FACTORS CONTRIBUTING TO LOW ACADEMIC PERFORMANCE IN PHYSICAL SCIENCE: A CASE OF JUNIOR SECONDARY SCHOOLS IN SHINYUNGWE CIRCUIT, KAVANGO EAST REGION NAMIBIA

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ABSTRACT

This study aimed to explore the factors contributing to low academic performance in Physical Science among Grades 8 and 9 learners in the Shinyungwe Circuit, Kavango East Region, Namibia, and to propose strategies to address these challenges. A qualitative case study design was employed to investigate the issues faced by learners and teachers in four selected schools, chosen due to their proximity and historically poor performance in Physical Science as reported by the Ministry of Education, Arts and Culture (MOEAC, 2017, 2018 & 2019). Furthermore, this study data were collected through open ended questionnaires from 12 learners, classroom observations, and interviews with 8 Physical Science teachers and the Senior Education Officer. Moreover, the findings revealed several key factors contributing to low academic performance, including a lack of teaching materials and resources, inadequate infrastructure such as laboratories, insufficient foundational knowledge in science from upper primary school, language barriers, limited parental involvement, excessive teacher workloads, a shortage of qualified teachers, and negative learner attitudes towards Physical Science. Guided by a constructivist framework, the study emphasized the importance of understanding these challenges within the specific educational context of the Shinyungwe Circuit. This approach allowed for the identification of actionable, context-sensitive strategies tailored to the local needs. The study recommends the implementation of targeted interventions, such as professional development workshops for teachers, investment in infrastructure (including laboratories and classrooms), the recruitment and training of qualified Physical Science teachers, partnerships with resource-rich schools, and the use of technology-enhanced learning tools like instructional videos. Additionally, promoting the consistent use of English in school environments and increasing parental involvement through the provision of necessary learning tools and support were identified as essential strategies to enhance learner engagement and academic performance. Thus, by addressing these factors and proposing practical solutions, this study lays the groundwork for improving academic outcomes in Physical Science, contributing to the broader educational development of the Shinyungwe Circuit.

Key words: Senior education officer, Teachers, learner and Physical Science

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List of abbreviations and acronyms

CPD= Continuous professional development

HOD = Head of Department

LCE = Learner centred education

NGO = Non-governmental organisation

MOEAC = Ministry of education arts and culture

SEO= Senior education officer

SDT = Self-Determination Theory

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Dedication

This work is dedicated to my late Parents: Mr Rafael Nginga Ndumba and Ms Adeline Likonge Ndjamba. May their souls continue to rest in eternal peace.

Declarations

I Joseph Kativa Nginga hereby declare that this study is my own work and is a true reflection of my research and that this work or any part thereof has not been submitted for a degree at any other institution.

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Joseph K Nginga April 2025

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

The academic performance of learners in physical science has been a topic of considerable research globally, with various studies highlighting the challenges and factors contributing to learners' success or failure in this critical subject. However, the majority of this research has taken place outside Namibia, which leaves a gap in understanding the specific issues Namibian learners, particularly those in the Shinyungwe Circuit. Numerous factors, including resource availability, teacher qualifications, learner motivation, and curriculum design, influence the teaching and learning of physical science worldwide. Studies in countries such as the United States, the United Kingdom, and Australia have shown that well-equipped laboratories, experienced teachers, and engaging teaching methods significantly enhance learners' performance in science subjects. However, even in these countries, challenges persist, including disparities in educational quality and access between different regions and schools (Kocak et al., 2021).

A recent study from the United States highlighted that resource availability and teacher expertise are crucial in improving student outcomes in physical science (McFarland et al., 2023). Similarly, research in the United Kingdom (UK) emphasised the importance of practical laboratory work in enhancing student understanding and engagement in science subjects (Smith & Jones, 2023). Research in Australia has demonstrated that the

implementation of innovative teaching methods, like inquiry-based learning, enhances student performance in physical science (Brown et al., 2023).

Systemic issues such as inadequate funding, lack of infrastructure, and insufficient teacher training often hinder the performance of learners in physical science in Africa. Large class sizes, outdated teaching materials, and a lack of laboratory facilities plague many schools in countries like South Africa, Kenya, and Nigeria, according to research. Socio-economic factors compound these challenges by affecting learners' ability to attend and focus on school.

A recent study in South Africa found that teacher qualifications and access to teaching resources are significant predictors of student performance in science subjects (Nkosi & Gumede, 2022). In Kenya, researchers have identified that socio-economic factors, including poverty and parental involvement, play a critical role in student performance in physical science (Muthoni et al., 2023). In Nigeria, the lack of laboratory facilities and modern teaching materials continues to be a major barrier to effective science education (Akinpelu & Olatunji, 2023).

Within Namibia, the situation mirrors many of the challenges faced by other African countries. There has been limited research specifically addressing the factors affecting physical science performance in Namibian schools, leading to a lack of targeted strategies to improve outcomes. The Shinyungwe Circuit in particular exemplifies these issues. Schools in this circuit often lack essential resources, and performance in physical science fluctuates dramatically from year to year. This inconsistency implies a lack of understanding or attention to the factors influencing performance.

Amukugo et al. (2021) conducted a study that highlighted the severe shortage of qualified science teachers and the lack of laboratory facilities in Namibian schools as key factors affecting student performance. Another study by Shikongo (2022) pointed out that socio-economic challenges and community attitudes towards education significantly impact learner outcomes in the Shinyungwe Circuit. The research reveals that addressing known factors like resource provision or teacher training does not always result in the desired improvements in physical science performance. . This suggests that there may be additional, unidentified factors at play. For instance, the Shinyungwe Circuit's performance variability from year to year suggests unexplored underlying issues. These could include socio-economic conditions, community attitudes towards education, or specific local challenges that impact learners differently each year.

This study aims to investigate the specific factors leading to poor performance in Grade 8 and Grade 9 Physical Science in the Shinyungwe Circuit. By conducting thorough research within this context, the study seeks to uncover both the known and unknown factors affecting learners. The researcher expects the findings to yield insights that guide targeted interventions and strategies aimed at enhancing the academic performance of physical science learners in this region.

Table 1 : Shinyungwe circuit grade 8 and 9 Physical Science Symbol analysis for 2018-2022.

Year	GRADE	TOTAL OF LEARNERS	SYMBOL AND PERCENTAGES								
			A	%	B	%	C	%	D	%	E
2018	8	277	2	0.72	4	1.4	12	4.33	43	**15.5**	118
	9	279	2	0.72	10	3.6	18	6.45	55	**19.7**	84
2019	8	334	9	2.69	8	2.4	32	9.58	**57**	17.1	**93**
	9	333	1	0.3	10	3	27	8.11	**76**	**22.8**	**146**
2020	8	246	1	0.41	8	3.3	28	11.4	**47**	**19.1**	**100**
	9	290	5	1.72	19	6.6	35	12.1	**51**	**17.6**	**116**
2021	8	272	3	1.1	2	0.7	17	6.25	**33**	**12.1**	**79**
	9	316	6	1.9	9	2.8	27	8.54	**49**	**15.5**	**79**
2022	8	321	23	7.17	54	17	65	20.2	**68**	**21.2**	**65**
	9	226	0	0	6	2.7	33	14.6	32	**14.2**	70

1.2 Problem statement

The academic performance in Physical Science for Grades 8 and 9 in the Shinyungwe Circuit from 2018 to 2022 shows a concerning trend, with a significant proportion of learners consistently achieving lower grades (E and U). The data spanning a five-year period reveals the following:

The percentage of learners receiving grades A and B remains very low across both grades, indicating a lack of high achievement in physical science. A considerable percentage of learners receive grades D, E, and U each year, suggesting widespread struggles with the subject.

For Grade 8, the percentage of learners achieving grade U peaked at 50.7% in 2021 before dropping to 14.3% in 2022. Meanwhile, the percentage of learners achieving grade A increased significantly in 2022. For Grade 9, the percentage of learners achieving grade U consistently remains high, with the lowest being 21.9% in 2019 and the highest being 46.2% in 2021.

This analysis highlights the urgent need to address the factors contributing to poor academic performance in physical science within the Shinyungwe Circuit, especially considering the critical foundation that these grades provide for future academic success in the sciences. The continuous high percentages of lower grades (D, E, and U) point to systemic issues that require immediate intervention to improve the educational outcomes and ensure that learners are better prepared for higher levels of education.

1.3 Research questions

1. What are the factors that contribute to low academic performance of learners in Physical Science at Junior Secondary Schools in Shinyungwe Circuit?
2. What are the possible strategies to improve learners' performance in Physical Science in the study area?

1.4 Significance of the study

The study has significance for all stakeholders interested in improving the performance of Physical Science learners. Pinpointing the factors contributing to low academic performance can provide insights into the root causes of poor performance and help educators, policymakers, and stakeholders develop targeted interventions. By uncovering the reasons behind low academic performance, the study can help educators and school administrators develop strategies to improve the teaching and learning of Physical Science. This could include curriculum adjustments, teaching methods, and resources allocation to better meet the needs of leaners in the specific context of the Shinyungwe Circuit. The study could highlight areas where teachers may need additional training and support. If certain teaching methods or content areas are consistently linked to low performance, the study could guide professional development initiatives to help teachers improve their teaching strategies and subject knowledge.

1.5 Limitation of the study

This study faced several potential limitations, which were carefully managed to minimize their impact on the research outcomes:

One anticipated limitation was the possibility that participants might not be fully open or forthcoming in their responses, particularly in interviews, due to discomfort, fear of judgment, or a desire to protect their reputations. To address this, the researcher ensured that all participants were thoroughly informed about the purpose of the study, the confidentiality of their responses, and their right to anonymity. By building trust and establishing a comfortable environment, participants were more likely to provide honest and candid responses. Additionally, conducting the interviews in a neutral and non-threatening setting helped to reduce participant anxiety and encouraged openness.

Another potential limitation was the refusal of some participants, particularly teachers and education officials, to be interviewed. To mitigate this, the researcher emphasized the importance of their contribution to the study and offered flexible interview schedules to accommodate their availability. In cases where participants were unwilling to engage in interviews, alternative methods of data collection, such as written responses to interview questions, were offered. This ensured that the study still gathered valuable qualitative data even if direct interviews were not possible.

The study's focus on a specific circuit within the Kavango East Region means that the findings may not be generalizable to the entire educational region or to other contexts. The researcher acknowledged this limitation by clearly delineating the scope of the study and emphasizing that the results are specific to the Shinyungwe Circuit. To

address this, the study included a diverse sample of schools within the circuit, enhancing the robustness of the findings within this localized context. Furthermore, the study's recommendations were designed to be adaptable, allowing other regions with similar challenges to consider the insights gained.

Some participants may have provided biased information to create favourable impressions, particularly in self-reported questionnaires and interviews. To manage this limitation, the researcher employed triangulation by collecting data through multiple sources (questionnaires, observations, and interviews), which allowed for cross-verification of information. Additionally, using anonymous questionnaires helped reduce social desirability bias, as participants were more likely to respond truthfully when their identities were not linked to their responses.

1.6 Delimitations of the study

This study focused on selected schools within the Shinyungwe Circuit in the Kavango East Region, specifically chosen to provide detailed and context-specific insights into the factors affecting academic performance in Physical Science. By concentrating on this particular circuit, the research aims to obtain explicit and actionable results that are directly relevant to the local educational environment.

The participants in this study included Physical Science teachers, learners from Grade 8 and 9, and the Senior Education Officer. This selection of participants is strategic, as it incorporates a diverse range of perspectives, from those directly involved in teaching and learning to those in leadership and support roles. By involving these key stakeholders, the aim of the study was to capture a comprehensive understanding of the

challenges and opportunities within the Physical Science educational framework in the Shinyungwe Circuit.

1.7 Definition of terms

Subject advisor- this study defines a subject advisor as the senior education officer responsible for advising teachers teaching Physical Science, Chemistry and Physics.

Educator- This study uses the term educator as a teacher.

Respondents- These are the participants of the study.

1.8 Summary

This chapter consisted of the background of the study, statement of the problem, research questions, and significance of the study, limitations, delimitation as well as the definitions of terms. Lastly, the purpose of the study was to explore the factors contributing to low academic achievement in junior secondary grades Physical Science subject among the three selected schools in the Shinyungwe circuit of the Kavango East region. The next chapter covers the theoretical framework and literature review.

CHAPTER TWO: THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 Introduction

Physical Science education plays a critical role in shaping leaners' understanding of the natural world, as well as their future academic and career prospects. However, over the past few decades, there has been growing concern about poor performance in physical science among leaners in grades 8-9. This chapter contains reviewed literature on the theoretical framework of the study, as well as the empirical study, which reviewed various written literature on the key factors contributing to low academic performance in Physical Science among junior secondary school leaners and literature on preventive measures to prevent poor academic performance in physical science.

2.2 Theoretical framework

The research was grounded in the Constructivism theory formulated by (Piaget, 1952). This theory posits that individuals forge their personal comprehension and wisdom about various subjects by engaging with experiences and subsequently pondering upon them. The Constructivism learning theory, as proposed by Piaget, essentially elucidates that when an individual or a learner confronts something novel, they initially strive to harmonize it with their pre-existing notions and past encounters. Constructivist learning focuses on learners and proposes that circumstances, beliefs, and attitudes influence learning. Learners are encouraged to come up with their own solutions and to build on existing knowledge and experiences. Leaners learn by actively constructing their own new understanding by combining and fitting new information with what they already know. As a result, leaners develop a better grasp of the event or knowledge, allowing them to construct their own new knowledge and answers to the difficulties presented

(Duffy & Jonassen, 1992). Furthermore, According to Jonassen et.al (1999), problems or tasks presented in a constructivist environment should be fascinating, engaging, appealing, authentic, personally relevant, difficult to learners, and provide a physical simulation of the real world activity. Hence, the foundation of constructivism can be traced back to ancient times, specifically to Socrates's dialogues with his disciples. In these dialogues, Socrates employed targeted questions to guide his leaners into recognizing the flaws in their own thinking. Moreover, the Socratic dialogue continues to hold significance as a valuable instrument for constructivist educators to evaluate their leaners' learning progress and design novel educational encounters (Elby, 2000). In addition, recent literature on constructivism and its applications in education highlights its relevance in contemporary learning environments. Subsequently, Dewey's ideas on constructivism, as elaborated in "Democracy and Education" (1966), have evolved to align with modern educational practices, emphasizing learner-centred, hands-on activities that promote critical thinking and collaboration. Furthermore, newer studies extend Dewey's principles by integrating them with interactive and experiential learning approaches, where students construct knowledge through active participation and reflection.

