in evaluating its effectiveness across various subjects. At form three level teaching combined science presents unique challenges and opportunities particularly within the context of Zimbabwean schools. Some of the challenges relate to shortages of resources, while opportunities are found on the development of the needed skills on learners. However, the focus of this chapter is to review literature review on the efficacy of teaching combined science under the CBC in three schools located in Zvishavane urban, by assessing both pedagogical strategies and student outcomes.

The literature that will be reviewed seeks to answer the following research questions:

- How competence based curriculum being implemented in science classrooms in the three selected schools in Zvishavane urban?
- How do resource constraints affect the teaching of science under CBC framework
- What types of assessment are being used to evaluate student competencies in science under the CBC in these schools?

2.2 Theoretical framework

The theoretical framework that underpins this study is rooted in constructivist theories of learning which emphasize the active role of learners in constructing their own understanding of scientific concepts. Constructivism as proposed by Piaget (1964) and later expanded by Vygotsky (1978) suggests that students learn best when they are actively involved in learning process rather than passively receiving information. This aligns well with the principles of the competence based curriculum which emphasizes learner-centered approaches and practical engagement.

Piaget's theory of cognitive development posits that learners construct knowledge through interaction with their environment with a focus on the stages of cognitive development. In

the context of form three students who are typically in the formal operational stage. The CBC aims to foster abstract thinking and problem solving abilities, skills that are essential for mastering combined science (Piaget, 1964).

Expanding on Piaget's work, Vygotsky's social constructivism highlights the importance of social interaction and collaboration in learning. He emphasizes the role of Zone of Proximal development (ZPD). According to Vygotsky (1978) students learn more effectively when they engage in tasks slightly beyond their current abilities with guidance from more knowledgeable peers or teachers. The CBC framework encourages group work and collaborative projects in science education directly informed by these principles.

In addition to constructivist theories, Bloom's Taxonomy of learning objectives as revised by Anderson and Krawthwohl (2001), provides a useful model for understanding how the CBC seeks to develop higher order thinking skills in science education. Bloom Taxonomy classifies learning objectives into cognitive domains ranging from basic knowledge recall to complex analytical and evaluative skills. The competence based approach with its emphasis on hands-on inquiry based learning aims to move students beyond mere memorization of scientific facts to the application and evaluation of scientific concepts.

Another key theoretical perspective is Shulman (1986) concept of pedagogical content knowledge which highlights the importance of teachers not only understanding subject matter but also knowing how to effectively teach it. In the CBC framework the teacher's role as a facilitator of learning becomes crucial in designing and delivering lessons that integrate both pedagogical knowledge and scientific content. Shulman's work underscores the need for continuous professional development for teachers particularly in adapting to new curricula like CBC.

Lastly, Taba (1962) model of curriculum development emphasizes the need for teachers to be active participants in the curriculum design process. According to Taba , educators should tailor instructional strategies to meet the specific needs of their students which resonates with the CBC's flexible learner-centered approach. This model supports the idea that teachers in Zvishavane urban schools must adapt their methods to effectively teach combined science within the competence-based framework.

EMPIRICAL STUDIES

2.3 The concept of competence based curriculum.

The competence based curriculum is a reform initiative that emphasizes the development of practical skills, knowledge application and problem solving abilities in students. According to Gonczi (1994), this approach equips learners with competencies essential for problem-solving critical thinking and adaptability in the workforce. CBC is also learner-centered, allowing students to progress based on mastery rather than time spent in class (Turker, 2019). Le Deist and Winterton (2005) highlight that CBC aligns education with the needs of the labor market, fostering a workforce capable of handling complex challenges. This will to explore the feature, benefits and challenges of CBC and assess its role in modern education.

2.3.1 Features of competence based curriculum

The competence based curriculum CBC emphasizes learner outcomes, focusing on student's ability to apply knowledge and demonstrates specific skills such as critical thinking. (Mulder, 2017). Unlike traditional models, CBC allows for personalized learning where students progress at their own pace based on competence rather than time spent in class, (Turker, 2019). This curriculum also prioritizes real-world applicability, encouraging learners to engage in practical tasks that prepare them for future professional environments. Assessments are typically performance-based, evaluating students on their ability to perform tasks in real-life contexts rather than through standardized tests (Gonczi, 1994).

2.3.2 How competence based is implemented in schools.

In Zimbabwe CBC was introduced in 2017 as part of educational reforms aimed at aligning the curriculum with the 21st century demands. However the success of its implementation particularly in science classrooms has been met with varying degrees of success across different regions including Zvishavane urban. This essay investigates how the competence based curriculum is being implemented in science classrooms in three selected schools in

Zvishavane urban, focusing on teacher preparedness, resource availability of resources and student engagement and assessment.

- Understanding the competence-based curriculum (CBC)

According to Chinyani (2017) CBC reforms aim to foster critical thinking, creativity and collaboration among students particularly in science subjects. This framework is built on four keys pillar which is knowledge, skills, values and attitudes that are integrated into teaching and assessment practices. In the context of science education CBC emphasizes inquiry based learning and hands-on activities. Requiring teachers to move beyond textbook instruction. Mavhunga (2019) highlights the importance of practical experiments and project based learning in fostering scientific competences

- Curriculum redesign and teacher preparedness in implementing CBC

According to Spady (1994, outcome-based education emphasizes the importance of specifying desired learning outcomes. Teacher preparedness plays a critical role in the successful implementation of CBC. According to Mungweni (2020), many teachers in Zimbabwe face challenges in fully understanding and applying the CBC framework due to inadequate training. This issue is particularly pronounced in semi-urban areas like Zvishavane urban where teachers may lack access to the necessary professional development opportunities. In the three selected schools in Zvishavane urban interviews with science teachers reveal a mixed level of readiness, while some teachers express confidence in facilitating inquiry based learning others struggle due to unfamiliarity with new teaching methods. Mutemeri and Chetty (2021) argue that ongoing professional development is essential to helping teachers transition from content delivery to competency development.

- Availability of resources

A significant barrier to the implementation of CBC in science classrooms is the availability of resources. Chivore (2018) notes that for CBC to succeed, schools must have adequate laboratory equipment, teaching aids and updated textbooks. Unfortunately resource constraints in many Zimbabwean schools hinder the full realization of CBC goals. In Zvishavane urban, the three selected schools show varying degrees of resource availability. One of the schools has a well-equipped science laboratory and benefits from external

support from Mimosa mining company while other two schools face shortages of basic laboratory materials. This disparity affects how well students can engage in practical activities which are central to the CBC approach in science.

- Student engagement, technological integration and assessment

A key feature of CBC is shift from traditional exams to continuous assessment where students are evaluated based on their ability to apply knowledge in practical settings. Zhou (2019) highlights that this approach promotes deeper understanding and long term retention of information in science subjects. In Zvishavane urban, teachers report varying levels of student engagement with the new curriculum. In the better resourced school student exhibit higher levels of participation in practical activities and group projects. However, in the two under-resourced schools, students struggle with the limited access to materials, reducing their ability to fully engage with the curriculum. Mpofu and Moyo (2021) suggests that without equal access to resources the CBC's potential to democratize education may be undermined. Technological integration facilitates efficient assessment and tracking of student progress. MasteryTrack (2020) highlights the potential of digital platforms in supporting CBC implementation.

In conclusion, the implementation of the competence based curriculum in science classrooms in the three selected schools in Zvishavane urban reflects both the potential and challenges of educational reform in Zimbabwe while the CBC framework offers an innovative approach to fostering scientific competences, its success in Zvishavane urban is contingent upon teacher preparedness resource availability and student engagement. Scholarly insights emphasizes the need for continuous teacher training and investment in educational resources to bridge the gap between policy and practice.

2.4 Impact of resources and benefits of competence based curriculum

The Competence based curriculum emphasizes the development of learners' skills and knowledge through practical, experimental learning. This educational approach priorities the mastery of core competencies over rote memorization, aiming to prepare students for real-world challenges. However, the successful implementation of a CBC largely depends on the availability and proper utilization of instructional resources. The success of the CBC heavily depends on the availability and effective use of educational resources which

support practical, experimental learning. Scholars like Wiggins and McTighe (2005) emphasize that diverse instructional materials promote deeper engagement and critical thinking while Kafu (2011) argues that the absence of practical resources such as laboratories, limits students ability to develop essential skills. Additionally, Darling-Hammond (2006) highlights the importance of teacher training in maximizing the use of resources, stressing that without proper professional development, even well-equipped classrooms may not achieve optimal learning outcomes. However, as Orodho (2014) points out resource disparities between schools can lead to unequal educational experiences, ultimately undermining the goals of the CBC.

