

**FACTORS AFFECTING UNSATISFACTORY PERFORMANCE IN PHYSICAL SCIENCES:
INSIGHTS FROM A CASE STUDY OF GRADE 12 LEARNERS IN UMKHANYAKUDE
DISTRICT**

by

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I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.

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SIGNATURE

05 February 2026

DATE

DEDICATION

I would like to dedicate this work to my lovely family, which comprises my wife, Mrs Winile (MaKhwela) Sibiya, who has been my pillar throughout this academic journey, my son Mbusi, my three daughters: Ndabezinhle (Ndabeh), Kwandile (Kwah), and Sinokuhle (Ndalo), as well as my mother Nomanzi. E (MaTembe) Sibiya. Not forgetting my brothers and sisters, namely, Delani (DJ), Mandla, Thully (Mrs Magwaza), Nhlanhla, Nonhlanhla (Mrs Mazibuko), Linda, and Nkosingiphile (Jesu). Thank you so much for your understanding while I stole your precious time and did my academic work. Thank you, thank you very much, thank you indeed.

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ABSTRACT

This study investigated factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences at Ingwavuma Circuit Management cluster, under the uMkhanyakude District. This study was triggered by the growing concern over the significant decline in performance in Physical Sciences. This study used an exploratory case study design, underpinned by constructivist theory and the interpretivist paradigm. The purposive sampling method was used to sample four high schools, one learner and one teacher per school. Eight (8) participants participated in this study. Four (4) Grade 12 Physical Science teachers and four Grade 12 learners formed part of the sample. The first category included two of the most senior and experienced Grade 12 Physical Science teachers, each with at least three years of teaching the subject and a postgraduate qualification with Physical Science as a specialisation. The second category included two novice Grade 12 Physical Science teachers with one year or two years of teaching the subject, and at least an undergraduate qualification with Physical Science as one of the specialisations. The data were collected through classroom lesson observation and face-to-face semi-structured interviews, which were audio-recorded. One of the interview guides was designed for teachers, and the other for learners. Semi-structured interviews were conducted with four teachers and four learners. The data were analysed using thematic analysis. Data were interpreted in line with the literature review. The outcomes of this study indicated that factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences are: Socio-economic factors, teachers and learners' absenteeism, lack of science laboratories and other resources, overcrowding in classes, unstructured workload to learners, lack of teaching methodology by teachers, learners' ill-discipline, substance abuse by both teachers and learners, learners' pregnancy, lack of parents' involvement, choosing incorrect stream due to pressure from parents and peers, and lack of motivation. Based on these outcomes, policy recommendations were made.

Keywords:

Unsatisfactory performance, Contributing factors to poor performance, Physical Sciences,

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LIST OF ACRONYMS AND ABBREVIATIONS

ATP	Annual Teaching Plan
CAPS	Curriculum and Assessment Policy Statement
DBE	Department of Basic Education
DOE	Department of Education
EGD	Engineering Graphics and Design
FET	Further Education and Training
IQ	Intelligence Quotient
KZN	KwaZulu-Natal
LP1M	First, Male Learner Participant
LP2F	Second, Female Learner Participant
LP3F	Third, Female Learner Participant
LP4M	Fourth, Male Learner Participant
NSC	National Senior Certificate
PGCE	Postgraduate Certificate in Education
TP1M	First, Male Teacher Participant
TP2M	Second, Male Teacher Participant
TP3F	Third, Female Teacher Participant
TP4M	Fourth, Male Teacher Participant
UNISA	University of South Africa
VVAT	Video Verifying Assistant Teacher
Wi-Fi	Wireless Fidelity

CHAPTER 1: ORIENTATION OF THE STUDY

1.1. Introduction

This study aimed to investigate the factors contributing to the unsatisfactory performance of Grade 12 learners in Physical Sciences in the uMkhanyakude District of KwaZulu-Natal Province. Physical Sciences, which includes both physics and chemistry, is part of the further education and training (FET) phase for Grades 10-12. This subject is considered essential for post-matriculation careers in fields such as engineering and medicine, making strong performance in it crucial. The study tracks learners' performance in Physical Sciences and highlights a concerning decline in Grade 12 results. Substantial evidence indicates that various factors contribute to the unsatisfactory performance of Grade 12 learners in Physical Sciences.