Recent literature on constructivist learning frameworks emphasizes the importance of real-world problem-solving and the social context of learning in creating meaningful educational experiences. These ideas are central to modern educational theories that advocate for active, hands-on learning environments where students engage with material in ways that mirror real-life scenarios. For example (Jurdak, 2016) highlights a multiple-perspective framework for real-world problem-solving in mathematics,

suggesting that students benefit significantly from learning environments that simulate real-world problems and encourage critical thinking across various contexts. This approach not only enhances understanding but also prepares learners for practical application beyond the classroom. Thus, the intersection of Dewey's pragmatism with constructivism has also been explored, showing how these theories support the idea that learning is a dynamic and ongoing process shaped by interactions with others and the environment. Therefore, this approach is particularly effective in science education where practical, inquiry-based learning aligns well with constructivist principles, helping students to internalize complex concepts through exploration and experimentation. In addition, J. Brooks and M. Brooks (1993) proposed that constructivism entails an engaged and context-bound procedure of forming knowledge, as opposed to simply obtaining it. This process involves the utilization of personal experiences and environmental hypotheses to construct knowledge. Through social negotiation, learners consistently assess these hypotheses. Moreover, Matthews, (1998) proposes that constructivist-learning theory asserts that individuals generate knowledge and shape meaning through their personal experiences. Key components of this theory, which contribute to the formation of new individual knowledge, include assimilation and accommodation. According to him aassimilation involves incorporating new experiences into existing ones, leading to the evolution of perspectives, reconsideration of misconceptions, and assessment of significance, thereby altering perceptions. On the contrary, accommodation entails the restructuring of existing mental frameworks to encompass novel experiences. Principally, Mathews believes iindividuals establish specific frameworks for understanding the world, and when confronted with non-conforming instances, they adjust their expectations to align with outcomes. As

elucidated by the Educational Broadcasting Corporation (2004), the classroom application of the constructivist perspective on learning encompasses diverse teaching practices. Generally, it encourages leaners to employ active techniques like experimentation and real-world problem solving to generate knowledge, subsequently prompting reflection and discourse about their actions and evolving understanding. The teacher's role involves comprehending leaners' pre-existing notions, guiding activities to address them, and building upon them.

2.2.1 Principles of Constructivist Learning Theory

Lebow (1993) outlines approximately nine principles of constructivist learning theory:

1. Learning is an active process where the learner processes sensory input to create meaning. This notion emphasizes learners' active engagement and their role in shaping knowledge, contrasting with passive acceptance.

2. Learning to learn is concurrent with the act of learning itself, involving the construction of both individual and systemic meanings. Constructing one meaning enhances the ability to interpret similar patterns in other experiences.

3. Constructing meaning is primarily a mental process. While hands-on experiences are crucial, mental engagement is equally important for effective learning.

4. Language is integral to learning, influencing the learning process. Language and learning are interconnected facets of the educational journey.

5. Learning is inherently social, entailing connections and interactions with others and the environment. Social interactions significantly facilitate the learning process.

6. Learning is contextual, linked to existing knowledge and beliefs. Isolated facts lack significance; learning occurs within the context of what is already known.

7. Prior knowledge is necessary for new learning; learners require a foundation to assimilate new knowledge. Teaching must align with learners' existing knowledge and provide a pathway into the subject.

8. Learning takes time and involves revisiting, contemplating, experimenting, and application. Substantial learning is gradual and iterative.

9. Motivation is integral to learning; it is not only beneficial but also essential for effective learning. Motivation drives the learning process.

Constructivism was an ideal framework for this study on low academic performance in physical science among junior secondary schools in the Shinyungwe Circuit because it emphasises the importance of learners actively constructing their own understanding and knowledge of the world through experiences and interactions. Here is the effective application of constructivism:

Constructivism shifts the focus from teacher-centred instruction to learner-centred learning. This is critical for addressing low academic performance because it allows learners to engage more deeply with the material, connect new knowledge with prior understanding, and actively participate in the learning process. In a context where foundational knowledge is inadequate, this approach can help bridge gaps by encouraging learners to build on what they already know.

Constructivism advocates learning in contexts that are meaningful to the learner. This is particularly important in the Shinyungwe Circuit, where socio-economic challenges, language barriers, and limited resources create a unique educational environment. By using constructivist methods, the study acknowledges the importance of these contextual factors and tailors strategies to fit the learners' specific needs and realities. Constructivist frameworks encourage learners to think critically and solve problems rather than passively receiving information. Given the issues with ineffective teaching methods identified in the study, adopting a constructivist approach would promote active learning strategies that could help improve learners' understanding of physical science.

2.2.2. Fostering Learner Motivation, Engagement, and Academic Performance

Motivation and engagement are critical factors in educational success, influencing not only how learners approach their studies but also their overall academic performance. Recent research has expanded our understanding of these elements, emphasizing the roles of self-determination, instructional design, and active learning strategies. This literature review synthesizes key studies that explore these concepts and their implications for educational practice.

2.2.2.1 Self-Determination Theory and Learner Motivation

Ryan et al. (2021) revisited Self-Determination Theory (SDT), which highlights the importance of autonomy, competence, and relatedness in fostering learner motivation and engagement. According to SDT, when learners feel autonomous in their choices, competent in their abilities, and connected to others, they are more likely to be intrinsically motivated. This intrinsic motivation, in turn, enhances their engagement and academic performance. The emphasis on these psychological needs suggests that

educational environments should be designed to support these elements, promoting a more self-determined and motivated learner population.

2.2.2.2. Learner Perceptions and Engagement

Kahu and Nelson (2018) explored the challenges related to learner engagement, particularly how perceptions of difficulty can affect overall academic performance. Their research indicates that when students perceive tasks as overly challenging, their engagement tends to decrease, leading to poorer academic outcomes. This highlights the need for educators to carefully calibrate the difficulty of tasks and provide adequate support to maintain high levels of engagement and motivation among learners.

2.2.2.3. Instructional Design and Learning Outcomes

Mayer (2021) expanded on his earlier work by emphasizing the importance of instructional design principles, particularly multimedia learning, to enhance learner understanding. Mayer argues that instructional materials should align with how learners process information best, incorporating multimedia elements that cater to different learning styles. This approach not only aids in understanding but also helps in maintaining learner interest and engagement, ultimately leading to better academic outcomes.

2.2.2.4. Learner Engagement and Academic Achievement

Reschly and Christenson (2022) provided a comprehensive overview of recent research on learner engagement, discussing its impact on academic achievement. They argue that engagement is multi-faceted, encompassing behavioural, emotional, and cognitive aspects. Their findings suggest that higher levels of engagement are directly correlated

with better academic performance, reinforcing the importance of strategies that actively involve students in the learning process.

2.2.2.5. Attendance and Academic Performance

Regular attendance has been identified as a key factor in academic success. Gottfried (2019) emphasizes that learners who attend school consistently are more likely to achieve higher academic outcomes. This consistency ensures continuous engagement with the curriculum and reinforces the material learned. On the other hand, Kearney (2021) highlights the risks associated with frequent absenteeism, noting that it often leads to decreased motivation and engagement, as learners struggle to keep up with the curriculum.

2.2.2.6. Active Learning and Note-Taking

Active learning strategies have been shown to significantly enhance learner engagement and understanding. Therefore, Cheema and Kitsantas (2018) highlight that effective note-taking is associated with improved academic performance it also encourages active engagement with the materials. Zimmerman and Schunk (2021) further suggest that active engagement in classroom activities, including note-taking, is essential for developing self-regulated learning skills, which are critical for academic success. Conversely, Prince (2019) warns against passive learning methods, noting that they can lead to decreased motivation and engagement. When learners are not actively involved in the learning process, they may struggle to internalize and apply knowledge. Freeman et al. (2020) support this by showing that active learning strategies, which involve students in the learning process, promote critical thinking and better understanding of the material.

The reviewed literature underscores the importance of motivation, engagement, and well-designed instructional strategies in fostering academic success. The insights provided by these studies suggest that educators should focus on creating supportive learning environments that promote autonomy, competence, and relatedness, while also incorporating active learning strategies and effective instructional design. By addressing these key factors, educators can enhance learner engagement and ultimately improve academic outcomes.

2.2.3. Curriculum Continuity, Mathematical Proficiency, and Educational Approaches in Science Education

The transition from primary to secondary education is a critical phase that can significantly impact a student's academic trajectory, particularly in science education. A robust understanding of how curriculum continuity, mathematical proficiency, teacher expertise, and instructional approaches affect learner outcomes is essential for developing effective educational strategies. This literature review synthesizes key studies that explore these factors and their implications for science education.

2.2.3.1. Curriculum Continuity between Primary and Secondary Education

Venville and Donovan (2022) highlight the importance of curriculum continuity in science education, emphasizing that a well-structured transition between primary and secondary education helps maintain and build upon the knowledge acquired at earlier stages. They argue that when the curriculum is aligned across these educational levels, students are better able to connect concepts and develop a deeper understanding of scientific principles. This continuity is crucial for sustaining interest in science subjects

and for ensuring that students are adequately prepared for the more complex material encountered in secondary education.

2.2.3.2. Mathematical Proficiency in Science Education

Mathematical proficiency is another critical factor in science education. Geary (2021) explores the role of mathematics as the foundation for understanding complex scientific concepts, particularly in physical sciences where mathematical equations and models are integral to the subject matter. This finding aligns with the earlier work of Mji and Makgato (2006), who emphasized the need for strong math foundations in science education. Their research indicates that students who are proficient in mathematics are more likely to excel in science subjects, as they are better equipped to grasp abstract and quantitative concepts.

2.2.3.3. The Influence of Teacher Expertise

The expertise of science teachers, particularly at the primary level, plays a significant role in preparing students for secondary-level physical science. Hoban et al. , (2023) argue that teachers who have a strong background in science are more effective in delivering content that is engaging and comprehensible to students. Their study underscores the importance of investing in teacher training and professional development to enhance science instruction at the primary level, which in turn affects students' preparedness and confidence as they progress to more advanced science courses.

This is further supported by Gess-Newsome et al., (2020) who found that a teacher's confidence in their subject matter knowledge directly impacts their teaching

effectiveness. Teachers who are well-versed in their subject matter are more likely to use innovative teaching strategies, engage students in meaningful learning activities, and respond to students' questions and misconceptions with greater clarity.

2.2.3.4. Inquiry-Based Learning vs Traditional Approaches

The educational approach used in science teaching also influences learner outcomes. Loibl et al., (2023) emphasize the benefits of inquiry-based learning over traditional teacher-centred approaches. Inquiry-based learning encourages students to explore scientific concepts through experimentation, problem-solving, and critical thinking, which leads to a deeper understanding and retention of knowledge. This method contrasts with traditional approaches that often rely on rote memorization and passive learning, which may not engage students as effectively.

2.2.3.5. The Impact of Classroom Environment and Assessment Practices

A positive classroom environment is essential for fostering learner engagement and learning. Brophy and Good (2022) highlight the significance of creating a supportive and inclusive classroom atmosphere where students feel valued and motivated to participate. A positive environment can enhance students' willingness to take risks, ask questions, and engage deeply with the material, all of which contribute to better academic outcomes.

In contrast, Putwain and Daly (2020) explore the psychological effects of high-stakes exams on learners, finding that the pressure to perform well can lead to increased levels of stress and anxiety, negatively impacting academic performance. Their research

suggests that while assessments are necessary, the way they are implemented can have significant consequences on students' well-being and motivation.

Furtak et al. (2021) reviewed the benefits of formative assessments in promoting learning, emphasizing that ongoing assessments provide valuable feedback that can guide instructional practices and help students identify areas for improvement. Unlike high-stakes exams, formative assessments are integrated into the learning process and are less likely to induce stress, making them an effective tool for enhancing student learning and engagement.

2.2.3.6. Language Barriers in Science Education

Language barriers can significantly hinder a learner's ability to understand and engage with science content, particularly when instruction is delivered in a language they are not fully proficient in. Probyn (2019) discusses how language barriers can limit students' comprehension and participation, leading to lower academic achievement. Lee and Buxton (2020) found that learners with limited proficiency in the language of instruction often struggle to grasp scientific concepts, resulting in a widening achievement gap between these students and their peers.

The reviewed literature highlights the interconnectedness of curriculum continuity, mathematical proficiency, teacher expertise, instructional approaches, classroom environment, and assessment practices in shaping learner outcomes in science education. A well-structured transition between educational levels, coupled with a strong foundation in mathematics and skilled teaching, is essential for student success in science. Additionally, adopting inquiry-based learning, creating positive classroom

environments, and using formative assessments can further enhance student engagement and achievement. Addressing language barriers is also critical to ensure that all students have equal opportunities to succeed in science education.

2.2.3.7. Key Factors in Science Education and Learner Achievement

Science education is a complex field influenced by various factors, including curriculum continuity, mathematical proficiency, instructional approaches, and socio-economic conditions. Understanding how these elements interact and affect learner outcomes is crucial for developing effective educational strategies. This literature review synthesizes key studies that explore these factors and their implications for science education. Venville and Donovan (2022) emphasize the importance of curriculum continuity in science education, arguing that a well-structured transition from primary to secondary education is essential for maintaining and building upon the knowledge acquired at earlier stages. This continuity helps students connect concepts across different educational levels, ensuring a smoother transition and better preparation for more advanced studies.

2.2.4. Strategies for Enhancing Science Education in Diverse and Resource-Limited Settings

Effective science education relies on addressing a wide array of challenges, from overcoming language barriers to ensuring equitable access to educational resources. This literature review synthesizes studies that explore strategies for enhancing science education, particularly in diverse and resource-limited settings. The review covers key aspects such as language support, curriculum review, classroom environment, resource allocation, and instructional methods, highlighting their impact on learner outcomes.

2.2.4.1. Overcoming Language Barriers in Science Education

Language barriers present a significant challenge in science education, particularly for learners who are not fully proficient in the language of instruction. Gibbons (2022) offers practical strategies for overcoming these barriers, including scaffolding instruction, using learners' home languages as a resource, and incorporating language development activities into science lessons. These strategies help make complex scientific concepts more accessible to all students, fostering better understanding and engagement.

Setati and Adler (2020) also highlight the importance of supporting learners who are learning in a second language. They emphasize that providing language support is crucial for ensuring that all students can fully participate in science lessons and achieve their academic potential. By integrating language development into science instruction, teachers can help bridge the gap between language proficiency and subject comprehension.