2.4.1 Benefits of competence-based curriculum

The Competence –based curriculum offers several advantages by focusing on the development of practical skills and knowledge that are essential for real-world application. One key benefit is emphasis on learner-centered education which tailors teaching methods to individual student needs, fostering active engagement and critical thinking (Wiggins and McTighe, 2005). This approach prepares students to solve complex, real-life problems by emphasizing the application of skills over rote memorization. Furthermore, the CBC promotes equity in education by accommodating diverse learning styles and paces, ensuring that all students have the opportunity to succeed based on their abilities rather than a one-size-fits-all approach (Darling-Hammond, 2006).

Another advantage is the integration of technology and modern resources into the curriculum which enhances learning experiences and allows students to develop digital literacy –a crucial skill in today's job market. The CBC also fosters collaborative learning, encouraging teamwork and communication, which are essential competencies in both academic and professional settings (Kafu, 2011). Additionally, the curriculum promotes continuous assessment rather than relying solely on final exams allowing for ongoing feedback and improvement. This system not only reduces exam-related stress but also provides a more comprehensive evaluation of a student's growth and competencies overtime (Orodho, 2014).

The competence based curriculum (CBC) emphasizes practical skills and real world problem solving making science education crucial in developing student's competences. However, the selected schools in Zvishavane face resources constraints such as limited laboratory equipment and instructional materials which hinder effective combined science teaching. These shortages affect student ability to engage in hands-on learning and fully grasp scientific concepts. This research examines how resource limitations impact the teaching of science under the CBC frame work and explores potential solutions to these challenges.

2.4.2 The role of resources in science education

The CBC framework emphasizes practical learning especially in science where hands on activities are crucial. However, schools lack essential resources like laboratory equipment which restricts the effective teaching of science. Mutemeri and Nyikahadzoi (2020), states that without these resources it is difficult for students to develop the critical thinking and problem solving skills that CBC aims to foster. Therefore for students at form three level the ability to experiment and observe scientific phenomena directly enhances their understanding of concepts. Without access to essential resources, educators struggle to implement the CBC effectively which undermines students' ability to develop problem solving and critical skills, key objectives of the CBC framework (Matsika, 2021).

2.4.3 Impact of inadequate lab equipment

Laboratory experiments are vital for science learning but schools in Zvishavane urban lack basic lab tools. This shortage forces teachers to demonstrate experiments rather than letting students participate hands-on which limits students' full understanding of scientific concepts (Chikunda and Nyikahadzoi, 2019). In the three schools in Zvishavane urban, teachers reported that they are often forced to demonstrate experiments themselves rather than allowing students to participate actively, severely limiting the efficacy of practical science lessons. This lack of engagement results in students not fully grasping key scientific concepts which are essential for mastering combined science at form three (Matsika, 2021).

2.4.4 Challenges with instructional materials

In addition to lab equipment, schools face a shortage of up-to date textbooks and digital learning tools. Schools rely on outdated materials that don't align with the CBC's competency goals. This limits student access to diverse learning opportunities, hindering their ability to connect theory with practice (Maringe and Prew, 2019). The lack of updated instructional materials makes it difficult for teachers to deliver lessons that meet CBC goals. Furthermore, the absence of digital resources such as projectors, computers and internet access limits the ability of students to access diverse learning materials that could enhance their understanding of complex scientific concepts. As a result, students face difficulties in connecting theoretical knowledge with real world applications, a key component of the CBC approach (Maringe and Prew, 2019).

2.4.5 Effects on competency development

Resource shortages prevent teachers from using student-centered learning approaches which are essential for developing critical skills and collaboration. In the schools studied, teachers reported that they often resort to traditional methods which limit the development of the competencies that CBC aims to achieve (Nyikahadzoi and Mutemeri, 2020).

Apart from the challenges and the barrier that can hinder the teaching of combined science in schools there are possible solutions to make. Nyikahadzoi (2019) suggests that one potential solution is the establishment of partnerships between schools and local industries to provide resources such as lab equipment and instructional materials by fostering collaborations with businesses and non-profit organizations, Schools could gain access to donated equipment or funding for science education. Another solution is the use of low – cost locally available materials for science experiments and also teachers should improvise on the apparatus like beaker by make use of plastic. According to Matsika (2021) some schools have successfully used everyday materials such as household items to conduct simple experiments while these materials may not replace fully equipped labs. They could serve as temporary substitutes allowing students to engage in practical learning to some extent.

2.5 Assessment procedure in different approaches.

Combined science at form three level is a critical subject that integrates various branches of science including biology, physics and chemistry. It is designed to provide students with a broad understanding of scientific principles and practical skills necessary for future academic and career pursuits. Assessing student competences in such a subject requires a variety of assessment methods that align with the goals of the CBC ensuring that students not only acquire knowledge but also demonstrate their ability to apply that knowledge in real-world contexts. In this literature review I explore the types of assessment used to evaluate student competencies in science under CBC with a particular focus on three selected schools in Zvishavane urban. Also will explore the efficacy of these assessments in enhancing the teaching and learning combined science at form three level.

Formative assessment, Summative assessment, performance-based assessment, Diagnostic assessment and peer and self- assessment are the types of assessment in science under CBC. In order to formative assessment is one of the central components of the CBC designed to provide continuous feedback to students and teachers throughout the learning process. According to Black and William (1998), formative assessment helps to identify areas where students are struggling, allowing teachers to adjust their instruction accordingly. In the context of combined science formative assessment can include quizzes, class discussions, practical experiments and group projects. These assessments enable teachers to gauge how well students are grasping scientific concepts and applying them in practical scenarios. Maringe and Prew (2014) highlighted that effective formative }" {assessment can lead to improved student performance and better understanding of scientific principles.

Summative assessment are typically conducted at the end of learning unit or academic term to evaluate the extent to which students have achieved the desired competencies (Harlen, 2007). In the combined science curriculum summative assessments often take the form of standardized tests or exams which assess student knowledge across biology, chemistry and physics. However, summative assessments have been critiqued for their inability to fully assess practical competencies in science, Shepard (2000), traditional summative may prioritize rote memorization over critical thinking and problem solving skills which are central to the CBC. In the selected schools in Zvishavane urban , teachers have observed

that while summative assessment effectively measure theoretical knowledge they may not adequately reflect student abilities to apply scientific concepts I practical situations. In addition, performance based assessments are a key feature of the CBC emphasizing the demonstration of skills and competencies through practical tasks (Muijis et al., 2014). In combined science these assessments might include laboratory experiments, project based learning and fieldwork. These assessments are designed to test students' ability to apply scientific knowledge to real-world problems thereby aligning with the competencies outlined in the CBC. Chisaka (2013), suggests that performance based assessments are more effective in science education because they engage students in active learning and allow them to demonstrate their understanding through hands-on activities. This type of assessment is particularly valuable in combined science where practical skills are essential to mastering the subject.

Diagnostic assessment are used to identify students' prior knowledge and any misconceptions they may have about scientific concepts before instruction begins. This type of assessment is crucial in the CBC as it helps teacher design lessons that address student' specific learning needs (Hattie, 2009). In combined science diagnostic assessment can involve pre-tests, concept maps or interviews with students about their understanding of key scientific ideas. At form three level diagnostic assessment have proven to be an important tool ensuring that students are adequately prepared for more advanced scientific topics. According to a study by Hlatshwayo (2016), Teachers in Zimbabwean schools have found that diagnostic assessments allow them to tailor their teaching strategies to meet the diverse needs of their student, leading to more effective science instruction. Lastly, Peer and self- assessment are increasingly being used in CBC classrooms to encourage students to take greater responsibility for their own learning. These assessments involve students evaluating their own work or that of their peers fostering a deeper understanding of the subject matter and promoting critical thinking (Topping, 2009).

The efficacy of these assessments methods are impact on teaching and learning and challenges and recommendations. Due to impact on teaching and learning formative and performance based assessments have been particularly effective in improving the teaching of combined science. Teachers in Zvishavane urban have reported that these assessments allow them to monitor student progress more closely and provide targeted feedback (Mupinga, 2020) However, the lack of adequate resources such as laboratory equipment

and instructional materials has hindered the full implementation of performance-based assessments in some schools. Summative assessment while useful for evaluating theoretical knowledge have been less effective in assessing practical competencies. This has raised concerns among educators about the alignment of summative assessments with the goals of the CBC. Shumba and Rembe (2015) suggests that more emphasis should be placed on performance assessments to ensure that students are developing the practical skills needed for scientific literacy.