1.2. Background of the Study

Globally, studies have shown that learning Physical Science poses challenges. In Turkey, Baran (2016) found that learners perceive Physical Science as problematic and difficult, leading to below-expectation achievement. In New Zealand, Buabeng (2015) reported similarly unsatisfactory performance in Physical Sciences. There is a lack of alignment between the New Zealand Curriculum's aspirations to encourage investigation and problem-solving and the teaching methods used in Physics. In Africa, the Uganda National Examinations Board (UNEBC) released the 2022 Uganda Certificate of Education (UCE) results, revealing persistently poor performance in the sciences; fewer than 20% of candidates attained a credit pass level in Physics and Chemistry, with over 40% of candidates failing to pass subject altogether (UNEBC, 2023). In contrast, Zambia's 2022 performance review report for the school certificate examination indicated a commendable overall performance of 85.55% in Chemistry and 85.30% in Physics (Examinations Council of Zambia, 2023). However, the percentage of distinctions was only 27.24%. While these figures may seem positive, the pass rates reflect a different picture: Physics had a pass rate of 61.93%, and Chemistry had 62.08%.

Table 1.1: Learners who wrote Physical Sciences in the National Senior Certificate (NSC) Examination from 2017 to 2022

Year		No. wrote	No. achieved at 30% and above	% achieved at 30% and above	No. achieved at 40% and above	% achieved at 40% and above
2017		179 561	116 862	65,1	75 736	42,2
2018		172 319	127 919	74,2	84 002	48,7
2019		164 478	124 237	75,5	85 034	51,7
2020		174 310	114 758	65,8	73 982	42,4
2021		196 968	135 915	69,0	88 164	44,8
2022		209 004	155 877	74,6	103 811	49,7

Source: (National Senior Certificate Diagnostic Report Part 1: Content Subjects, 2022)

Table 1.1 illustrates the number of learners who participated in the National Senior Certificate (NSC) Physical Sciences examination from 2017 to 2022. Across all six years under review, performance remained a concern, with a persistent and substantial gap between learners achieving 30% and above and those achieving 40% and above. In 2022, for example, while 74.6% of candidates achieved 30% and above, only 49.7% achieved 40% and above, a difference of nearly 25 percentage points, suggesting that a significant proportion of learners are clustered in the 30–39% range, barely meeting the minimum pass threshold. A notable decline was recorded in 2020, with pass rates at 30% and above dropping to 65.8%, likely reflecting the disruption to teaching and learning caused by the COVID-19 pandemic. Although 2022 recorded the highest candidature over the six-year period, with 209 004 learners sitting the examination compared to 196 968 in 2021, the proportion achieving 40% and above (49.7%) had not yet returned to the pre-pandemic high of 51.7% recorded in 2019. This sustained underperformance highlights the need for targeted intervention in the teaching and learning of Physical Sciences.

1.3. The Rationale for the Study

In general, Physical Sciences is offered as a subject in high school beginning in Grade 10. Prior to this, learners in Grades 8 and 9 are introduced to some basic elements of science, and the teacher needs to establish a solid foundation for both Physics and

Chemistry. However, many learners struggle with Physical Sciences in Grade 10. By Grade 11, they often develop a resistance to the subject and a lack of interest, which leads to poor performance in Grade 12. Multiple scholars, including Mucholobwe and Mutambo (2023), Rankhumise (2018), Nzioka (2008), and Karwitha (2016), have reported various causes for the overall poor performance of Grade 12 learners, but these studies do not focus on subject-specific issues. As a result, there is a lack of data on the factors that negatively impact learners' performance in Physical Sciences.

The researcher believes there are common factors contributing to lower matric results in Physical Science across schools. This study focuses on identifying specific factors that lead to unsatisfactory performance in Physical Sciences among Grade 12 learners. As a Physical Science teacher and researcher, I aimed to improve learner performance through quality passes and to advocate for the Department of Basic Education to implement recommendations from scholars to address the underlying issues affecting Grade 12 performance. The researcher intends to change the approach to delivering the subject content to align it with the experiences shared by the respondents. Furthermore, the recent skills list published by the Home Affairs Minister in 2021 identified over 100 skilled professions that require specialisation in Mathematics and Science, often associated with high pass marks. Unfortunately, achieving the desired results, such as Levels 6 and 7, among learners is rare.