2.2.4.2. Creating a Supportive and Inclusive Classroom Environment

A supportive and inclusive classroom environment is essential for boosting learner motivation and engagement. Dörnyei and Ushioda (2021) suggest that fostering such an environment can help students feel more connected to their learning and more confident in their abilities. This is particularly important in science education, where students may face challenges in understanding complex material. Creating an inclusive environment also involves addressing the diverse needs of students, including those from different cultural and linguistic backgrounds. By promoting inclusivity and support, teachers can help all learners feel valued and capable of succeeding in science education.

2.2.4.3. Access to Educational Resources and Equitable Distribution

Access to quality educational resources, such as textbooks, digital tools, and laboratory equipment, is fundamental for learners to grasp complex scientific concepts. Smith and Lambert (2023) emphasize the importance of providing these resources to ensure that all students have the tools they need to succeed in science education. Without access to adequate resources, students may struggle to fully engage with the curriculum, leading to gaps in their understanding.

Leone and Hummel (2021) argue that equitable distribution of resources, particularly in underfunded schools, is essential for levelling the playing field. They highlight that students in resource-limited settings are at a disadvantage compared to their peers in better-funded schools, which can exacerbate educational inequities. Ensuring that all students have access to the necessary resources is critical for promoting fairness and improving overall academic outcomes.

2.2.4.4. Integrating Math Support and Inquiry-Based Learning

Integrating math support into science lessons is another strategy for enhancing student understanding of the quantitative aspects of physical science. Clements and Sarama (2021) suggest that by reinforcing math skills within the context of science education, teachers can help learners better grasp complex scientific concepts that rely on mathematical reasoning.

Hmelo-Silver et al., (2019) advocate for the use of inquiry-based learning, where learners actively engage in experiments and problem-solving rather than passively receiving information. This approach encourages students to explore scientific concepts

in a hands-on, interactive manner, which can lead to deeper understanding and retention of knowledge. Inquiry-based learning also promotes critical thinking and allows students to apply their knowledge in practical contexts.

2.2.4.5. Diagnostic and Formative Assessments

Early identification of gaps in learners' knowledge is crucial for providing targeted support before these gaps impact science learning. Wright and Williams (2020) recommend using diagnostic assessments at the start of the school year to identify areas where students may need additional help, particularly in math, which is foundational for success in science subjects.

Formative assessments are another valuable tool for supporting student learning. Black and Wiliam (2021) advocate for the use of formative assessments that provide continuous feedback to learners, allowing teachers to adjust instruction based on student needs. This approach helps ensure that students are progressing and that any difficulties are addressed promptly, leading to better overall outcomes.

2.2.4.6. Supporting Learners from Low Socio-Economic Backgrounds

Learners from low socio-economic backgrounds often face additional challenges, such as inadequate study environments and limited access to educational resources. Jensen (2021) emphasizes the importance of providing additional support to these learners, recognizing that socio-economic factors can significantly impact academic achievement. By offering targeted interventions and support, schools can help mitigate the effects of socio-economic disadvantages on student performance.

Smith and Lambert (2023) suggest that collaboration between schools and community organizations can help alleviate some of the non-academic barriers to learning, such as providing access to study spaces or extracurricular tutoring. These partnerships can play a crucial role in supporting students from disadvantaged backgrounds and helping them succeed academically.

The literature reviewed highlights the importance of addressing language barriers, creating supportive classroom environments, ensuring equitable access to resources, and integrating math support into science education. Strategies such as inquiry-based learning, diagnostic and formative assessments, and targeted support for socio-economically disadvantaged learners are essential for improving educational outcomes in science. By adopting these approaches, educators can better support all students in achieving their full potential in science education

2.5 Summary

This chapter was about theoretical framework this study underpinned and literature review based on the factors contributing to low academic achievement in Physical science and some possible strategies to overcome these factors. Furthermore, the most factors that stood out most are: language barrier, motivation among learners, teaching or instructional approach, and teacher's expertise on the subject content, school attendance of learners, their perceptions on the subject, curriculum continuity and classroom environment as well as assessment. Therefore as strategies to overcome, the reviewed literature underscores the importance of motivation, engagement, and well-designed instructional strategies in fostering academic success. The insights provided by these studies suggest that educators should focus on creating supportive learning environments

that promote autonomy, competence, and relatedness, while also incorporating active learning strategies and effective instructional design. By addressing these key factors, educators can enhance learner engagement and ultimately improve academic outcomes. The next chapter is about the methodology of this study.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter presents the research methodology used to address the research questions. It commences by situating the study within its relevant field. Additionally, it reveals the application of a qualitative research approach, elucidating the functions it serves and how it synergises to enhance the study. The chapter delineates the various data collection methods, including comprehensive interviews, analysis of documents, and an examination of junior-grade learners' pass rates in physical science in the Shinyungwe circuit. Furthermore, ethical considerations, as well as issues related to the study's reliability and validity, are examined in this chapter. To sum up, the chapter highlights the inherent limitations of this study.

3.2 Research design

This study used a qualitative research approach, which is particularly appropriate for exploring complex social phenomena and comprehending participants' lived experiences, as stated by (J. Creswell and D. Creswell, 2017). Given that the research focuses on understanding the factors contributing to low academic performance, a qualitative approach allows the researcher to delve deeply into the perspectives and contexts of the study participants (leaners, teachers and Science senior education officer). The exploratory descriptive study approach was used. This approach allows the researcher to collect detailed information and generate insights into the key aspects.

3.2 Targeted population

The population consisted of physical science teachers, learners, and a senior education officer for physical science. The population was limited to the Shinyungwe circuit. The circuit consists of four secondary schools, 8 physical science teachers, 510 grade 8 and 9 learners combined, and one senior education officer for physical science in the region.

3.3 Sample and sampling method

The researcher employed a purposeful sampling approach to ensure a comprehensive and diverse perspective on the subject of the study, which primarily focusses on physical science education. This purposeful sampling method as described by (Creswell, 2017, p. 430) allowed the researcher to strategically select individuals who possess valuable knowledge and experiences relevant to the research objectives. Participants in this study included physical science teachers, learners, and a senior education officer. This diverse group of participants was selected to provide a well-rounded understanding of the various factors influencing academic performance in this subject. Furthermore, the decision to concentrate on schools with a history of low academic performance in physical science for the purposeful sampling process underscores the research's commitment to addressing challenges within this specific context. By focusing on schools with lower performance, the study aimed to identify crucial issues and barriers contributing to academic challenges. This approach aims to inform the development of effective strategies for improvement. In summary, this purposive sampling strategy aligns with Creswell's methodology and significantly enhances the study's ability to gather comprehensive and meaningful insights. A total of 32 learners from Grade 8 and

9 across four schools participated in the questionnaire survey; 8 teachers and 1 senior education officer answered the interview questions.

Table 2 below provides the profiles of the teachers and senior education officer.

Table 2: Schools and teachers code

School code	**Teachers' code**	**Qualifications**	**Major subjects**	**Years of teaching**
A	T1	BED(Honours)	Mathematics and natural sciences	6
	T2	BED(Honours)	Mathematics and natural sciences	4
B	T3	BETD	Agriculture	20
	T4	BETD	Mathematics and natural sciences	2
C	T5	BED(Honours)	Biology and Physics	4
	T6	BETD	Mathematics	13
D	T7	BED(Honours)	Mathematics and natural sciences	5
	T8	BED(Honours)	Mathematics and natural sciences	6

3.4 Research instruments

In this study, three primary research instruments were used to gather data namely: open ended questionnaire, interview guide and observation checklist.

3.4.1. Questionnaires

These were administered to learners to gather qualitative data on their experiences, challenges, and perceptions regarding physical science education. The questionnaires included open-ended questions for qualitative insights.

3.4.2. Classroom Observations

Observations were conducted in Physical Science classes to gain first-hand insights into the teaching methods, learner engagement, classroom environment, and the availability and use of resources. These observations provided contextual understanding and allowed for the verification of data gathered through questionnaires and interviews.

3.4.3. Interviews

Semi-structured interviews were conducted with Physical Science teachers and the Senior Education Officer. These interviews aimed to gather in-depth qualitative data on the educators' perspectives regarding the challenges in teaching physical science, their views on student performance, and the broader educational context in the Shinyungwe Circuit.

3.5 Data collection methods

The data collection was executed through the following methods:

3.5.1. Questionnaires

Distributed to a sample of learners in the Shinyungwe Circuit, these open ended questionnaires were designed to capture the learners' academic backgrounds, their challenges in Physical Science, and their perceptions of the subject. The learners were given sufficient time to complete the questionnaires, and assistance was provided where needed to ensure clarity and accuracy of responses.

3.5.2. Classroom Observations

Observations were carried out over multiple sessions to capture different teaching styles, classroom interactions, and learning activities. These observations were systematically recorded using an observation checklist that focused on specific aspects such as teacher-learner interactions, use of teaching aids, and learner participation.

3.5.3. Interviews

Conducted with a select number of Physical Science teachers and the Senior Education Officer, the interviews were semi-structured, allowing the interviewer to probe deeper into specific areas of interest while maintaining a consistent set of questions across all interviews. The interviews were audio-recorded (with consent) and later transcribed for analysis.

3.6. Data analysis

The collected data were analysed using a qualitative method: The qualitative data from open-ended questionnaire responses, interview transcripts, and classroom observation notes were analysed using thematic analysis. This included coding the data to identify recurring themes and patterns related to the challenges in physical science education.

The themes were then categorised to provide a comprehensive understanding of the issues. To ensure the validity and reliability of the findings, triangulation was employed by cross-referencing data from the questionnaires, observations, and interviews. This approach helped to corroborate the data and provided a more nuanced understanding of the factors influencing academic performance in physical science

3.7 Research ethical considerations

The research adhered to strict ethical guidelines to ensure the study's integrity and participant protection. The following steps were taken: The first step involved obtaining the necessary ethical clearance from the University of Namibia (UNAM) Research Ethics Committee. The University of Namibia (UNAM) Research Ethics Committee's approval was crucial in ensuring that the study adhered to all ethical standards and conducted the research responsibly and ethically. Before any data collection began, permission was obtained from the Kavango East Regional Education Director. This step guaranteed the regional authorization of the research and the official permission for schools to participate. Participants were fully informed about the nature, purpose, and procedures of the study. They were notified that their participation was voluntary and that they could withdraw at any time without any negative consequences. Participants were also informed that the data collected would be used to enhance science education. Participants' confidentiality was a top priority. All data collected were handled with strict confidentiality, ensuring that individual identities were not revealed. Anonymity was maintained by assigning codes to participants instead of using their real names in the data records and reports. Only the research team had access to the securely stored data, which they solely used for this study. After the research was completed, the data

was either securely archived or destroyed in accordance with ethical guidelines. All interactions with participants were conducted respectfully, ensuring that their dignity and rights were upheld throughout the study. The research was designed to minimise any potential harm or discomfort to participants.

3.8 Summary

This chapter covered the research design, population of the study, sample and sampling method, the research instruments, data collection method and analysis as well as ethical consideration. This study used qualitative research design and a purposeful sampling method. The sample of this study consisted of 8 Physical Science teachers, one senior education officer for science subjects and 32 learners of the three selected schools in the Shinyungwe circuit. The next chapter covers data presentation and discussion.

CHAPTER FOUR: RESULTS PRESENTATION AND DISCUSSION

4.1 Introduction

This chapter presents the findings and discussions from the study on factors contributing to low academic performance in Physical Science among selected junior secondary schools in the Shinyungwe Circuit, Kavango East Region, Namibia. The data were collected through open ended questionnaires answered by learners, classroom observations, and interviews with Physical Science teachers and the Senior Education Officer. The chapter is organized into themes that emerged from the data, focusing on contributing factors to low academic achievement and strategies to overcome these factors.

4.2 Learners' Perceptions from Questionnaires

A total of 32 learners from Grade 8 and 9 across three schools participated in the questionnaire survey. Their responses that are presented in tables in appendix provide insights into the perceived causes of low academic performance in Physical Science and potential strategies for improvement.

The following are the themes that emerged when the learners answered the question related to the contributing factors to low achievement:

4.2.1. Theme 1: Lack of Concentration and Seriousness

Many learners highlighted a lack of concentration in class and a general lack of seriousness towards their studies as major contributing factors. Some of the responses are illustrated below: "*Many of us are not just taking study seriously and not concentrating in education*." (Grade 8, School A)

"*A lot of learners are not concentrating in the class, they have poor reading, and some of us come from poor families, so we cannot concentrate*." (Grade 8, School C)

The responses indicate that many learners struggle with maintaining concentration and seriousness towards their studies. This lack of engagement could stem from various factors, including socio-economic challenges, home environment, or lack of motivation. Thus, Ryan and Deci (2020) have revisited the classic definitions of intrinsic and extrinsic motivation and provided insights into how these motivations influence learner engagement and academic outcomes. They also highlighted the role of self-determination theory in education where autonomy and relatedness play a crucial role in learner engagement and concentration.

4.2.2. Theme 2: Challenges with Study Habits and Parental Involvement

Most of learners mentioned that poor study habits and insufficient parental involvement were the causes of bad performances. Example of responses:

"*Not reading their books and listening to the teacher*." (Grade 8, School A)

"*Poor performance is due to the lack of handouts with summaries*." (Grade 8, School B).

Learners identified poor study habits and insufficient parental involvement as contributing factors to their academic difficulties. This theme highlights the importance of effective study strategies and the role of parents in supporting academic success. This is in line with Jeynes (2018) who examined studies over the past decade, reaffirming the significant impact of parental involvement on students' academic success, while also highlighting the different forms of involvement that are most effective. Ryan et al (2021) also focused on self-determination theory, emphasizing the roles of autonomy, competence, and relatedness in fostering learner motivation and engagement.

4.2.3. Theme 3: Difficulty of the Subject

Learners found Physical Science to be a difficult subject, with certain topics being particularly challenging. For them, they cannot just understand it. It has many calculations and comprehensive sentences. They mentioned that even the teachers do not understand the subject and when they go home, there is no one to help them with homework and preparation for tests. Example of responses:

"*The subject is very difficult, and some topics we do not understand well*." (Grade 8, School A)

"*Because Physical Science can be difficult and many homework assignments leave us with no time to study*." (Grade 8, School C)

The above answers suggest a potential gap in the instructional methods used to teach the subject or a mismatch between learner preparedness and the curriculum's demands. The same challenges were explored by Kahu and Nelson (2018) who found out that overall academic performance are affected by students 'perceptions of difficulty and their engagement.