In order to challenges and recommendations, teachers in Zvishavane urbn schools have noted that large class sizes and limited infrastructure make it difficult to conduct regular formative and performance –based assessments (Muringe and Prew, 2014). Additionally there is a need for more in-service training for teachers to help them effectively implement the new assessment methods. To address these challenges scholars such as Hlatshwayo (2016) recommend increasing investment in science education particularly in under resourced areas and providing ongoing professional development for teachers, Improving the quality of assessments, the CBC can better achieve its goals of developing competent and skilled learners.

In conclusion, formative, performance-based and diagnostic assessments have shown promise in improving teaching and learning outcomes, challenges remain in terms of resource allocation and teacher preparedness. By addressing these issues, the effectiveness of the CBC in promoting scientific literacy and practical skills can be further

2.8 Chapter summary

This chapter related literature was reviewed with the view to identify the gaps to be filled by this study. The next chapter will focuses on research methodology which will guide data generation.

Chapter 3

Research Methodology

3.1 Introduction

This section outlines the research methodology employed to investigate how effective the CBC is enhancing learning outcomes in combined science. This methodology is designed to provide a systematic approach to gathering and analyzing data from the three selected schools under study, the primary aim is to gain insights into the instructional strategies, available resources, student engagement and overall performance within the context of CBC. Moreover, the focus of this chapter outlines the research design, sample and sampling, research instruments, data generation, presentation analysis procedure, research integrity and ethical consideration then lastly chapter summary.

3.2 Research design

A mixed-methods research design was employed combining qualitative data collection techniques. According to Creswell (2014), mixed methods research allows for a more profound understanding of research problems by integrating statistical trends with in depth qualitative insights. Qualitative data are used to explore teacher experiences and instructional strategies in depth as well as to measure student performance and engagement. This approach will help the researcher to answer complex research questions by allowing them to address both the breadth and depth of the subject. He emphasizes that mixed method research provides a more complete understanding of the research problem as it corporates the strength of both methodologies. Jennifer Greene (2007) , she outlines the complementary of qualitative methods, Suggests that mixed method research is particularly significant relationships. Qualitative methods are essential for exploring the contextual complexities behind these patterns. This allows the researcher to know more nuanced understanding of the research topic. The researcher can verify whether the insights from one method align with those from the other. This will help the researcher bias and ensures that the findings are robust and well-supported.

3.3 Sample and Sampling procedures

The population for this study includes form three students and science teachers from three selected secondary schools in Zvishavane urban. A purposive sampling strategy was employed to select schools with varying levels of resources and performance in science education, ensuring a diverse sample that could provide a broad picture of CBC implementation. Also random sampling was then employed to select 45form three students (15from each school) to ensure that the student sample was representative of the student population in each school. Additionally, 9 science teachers were purposively selected (3 from each school) due to their direct involvement in teaching combined science at the form three level. Cohen, Manion and Morrison (2018), highlight the importance of purposively sampling in educational research when the aim is to select participants who are most relevant to the research question. Tashakkori and Teddlie (2010), highlights the importance of mixed method sampling , they argue that purposively sampling in qualitative components helps to select participants who provide rich and detailed information. This approach aligns with the current study, where purposive sampling was used to select schools and teachers and randomly was used for students to ensure representativeness.

3.4 Research Instruments

In this study data collection will be carried out using three primary methods include questionnaires, document analysis, and interviews with the key stakeholders such as teachers. Each of these methods was chosen to address different aspects of how the CBC is implemented and its effectiveness in teaching combined science at the form three level in three secondary schools in Zvishavane urban.

3.5 Questionnaires

These are widely used data collection tool in educational research especially when seeking to gather information from a large number of participants in a standardized manner. In this study, structured questionnaires were administered to both students and teacher to collect data on their experience with the competence based

curriculum. Bryman (2016) argues questionnaire are effective for collecting data that can be easily analyzed statistically. They allow the researcher to identify trends and patterns across a broad sample such as the level of student engagement with the CBC or the challenges teachers face in delivering thee combined science curriculum. Dillman, Smyth, and Christian (2014) note that questionnaires are particularly useful when the researcher needs to gather information from a dispersed population as they can be administered in person, via email or online. In this study two types of questionnaires were used which is student questionnaire and Teacher questionnaires. These included closed-ended questions designed to measure students' engagement with the curriculum , their understanding of scientific concept and their participation in practical activities for example to rate their confidence in performing science experiments or understanding scientific theories. The teacher questionnaires focused on assessing the instructional strategies used, the resources available for teaching combined science and the challenges faced under the CBC. Teachers were also asked to rate the effectiveness of the curriculum in enhancing students learning outcomes.

3.6 Advantages of Questionnaire

- Standardization – questionnaire provide a consistent format for collecting data, ensuring that all participants respond to the same set of questions, which enhances comparability (Cohen et al, 2018).
- Efficiency- it is cost –effective method for gathering data from large groups of respondents within a limited timeframe (Dillman et al., 2014).
- Anonymity- respondents may feel more comfortable providing honest answers due to the anonymity that questionnaires often provide (Bryman, 2016).

3.7 Limitations of Questionnaires

- Limited Depth- While questionnaires are good for capturing broad trends, they may not provide the depth of understanding that qualitative methods like interviews offer (Creswell, 2014).

- Response Bias- There is the risk that respondents may not fully understand the questions or may provide socially desirable answers rather than their true opinions (Cohen et al., 2018).

3.8 Document Analysis (CBC Syllabus and Policy)

It is a qualitative research method that involves the review of official documents to interpret and understand the content and context. In this study the CBC syllabus and related policy documents were analysed to understand the theoretical framework, objectives and guidelines for teaching combined science at the form three level. Bowen (2009) explains, document analysis is particularly useful in educational research for understanding the institutional and policy context within which teaching and learning occur. Reviewing the CBC syllabus, the researcher can gain a deeper understanding of what the curriculum is designed to archive and how it is intended to be implemented in practice. Policy document provide additional context on the broader goals of CBC, Its assessment methods and expected competencies students should develop. The key aspects analyzed are the curriculum objectives this include the focus on practical skills, critical thinking and problem solving abilities. Also Competency framework these includes both scientific knowledge and practical skills and lastly Assessment methods for example summative and formative assessment used to evaluate student performance particularly in science subjects.

3.4.2.1 Advantages of Document analysis

- Rich contextual data- It provides access to official policy frameworks and curriculum guidelines which can help the researcher understand the theoretical underpinning of the CBC (Bowen, 2009).
- Non-reactive- the documents are not influenced by the researcher‘s presence which avoids the reactivity bias often associated with interviews or surveys (Merriam and Tisdell, 2016).
- Longitudinal Perspective since documents can reflect policy changes over time they offer a historical perspective on the evolution of the curriculum (Creswell, 2014).

3.4.2.2 Limitations of Document analysis

- Insufficient Detail – policy documents may provide broad overviews but lack specific details about how the curriculum is implemented in practice (Bowen, 2009).
- Potential Bias- official documents may reflect the ideals of policymakers rather than the realities experienced by teachers and students in the classroom (Merriam and Tisdell, 2016).

3.5 Personal Interviews

Personal interviews were conducted with key stakeholders including teachers, HoDs and school administrators to explore their experiences and perceptions of the CBC in more depth. This qualitative data collection method allowed for a more nuanced understanding of the challenges and successes in implementing the CBC for combined science. This provide flexibility, allowing the researcher to follow up on interesting points that arise during conversation while still covering a set of predefined questions (Kvale, 2007). This method is particularly valuable when the research aims to uncover personal experiences and subjective opinions that cannot be easily captured through questionnaires for example teacher were asked to describe their experience with the CBC including how well they feel it prepares students for scientific inquiry and how effectively they can apply practical teaching methods. They also asked about the availability of resources, teachers training and the general challenges of implementing the CBC. Teachers were asked open-ended questions about their teaching strategies.

3.6 Advantages of Interviews

- Depth of Insight – Interviews allow for in-depth responses, providing rich detailed data that can reveal the complexities of implementing the CBC (Cohen et al., 2018).
- Flexibility – The interviewer can probe deeper into certain issues as they, arise allowing for a more explanatory approach (Kvale, 2007).