Many high school learners pass Physical Science with a Level 2 or 3, which does not qualify them for enrolment in courses such as health professions, clinical sciences, architecture, urban planning, and surveying. There is a significant shortage of skilled professionals in these fields. Due to the high demand for these skills, the country is often compelled to source talent from abroad, largely because many learners underperform in Physical Sciences. This inadequate performance hinders their ability to pursue highly sought-after careers. Schools frequently aim for high pass rates, sometimes targeting 100% pass rate in science subjects. However, this focus on quantity rather than quality creates a significant issue: learners are unable to enrol in critical skills professions due to their unsatisfactory results. This research investigates the factors contributing to poor learner outcomes in Physical Science and the challenges faced by science teachers.

1.4. The Problem Statement of the Study

Scholarly work by Ngema (2016), Simelane (2019), and Thomas et al. (2023) provides critical insights into the persistent problem of inadequate learner performance in Physical Sciences. Ngema (2016) focused on factors contributing to unsatisfactory results in science subjects and found that insufficient time was allocated to cover the curriculum. It was noted that the amount of information taught per hour exceeded the learners' cognitive workload (Thomas et al., 2023). Likewise, Simelane (2019) examined the barriers to high performance in Physical Sciences and identified several factors, including the inability to complete the Grade 12 curriculum on time, parental pressure to take Physical Sciences, and dysfunctional laboratories.

This study specifically investigates the factors contributing to the unsatisfactory performance of Grade 12 learners in Physical Sciences within the uMkhanyakude District. Addressing these issues could lead to improved outcomes in the high schools of the Ingwavuma circuit and could encourage more learners to pursue careers in critical skills professions. There was a growing concern over the significant decline in performance in Physical Sciences. Over the years, the subject has consistently produced poor results and is viewed as a challenge, hindering learners' access to higher education institutions in South Africa (Mucholobwe & Mutambo, 2023; Rankhumise, 2018; Karwitha, 2016). Therefore, this research aims to investigate the factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences.

1.5. The Aim of the Study

This study aims to investigate the factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences at the uMkhanyakude District.

1.5.1. Main Research Question

What factors contribute to the Grade 12 learners' unsatisfactory performance in Physical Sciences at the uMkhanyakude District?

1.5.1.1. Research Sub-questions

The following comprised the study:

- What factors contribute towards learners' unsatisfactory performance in Grade 12 Physical Sciences?
- How do teachers address the factors that influence the improvement of Grade 12 learners' performance in Physical Sciences?

- What are learners' perceptions of the factors that contribute to their unsatisfactory performance in Physical Sciences?
- In what ways do learners address the factors that lead to their unsatisfactory performance in Grade 12 Physical Sciences?

1.5.2. Research Objectives

The objectives of this study were to:

- Identify the factors that contribute towards learners' unsatisfactory performance in Grade 12 Physical Sciences.
- Determine how teachers address the factors that influence the improvement of Grade 12 learners' performance in Physical Sciences.
- Establish the learners' perceptions of the factors contributing to their unsatisfactory performance in Physical Sciences.
- Determine ways in which learners address the factors that lead to their unsatisfactory performance in Grade 12 Physical Science.

1.6. Significance of the Study

The significance of this study lies in its potential to address the key factors contributing to learners' inadequate performance in Grade 12 Physical Sciences. The results could inform changes in both the teaching methods used for Physical Sciences and the study techniques employed by learners. Additionally, it could encourage more hands-on experiments and practical work to help Grade 12 learners grasp scientific concepts. This approach may also help shift learners' attitudes and perceptions about the subject, particularly the belief that it is too difficult to master. The study aimed to uncover findings that would enhance learner performance in Physical Sciences subject, leading to improved results. Ultimately, this study intended to guide both teachers and learners on how to address and improve the factors that lead to unsatisfactory performance in Grade 12 Physical Science.