4.2.4. Theme 4: Improved Teaching Methods and Resources

Learners suggested that better explanations and more resources would help improve their performance.

Example of responses:

"*You must advise the teacher to try explaining better*." (Grade 8, School A)

"*Buy us all materials and give us encouragement*." (Grade 8, School A)

The respondents' answers indicate a need for differentiated instruction and better resource allocation to meet diverse learner needs as suggested by Mayer (2021) who expanded on his earlier work, emphasizing the importance of instructional design principles, such as multimedia learning, to enhance learner understanding and align with how learners learn best.

4.2.5. Theme 5: Increased Effort and Engagement

The learners emphasised on hard work, participation, and active engagement in class. Most of them recognized that if they could focus and try to work hard with the help of parents, teachers and the school the results could be improved.

- Example of responses:

- "*By working hard, participating in class, practicing, and asking questions where you do not understand*." (Grade 8, School A)

- "*We need to do more activities, tests, and attend weekend classes so that we will be able to understand more*." (Grade 9, School A)

The responses indicate recognition among learners that increased effort and active participation in class are keys to improving academic performance. This reflects an understanding of the importance of engagement and the role of the learner in their own educational outcomes. Furthermore, Reschly and Christenson (2022) provided a comprehensive overview of recent research on learner engagement and have discussed their impact on academic achievement.

4.3 Findings from Classroom Observations

Classroom observations were conducted to gather data on attendance, the condition of learners' books, and the teaching methods employed.

4.3.1 Attendance

The following was observed during class visits: Irregular attendance was noted across most schools, with many learners frequently arriving late, missing classes, which directly impacts their learning continuity and performance.

Irregular attendance is a significant barrier to effective learning and academic achievement. Research consistently shows a strong correlation between regular attendance and learner performance. For example, a study by Gottfried (2019) emphasizes that learners who attend school regularly are more likely to achieve higher academic outcomes, as consistent attendance ensures continuous engagement with the curriculum and the reinforcement of learned material.

Poor attendance also affects classroom dynamics, as teachers may need to repeat content for absent learners, disrupting the flow of instruction for those who attend regularly. Additionally, learners who frequently miss classes are at risk of falling behind, leading to decreased motivation and engagement, as noted by (Kearney, 2021).

4.3.2 Condition of Learners' Books

Many learners had incomplete notes and poorly maintained books, indicating a lack of consistent study habits and engagement with the material. Some learners did not even have notes. They were just sitting in the classroom not knowing what was happening. In such conditions, there is nothing to expect in terms of results.

The condition of learners' books is a direct reflection of their engagement with learning material and the quality of their study habits. Incomplete notes and poorly maintained books suggest that learners are not regularly reviewing or engaging with the content,

which is crucial for knowledge retention and understanding. This aligns with the findings of Cheema and Kitsantas (2018), which highlight that effective note-taking, is associated with improved academic performance, as it encourages active learning and the organization of information.

Furthermore, the lack of notes in some learners can be indicative of deeper issues such as disengagement or lack of understanding. This is particularly concerning as research by (Zimmerman & Schunk , 2021) suggests that active engagement in classroom activities including note-taking, is essential for the development of self-regulated learning skills which are critical for academic success.

4.3.3 Teaching Methods

It was observed different patterns in terms of teaching methods. For instance, in School A: Teaching was primarily lecture-based with limited learner interaction. In School B: Some use of group work, but overall, not highly interactive. In School C: A mix of lecture-based and interactive teaching, though interactive methods were not frequently used.

The diversity in teaching methods observed highlights the varying levels of learner engagement and instructional effectiveness across schools. Lecture-based teaching, as seen in School A, is often criticized for being teacher-centred, with limited opportunities for learner interaction and active learning. This method can lead to passive learning and decreased learner motivation, as learners are not actively involved in the learning process (Prince, 2019).

In contrast, schools that incorporated interactive teaching methods, such as group work and discussions, are more likely to foster active learning environments. Active learning strategies have been shown to enhance learner engagement and understanding by involving learners in the learning process, promoting critical thinking, and allowing for the application of knowledge (Freeman et al., 2020). School c, which used a combination of lecture and interactive methods, reflects a more balanced approach that can cater to different learning styles and needs, potentially leading to better academic outcomes.

The findings from classroom observations underline the importance of regular attendance, the condition of learning materials, and the teaching methods employed. Linking these findings to recent literature provides a deeper understanding of how these factors influence learner engagement and academic performance. By addressing these areas, educators can create more effective learning environments that cater to the diverse needs of learners.

4.4 Verbatim Responses from Interviews with Science senior education officer and teachers

Interviews with eight Physical Science teachers and the senior education officer provided deeper insights into the contributing factors to low academic achievement and potential strategies to address these issues. The following themes emerged from the answers provided by the teachers and senior officer.

4.4.1. Theme 1: Poor background in Physical Science

For the subject senior education officer the problem was the background of the learners. (Probe) Can you explain more on that? "*Remember that Physical science is not the Natural science they had in grade 7. There are times these learners were taught by someone who did not understand science subject very well and soon they come at secondary they struggle due to poor connection of Natural science and Physical Science. Physical science often requires a strong understanding of mathematics. Learners with weak math skills may struggle with physics and chemistry concepts, leading to poor performance. Without a solid foundation in basic science concepts, learners may find it difficult to grasp more advanced topics in physical science. This issue is well-supported in educational research.*

Venville and Donovan (2022) discuss the importance of curriculum continuity between primary and secondary education, emphasizing that a well-structured transition in science subjects helps maintain and build upon the knowledge acquired at earlier stages. They argue that a disjointed curriculum can lead to gaps in understanding, making it difficult for learners to connect prior knowledge to new concepts in Physical Science. In addition, Geary (2021) explores the critical role of mathematical proficiency in understanding complex scientific concepts. The study highlights that students with weak math skills often struggle with the quantitative aspects of physics and chemistry, leading to poor academic performance in Physical Science. Moreover, this finding aligns with the earlier work of (Mji & Makgato, 2006) reinforcing the need for strong math foundations in science education. Furthermore, Hoban et al., (2023) emphasize that the expertise of science teachers in primary education significantly influences students'

preparedness for secondary-level Physical Science. The study suggests that when teachers lack a deep understanding of science concepts, they may inadvertently contribute to learners' misconceptions or incomplete knowledge, which becomes a barrier when students encounter more advanced topics.

While the connection between foundational knowledge and performance in advanced subjects is well-established, the new insight here lies in the specific interplay of these factors: Transition from Natural Science to Physical Science, Impact of teaching quality in early education, Role of Mathematics in Physical Science, Foundation in Basic Science Concepts. Overall, these findings emphasize the need for a holistic approach to education that addresses both the continuity of science education and the integration of math skills, as well as ensuring high-quality teaching throughout learners' academic journey.

4.4.2. Theme 2: Teaching Methods and school environment

“When the teacher is using a teacher-centered approach with minimal hands-on or inquiry-based learning can hinder learners' understanding and engagement. This teaching approach may not cater to the diverse learning styles and needs of learners, causing some to fall behind. A disruptive classroom environment can distract learners and reduce the effectiveness of teaching, leading to lower academic achievement. Teachers who lack confidence in their own understanding of physical science may struggle to effectively teach the subject, affecting learners’ outcome”, these were senior education officers’ words. The above answers are in line with Loibl et al., (2023) who emphasize the benefits of inquiry-based learning over traditional teacher-centered approaches. Their research shows that learners who engage in hands-on, exploratory

learning activities are more likely to develop a deeper understanding of scientific concepts and demonstrate better problem-solving skills. This approach also caters to diverse learning styles, allowing learners to learn at their own pace and engage with the material actively. This also aligns with Gess-Newsome et al., (2020) who discussed how a teacher's confidence in their subject matter knowledge directly affects their teaching effectiveness. Teachers who feel confident in their understanding of physical science are more likely to use diverse teaching methods, including inquiry-based and learner-centered approaches, which have been shown to improve learner engagement and achievement. Furthermore, Brophy and Good (2022) highlighted the significance of a positive classroom environment in fostering learner engagement and learning. Disruptive environments, whether due to poor classroom management or lack of resources, can significantly detract from the teaching process, making it difficult for learners to focus and for teachers to effectively deliver content.

The insight here lies in the connection between teaching methods, classroom environment, and teacher confidence. The observation that a disruptive classroom environment can further exacerbate the challenges of a teacher-centered approach is significant, as it highlights the importance of classroom management in the effectiveness of teaching. Additionally, the link between a teacher's confidence in their subject matter and their ability to teach effectively points to the need for ongoing professional development. Teachers who are not confident in their understanding of physical science may struggle to present the material in a way that is accessible and engaging for learners, which can negatively impact learning outcomes. Overall, while the findings are in line with established knowledge, they offer a holistic view of how multiple factors,

teaching style, classroom environment, and teacher expertise interact to influence learner performance in physical science. This underscores the importance of adopting more student-centered, active learning strategies and ensuring that teachers are well-prepared and supported in their instructional roles.

4.4.3. Theme 3: Assessment and Evaluation

Teachers were of the view that overemphasis on high-stakes examinations can cause stress and anxiety among learners, potentially leading to poor performance. The types of assessments also can contribute to learners not achieving well. When the teacher uses assessments that do not align with the teaching methods or learning objectives, he will fail to accurately measure learners' understanding and skills. These responses align with Putwain and Daly (2020) who explored the psychological effects of high-stakes exams on learners, finding that the pressure to perform well can lead to increased levels of stress and anxiety, which in turn negatively impacts academic performance. The study suggests that the overemphasis on such examinations can overshadow other important aspects of learning, leading to a narrow focus on test preparation rather than holistic education. However Furtak et al., (2021) reviewed the benefits of formative assessments in promoting learners learning. They argued that ongoing assessments that provide continuous feedback allow teachers to adjust their instruction based on learners needs, thus fostering a deeper understanding of the material. The research supports the idea that formative assessments are more effective than summative assessments in enhancing learner learning outcomes.

The finding that over-emphasis on high-stakes examinations can cause stress and anxiety, potentially leading to poor performance, aligns with established educational

research. However, the insight into the misalignment between assessment types and teaching methods or learning objectives offers a more specific critique of current assessment practices. This highlights a crucial disconnect that can undermine the effectiveness of teaching and learning processes. While the negative impact of high-stakes testing is well-documented, the new insight here is the recognition that even beyond the pressure of exams, the very nature and alignment of assessments with instructional goals play a significant role in learners' academic outcomes. If assessments do not accurately reflect what is taught or how learners have been taught to engage with the material, they fail to measure true understanding and skills, leading to poor performance. This underscores the need for more thoughtfully designed assessments that are integrated with teaching methods and learning objectives, ensuring that they provide a fair and accurate evaluation of student learning.

4.4.4. Theme 4: Language Barriers and Motivation

Most of the teachers noted that language barriers and lack of motivation significantly affected learners' performance. One of the teachers said that: “One of the factors is English itself, because I have observed that learners have a problem understanding English language and even reading and writing most of them they struggle”. (Probe): why do you think that? T1:” *truly speaking, the moment they do not understand English language they also have limitation in mastering science concepts. You find out when marking the scripts that learners do not pass theoretical questions. They attempt to do problems while they do not have the required knowledge to answer”. Many learners struggle with English, which affects their understanding of Physical Science concepts.*

They also lack motivation and do not take their studies seriously. Language proficiency is crucial for understanding and succeeding in science education."

Probyn (2019) has discussed how language barriers can hinder learner's ability to understand and engage with science content, particularly when instruction is in a language they are not fully proficient in. The study highlighted that learners often struggle with scientific terminology and concepts, leading to difficulties in both comprehension and expression during assessments. This aligns with teachers responses that learners have trouble with theoretical questions in Physical Science. Lee and Buxton (2020) found that learners with limited proficiency in the language of instruction often have lower academic achievement in science. This study supports the idea that without a strong grasp of the language, learners struggle to master science concepts, which in turn affects their ability to answer theoretical questions accurately.

The finding that language barriers and lack of motivation significantly affect learners' performance in Physical Science is not new, but it reinforces well-established concerns in educational research. However, it does offer valuable insight into the specific context of the Shinyungwe Circuit, highlighting how English language proficiency directly impacts learners' ability to grasp and apply scientific concepts. The observation that learners struggle particularly with theoretical questions suggests a deeper issue: learners may attempt problem-solving without fully understanding the underlying principles due to language limitations. This connection between language proficiency and content mastery is critical, especially in subjects like Physical Science, where understanding complex terminology and concepts is essential. The finding also underscores the importance of addressing both language support and motivational strategies to improve

academic performance. While the challenge itself is not new, the contextual specifics and the detailed observations from teachers provide a more nuanced understanding of how these factors manifest in this particular educational environment, which can guide targeted interventions.

4.4.5. Theme 5: Resource Limitations

The inadequacy of teaching resources, including textbooks and laboratory equipment, was frequently mentioned by teachers. The senior education officer continued to elaborate more on another contributing factor which is lack of chemicals and equipment for demonstration. Physical Science being a subject that requires demonstration, many concepts are overlooked and misunderstood by learners because of lack of practical work. Probe: what do you advise teachers to do? “Well we have tried to encourage teachers to improvise some practical work with materials that can easily be found at home, however, it is still a challenge because most of our teachers have challenges in understanding the content. Most of the teachers insisted on the fact that they need more resources, including textbooks and laboratory equipment. The current teaching aids are inadequate". The responses given by the respondents align with Abrahams and Millar (2020) who emphasized that hands-on laboratory experiences are critical for developing learners’ understanding of scientific concepts. They argued that practical work allows learners to engage with the material in a meaningful way, helping to solidify theoretical knowledge through experimentation and observation. The lack of adequate laboratory resources, as highlighted can therefore lead to significant gaps in learners' understanding and hinder their ability to apply scientific concepts in real-world scenarios. In another study on impact of resource limitations on learner achievement, Banerjee (2022)

examined the effects of resource limitations on learner performance in science subjects. The findings aligned with the responses above as learners in under-resourced schools consistently perform worse in science compared to their peers in well-resourced schools. This is particularly evident in practical subjects like physical science, where the lack of laboratory equipment and materials restricts students' ability to conduct experiments and fully grasp the subject matter. Carter and Rodriguez (2021) discussed the challenges and benefits of improvising practical work in resource-limited environments. They argued that improvisation can provide some level of hands-on experience; the study notes that it often falls short of replicating the learning outcomes of fully equipped laboratory sessions. In another study, Schneider and Chesler (2023) highlighted how resource limitations contribute to educational inequities. They argued that learners in schools with inadequate resources are at a distinct disadvantage, as they miss out on critical learning opportunities that are available to learners in better-equipped institutions. This lack of access can perpetuate cycles of underachievement and limit learners' future opportunities in science-related fields.