3.7 **Limitations of Interviews**

- Time-Consuming – conducting and transcribing interviews is a time-intensive process which can limit the number of participants (Creswell, 2014).
- Interviewer Bias- the interviewer presence and questioning style could influence participant responses, potentially introducing bias (Bryman, 2016)

3.9 Focus Group

A focus group is a qualitative research method used to gather diverse perspectives on a specific topic by engaging a small group of participants in guided discussions. Typically consisting of 5-10 individuals, focus groups are facilitated by moderator who encourages interaction and explores participant thoughts feeling and experiences related to the subject matter.

3.4.4.1 Advantages of Focus Group

- In depth insights- participants can share their thoughts and experiences in detail, providing rich qualitative data (Krueger and Casey 2015).
- Group dynamics- the interaction among participants can stimulate ideas and encourage discussion, leading to insights that may not emerge in individual interviews (Morgan 1997).
- Flexibility- Moderators can adapt questions and explore new topics that arise during discussions allowing for a more responsive research approach (Barbour 2007)
- Diverse perspective- a focus group can include participants from various backgrounds, offering a range o viewpoints on the topic (Steward and Shamdasani, 2015).
- Cost-effective- conducting a single focus group can gather information from multiple participants simultaneously saving time and resources compared to individual interviews (Gill et al, 2015).

3.4.4.2 Disadvantages of Focus Group

- Groupthink- some participants may conform to dominant opinions or ideas leading lack of diverse perspectives (Janis 1982)
- Moderator bias- The facilitator's influence can affect the direction of the discussion, potentially skewing the data collected (Kitzinger 1995).
- Limited Generalizability- findings from focus groups may not be universally applicable due to the small and specific participant sample (Onwuegbuzie and Leech 2007).
- Logistical Challenges- Organizing focus group can be time-consuming and may require significant coordination to align participant schedules (Bloor et al. 2001).
- Sensitive Topics- discussing sensitive issues may make some participants uncomfortable leading to reluctance in sharing honest opinions (Kitzinger,1995).

3.10 Data analysis

The data from the questionnaire were analyzed using descriptive statistics including measures of central tendency and frequency distributions. These statistics helped to identify patterns and trends related to student performance and engagement in combined science. According to Field (2018), descriptive statistics are essential for summarizing large datasets in a meaningful way. Qualitative data from interviews were analyzing using thematic analysis as described by Braun and Clarke (2006). This involved identifying recurring themes related to the effectiveness of teaching strategies, resource availability and student engagement with the CBC. The thematic analysis allowed for a nuanced understanding of the experiences of both students and teachers.

3.11 Research integrity

Research integrity speaks to ethical issues which guided data generation, presentation, analysis and interpretation.

3.6.1 Ethical Considerations

Ethical approval was obtained from the relevant educational authorities. Participation was voluntary and informed consent was obtained from all participants including students, teachers and school administrators. Measures were taken to ensure participant anonymity and confidentiality following guidelines

recommended by Babbie (2020). Data were stored securely and only the research team had access to the raw data.

3.6.2 Validity and Reliability

To ensure the validity and reliability of the research several strategies were employed. The questionnaires were pre-tested to identify any ambiguities and adjustments were made accordingly. Triangulation was used by comparing data from multiple sources which include questionnaires, interviews and document analysis as suggested by Denzin (2012), to improve the credibility of the findings.

Chapter Summary

This chapter looked at research methodology to be used in the study. The qualitative approach was discussed as the research design guiding this study for sampling the participants, purposive and convenience techniques will be used. The data generation for this study include document analysis and personal interviews. It also looked at research integrity. The next chapter will deal with data presentation.

CHAPTER 4

Data presentation, Interpreting, Analysis and Discussion

4.1 Introduction

This chapter presents the findings of the study on the efficacy of teaching combined science at the form three level within the competence –based curriculum (CBC) in Zvishavane Urban. The data is systematically presented through tables, followed by an analysis to uncover key trends and patterns that address the study's objectives. Finally, the interpretation links the findings to the research questions and theoretical framework providing insights into the strengths and challenges of implementing the CBC in combined science education. The following is the biographical data obtained from questionnaire for teachers and students.

4.2 Demographic characteristics of the participants

Table 4.2.1 Demographic of characteristics of the combined science teachers form three

Respondent	**Sex**	**Age**	**Professional qualifications**	**Working experiences**
1.	M	41-50 years	Post graduate	Above 5 years
2.	M	31-40 years	Post graduate	3-4 years
3.	M	21-30years	undergraduate	Less than a year
4.	F	31-40years	Post graduate	3-4 years
5.	M	41-50 years	Post graduate	Above 5 years
6.	F	41-50 years	Post graduate	Above 5 years
7.	F	21-30 years	undergraduate	Less than a year
8.	F	31-40years	Post graduate	1-2 years
9	F	31-40 years	Undergraduate	Less than a year
10	M	Above 50 years	Post graduate	Above 5 years
11	M	Above 50 years	Post graduate	Above 5 years

The data shown on the table above analysis the data performed using mixed method to collect data. The researcher noted that among eleven teachers from three different schools in Zvishavane urban were 6 male teachers and 5 were females including two school headmasters. Also the researcher noted that teaching experience ranged from less than a year and above 5 years. The data also shows that professional qualifications ranged both undergraduates and

postgraduates. Moreover, teacher age ranged from 21 up to 50 years making the capable of marking research findings credible and dependable.

Table 4.2.2 Demographic Characteristics of Form Three Learners (n=45)

Attributes		(n)	(%)
Sex	Female	25	
	male	20	
Age Range (Years)	13-15 years	8	
	16-18years	30	
	Above 18	7	
Form	3	45	

The researcher worked with 45 students from the selected three schools in Zvishavane urban, we used focus group discussion as an instrument to collect the data. They were 25 female students and 20 were male students. Moreover, their ages ranges from 13 years to 18 years. Studying a group constituted by learners from diverse backgrounds enriched the research findings since different perspectives were raised.

4.3 Respondents Perceptions on the implementation of competence-based curriculum in the combined science classroom.

This section explores the perceptions of teachers and learners from the three selected schools in Zvishavane urban, regarding how the competence based curriculum is being implemented in combined science classrooms. The findings are discussed in light of relevant scholarly perspectives to provide a comprehensive understanding of the current state of CBC implementation.

Teacher respondents generally expressed mixed feelings about the implementation of the CBC in combined science classrooms. The four of respondents were agreed that the competence based curriculum has changed their approach to teaching science, they acknowledged that the CBC has helped syllabus coverage as some topics can now be administered through use of

CALAS and it emphasizes practical skills, critical thinking and problem –solving which are essential for preparing students for real-life challenges. They also agreed that participation by learners improved since learners were involved in research students participated actively. These sentiments reflects the findings of Marope et al. (2015), who respectively indicated that the CBC is designed to equip learners with competencies that align with 21ST century demands, emphasizing hands on activities and learner centered approaches. In the context of Zvishavane teachers admitted that the curriculum's focus on competencies is a positive step forward improving science education

However, seven teachers were disagreed since they highlighted challenges that hinder effective implementation. They mentioned challenges for example the CALAS took a lot of time administer and to mark leaving the teacher with less time to do revision and also lack of technology at the school like WIFI at the school impacted negatively in learners doing research. Also they mentioned that lack of adequate resources, insufficient training on CBC methodologies and large class sizes that made individualized attention difficult. As noted by Chikumbu and Makamure (2000), the success of competency –based curriculum depends heavily on the availability of resources and teacher preparedness. In this study teachers raised concerns about the lack of laboratory equipment and materials necessary for conducting practical experiments which are a cornerstone of the CBC approach in science education. Additionally, Teachers reported that while the curriculum promotes a shift to learner –centered teaching, they often reverted to traditional lecture methods due to time constraints and pressure to complete syllabi. This aligns with findings by Murekezi (2013), who observed that teachers in resource constrained environment often struggle to balance curriculum demands with realities of their classrooms.

Respondents learners were also strong agree on the other hand appreciated the interactive and practical nature of the competence based curriculum. Form the focus groups discussion, Almost 20 of them mentioned that it is quite helpful due to teaching methods used in their combined science classes. They said it allows them to do more research in the school work and they engaged that made them become effective in measuring their understanding. They reported that the competence based curriculum has changed their approach of learning science compared to previous years. They mentioned that the new curriculum encourages them to participate

actively in lessons through experiments, group discussions and problem solving activities. They said that the most significant methods allowed them to be critical thinkers and became good at creating new ideas. This aligns with Farrant (1991), who argues that active participation enhances learning by allowing students to apply concepts in real world scenarios.