1.7. Delimitation of the Study

This study utilised a qualitative case study design, and its findings are confined to the Ingwavuma circuit in the uMkhanyakude District in KwaZulu-Natal Province. Miles (2019) defines delimitation as the process of determining the limits of the research process and its participants. In this study, the following delimitations were observed. The sample comprised only eight participants, namely four teachers and four learners. The

study used constructivist theory reinforced in the interpretivist paradigm. Constructivism was considered particularly appropriate for this study as it recognises that learners actively construct knowledge through experience and interaction with their environment, rather than passively receiving information, a perspective especially relevant to understanding the challenges learners face in Physical Sciences. Furthermore, grounding the study in constructivist theory allowed for a deeper exploration of how both teachers and learners make meaning of their experiences in the Physical Sciences classroom, thereby providing richer insights into the factors influencing performance. This study targeted Physical Sciences Grade 12 learners and teachers. The ethics section did not guarantee whether the purposefully selected participants would complete the research processes during the data collection period (Ndlovu, 2023).

1.8. Overview of Methodology of the Study

This chapter elaborates the research approach, population sampling, target population sampling method, sampling technique, sample size, instrumentation and data collection, technique (semi-structured interviews), procedure for administration of interviews, data collection technique, data analysis and interpretation, trustworthiness of the study, ethical considerations, limitation of the study and delimitation of the study and lastly the conclusion of this study.

This chapter elaborates the research approach, population, sampling method, techniques and size, and data collection techniques and procedures. This chapter also captures data analysis and interpretation, trustworthiness of the study, ethical considerations, limitations and delimitations of the study, and the conclusion. Central to any research is the process of investigation, which entails the systematic collection and analysis of data to answer research questions. To this end, this study adopts a qualitative research approach, which is best suited to exploring the lived experiences and perspectives of participants in their natural settings.

A case study design was employed to allow for an in-depth examination of the phenomenon under investigation within a bounded context. In terms of sampling, purposive sampling was used to deliberately select participants who possessed the relevant knowledge and experience necessary to address the research questions. The sample comprised four teachers and four learners, selected based on their direct involvement with the subject of inquiry. Data was gathered through semi-structured interviews, a method that afforded both structure and flexibility, enabling participants to

elaborate on their experiences while ensuring that key themes were consistently explored across all interviews. The subsequent sections of this chapter provide a detailed account of each methodological component, offering a transparent and coherent framework that guided the conduct of this study.

1.9. Definition of Terms

Factors are the variables in the study that we believe will influence its results (Bahcekapili, 2013), such as teachers' knowledge and skills, which usually determine learners' understanding of the subject and produce meaningful results.

At the core of any research endeavour lies systematic **investigation**: a rigorous process of data collection and analysis designed to address clearly defined research questions.

Matric refers to the last grade in high school, known as Grade 12 in South African terms, because you need to pass matric to be awarded a matric certificate, which is the qualification needed to study at the university (Zhang, 2019). Thus, it is imperative that the matric results of learners, particularly in Physical Sciences, be a pass ranging from level 4 (50%) and above to pursue a career that requires Physical Sciences.

Physics is “the natural science of matter, involving the study of matter, its fundamental constituents, its motion and behaviour through space and time, and the related entities of energy and force” (<http://en.wikipedia.org>). Physical Sciences is a critical subject, particularly for those pursuing engineering careers, given the country's shortage of qualified professionals in this field.

Chemistry is the science that deals with the properties, composition, and structure of substances (defined as elements and compounds), the transformations they undergo, and the energy released or absorbed during these processes. Therefore, Chemistry is one of the scarce skilled subjects. Thus, learners need sufficient understanding and adequate knowledge to perform the basic work required to become pharmacists, a career that is also in short supply in South Africa. Unsatisfactory performance is legally defined as when an individual's behaviour or performance falls below the required standard (Robbin, 2010). This results in an individual being deemed as unable to further his or her career due to unsatisfactory results.

Physical Sciences is the science connected with the acquisition of inanimate natural objects, including physics, chemistry, astronomy, and related subjects that do not study

living things (Fetterman & Robinson, 2012), as it is one of the subjects that is required for enrolling in enrolling specific scarce skills careers in the universities in South Africa.

A learner is an individual engaged in learning new skills or knowledge to address the country's current problems.