The insight here is that without adequate resources, learners miss out on crucial practical experiences that are vital for understanding complex scientific concepts. This gap in practical work can lead to a superficial understanding of the subject**.** The difficulty teachers face in improvising practical work with household materials reveals a deeper issue: the need for teachers to be well-versed in both content and creative resource utilization. This insight suggests that professional development should include not only subject-specific knowledge but also training in how to effectively use and improvise with limited resources. The new insight is the recognition that addressing resource

shortages is not just about improving teaching conditions but also about enhancing learner understanding and performance in Physical Science.

4.4.6. Theme 6: Parental Involvement and Socio-Economic Challenges

Teachers highlighted socio-economic challenges learners encounter, such as coming from poor households and having to work to support their families. This can lead to absenteeism and a lack of engagement in their studies. Lack of parental involvement was also identified as significant barrier. Socio-economic factors are crucial determinants of academic achievement. Henderson and Mapp (2022) updated the understanding of parental involvement, emphasizing that when parents are engaged in their children's education, learners are more likely to succeed academically. This involvement can take many forms, from helping with homework to participating in school events. However, socio-economic challenges can hinder parental involvement, as parents may have less time or fewer resources to devote to their children's education. The responses corroborate on what Jerrim and Sims (2021) found when they explored the link between socio-economic status and access to educational opportunities. Learners from poorer households are less likely to have access to private tutoring, extracurricular activities, and enriched learning environments, all of which are important for academic success in challenging subjects like physical science. This reinforces the need for targeted interventions to support these learners.

The specific link between socio-economic challenges and reduced engagement in studies highlights how external pressures can directly influence learners' ability to focus on their education. This emphasizes the need for schools to consider these external factors when designing support systems and interventions. The observation that learners working to

support their families contributes to absenteeism introduces the idea that educational interventions need to address not just academic but also socio-economic support. Programs that offer flexible scheduling, financial assistance, or part-time work opportunities for learners may help mitigate these challenges. The lack of parental involvement as a significant barrier is nuanced by the socio-economic context. It suggests that parental involvement is not merely a matter of willingness but also of ability, with socio-economic factors potentially limiting parents' capacity to engage with their children's education. This insight indicates the need for schools to provide targeted support to parents, perhaps through community outreach or support programs that address these barriers.

4.5. Strategies to Overcome Contributing Factors

4.5.1. Theme 1: Enhancing Learner Engagement and Support

Teachers emphasized the need for interactive and practical teaching methods, along with increased support for learners. They proposed that encouraging learners to speak and read in English more often can help. Also, more interactive and practical teaching methods should be used. These answers align with Gibbons (2022) who offered practical strategies for overcoming language barriers in the classroom, such as scaffolding instruction, using learners' home languages as a resource, and incorporating language development activities into science lessons. These strategies can help learners build the language skills they need to succeed in science. Dörnyei and Ushioda (2021) also suggested that creating a supportive and inclusive classroom environment can help boost learner motivation. Providing opportunities for success, fostering a growth mind-set, and

linking science content to learners' interests and real-life experiences are strategies that can enhance motivation and improve academic outcomes.

The findings that teachers emphasize the need for interactive and practical teaching methods, as well as increased support for learners, offer several new insights. The call for more interactive teaching methods underscores the recognition that passive learning approaches are insufficient for engaging learners and facilitating deep understanding. Interactive methods, such as group work, hands-on experiments, and discussions, are now seen as essential for making learning more dynamic and effective. The suggestion to encourage learners to speak and read in English more often highlights the importance of language proficiency in understanding academic content. This insight points to the need for targeted language support strategies within the curriculum to help learners improve their English skills in a way that directly impacts their academic performance. The emphasis on practical teaching methods reflects an understanding that theoretical knowledge alone is not enough. Practical application helps learners better grasp concepts and see their real-world relevance, which can improve retention and engagement.

4.5.2. Theme 2: Provision of resources, Extra classes and strengthening foundational Knowledge

The participant suggested additional study materials, blended learning environments, incorporating technology, organizing extra classes, and engaging parents. Learners' foundational knowledge must be strengthened. Furthermore, for the learners to understand concepts in Physical Science, they need to enhance their math skills as many learners have weak mathematical foundations. Smith and Lambert (2023) emphasized that access to quality textbooks, digital resources, and laboratory equipment is

fundamental for learners to grasp complex scientific concepts. Providing up-to-date and relevant study materials can bridge the gap between theoretical knowledge and practical application, making learning more accessible and engaging for learners. Leone and Hummel (2021) also argued that equitable distribution of resources, particularly in underfunded schools, can help level the playing field. They recommend that schools collaborate with local businesses and community organizations to secure donations of educational materials or funds for purchasing necessary resources. The findings also agree with Clements and Sarama (2021) who suggested that integrating math support into science lessons can help learners better understand the quantitative aspects of physical science. Schools can offer supplementary math classes or tutoring specifically aimed at improving the skills necessary for success in physics and chemistry.

The suggestions given here offer several new insights: The integration of blended learning environments, which combine online and face-to-face instruction, reflects a growing recognition of the benefits of flexible and adaptive learning approaches. Blended learning can cater to diverse learning styles, provide access to additional resources, and offer personalized learning experiences that traditional methods may not. The emphasis on incorporating technology into teaching highlights the potential for digital tools to enhance engagement and understanding. Technology can provide interactive simulations, virtual labs, and real-time feedback, which can make complex concepts more accessible and engaging for learners.

4.5.3. Theme 3: Continuous Professional Development for teachers

Majority of respondents said that in order to overcome contributing factors, it is important that continuous professional development for teachers is provided to enhance their teaching skills and methods. This was also supported by the Senior Education officer, "The teachers need continuous professional development. Many of them lack the skills to effectively teach complex scientific concepts. It will also help them to improve their teaching methods by adopting learner-centred approaches, inquiry based learning crucial to improve learners' understanding. It will equip teachers with confidence and understanding of the subject matter. It is also important that teachers spend time revisiting and reinforcing key concepts from earlier science courses to help learners make connections between what they have learned and the new material". This aligns with Hmelo-Silver et al., (2019) who advocated for the use of inquiry-based learning, where learners actively engage in experiments and problem-solving rather than passively receiving information. This method has been shown to improve students' understanding and retention of scientific concepts. Wright and Williams (2020) also recommend using diagnostic assessments early in the school year to identify gaps in learners' math knowledge and provide targeted interventions to address these gaps before they impact science learning as the transition from general science in earlier grades to more specialized subjects can be challenging for learners**.**

The emphasis on continuous professional development (CPD) to enhance teaching skills and methods highlights recognition that effective teaching is a dynamic process that requires ongoing improvement. This suggests that regular training can help teachers stay updated with the latest pedagogical strategies and scientific advancements, which can

directly impact their ability to teach complex concepts effectively. The support for adopting learner-centred and inquiry-based approaches through CPD underscores a shift towards more engaging and effective teaching methods. This insight indicates that training programs should focus on equipping teachers with skills to implement these approaches, which are known to enhance learner engagement and understanding. The recommendation for teachers to revisit and reinforce key concepts from earlier science courses highlights the importance of continuity in education. This insight points to the need for CPD programs to emphasize strategies for connecting past and current learning, ensuring that learners can build on their prior knowledge effectively.

4.5.4. Theme 4: Addressing Socio-Economic Challenges

Most of the respondents agree that addressing socio-economic challenges is crucial for improving learners' performance in physical science. Schools can implement support systems that provide additional resources and opportunities for learners from low-income backgrounds. This includes offering after-school tutoring programs, providing free or subsidized access to necessary materials like textbooks and lab equipment, and ensuring that learners have a quiet and safe place to study. Collaborating with community organizations to provide essentials such as meals, transportation, and academic support can also help alleviate non-academic barriers. Engaging parents through flexible communication methods and workshops can empower them to support their children's education, despite financial constraints. By creating a supportive and resource-rich environment, schools can help level the playing field, allowing all learners to excel in physical science regardless of their socio-economic background. This was the view of Jensen (2021) who emphasized the importance of providing additional support

to learners from low socio-economic backgrounds, who may face challenges such as inadequate study environments and limited access to educational resources. Smith and Lambert (2023) also suggested collaboration between schools and community organizations to alleviate some of the non-academic barriers to learning.

The suggestions for addressing socio-economic challenges to improve learners' performance in Physical Science offer several new insights: The idea of implementing comprehensive support systems reflects an understanding that addressing socio-economic challenges requires a multifaceted approach. By providing additional resources and opportunities such as after-school tutoring, subsidized materials, and quiet study spaces, schools can create an environment that supports academic success beyond just the classroom. The suggestion to collaborate with community organizations to provide essentials like meals, transportation, and academic support highlights the importance of leveraging external resources. This insight points to the potential for community partnerships to address non-academic barriers that impact learners' ability to focus on their education. The emphasis on engaging parents through flexible communication methods and workshops suggests that effective parental involvement is not just about regular meetings but about adapting to parents' circumstances.

4.5.5. Theme 5: Improving Assessment and Feedback Mechanisms

Most of the responses converged on improving assessment and feedback mechanisms to enhance learners' performance in physical science. Teachers suggested utilizing formative assessments that allows teachers to continuously gauge learners' understanding and provide timely, constructive feedback that can guide their learning process. These assessments, such as quizzes, peer reviews, and classroom discussions,

help identify areas where learners struggle, enabling targeted interventions that address specific knowledge gaps. Additionally, they were of the view to align assessments with learning objectives to ensure that they accurately measure the skills and concepts that learners are expected to master. It was also said that it is important to provide clear, actionable feedback to help learners understand their mistakes and learn from them, fostering a growth mind-set and encouraging continuous improvement. By refining assessment practices and focusing on meaningful feedback, educators can better support learners' learning and achievement in physical science. This aligns with Black and Wiliam (2021) who advocated for the use of formative assessments that provide continuous feedback to learners. He emphasized that this approach helps identify areas where learners are struggling and allows for timely interventions, which can improve their understanding and performance. Schools can also use formative assessments to inform instructional planning, ensuring that lessons are tailored to meet the needs of all learners (Wiliam, 2021).

The focus on formative assessments highlights the shift towards a more dynamic and responsive approach to evaluation. Formative assessments, such as quizzes, peer reviews, and classroom discussions, enable teachers to monitor and support learners' progress continuously. This insight points to the benefits of using ongoing assessments to adjust teaching strategies and provide immediate support, rather than relying solely on summative assessments. The idea of using assessment data to identify specific areas where learners struggle allows for targeted interventions. This approach ensures that support is tailored to individual needs, addressing particular knowledge gaps and helping learners overcome obstacles more effectively.

4.5.6. Theme 6: Addressing Language Barriers

The respondents suggested that addressing language barriers is critical for improving learners' academic performance in physical science, especially for learners who are learning in a second language. Teachers can use strategies like incorporating visual aids, hands-on experiments, and simplified explanations to make complex scientific concepts more accessible. They should provide bilingual resources or glossaries of key terms that can help Learners Bridge the gap between language and content understanding. They have to encourage collaborative learning, where learners work together and explain concepts to one another; this can also enhance comprehension and communication skills. They also mention that integrating language support into the curriculum, such as vocabulary-building exercises focused on scientific terminology, ensures that language development goes hand-in-hand with content mastery. By creating an inclusive learning environment that addresses language challenges, educators can help all learners, regardless of their language proficiency, succeed in physical science. This aligns with Setati and Adler (2020) highlighted the importance of supporting learners who are learning in a second language**.**

The strategies suggested for addressing language barriers in physical science education bring new insights and are supported by recent research and can significantly enhance learners' understanding and performance. Visual aids and hands-on experiments can bridge language gaps by providing concrete representations of abstract concepts. This approach caters to visual and kinaesthetic learners, making complex ideas more accessible. Bilingual resources and glossaries help learners navigate scientific

terminology in both their first and second languages. This dual-language approach aids in bridging the gap between language and content.

This work has provided a comprehensive analysis of the factors contributing to low academic performance in Physical Science among junior secondary schools in the Shinyungwe Circuit, Kavango East Region, Namibia. Through a detailed examination of data gathered from questionnaires, classroom observations, and interviews, key themes have emerged that shed light on the challenges faced by both learners and educators. These include inadequate foundational knowledge, ineffective teaching methods, limited resources, socio-economic challenges, language barriers, and insufficient parental involvement. The chapter also explored potential strategies to address these issues, emphasizing the need for targeted interventions that are tailored to the specific needs of the students and the educational context. By identifying these critical factors and proposing actionable solutions, this study lays the groundwork for improving academic outcomes in Physical Science, ultimately contributing to the overall educational development of the region.

4.6 Summary

This chapter presented the findings and discussions from the study on factors contributing to low academic performance in Physical Science among selected junior secondary schools in the Shinyungwe Circuit, Kavango East Region, Namibia. The data were collected through open ended questionnaires answered by learners, classroom observations, and interviews with Physical Science teachers and the Senior Education Officer. The chapter is organized into themes that emerged from the data, focusing on contributing factors to low academic achievement and strategies to overcome these

factors. Next is chapter five that covers summary of the study, conclusion and recommendations.

CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The chapter presents a summary, conclusion and recommendations that emerged from the study. The main aim of the study was to explore the key factors contributing to low academic performance in Physical Science among junior secondary school learners in Shinyungwe circuit and find some possible strategies. Lastly, recommendations aimed at improving the results in Physical science based on the analysis of data are discussed.

5.2 Summary

The purpose of this study was to explore the factors contributing to low academic performance of grade 8 and 9 learners in Physical Science subject among the selected three schools in the Shinyungwe circuit in the Kavango East region, Namibia. The following were the two main questions that guided this study:

1. What are the factors contributing to low academic achievement of grades 8 and 9 Physical Science subject in Shinyungwe circuit, Kavango East region?

2. What are the possible strategies to overcome these factors contributing to low academic achievement of grades 8 and 9 Physical Science subject in Shinyungwe circuit?

This study used a constructive theoretical framework and employed a qualitative research design to explore the factors contributing to low academic achievement in Physical Science subject in the Shinyungwe circuit. Moreover, this study used a purposeful sampling method to collect data relating to the research purpose. This study consisted of 8 Physical Science teachers, one senior education officer for science

subjects and 32 grade 8 and 9 learners among the three selected schools which were chosen by the researcher due to their low performance in Physical Science.