However, 25 students also highlighted challenges such as insufficient practical sessions due to resource shortages. In some cases, they reported that the teachers resorted to theoretical explanations of experiments instead of allowing hands on participation. This issue resonates with the findings by Tiberghien et al. (2001), who emphasized that science education requires adequate practical exposure for students to fully grasp scientific concepts and develop problem solving skills.

The perception of both teachers and students also pointed to systemic challenges in the implementation of the CBC. Schools administrators were often unable to provide the necessary support due to limited funding and inadequate infrastructure. According to Fullan (2007) successful curriculum reform requires strong leadership and systemic support to address logistical and operational challenges. In the case of Zvishavane, the lack of government funding for CBC implementation was a recurring concern among respondents. Furthermore, there was a lack of alignment between teacher training programs and the demands of CBC. Teachers reported that the professional development workshops they attended were either too short or overly theoretical, leaving them ill-prepared to implement the curriculum effectively. This is consistent with the findings of O'Sullivan (2002), who noted that insufficient training is significant barrier to educational reform in developing countries.

Despite the challenges respondents recognized several opportunities to improve the implementation of the CBC in science classrooms. Teachers suggested that the government should invest in equipping schools with laboratory facilities and training teacher on CBC methodologies. They also recommended reducing class sizes to enable more personalized instruction. These suggestions align with Vygotsky's (1978) socio-theory which emphasizes the importance of providing learners with appropriate tools and support to facilitate meaningful learning experiences. Additionally, integrating technology into science teaching was seen as a

potential solution to some of the challenges for instance, digital simulations and virtual labs could supplement practical experiments in resource-constrained environments. According to Mishra and Koehler (2006), technology can play a transformative role in education by enhancing both teaching and learning processes.

In conclusion, the results obtained from the interviews indicated that the perceptions of teachers and students in Zvishavane Urban reveal a complex picture of CBC implementation in combined science classrooms. While the curriculum's focus on practical skills and learner-centered approaches is widely appreciated. Challenges such as resource shortages, inadequate training and systemic issues hinder its effective implementation. Addressing these challenges requires a collaborative effort involving teachers, administrators and policymakers to ensure that the goals of the CBC are fully realized. Through investing in resources, training and innovative teaching methods, Zimbabwean schools can enhance the teaching and learning of combined science under based curriculum.

4.4 Respondents perception on resource constraints in learning and teaching of science under competence based curriculum.

The researcher in this section centers on the analysis and discussion on the resource constraints in the teaching and learning activities. In line with the theme derived from the question, from the questionnaire respondents all teachers emphasizes that resource shortages present significant challenges to teachers effectiveness in delivering science lessons. The one of the teachers mentioned that*, competence based education requires active hands-on learning approaches, particularly in science where practical experiments and investigations are key to developing competences. However, in resource-constrained environments, I often left with limited options for delivering practical lessons*

.

This aligned with Adedeji and Olaniyan (2011), states that teachers in under resourced schools often resort to theoretical teaching methods due to the unavailability of laboratory equipment and consumable materials like chemicals. Respondents in their study indicated that this theoretical approach diminishes student ability to grasp scientific concepts and hinders their

development of analytical skills. Furthermore, Both HODs mentioned that teachers face additional pressure to improvise often using inadequate or locally available materials that may not fully replicate the intended learning experience. This improvisation while creative can limit the depth and quality of scientific exploration.

Respondents also pointed to the lack of professional development opportunities as a critical issue. Two teachers mentioned that, *regular professional development sessions, collaborative planning meetings are less conducted and also clearly guidelines, shared of resources and lesson templates are less provided as well as feeding back.* Orodho (2014), noted that resource constraints often prevent teachers from accessing training programs essential for mastering CBC methodologies. Teachers who are not adequately trained may struggle to implement the competence-based approach as they lack the pedagogical skills and strategies required to navigate resource-constrained settings effectively.

Respondents frequently highlight the detrimental effects of resource constraints on students learning experiences. Incompetence-based science education students are expected to actively engage in experiments, solve real-world problems and collaborate with peers. However, all most 35 students reported that the lack of essential resources such as laboratories, textbooks and ICT tools limits their ability to participate in experiential learning activities. This aligned by Mulkeen (2009) underscores this issue stating that schools without laboratories or functional equipment cannot provide learners with the practical experiences necessary for mastering scientific concepts. Other 10 Students in their study described how the absence of hands-on activities leads to disconnect between theoretical knowledge and practical application. The gap not only affects student's understanding of science but also reduces their motivation and engagement with the subject.

Due to document analysis observation, respondents also point to broader systemic challenges associated with resource constraints. At the policy level, insufficient funding for education limits ability of government to provide schools with the necessary resources for implementing Competence based education in science. According to Mawunga-Zake (2008), resource constraints are particularly acute in developing countries where education budgets are often

stretched thin. Learners in this study noted that the lack of investment in science education perpetuates a cycle of poor-quality education as schools are unable to procure the tools and materials needed for effective teaching and learning.

The respondents also emphasized the role of technology in mitigating resource constraints but noted that its adoption is hindered by systemic issues. Digital tools such as virtual labs and online learning platforms have been identified as cost-effective solutions for resource – constrained environments. However, in studies by Mulkeen (2009) and UNESCO (2017), reported that many schools lack the infrastructure such as reliable internet connectivity and access to devices needed to integrate these tools into science education. This digital divide further exacerbates the challenges faced by students and teachers in under resourced schools.

Moreover, the respondents offered several recommendations for mitigating the impact of resource constraints on science education under a competence-based framework. One common suggestion was increased government investment in science education. Also they argued that policymakers should prioritize funding for laboratories, textbooks and teacher training programs to ensure that all schools have the resources needed to implement competence based education effectively. Partnerships with private organization (NGOs) were also cited as potential avenues for bridging resource gaps. Another recommendation was training of teachers to adapt to resource constrained environments. Respondents in Muwanga-zake's (2008) study suggested that teachers should be equipped with skills to improvise and use locally available materials for experiments while this approach does not eliminate resource constraints. It provides a practical way for teachers to deliver hands-on lessons in challenging circumstances. They also highlighted the importance of integrating technology into science education. Virtual labs and open educational resources are identified as promising solutions for schools without physical laboratories. However respondents stressed that these tools must be accompanied by investments in ICT infrastructure and teacher training to ensure their effective use.

Respondents' perceptions underscore the significant challenges posed by resource constraints in teaching and learning of science under a competence based framework. These constraints affect teachers to deliver practical lessons, limit student access to experiential learning and

create systemic inequities in education. Also they highlighted potential solutions, including increased investments in science education, teacher training and the integration of technology. Addressing these issues is essential for ensuring that all students regardless of their socioeconomic background have the opportunity to develop the competencies needed for success in science and beyond. As scholars such as Adedeji and Olaniyan (2011) and UNESCO (2017) emphasize, overcoming resource constraints is critical to the effective implementation of competence-based science education.

4.5 Respondents perception on the assessment procedure in different approaches.

Teachers provided significant insights into the assessment procedure used in CBC classrooms. Interviews revealed that teachers frequently employ formative assessments, practical experiments and project-based tasks to evaluate student's competencies in science for instance, one teacher stated during an interview that, *Formative assessments like quizzes and group discussions help me track individuals student progress and identify areas where they need support but with large class sizes its tough to give personalized feedback.* This perspective is consistent with the findings of Black and William (1998), who emphasized the role of formative assessments in identifying learning gaps and improving outcomes. Questionnaire responses also indicated that teachers view project-based assignments as a critical component of CBC. However, 65% of teachers reported challenges such as insufficient resources for practical experiments and limited training on CBC-aligned assessment techniques. These findings suggest that while teachers recognize the value of CBC assessment in fostering competencies such as critical thinking and problem –solving , systemic barriers hinder their effective implementation. Similar challenges were highlighted in Guskey (2007) study, which noted that teacher workload and resource constraints often limit the effectiveness of formative assessment practices.