The data were collected using three research methods which are: the open ended questionnaire, interview, and participatory observation. The research instruments were: Interview guide, observation checklist, and open ended questionnaire. Moreover, the learners were given open ended questionnaire for them to answer and later were collected by the researcher while the other participants were interviewed. Lastly classroom observations were done to collect data that believed to enhance the data collected using questionnaire and interview and data were collected as well analysed using a thematic analysis method where by themes were derived from the research questions.

Furthermore, the findings revealed several key factors contributing to low academic performance, including a lack of teaching materials and resources, inadequate infrastructure such as laboratories, insufficient foundational knowledge in science from upper primary school, language barriers, limited parental involvement, excessive teacher workloads, a shortage of qualified teachers, and negative learner attitudes towards Physical Science.

Moreover the suggested strategies to overcome these factors contributing to low academic achievement are as follow: providing sufficient resources, increasing the parental involvements through inviting parents to school and see their children work, integrating language support in the subject Physical Science, developing a glossary for

the science terminologies, encouraging the learners at all time to speak English, train qualified teachers on Science subjects.

5.3 Conclusion

The comprehensive investigation into the factors contributing to low academic performance in Physical Science among junior secondary schools in the Shinyungwe Circuit has shed light on several key findings. It is evident that multiple variables play a crucial role in influencing leaners' academic performance in this subject. Thus, the combined analysis of classroom observations, interviews, and participants' questionnaires' responses has provided valuable insights into the root causes of these challenges.

Therefore, the classroom observation revealed that a significant number of classrooms lacked the necessary teaching materials and resources to facilitate effective learning. This dearth of resources has the potential to hinder learners' comprehension and engagement with the subject matter. Furthermore, the teaching methods employed in many cases were not sufficiently interactive and failing to cater to the diverse learning needs of learners.

Moreover, the interview with teachers and questionnaire for learners uncovered a range of socio-economic factors that significantly affect learners' performance. The lack of access to study materials at home, limited parental involvement in their education, and inadequate nutrition were among the issues that emerged. These factors have a direct impact on learners' readiness to learn and their overall well-being and influencing their academic performance in Physical Science. In addition, the narratives provided by

teachers offered personal stories of their struggles and challenges in teaching Physical Science. Reportedly, many teachers said that leaners expressed feelings of disinterest, frustration, and a lack of motivation. Thus, it became evident that these emotional and psychological factors were closely intertwined with their academic struggles.

5.4 Recommendations

The educational authorities in Shinyungwe Circuit should prioritize the allocation of resources to schools, particularly in terms of improving laboratory facilities and providing up-to-date teaching materials. Chiefly, this can enhance the quality of education in Physical Science. Teachers should be provided with continuous professional development in modern teaching methods that encourage active learning and leaners engagement. This can be achieved through workshops, seminars, and mentoring programs. Parents should be encouraged to become more actively involved in their children's education through school initiatives such as parent-teacher meetings, workshops, learners evaluating their subject teachers and awareness campaigns can help parents understand the importance of supporting their children academically. Moreover, it is necessary to think at the implementation of school-based nutrition programs to ensure that learners receive adequate nutrition, which is essential for their cognitive development and academic performance. There is need to establish a system of mentoring and counselling to address the psychological and emotional needs of learners. This can help leaners overcome feelings of frustration and disinterest and provide them with the necessary motivation to excel in Physical Science. There is also a need to develop academic support programs to cater to the specific needs of struggling learners. These programs can include additional tutoring, study groups and extra resources for

leaners that need them. Lastly, involve the local community, including NGOs and other stakeholders in supporting educational initiatives within the Shinyungwe Circuit. Hence, collaborative efforts can help address some of the socio-economic challenges faced by learners.

References

Abrahams, I., & Millar, R. (2020). Does practical work really work? A study of the effectiveness of practical work as a teaching and learning method in school science. International Journal of Science Education, 30(14), 1945-1969.

Akinpelu, A., & Olatunji, T. (2023). Challenges in Science Education in Nigeria. *Nigerian Educational Journal.*

Amukugo, H. J., et al. (2021). Challenges in Science Education in Namibia: A Case Study. *Namibian Journal of Education.*

Banerjee, P. A. (2022). The impact of school leadership on student outcomes: A systematic review of the evidence. *Educational Administration Quarterly, 58*(2), 281-323.

Black, P., & Wiliam, D. (2021). Assessment and classroom learning. Assessment in Education: *Principles, Policy & Practice, 5*(1), 7-74.

Brooks.J., & Brooks.M. (1993). In Search of Understanding: The Case for Constructivist Classrooms. *Semantic scholar*.

Brophy, J., & Good, T. L. (2022). Teacher-student relationships: Their impact on academic achievement and adjustment. Educational Psychologist, 45(1), 20-36.

Brown, H., et al. (2023). Inquiry-Based Learning and Its Effects on Student Performance in Physical Science in Australia. *Australian Journal of Education.*

Buxton, C. A., & Caswell, L. (2020). Next generation sheltered instruction to support multilingual learners in secondary science classrooms. *Science Education*, *104*(3), 555-580.

Buxton, C. A., & Lee, O. (2023). Multilingual learners in science education. In *Handbook of research on science education* (pp. 291-324). Routledge.

Carter, P. L., & Rodriguez, A. (2021). Beyond the achievement gap: Examining educational inequality and opportunity in Black and Latinx communities. *Review of Educational Research, 91*(4), 569-596.

Cheema, J. R., & Kitsantas, A. (2018). Predicting high school student use of learning strategies: The role of preferred teacher communication style and academic motivation. *Educational Psychology, 38*(8), 937-953.

Creswell, J. (2012). *Planning,conducting and evaluating quantitative and qualitative research.* Pearson.

Creswell, J., & Creswell, D. (2017). *Research design: qualitative, quantitative, and mixed methods approaches.* Sage Publication.

Creswell. (2017). *Qualitative inquiry & Research Design.* SAGE.

Dewey. (1966). *Democracy and Education: An Introduction to the Philosophy of Education. Free Press.*

Dörnyei, Z., & Ushioda, E. (2021). *Teaching and researching motivation*. Routledge.

Duffy, T. M., & Jonassen, D. H. (1992). *Constructivism and the technology of instruction: A conversation.* Hillsdale, NJ: Lawrence Erlbaum.

Elby, A. (2000). What leanerss' learning of representations tells us about constructivism. *The Journal of Mathematical Behavior, 19*(4), 481-502.

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2020). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences, 111*(23), 8410-8415.

Furtak, E. M., Seidel, T., Iverson, H., & Briggs, D. C. (2021). Experimental and quasi-experimental studies of inquiry-based science teaching: A meta-analysis. *Review of Educational Research, 82*(3), 300-329.

Geary, D. C. (2021). The evolution of human motivation. *Annual Review of Psychology, 72*(1), 427-457.

Gess-Newsome, J., Taylor, J. A., Carlson, J., Gardner, A. L., Wilson, C. D., & Stuhlsatz, M. A. (2020). Teacher pedagogical content knowledge, practice, and student achievement. *Journal of Research in Science Teaching, 56*(1), 106-124.

Gibbons, J. (2023). *Exploring the Use of Perusall Social Annotating to Support Academic Reading and Writing* (Doctoral dissertation, Texas A&M University-Commerce).

Henderson, A. T., & Mapp, K. L. (2022). A new wave of evidence: The impact of school, family, and community connections on student achievement. *Southwest Educational Development Laboratory*.

Hmelo-Silver, C. E., Bridges, S. M., & McKeown, J. M. (2019). Facilitating problem-based learning. *The Wiley handbook of problem-based learning*, 297-319.

Jensen, E. (2021). Teaching with poverty in mind: What being poor does to kids' brains and what schools can do about it. ASCD.

Jensen, E. (2022). *Teaching with Poverty and Equity in Mind*. ASCD.

Jeynes, W. H. (2018). A practical model for school leaders to encourage parental involvement and parental engagement. *School Leadership & Management, 38*(2), 147-163.

Jonassen, D. H., Peck, K. L., & Wilson, B. G. (1999). *Learning with technology: A constructiv ist perspective.* . Upper Saddle River, NJ: Merrill.

Kahu, E. R., & Nelson, K. (2018). Student engagement in the educational interface: Understanding the mechanisms of student success. *Higher education research & development, 37*(1), 58-71.

Kearney, C. A. (2021). *Getting Your Child Back to School: A Parent's Guide to Solving School Attendance Problems*. Oxford University Press.

Kocak,O. Goksu, I, Goktas, Y. (2021). The factors affecting academic achievement: a systematic review of meta analyses. *International Online Journal of Education and Teaching (IOJET), 8*(1).454-484

Lebow, D. (1993). Constructivist values for instructional systems design: Five principles toward a new mindset. *Educational Technology Research and Development volume, 41*, 4-16.

Leone, P., & Hummel, T. (2021). Strategies for integrating project-based learning in STEM education. *Journal of Educational Technology Systems*, *49*(4), 494-510.

Loibl, K., Roll, I., & Rummel, N. (2023). Supporting teachers in implementing inquiry-based learning: A systematic review of professional development programs. *Journal of Research in Science Teaching, 60*(4), 547-576.

Matthews, W. (1998). Let's get real: The fallacy of post modernism. *Journal of Theoretical and Philosophical Psychology, 18*, 16-33.

Mayer, D. (2021). The connections and disconnections between teacher education policy and research: Reframing evidence. *Oxford Review of Education*, *47*(1), 120-134.

McFarland, J., et al. (2023). Impact of Resource Availability and Teacher Expertise on Student Performance in Physical Science. *Journal of Science Education.*

.

Millar, R., & Abrahams, I. (2009). Practical work: making it more effective. *School Science Review*, *91*(334), 59-64.

Mji, A., & Makgato, M. (2006). Factors associated with high school learners' poor performance: A spotlight on mathematics and physical science. *South African Journal of Education, 26*(2), 253-266.

Muthoni, R., et al. (2023). Socio-Economic Factors Influencing Student Performance in Kenya. *Kenyan Journal of Educational Research.*

Nielsen, C. P., & Shepherd, R. F. (2023). Innovative teaching methods in STEM education: A review of current practices and future trends. *Journal of Science Education and Technology, 32*(1), 109-124.

Nkosi, M., & Gumede, V. (2022). Teacher Qualifications and Student Performance in South Africa. *African Journal of Education.*

Piaget, J. (1952). The origins of intelligence in children. *International Universities press*. doi:10.1037/11494-000.

Prince, M. (2019). Does active learning work? A review of the research. *Journal of Engineering Education, 93*(3), 223-231.

Probyn, M. (2019). Constructing Science Knowledge in Linguistically Diverse South African Classrooms: Opportunities and Challenges for Learning. *Voices and Practices in*, 211.

Putwain, D. W., & Daly, A. L. (2020). Test anxiety prevalence and gender differences in a sample of English secondary school students. *Educational Psychology, 30*(1), 66-74.

Reschly, A. L., & Christenson, S. L. (2022). *Jingle-jangle revisited: History and further evolution of the student engagement construct*. In *Handbook of research on student engagement* (pp. 3-24). Springer International Publishing.

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary educational psychology*, *61*, 101860.

Ryan, R. M., Deci, E. L., & Vansteenkiste, M. (2021). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Press.

Sarama, J., & Clements, D. H. (2021). Long-Range Impact of a Scale-up Model on Mathematics Teaching and Learning: Persistence, Sustainability, and Diffusion. *Journal of Cognitive Education and Psychology, 20*(1).

Schneider, R. M., & Chesler, M. A. (2023). The role of science identity in science learning and teaching: A synthesis of the research. *Science Education, 107*(3), 497-515.

Setati, M., & Adler, J. (2020). Between languages and discourses: Language practices in primary multilingual mathematics classrooms. *Educational Studies in Mathematics, 43*(3), 243-269.

Sharpe, R., & Abrahams, I. (2020). Secondary school students' attitudes to practical work in biology, chemistry and physics in England. *Research in Science & Technological Education, 38*(1), 84-104.

Shikongo, K. (2022). Socio-Economic Challenges and Education in the Shinyungwe Circuit. Namibia Education Review.

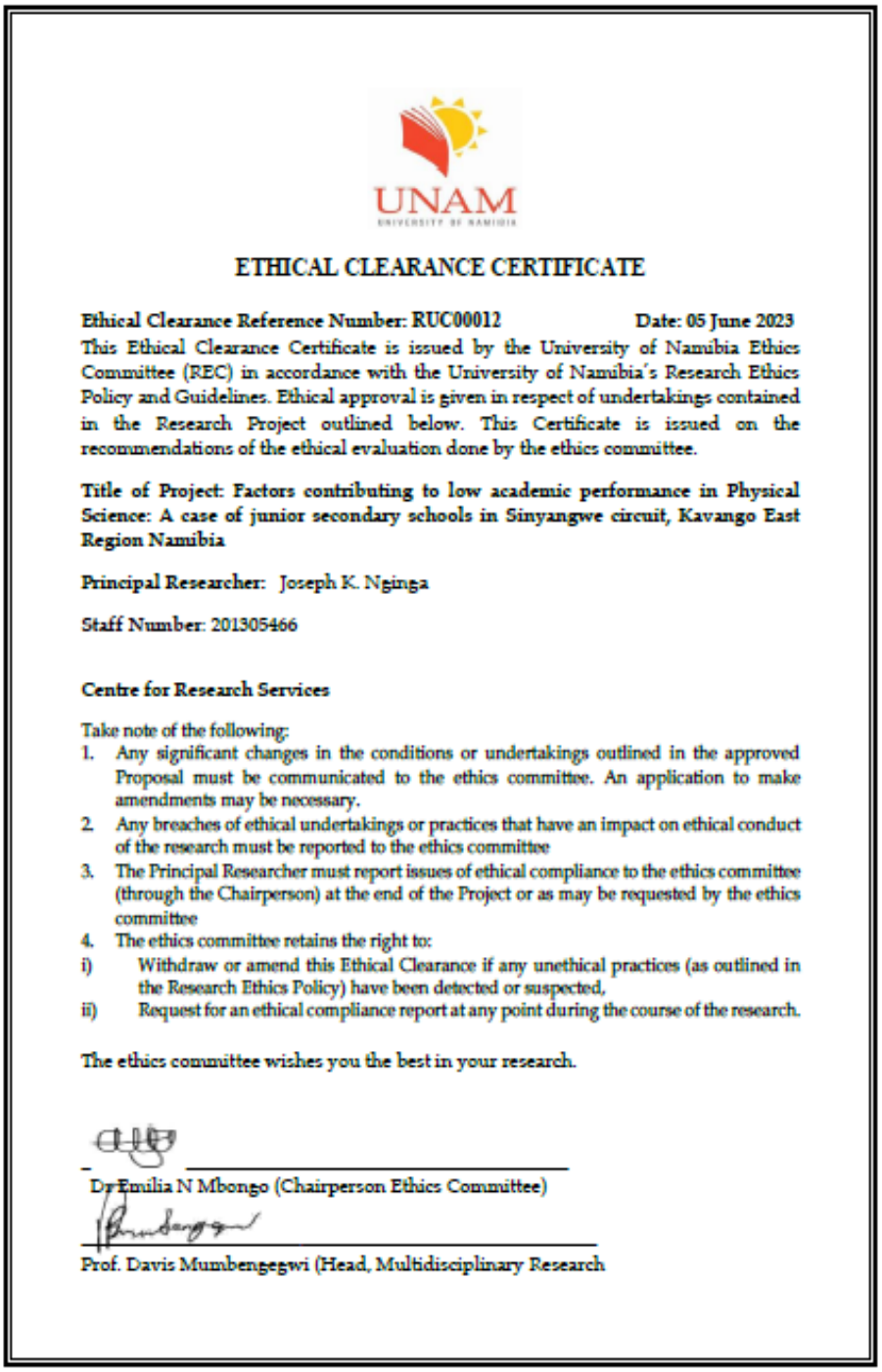
Smith, L., & Jones, P. (2023). Enhancing Student Engagement through Practical Laboratory Work in the UK. Science Education Review.