HODs also highlighted the role of departmental planning meetings in supporting teachers to develop CBC aligned assessments. However, they expressed concerns about the sustainability of these practices particularly in schools with large student populations and limited laboratory facilities. These challenges are supported by Doran et al. (1993), who argued that practical assessments require adequate resources and institutional support to be effective. Additionally,

HODs noted discrepancies in assessment implementation across schools with some teachers still relying heavily on traditional summative assessments rather than embracing CBC-aligned methods. This observation aligns with Shepard's (2000) argument that transitioning to competency –based assessments requires a cultural shift in how educators and institutions view learning evaluation.

Focused group discussions with learners provided valuable insights into their experiences with CBC aligned assessments procedures. Most learners expressed a preference for practical and project-based assessments which they found engaging and relevant to real-life applications, one student explained, "*I enjoy doing experiments because they help me understand how science works in real life. It's better than just reading from a textbook*." This sentiment reflects Kolbs's (1984) experiential learning theory which emphasizes the importance of hands-on activities in promoting deeper understanding and skill development. Approximately 78% of learners who completed questionnaire agreed that practical assessments helped them developing critical thinking and problem-solving skills. However, some learners voiced concerns about the fairness and consistency of peer assessments for example a focus group participant noted, *sometimes it is hard to judge my friend's work because I don't know if I'm doing it correctly myself."* These concerns highlight the importance of clear guidelines and rubrics in peer assessments practices as emphasized by Nicol and Macfarlane-Dick (2006). Learners also reported challenges with limited access to laboratory equipment which hindered their ability to fully participate in practical assessments. This finding is consistent with studies by Darling-Hammond et al. (2014), who identified resource availability as a critical factor in the success of competency-based assessments.

The findings indicate that CBC aligned assessment procedures are gradually replacing traditional exam –based practices in schools. Formative assessments practical experiments and project based tasks are widely recognized as effective tools for fostering competencies such as critical thinking, creativity and collaboration. These findings align with Gulikers et al. (2004), who argued that competency-based assessments are essential for preparing students for the demands of the 21st century. However, systemic challenges such as resource limitations, large class sizes and inconsistent teacher training were consistently highlighted by teachers, HODs and learners. Addressing these challenges requires targeted interventions including investment

in infrastructure, provision of adequate teaching materials and professional development programs for educators. As heritage (2010) noted the success of competency-based assessments depends on the availability of resources and the capacity of educators to implement innovative practices effectively. Additionally, the findings underscore the importance of ensuring alignment between assessment procedures and CBC objectives. As Shepherd (2000) argued assessments should not only measure learning outcomes but also actively contribute to the learning process. This requires a shift in how educators and stakeholders perceive and implement assessments moving towards more holistic and student –centered approaches.

In conclusion, the analysis of respondent perception revealed a general consensus on the potential of CBC aligned assessment procedure to promote students competencies in science. Teachers, HODs and learners recognized the value of practical experiments, project-based tasks, and formative assessments in fostering critical thinking and problem-solving skills. However, systemic challenges such as limited resources, class size and inadequate teacher training were identified as significant barriers to effective implementation. To optimize the effectiveness of CBC assessment it is essential to address these challenges through targeted interventions. These include improving resource allocation providing comprehensive teacher training and developing clear guidelines for assessment practices. As schools continue to implement CBC a collaborative effort among educators, policymakers and stakeholders is crucial to ensure that assessment procedures are both practical and aligned with the curriculums goals.

4.6 chapter Summary

In this chapter findings were presented, analyzed and interpreted. Chapter five which follows gives a summary of the research study, general conclusion and recommendations of the study. Also the following chapter gives an overview of the study.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The previous chapter presented, analyzed and interpreted findings in responding to the research questions indicated in the first chapter. The current chapter now summarizes the study highlighting the conclusion, recommendations together with proposing further areas of research and chapter summary.

5.2 Summary of the project

In the chapter one introduces the study outlining its objectives and research questions, it delves into the significant of the study in addressing the need for effective science education in Zvishavane urban. Chapter 2 presents a comprehensive review of the literature, exploring the concept of the competence based curriculum, its implementation and its potential benefits in science education. The chapter also examines the specific context of science education in Zimbabwe highlighting the challenges faced by teachers and students. Chapter 3 details the research methodology employed in the study including the research design, data collection methods qualitative and data analysis techniques. This chapter also discusses the ethical considerations and measures taken to ensure validity and reliability of the research findings. Chapter 4 presents the findings of the study derived from qualitative data analysis. The qualitative findings provide insights into teachers and students perceptions of the CBC and its implementation challenges. It also gave an outline of the following major findings:

- The CBC approach had a positive impact on students learning outcomes with significant improvements observed in their knowledge and practical skills. Students were better equipped to apply scientific concepts to real-world problems leading to a deeper understanding of the subject matter. The curriculum's emphasis on hands on activities and inquiry –based learning fostered a more engaging and effective learning environment…(research question 1)
- Teachers reported that the CBC approach promoted active learning, critical thinking and problem abilities among students The curriculum's emphasis on problem solving and critical thinking skills enabled students to analyze complex scientific issues and develop innovative solutions …(research question 2)
- The successful assessment of CBC was hindered by several challenges including lack of adequate resources and teacher training … (research question 3)

5.3 Conclusion

The implementation of the competence-based curriculum (CBC) in Zvishavane urban schools has shown promising results in enhancing student scientific knowledge and practical skills. The CBC's emphasis on active learning, inquiry-based approaches and real world applications has fostered a more engaging and effective learning environment. However the successful implementation of CBC is contingent upon addressing several challenges. These challenges include a lack of adequate resources such as laboratory equipment and chemicals as well as a shortage of qualified science teachers. Furthermore, the need for comprehensive teacher training programs to equip educators with the necessary pedagogical skills to deliver the CBC effectively is paramount. By addressing these challenges the CBC can be fully realized, leading to improved science education outcomes for all students in Zimbabwe.

5.4 Recommendations

Based on the findings the researcher made the following recommendations:

- Prioritize the allocation of adequate funds for the procurement of essential laboratory equipment, chemicals and other instructional materials
- Implement comprehensive teacher training programs to equip educators with the necessary pedagogical skills to deliver the CBC effectively.
- Develop a variety of assessment tools including performance-based assessments to measure student competences and skills.

5.5 Areas for further research

Given that schools are in different locations and accommodate learners from different backgrounds, the researcher proposes that a similar study be conducted in the districts nationwide so that a comprehensive solution that helps the nation at large can be found.

5.6 Chapter summary

This chapter gave summary of the project, conclusion to the project, outlined recommendations and areas for further study.

REFERENCES:

Adedeji, S. O., and Olaniyan, O. (2011). *Improving the conditions of teachers and teaching in rural schools across African countries.* UNESCO.

Anderson, L. W., and Krawthwohl, D.R. (2001). *A taxonomy of learning, teaching, and assessing:* A revision of Bloom's taxonomy of educational objectives. Longman.

Babbie, E., and Denzin, N. K. (2020). *The basics of social research (7th ed.).* Cengage Learning.

Bandura, A. (1997). *Self-Efficacy: The Exercise of Control.* New York W. H Freeman and Company.

Barbour, R. S. (2007). *Investigating the social world:* The process of research (3rd ed.). Sage Publications.

Bowen, G. A. (2009). *Document analysis as qualitative research.* Emerald Group Publishing.

Black, P., and Wiliam, D.(1998). *Assessment and classroom learning.* Assessment in Education: Principles, Policy and Practice, 5(1), 7-74

Bloor,M., Thomas, J., and Golding, J. (2001). *Designing social research,* Sage Publications.

Braun, V., and Clarke, V. (2006). *Using thematic analysis in psychology.* Qualitative Research in Psychology, 3(2), 77-101.

Bryman, A. (2016). *Social research methods (5th ed.).Oxford University Press.*

Bybee, Rodger W. (2010). *Advancing STEM Education: A 2020 vision.* Technology and Engineering Teacher, 70 (1), 30-35.

Chikumbu, T. J., and Makamure, R. (2000). *Curriculum theory, design and assessment.* Harare: The Open University of Zimbabwe

Chikunda, C., and Nyikahadzoi, L. (2019). *The state of science education in Zimbabwe: Challenges and opportunities.* Journal of Science Education in Africa, 3(1), 23-35.

Chinyani, H. (2017). *Competence-based education in Zimbabwe: Challenges and prospects.* Zimbabwe Journal of educational Research, 29(1), 34-52.

Chinyani, H. (2020). *Competence-Based Curriculum Reforms in Zimbabwe*: Prospects and Challenges. Journal of Education and Practices Teacher, 11(3), 45-52.