Venville, G., & Donovan, J. (2022). The impact of inquiry-based learning on middle school students' science literacy: A systematic review. *International Journal of Science Education, 44*(12), 1908-1928.

Wright, S., & Williams, C. (2020). The role of formative assessment in learning: A systematic review of the evidence. *Educational Assessment, 30*(3), 234-251.

Zimmerman, B. J., & Schunk, D. H. (2021). *Reflections on theories of self-regulation and models of self-regulated learning: Summarizing two decades of research*. In Schunk, D. H., & Greene, J. A. (Eds.), *Handbook of self-regulation of learning and performance* (2nd ed., pp. 717-732). Routledge.

Appendix 1: Ethical Clearance letter



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ETHICAL CLEARANCE CERTIFICATE

Ethical Clearance Reference Number: RUC00012 **Date: 05 June 2023**

This Ethical Clearance Certificate is issued by the University of Namibia Ethics Committee (REC) in accordance with the University of Namibia's Research Ethics Policy and Guidelines. Ethical approval is given in respect of undertakings contained in the Research Project outlined below. This Certificate is issued on the recommendations of the ethical evaluation done by the ethics committee.

Title of Project: Factors contributing to low academic performance in Physical Science: A case of junior secondary schools in Sinyangwe circuit, Kavango East Region Namibia

Principal Researcher: Joseph K. Nginga

Staff Number: 201305466

Centre for Research Services

Take note of the following:

1. Any significant changes in the conditions or undertakings outlined in the approved Proposal must be communicated to the ethics committee. An application to make amendments may be necessary.
2. Any breaches of ethical undertakings or practices that have an impact on ethical conduct of the research must be reported to the ethics committee
3. The Principal Researcher must report issues of ethical compliance to the ethics committee (through the Chairperson) at the end of the Project or as may be requested by the ethics committee
4. The ethics committee retains the right to:

i) Withdraw or amend this Ethical Clearance if any unethical practices (as outlined in the Research Ethics Policy) have been detected or suspected,

ii) Request for an ethical compliance report at any point during the course of the research.

The ethics committee wishes you the best in your research.

Dr Emilia N Mbongo (Chairperson Ethics Committee)

Prof. Davis Mumbengegwi (Head, Multidisciplinary Research

Appendix 2: UNAM research permission letter

CENTRE FOR RESEARCH SERVICES
Office of the Pro-Vice Chancellor: Research, Innovation & Development
University of Namibia, Private Bag 13301, Windhoek, Namibia
340 Mandume Ndemufayo Avenue, Pioneers Park, Office F223 - F-block, Second Floor
☎ +264 61 206 4673; E-mail: kmbuta@unam.na; URL: http://www.unam.edu.na

UNAM
UNIVERSITY OF NAMIBIA

RESEARCH PERMISSION LETTER

Date: 15/06/2023

Student Name: Joseph K. Nginga

Student Number: 201305466

Programme: Master of Science Education

Approved Research Title: Factors contributing to low academic performance in Physical Science: A case of junior secondary schools in Sinyangwe circuit, Kavango East Region Namibia.

TO WHOM IT MAY CONCERN:

I hereby confirm that the above-mentioned student is registered at the University of Namibia for the programme indicated. The proposed study met all the requirements as stipulated in the University guidelines and has been approved by the relevant committees.

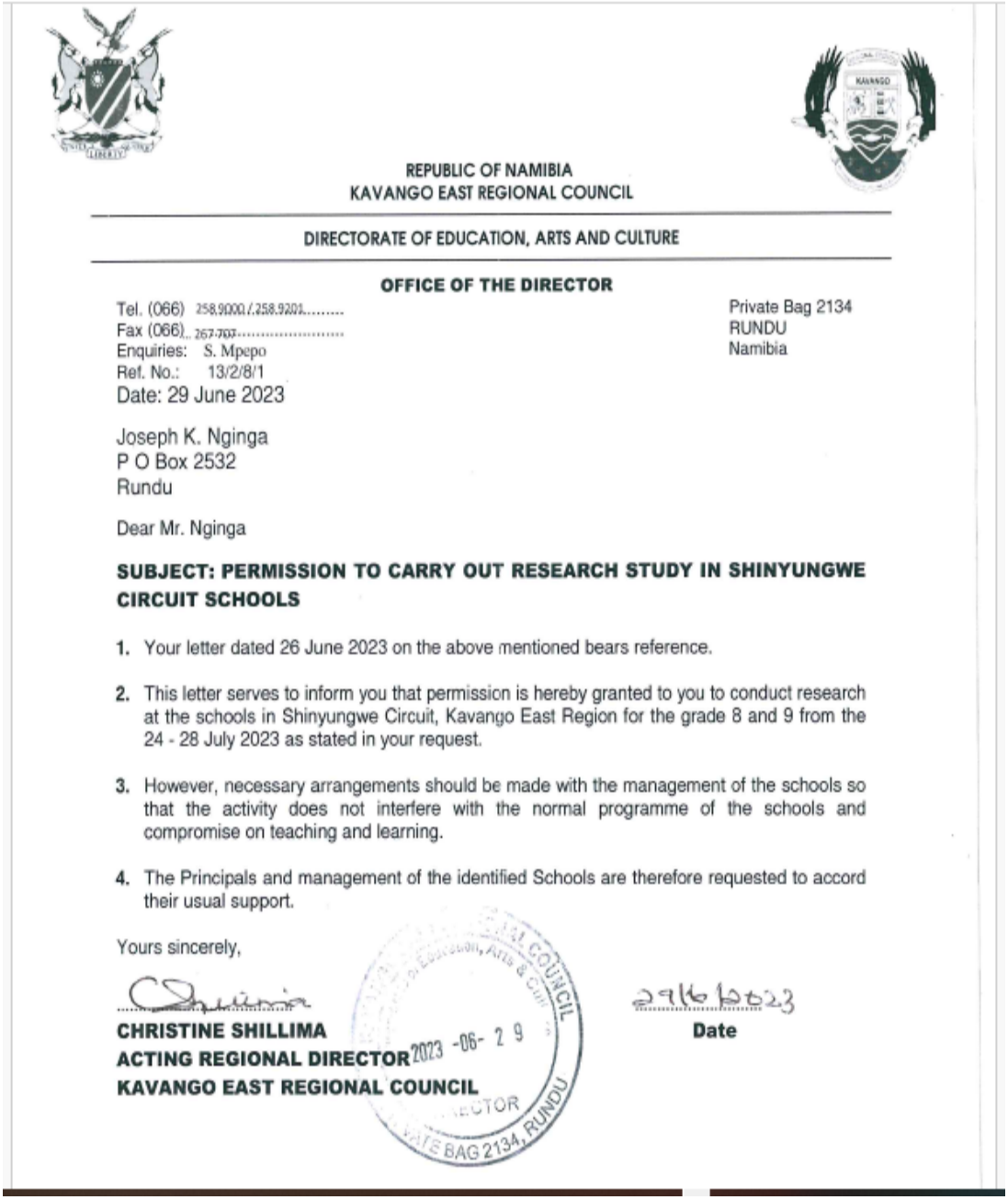
The proposal adheres to ethical principles as per attached Ethical Clearance Certificate. Permission is hereby granted to carry out the research as described in the approved proposal.

Best Regards

Dr. AEE Shikongo
Head: Postgraduate Research Support Services
Tel: +264 61 206 3129
E-mail: aeshikongo@unam.na

CENTRE FOR RESEARCH SERVICES
Office of the Director
2023 -06- 15
University of Namibia
UNAM

Appendix 3: Ministry of education Kavango East regional director Permission letter



REPUBLIC OF NAMIBIA
KAVANGO EAST REGIONAL COUNCIL

DIRECTORATE OF EDUCATION, ARTS AND CULTURE

OFFICE OF THE DIRECTOR

Tel. (066) 258 9000 / 258 9201
Fax (066) 267 703
Enquiries: S. Mpepo
Ref. No.: 13/2/8/1
Date: 29 June 2023

Private Bag 2134
RUNDU
Namibia

Joseph K. Nginga
P O Box 2532
Rundu

Dear Mr. Nginga

SUBJECT: PERMISSION TO CARRY OUT RESEARCH STUDY IN SHINYUNGWE CIRCUIT SCHOOLS

1. Your letter dated 26 June 2023 on the above mentioned bears reference.
2. This letter serves to inform you that permission is hereby granted to you to conduct research at the schools in Shinyungwe Circuit, Kavango East Region for the grade 8 and 9 from the 24 - 28 July 2023 as stated in your request.
3. However, necessary arrangements should be made with the management of the schools so that the activity does not interfere with the normal programme of the schools and compromise on teaching and learning.
4. The Principals and management of the identified Schools are therefore requested to accord their usual support.

Yours sincerely,

CHRISTINE SHILLIMA
ACTING REGIONAL DIRECTOR
KAVANGO EAST REGIONAL COUNCIL

2023 -06- 29

29/6/2023
Date

Appendix 4: learners Questions

***School number: 1, 2 or 3 (choose and write on the space)*……**Grade: ……..

1. How is your performance in Physical Science?

……

……

……

……..

2. What do you think might be the causes of poor performance in Physical Science subject?

……

……

……

……

……

3. What do you think are the possible ways to solve these causes of poor performance in Physical Science problem?

……

……

……

……

…….

4. How can parents assist you or others in order to be motivated and perform well in Physical science subject?

……

……

……

……

5. What do you think are the difficulty topics in Physical Science that you and your fellow learners do not understand well and might contribute to poor performance?

……

……

……

……

6. What can you say about the way you are taught by your Physical science teacher and how do you want to be taught?

……

……

……

……

……

Thank you very much for your time and all the best in your studies.

Appendix 5: Informed consent form

ANNEX 5F

INFORMED CONSENT FOR QUALITATIVE STUDIES

Informed Consent for Physical Science teachers, Head of department or subject advisor. I am inviting you to partake in the research titled factors contributing to low academic performance in Physical Science.

Name of Principal Investigator:	Joseph Kativa Nginga
Name of Sponsor:	N/A

This Informed Consent Form has two parts:

• Information Sheet (this section, to share information about the study with you)

• Certificate of Consent (for signatures if you choose to participate)

You will be given a copy of the full Informed Consent Form.

PART I: INFORMATION SHEET

Introduction

I am Joseph K Nginga a university of Namibia leaners studying a master degree in education specialising in Science education. I am doing a research on low academic performance in Physical Science which is common in the Kavango East region and the nation Namibia at large. I am going to give you information and invite you to be part of this research. You do not have to decide today whether or not you will participate in the research. Before you decide, you can talk to anyone you feel comfortable with about the research. This consent form may contain words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask them of me or other researcher.

Purpose of the Research

Low academic performance in Physical science currently is a concern in Namibia. Therefore I would like to find the contributing factors to low academic performance in Physical Science. I trust and believe that with your experience you can help me to tell your ideas on the leading problems that you may think are the contributing factors to low academic performance in Physical Science. I want to learn more about these contributing factors in order to have solutions to them and help the nation and improve on the problem of low performance in this subject Physical Science.

Type of Research Intervention

This research will require your participation to be interviewed or answer the questionnaire. The interview will not take more than 20 minutes and the questionnaire

will take less than 10 minutes as it only consists of two questions.

Participant Selection

You are chosen to be part of this research because I believe the experience that you have will help and contribute to the understanding and knowledge of solving the problem of low academic performance in Physical Science subject.

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. If you choose not to participate, all the services you receive at this Centre or institution will continue and nothing will change.

Procedures

I am asking you to help me to learn more about the contributing factors of low academic performance in Physical Science. I am inviting you to participate in this research project. If you accept you will be interviewed and some observation will be done in the classroom. I am not going to mention names in this interview and everything that will be discussed here will be of academic use only. I will record the interview with your permission in order to help me to summarise the study later. No one else but I or the interviewer will be present unless you would like someone else to be there. The recording will be stored safely and later be deleted after one or two weeks. The questions that you will be asked are about the factors that contribute to low performance in Physical Science and suggestions on overcoming these factors.

Duration

The research will take place in one day only and not take more than an hour.

Risks

There are no risks in taking part in this study. If you will at some point feel the questions will be uncomfortable to answer, you do not have to answer them. Any question I can be asked.

Benefits

There is no direct benefit for you but your participation is likely to help us find out more about factors that contributes to low performance in Physical Science.

Reimbursements

You will not be provided any incentive to take part in the research.

Confidentiality

The research being done at the school which may draw attention and if you participate you may be asked questions by other colleagues. We will not be sharing information about you to anyone outside of the research team. The information that we collect from this research project will be kept private. Any information about you will have a number on it instead of your name. Only the researcher will know what your number is and we will lock that information up with a lock and key. It will not be shared with or given to anyone except my supervisors and authorised University personnel. Do you have any more questions?