Chisaka, H. (2013). The influence of school leadership on teacher motivation and student achievement in Zimbabwe. International Journal of educational leadership, 3(1), 1-16.

Chivore, B. (2018). *Resource constraints in implementing the Competence-Based Curriculum in Zimbabwean schools.* African Journal of Education, 23(2), 101-118.

Cohen, L., Manion, L., and Morrison, K. (2018). *Research methods in education (8th ed.).* Routledge.

Creswell, J. W. (2014). *Research Design: Qualitative and Mixed Methods Approaches 4th edition.* Thousand Oaks, CA: Sage publications.

Darling-Hammond, L. (2006). *Powerful Teacher Education:* Lessons from Exemplary *Programs. Jossey-Bass.*

Darling Hammond, L., et al. (2014). *Beyond the bubble test:* How performance assessments support 21st –century learning Jossey-Bass.

Dillman, D. A., Smyth, J. D., and Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys:* The tailored design method (5th ed.). Wiley.

Doran, R.L., Chan, F., and Tamir, P. (1993). *Science educator's guide to assessment.* National Science teachers Association.

Farrant, J. S. (1991). *Principles and Practice of education.* Longman.

Field, A. (2018). *Discovering statistics using IBM SPSS statistics (5th ed.). Sage Publications.*

Fullan, M. (2007). *The new meaning of educational change.* Teachers College Press.

Gill, P., Stewart, K., Treasure, E., and Chadwick, B. (2015). *Methods in qualitative research (4th ed.).* Sage Publications.

Gonczi, A. (1994). *Competency-based education:* A discussion paper. Australian National Training Authority.

Gulikers, J., Bastaens, T., and Kirschner, P. (2004). *A five-dimensional framework for authentic assessment.* Educational Technology Research and development.

Guskey, T.R. (2007). *Closing achievement gaps:* Revisiting Benjamin S. Bloom's Learning for Mastery, Journal of Advanced Academics, 19 (1), 8-31.https://doi.org/10.4219/jaa-2007-704

Greene, J.C. (2007). *Qualitative inquiry for social change (2nd ed.).* Sage Publications.

Harlen, W. (2007). *The principles of assessment for learning*. Assessment reform group.

Harlen, W. (2010). *The teaching of science in primary schools (5th ed.).* Heinemann.

Hattie, J. (2009). *Vissible learning:* A synthesis of over 800 meta-analyses relating to achievement. Routledge.

Heritage, M. (2010). *Formative assessments: Making it happen in classroom.* Corwin Press.

Hofstein, A., and Lunetta, V. N. (2004) *the laboratory in science education: Foundations for the twenty-first century.* Science Education

Hlatshwayo, S. (2016). *The influence of school leadership on teacher motivation and student achievement in Zimbabwe.* International Journal of Educational Leadership, 3(1), 1-16.

Janis, I. L. (1982). *Victims of groupthink:* A psychological study of foreign-policy decisions and fiascos. Houghton Mifflin Harcourt.

Kafu, P.A. (2011). *Teachers Education: Its implications to quality of teachers in Kenya.* International Journal of Humanities and Social Sciences 1(6), 101-108.

Kitzinger, J. (1995). *The qualitative research interview:* A guide for those conducting research interview. Sage Publications.

Kolb, D. A. (1984), *experiential learning: Experience as the source of learning and development.* Prentice Hall.

Kyvale, S., Krueger, R. A., and Casey, M. A. (2007). *Focus groups:* A practical guide for applied research (3rd ed.). Sage Publications.

Krueger, R. A., and Casey, M. A.(2015). *Focus groups:* A pr*act*ical

For guide for applied research (4th ed.). Sage Publications.

Maringe, F., and Prew, M. (2019). *Educational in challenging contexts: Overcoming resource constraints in African schools.* African Journal of Education, 10(2), 45-60.

Marope, M., Chakroun, B., and Holmes, K. P. (2015). *Unleashing the potential: Transforming technical and vocational education and training.* UNESCO.

Mavhunga, E. (2019). *Inquiry-based learning and the Competence-Based Curriculum in Zimbabwean science education.* Journal of Science Education in Africa, 12(3), 45-60.

Mavhunga, E., and Rollnick, M. (2016).*Teacher Preparedness in Implementing the Competency-based curriculum:* Insights from Zimbabwean Science Teachers. African Journal of Research in Mathematics, science and technology Education, 20 (2), 167-80.

Matsika, C. (2021). *The impact of resource shortages on the implementation of the Competency –based curriculum in Zimbabwean secondary schools.* Zimbabwe Journal of Education Research, 9(1), 28-42.

Merriam, S. B., and Tisdell, E. J. (2016). *Qualitative research:* A guide to design and implementation (5th ed.). Jossey-Bass.

Mishra, P., and Koehler, M. J. (2006). *Technological content knowledge:* A framework for teacher knowledge. Teachers college Record, 108 (6), 1017-1054.

Morgan, D. L. (1997). *Focus group interviewing:* A practical guide (2nd ed.). Sage Publications.

Mugweni, B. (2020). *Teacher training and the implementation of the competence-based curriculum in Zimbabwe.* Journal of Pedagogical Studies, 15(4), 67-83.

Muijis, D., Kyriakides, L., Van der Werf, G., Creemers, B., Timberly, H., and Earl, L. (2014). *State of the art-teacher effectiveness and professional learning.* School improvement: An international Journal of research, Policy and practice, 25(2), 189-226.

Mukeredzi, T. G. (2013). *Professional development through teacher roles:* Conceptions of professionally unqualified teachers in rural Zimbabwe. Professional Development in education, 39(3) 400-418.

Mulder, M. (2017). *Competence-based education and Training:* The Need for a Learning Theory? Journal of Agricultural Education and Extension, 23 (3), 230-242

Mulkeen, A. (2009). *Teachers in Anglophone Africa:* Issues in teacher supply, training and management. World Bank Publications.

Mungwini, P. (2018). *The challenges of Science Education in a competence curriculum in Zimbabwe:* Journal of Education Research, 30 (1), 25-35.

Mupinga, D. (2009). *The impact of collaborative teacher learning on student achievement in Zimbabwean primary schools.* International Journal of Educational Research, 49,101-114.

Mutemeri, J., and Chetty, N. (2021). *Teacher preparedness and science education in Zimbabwe's competence-based curriculum* .International Journal of Educational Development, 40(1), 22-36.

Muwanga –Zake, J.W.F. (2008). *Is science education in a crisis?* Some of the problem in South Africa." Science in Africa, 6(1), 23-28.

Mpofu, T., and Moyo, R. (2021). *Addressing disparities in competence based curriculum implementation in Zimbabwean schools.* Zimbabwe Education Review, 28(2), 89-110.

Nyikahadzoi, L., and Mutemeri, J. (2020). Competency-based Curriculum in Zimbabwe: Realities and challenges. Educational Review of Southern Africa, 8(3), 120-135.

Orodho, J. A. (2014). *Financing Basic Education: What implications of free primary education (FPE) and free day secondary education (FDSE) policies in Kenya.* International Journal of Development Research, 4(3), 477-487.

Onwuegbuzie, A. J., and Leech, N. L. (2007). *Linking research methods to research design logic:* Using mixed methods in the social and behavioral sciences. Sage Publications.

O'Sullivan, M. (2002). *Reform implementation and the realities within which teachers work:* A Namibian case study. Compare: A journal of comparative and International Education, 32(2), 219-237

Piaget, J. (1964).*Development and learning.* In Piaget rediscovered, ed. R. Ripple and U. Rockcastle. Ithaca: Cornell University.

Rychen, Dominique Simone, and Salganic Laura Hersh (Eds.) (2008). *Key Competencies for a successful Life and Well- Functioning society.* Cambridge, MA: Hogrefe and Huber Publishers.

Sanders, M.A (2009) STEM, *STEM education, STEM mania.* The technology teacher.

Shepard, L. A. (2000). *The role of assessment in a learning culture.* Educational Researcher, 29(7), 4-14.

Shumba, A., and Rembe, T. (2015). *The influence of school leardership on teacher motivation and student achievement in Zimbabwe.* International Journal of Educational leadership, 3(1), 1-16.

Shulman, L. S. (1986). *Those who understand:* Knowledge growth in teaching. Educational

Steward, D. W., and Shamdasani, P. N. (2015). *Focus group research (2nd ed.).* Sage Publications.