Sharing the Results

Nothing that you tell us today will be shared with anybody outside the research team, and nothing will be attributed to you by name. The knowledge that we get from this research will be shared with you and your community before it is made widely available

to the public. Each participant will receive a summary of the results. The results later on will be published on UNAM repository so that other interested people may learn from the research**.**

Right to Refuse or Withdraw

This is a reconfirmation that participation is voluntary and includes the right to withdraw. As a participant you will have an opportunity to review your remarks individual interviews and erase part of the recording or note.

You do not have to take part in this research if you do not wish to do so, and choosing to participate will not affect your job or job-related evaluations in any way. You may stop participating in the interview at any time that you wish without your job being affected. I will give you an opportunity at the end of the interview to review your remarks, and you can ask to modify or remove portions of those, if you do not agree with my notes or if I did not understand you correctly.

Who to Contact

This research has been reviewed and approved by the relevant Ethics Review Committee at the University of Namibia, which is a committee whose task it is to make sure that research participants are protected from harm. The committee reports to the University's Centre for Research Services. You can contact me at 0814400006 or my research supervisor at 0812689575 and you can contact the centre for research and services at kmbulu@unam.na if you have any further queries about the study or if you have any concerns or complaints that have not been adequately addressed by the research team.

You can ask me any questions about any part of the research study if you wish to. Do you have any questions?

PART II: CERTIFICATE OF CONSENT

I have been invited to participate in research about contributing factors to low academic performance in Physical Science. I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study.

…….

Name of Participant (print)

……

Signature of Participant

……

Date (day/month/year)

Statement by the Researcher/Person taking Consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands that the following will be done:

1. First the participant will be interviewed
2. Classroom observations will be done

3. some of the documents will be checked any document that will be provided such as the continuous assessments for the previous years, learners' class attendance register etc.

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

…….

Name of Researcher/Person taking Consent (print)

……

Signature

……

Date (day/month/year)

Appendix 6: Parental consent form

INFORMED PARENTAL CONSENT FOR QUALITATIVE STUDIES

Informed Consent for parents of learners under the age of 18 years in the research title: factors contributing to low academic performance in Physical science in Kavango East region.

Name of Principal Investigator:	Joseph Kativa Nginga
Name of Sponsor:	N/A

This Informed Consent Form has two parts:

• **Information Sheet (this section, to share information about the study with you)**

• **Certificate of Consent (for signatures if you choose to participate)**

You will be given a copy of the full Informed Consent Form.

PART I: INFORMATION SHEET

Introduction

My name is Joseph K Nginga and my task is to research on the factors that contributes to low academic performance in Physical science. This is important to explore the problems that lead to low performance and improve this problem. This research will help find these factors and have solutions to overcome them. This is to inform and get your consent for your child to take part in this research. I am going to give your child information and invite the child to be part of this research study. You may talk to anyone

you feel comfortable talking with about the research and take time to reflect on whether you want your child to participate or not. There may be some words you don't understand or things that you want me to explain more about because you are interested or concerned. Please ask me to stop at any time and I will take time to explain**.**

Purpose of the Research

The purpose of this study is to explore factors that lead to low performance in Physical Science and find possible solutions to overcome these problems. Nation-wide in Namibia this problem has been there into different region that include Kavango East. The children who are in school have the knowledge on problems they face in learning Physical Science. So it is Important to involve them and say their experiences.

Type of Research Intervention

This research will involve your child's participation in a questionnaire which will have two questions to be answered .These questions will not take more than 10 minutes to be answered.

Participant Selection

I will not want to talk to many children as this will take more time of the children. I trust and believe your child is one of the learners that can help me get some of the challenges he/she faces in Physical science which may hinder the performance of some learners and suggest some possible ways to overcome them.

Voluntary Participation

This participation is not a force to your child. You have the freedom to not allow your child talk to us. You can choose to say no and nothing will be done to your child as well to your child's education. You can think about it and tell me what you decide later.

Procedures

Your daughter/son will fill out a questionnaire which will be provided by the Physical Science teacher and be collected by myself (Joseph K Nginga). Or the 2 questions will be read to your child then your child will provided answers to the child want me to write if need be.

Duration

I will ask our child to answer a questionnaire which will take less than 10 minutes. There are only two questions that your will write the answers. This will be done either during break time or right after school or even at home if the child say so.

Risks

There is no risk involved to your child in taking part in this study. There will be no names of your child to be attached to the questionnaire.

Benefits

There will be no immediate and direct benefit to your child or to you, but your child's participation is likely to help us find out more about the health needs of teenage girls and boys and we hope that these will help the local clinics and hospitals to meet those needs better in the future.

Reimbursements

Your daughter/son will not be provided with any payment to take part in the research.

Confidentiality

We will not be sharing information about your son or daughter outside of the research team. The information that we collect from this research project will be kept confidential. Information about your child that will be collected from the research will be put away and no-one but the researchers will be able to see it. Any information about your child will have a number on it instead of his/her name. Only the researchers will know what his/her number is and we will lock that information up with a lock and key. It will not be shared with or given to anyone except my research supervisor.

Sharing the Results

At the end of the study, I will be sharing what we have learnt with the participants and with the school. Nothing that your child will tell us today will be shared with anybody outside the research team, and nothing will be attributed to him/her by name. A written report will also be given to the participants that they can share with their families. We will also publish the results in order that other interested people may learn from our research.

Right to Refuse or Withdraw

You may choose not to have your child participate in this study and your child does not have to take part in this research if she/he does not wish to do so. Choosing to participate or not will not affect either your own or your child's future treatment at the Centre here in any way. You and your child will still have all the benefits that would otherwise be

available at this school. Your child may stop participating in the questionnaire /interview at any time that you or she/he wish without either of you losing any of your rights here.

Who to Contact

If you have any questions, you can ask them now or later. If you wish to ask questions later, you may contact me at 0814400006 / josephnginga@gmail.com or my research supervisor at 0812689575 or via his email: mkalengay@unam.na. This research has been reviewed and approved by the relevant Ethics Review Committee at the University of Namibia, which is a committee whose task it is to make sure that research participants are protected from harm. The committee reports to the University's Centre for Research Services. You can contact the university's centre for research services at kmbulu@unam.na for further queries about the study or any concerns or complaints that have not been adequately addressed.

You can ask me any questions about any part of the research study if you wish to. Do you have any questions?

PART II: CERTIFICATE OF CONSENT

This research is about the factors contributing to low academic performance in Physical Science. I have been asked to give consent for my daughter/son to participate in this research study which will involve her completing one questionnaire.

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked and have been answered to my satisfaction. I consent voluntarily for my child to be a participant in this study**.**

…….

Name of Parent/Guardian (print)

……

Signature of Parent/Guardian

……

Date (day/month/year)

If illiterate

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

…….

Name of Witness (print)

……

Signature of Witness

……

Date (day/month/year)

Statement by the Researcher/Person taking Consent

I have accurately read out the information sheet to the parent of the potential participant, and to the best of my ability made sure that the participant understands that the following will be done:

1. Questionnaire will be given to my child to answer them and be collected later by the researcher.

2. Observation will be done in the classroom where my child will be.
3. My child's work in the book will be checked as well.

I confirm that the parent was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

A copy of this ICF has been provided to the participant.

…….

Name of Researcher/Person taking Consent (print)

……

Signature

……

Date (day/month/year)

If Assisted by an Interpreter: Statement by Interpreter

I have accurately interpreted the information sheet to the parent of the potential participant in …….. (insert name of target language), and to the best of my ability made sure that they understand that the following will be done:

1. Questionnaire will be given to my child to answer them and be collected later by the researcher.
2. Observation will be done in the classroom where my child will be.
3. My child's work in the book will be checked as well.

I confirm that the parent was given an opportunity to ask questions about the study, and all the questions asked by the parent have been interpreted correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

I declare that I will not divulge any information that I interpret during this research intervention to a third party outside this study.

…….

Name of Interpreter (print)

……

Signature

……

Date (day/month/year)

Appendix 7: Interview questions

My name is Joseph Kativa Nginga, I am studying towards a master of education in Science education degree at the University Of Namibia (UNAM), and I am conducting an approved study to determine factors contributing to low academic performance in Physical Science among junior secondary schools in the Kavango East region. With your permission I would like to record the interview for later summary. However, if it will not be granted, notes will be taken. Confidentiality will be adhered.

Respondent: 1,2,3,4 or 5…… School: 1, 2, 3, 4 or 5…….

Place: ……...……Time: ……..

The number of years in the teaching profession: ……

Rank: ……

Qualification: ……

The following will be the questions that will guide the interview:

1. What is your general impression of performance in Physical science at the school and circuit level?

2. According to your understanding what do you think are the factors that contribute to low academic performance in Physical Science?

3. What strategies can be suggested to overcome these contributing factors in order to improve the low academic performance in Physical Science?

4. What do you think are the most difficult topics in Physical Science?

5. How best can these topics be taught in order for the learners to understand them?

6. How can parents be involved in their children's studies in order for them to perform better?

7. What other information will you recommend to the researcher?

THANK YOU FOR YOUR TIME AND ALL THE BEST IN YOUR FUTURE ENDEAVOURS.

Appendix 8: Observation instrument

The following was some of the general points that were considered during the classes' observation and expressive comments were written on the spaces.

Grade: ……

Place: ……

School: 1,2,3,4 or 5: ……

Lesson preparation:

……

……

……

……..

How is the use of teaching aids?

…….

……..……

……

…….……...

Language usage in the class:

…….…….……

……

……

…….……..

Learner and teacher interaction in the class:

……

……

……

……..…….……..

Sitting arrangement for the learners:

……

……

……

……..…….……..

Teaching approach:

…….……..…….

……

……

…….……..

Discipline of learners:

……..…….

……..

……

……..

Learners' written work:

…….…….

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……..……..……

……..

Laboratory and teaching materials availability:

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……..……

……...……

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Any other information pertinent to the study

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……..

Appendix 9: SHINYUNGWE CIRCUIT GRADE 8 AND 9 PHYSICAL SCIENCE SYMBOL ANALYSIS FOR 2018-2022

Year	GRADE	TOTAL OF LEARNERS	SYMBOL AND PERCENTAGES								
			A	%	B	%	C	%	D	%	E
2018	8	277	2	0.72	4	1.4	12	4.33	43	**15.5**	118
	9	279	2	0.72	10	3.6	18	6.45	55	**19.7**	84
2019	8	334	9	2.69	8	2.4	32	9.58	**57**	17.1	**93**
	9	333	1	0.3	10	3	27	8.11	**76**	**22.8**	**146**
2020	8	246	1	0.41	8	3.3	28	11.4	**47**	**19.1**	**100**
	9	290	5	1.72	19	6.6	35	12.1	**51**	**17.6**	**116**
2021	8	272	3	1.1	2	0.7	17	6.25	**33**	**12.1**	**79**
	9	316	6	1.9	9	2.8	27	8.54	**49**	**15.5**	**79**
2022	8	321	23	7.17	54	17	65	20.2	**68**	**21.2**	**65**
	9	226	0	0	6	2.7	33	14.6	32	**14.2**	70

Appendix 10: Frequency Tables for Causes of Poor Performance in Physical Science

Table 1: Grade 8 Learners at School A

Causes of poor performance in Physical Science	Frequency
Teacher's problem	1
not taking study seriously	1
Not concentrating in education	1
Not reading books and listening to the teacher	1
Subject is very difficult	1
Not understanding some topics well	1
Poor explanation by the teacher	1

Table 2: Grade 8 Learners at School B

Causes of poor performance in Physical Science	Frequency
Not answered	2
Lack of handouts/summary materials	1
Not studying hard	1

Table 3: Grade 8 Learners at School C

Causes of poor performance in Physical Science	Frequency
Not concentrating in class	1
Poor reading	1
Coming from a poor family	1
Not being serious	1
Noise from others	1
Subject difficulty	1
Too much homework	1
Not listening to the teacher	1

Table 4: Grade 9 Learners at School A

Causes of poor performance in Physical Science	Frequency
Lack of laboratory	1
Teacher's effort/teaching	1
Lack of summaries	1
Lack of studying	1
Absenteeism	1
Not writing summaries	1
Not listening well	1

Subject difficulty	1
Lack of teacher explanation	1

Table 5: Grade 9 Learners at School B

Causes of poor performance in Physical Science	**Frequency**
Ignorance	2
Difficulty memorizing formulas	1
Lots of calculations	1
Misunderstanding/not listening to teacher	1
Choosing subjects selectively	1
Difficulty in some topics	1
Not copying summary	1

Table 6: Grade 9 Learners at School C

Causes of poor performance in Physical Science	**Frequency**
Not doing activities/work	1
Not listening in class	1
Hunger	1
Poor listening skills	1

Weak in reading and understanding	1
Absenteeism	1
Poor studying habits	1
Not understanding topics	1
Not doing homework/activities	1

Frequency Tables for Solutions to Overcome Poor Performance in Physical Science

Table 7: Grade 8 Learners at School A

Solutions to Overcome Poor Performance in Physical Science	**Frequency**
Advise the teacher to try explaining better	1
Regular school attendance and test participation	1
Provide all necessary materials and encouragement	1
Work hard, participate in class, practice, ask questions	1

Table 8: Grade 8 Learners at School B

Solutions to Overcome Poor Performance in Physical Science	**Frequency**
Study hard	2
Order handouts for better reading materials	1
Pay attention to the teacher and friends	1

Table 9: Grade 8 Learners at School C

Solutions to Overcome Poor Performance in Physical Science	**Frequency**
Study hard	1
Understand the topic, listen to the teacher, study	1
Use the five senses	1
Not answered	1

Table 10: Grade 9 Learners at School A

Solutions to Overcome Poor Performance in Physical Science	**Frequency**

Need laboratory, more experiments, and chemicals	1
Teacher to put more effort and give summaries	1
Ask questions and study with others	1
Do more activities, tests, and attend weekend classes	1

Table 11: Grade 9 Learners at School B

Solutions to Overcome Poor Performance in Physical Science	**Frequency**
Listen to the teacher, stop being ignorant, ask questions	1
Give enough time to study	1
Be serious and listen to the teacher	1
Pay attention and ask questions	1

Table 12: Grade 9 Learners at School C

Solutions to Overcome Poor Performance in Physical Science	**Frequency**
Ask the teacher how to answer questions, listen to	1

teacher	
Teacher to teach slowly, study hard	1
Avoid absenteeism, be serious in reading and understanding	1
Be serious about studies, study hard, ask teacher questions	1
Government to provide computers and internet	1