Taba, H. (1962). *Curriculum development: Theory and practice.* Harcourt, Brace and world.

Tashakkori, A., and Teddlie, C. (2010). *Handbook of mixed methods in social and behavioral research (2nd ed.).Sage Publications.*

Tiberghien, A., Veillard, L., Le Marechal, J. F., Buty, C., and Miller R. (2001). *An analysis of labwork tasks used in science teaching at upper secondary school and University levels in several European countries.* Science Education, 85(5), 483-508.

Tomlinson, C.A (2001). *How to Differentiate Instructions in Mixed –ability classrooms (ASCD).*

Topping, K. J. (2009). *Peer tutoring:* Research and practice. Routledge.

Turker, M. S. (2019). *Leading high-performance school systems:* Lessons from the world's best ASCD.

Tyler, R. (2007). *Re-imagining science Education: Engaging students in Science for Australia's future.* Future Australia's council for Educational Research.

UNESCO. (2017). *Cracking, the code:* Girls and Woman's education in STEM. Paris: UNESCO.

Vygotsky, L. S. (1978). Mind in Society *the development of Higher Psychological Process.* Harvard University Press.

Wiggins, G., and Mactighe, J. (2005). *Understanding by Design (2nd ed.)*Association for supervision and curriculum Development (ASCD).

Yin, Robert K. (2014). *Case study Research, Design and Methods. 5th Edition* .Thousand Oaks, CA: Sage Publications.

Zhou, D. (2019). *Assessing student engagement in Competence-Based Science Education in Zimbabwe.*Journal of Educational assessment, 32(3), 78-94.

Zvobgo, R. (2019). *Educational Reforms in Zimbabwe:* A critical Analysis of the competence-based curriculum, Journal of education policy, 34 (4), 558-573.

APPENDICES:
APPENDIX 1 – Personal Interview for HODs

Name of School…….

Date……

SECTION A: BASIC SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS.

Gender of Respondent

Female [ ] Male [ ]

Age of Respondent

Below 20 [ ]

21-30 years [ ]

31-40 years [ ]

41-50years [ ]

Above 50 years [ ]

Level of Education

Secondary [ ]

Certificate [ ]

A'level [ ]

Undergraduate [ ]

Post graduate [ ]

Position in the Organization

School head [ ]

Senior teacher [ ]

Deputy Head [ ]

HOD [ ]

Working Experience

Less than a year [ ]

1-2 years [ ]

3-4 years [ ]

Above 5 years [ ]

SECTION B

1. Describe the key competencies that the combined science curriculum aims to develop in students……
   ……
   ……
   ……

2. What specific strategies have you implemented to integrate competence based learning into the combined science curriculum?

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

3. How do you ensure that all teachers in your department are aligned with the principles of competence-based learning into the combined science curriculum?
   ……
   ……
   ……
   ……
   ……..

4. What specific resource limitations have you encountered in teaching combined science under the competence –based framework, how do these limitations impact your ability to deliver lessons effectively?.....
   .....
   .....
   .....

5. In your experience , how do resource constraints affect student engagement and learning outcomes in a competence –based curriculum……
   ……
   ……
   ……..

6. How have you adapted or modified your teaching strategies to cope with the resource constraints you face in teaching science under the competence –based framework, What strategies have been most successful?.....
.....
.....
.....
.....
.....
7. What types of assessment do you use evaluate students' competencies in science under the competence based curriculum? How do these assessments differ from traditional assessment?
……
……
……
……
……
8. How do assessments you use in science help students demonstrate not only knowledge but also key competencies such as critical thinking, problem solving and a practical application? Can you provide examples of specific assessment tasks or activities?
……
……
……
……
……
9. What challenges have you encountered when designing or implementing assessments that effectively measure student competencies in science? How have you addressed these challenges?
……
……
……
……
……
……
……
……

FOCUS GROUP DISCUSSION

Group A [ ], B [ ] and C [ ] competence based curriculum

AGE: 15-16yrs [ ], 16-18yrs [ ], 18 [ ]

GROUP LEADER: ……

SCHOOL: …….

PARTICIPANTS:
……
……
……

Section A

1. How do you feel about the teaching methods used in your combined science classes? Are they engaging and effective in helping you understand the material?
   ……
   ……
   ……
   ……
   ……
   ……
2. Can you share an example of a hands-on activity or project you worked on in class? How did it contribute to your learning?……
   ……
   ……
   ……
   ……
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   ……
   ……
3. In what ways do you think the competence-based curriculum has changed your approach to learning science compared to previous years?
   ……
   ……
   ……
   ……
   ……
   ……
   ……

Section B

4. Have you experienced any limitations in resources that affected your learning in combined science? Can you describe these experiments or projects in class?
   ……
   ……
   ……
   ……
   ……
   ……
   ……..
5. How do you think a lack of resources impacts your ability to complete experiments or projects in class?.....
   .....
   .....
   .....
   .....
   .....
6. What suggestions do you have for improving resource availability in your science classes?.....
   .....
   .....
   .....
   .....
   .....

Section C

7. How do you feel about the way your understanding and skills in science are assessed under the competence based curriculum? Do you think the assessments reflect your true abilities?.....
   .....
   .....
   .....
   .....
8. Can you describe any assessments that you found particularly helpful or challenging? Why did you feel that way?
   ……
   ……
   ……
9. In what ways do you think feedback from assessment could be improved to help you learning better in combined science?
   ……
   ……
   …….....
   .....

TEACHER QUESTIONNAIRE ON COMPETENCE BASED CURRICULUM

AT FORM 3 LEVEL

Thank you for accepting the questionnaire request, the purpose of this form is to allow you to give the researcher about how the competence based curriculum is being implemented in science classroom. I hope to get significant contribution about gaining insight into the issue under study. Feel free to express your thoughts and answer the questions to the best of your ability and no personal information will be included in the final report.

FEMALE [ ] MALE [ ]

SCHOOL…….

DATE…….....

AGE…….

LEVEL OF EDUCATION……..

TICK ONE

Concept of competence based curriculum

Questions	**yes**	**No**	**sometime**
1. Do you feel adequately trained to implement a competence-based curriculum in your classes?			
2. Have you integrated hands-on activities and projects into your teaching of the competence-based curriculum?			
3. Do you believe that students are more engaged in learning under a competence-based curriculum compared to traditional methods?			
4. Are you able to assess student competence effectively using tools available to you?			
5. Do you think that the current resources are sufficiently to support the competence-based curriculum?			
6. Have you encountered challenges in aligning your teaching strategies with the principle of a competence a competence –based curriculum			
7. Do you receive adequate support from school administration in implementing the competence – based curriculum?			
8. Do you feel that the competence based curriculum meets of all students in your class?			
9. Have you collaborated with other teachers to enhance the implementation of the competence-based curriculum?			

Please indicate your level of agreement or disagreement with each of these statements regarding: Impact of resources and benefits of competence based curriculum

Questions	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. I have sufficient teaching resources to effectively deliver the competence-based curriculum					
2. Resource constraints have negatively impacted my ability to implement the competence-based curriculum successfully.					
3. The competence –based curriculum offers significant benefits to student learning compared to traditional curricula					
4. I believe that hands-on and practical activities which are essential to the competence-based curriculum are hindered by lack of resources					
5. Inadequate resources make it challenging to assess students competencies effectively					
6. The benefits of a competence-based curriculum justify the challenges posed by resource constraints					
7. I feel that collaboration with colleagues could help mitigate some resource constraints in implementing the competence-based curriculum.					
8. My students demonstrate a better understanding of concepts when resources are available to support the competences-based curriculum					
9. I believe that additional that additional resources could significantly enhance the effectiveness of the					

competence –based curriculum					

Assessment procedure in different approaches based on competence based curriculum

QUESTION	true	false
1. The assessment methods I use are aligned with the principles of a competence –based curriculum		
2. I regularly use formative assessments to gauge student understanding throughout the learning process.		
3. Summative assessments are the primary method I use to evaluate student competencies		
4. I believe that assessments should include a variety of formats to effectively measure student competencies		
5. I provide students with feedback on their assessments that helps them improve their learning and understanding.		
6. I involve students in the assessment process by allowing them to self –assess or peer-assess their work		
7. Assessment criteria are clearly communicated to students before they complete tasks or projects		
8. I regularly adjust my teaching based on the results of student assessments.		

Thank you for contribution in this questionnaire activity.