Unsatisfactory performance occurs when learners achieve less than 50% in the National Senior Certificate Examination, consequently resulting in them failing the subject (Department of Education, 2021). In this study, unsatisfactory performance is defined as academic achievement below 50% (Level 4). Notably, 30% is considered a pass in South Africa, but this is rejected in this study in order to maintain and improve high standards in education.

1.10. Chapters' Outline

Chapter 1: Introduction of the Study

This chapter introduces the topic and provides a brief rationale for the study. It also presents the problem statement, the aim and research questions, objectives, the significance, the delimitation of the study, an overview of the methodology, and definitions of terms. It also explains how chapters are divided and provides a summary of the chapter.

Chapter 2: Literature Review

This chapter focuses on analysing the scholarship review required to grasp the objectives of the study. It also comprises an itemised theoretical framework. It deals with information reconsideration on aspects that contribute to insignificant accomplishments in physical science matric results. It presents different discourses on the influences that contribute to inadequate performance in the physical sciences matric results.

Chapter 3: Research Design and Methodology

This chapter elaborates on the research approach, population sampling, target population sampling method, sampling technique, sample and sample size, instrumentation and data collection, technique (semi-structured interviews), procedure for administration of interviews, data collection technique, data analysis and interpretation, trustworthiness of the study, ethical considerations, limitation of the study and delimitation of the study and lastly the conclusion of this study.

Chapter 4: Data Presentation and Discussion

The data gathered during the research process is presented and discussed here. It also affords a widespread analysis of the data using thematic analysis.

Chapter 5: Findings of the Study

This chapter discusses the core study's verdicts and presents detailed answers to the research questions. summarises the discussion of the findings, recommendations, and the conclusion of the study.

1.11. Chapter Summary

The problem investigated was introduced and described in the chapter. The study investigated the factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences. The researcher was prompted by the Grade 12 learners' unsatisfactory performance in Physical Sciences, leading the researcher to presume that there is a burning issue with the subject. The presumption assisted the researcher in developing the study's research aim and formulating its research questions. The chapter presents the outline and research method used. It also highlights how research questions were answered. The crucial issues, including the influences contributing to learners' inadequate performance in Grade 12 Physical Sciences in the uMkhanyakude District and the inquiry approach used in the study, were outlined. Ultimately, this part defined the research design, structured in accordance with the chapter.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter focuses on the literature review concerning the factors contributing to unsatisfactory performance in Physical Sciences among Grade 12 learners. This literature review chapter examines the various factors that contribute to the unsatisfactory performance of learners in Physical Sciences, specifically in the uMkhanyakude District. This literature review chapter highlights the factors contributing to unsatisfactory educational performance and the challenges teachers face in addressing these issues. It examines how knowledge is conveyed through the curriculum. The chapter opens with an exploration of the theoretical framework underpinning the study. Subsequently, the following sections are explored in detail: teachers' attitudes towards the subject of Physical Sciences; challenges encountered in teaching Physical Sciences; class size and available resources; parental support and expertise; socio-economic factors; language barriers; and additional factors based on relevant research.

2.2. Theoretical Framework

Constructivism was considered particularly appropriate for this study as it recognises that learners actively construct knowledge through experience and interaction with their environment, rather than passively receiving information. This perspective is especially relevant to Physical Sciences, where conceptual understanding and the ability to apply knowledge to problem-solving situations are central to learner success. Constructivism shifts the focus away from viewing poor performance as a learner deficit, and instead directs attention towards the quality of learning experiences and the conditions under which meaningful knowledge construction takes place.

Grounding the study in constructivist theory allowed for a deeper exploration of how both teachers and learners make meaning of their experiences in the Physical Sciences classroom, acknowledging that knowledge is shaped by prior understanding, social interaction, and context rather than direct transmission from teacher to learner. This theoretical lens enabled the study to investigate not only what learners know, but how they came to know it, and where the process of knowledge construction may have been disrupted. The alignment of constructivism with the interpretivist paradigm further strengthened this foundation, as both frameworks prioritise understanding human

experience from the perspective of those involved, thereby yielding richer and more nuanced insights into the factors influencing Physical Sciences performance.

Figure 2.1 below shows learners' performance levels from low to high, and the increase in circle size indicates the difficulty of the performance.

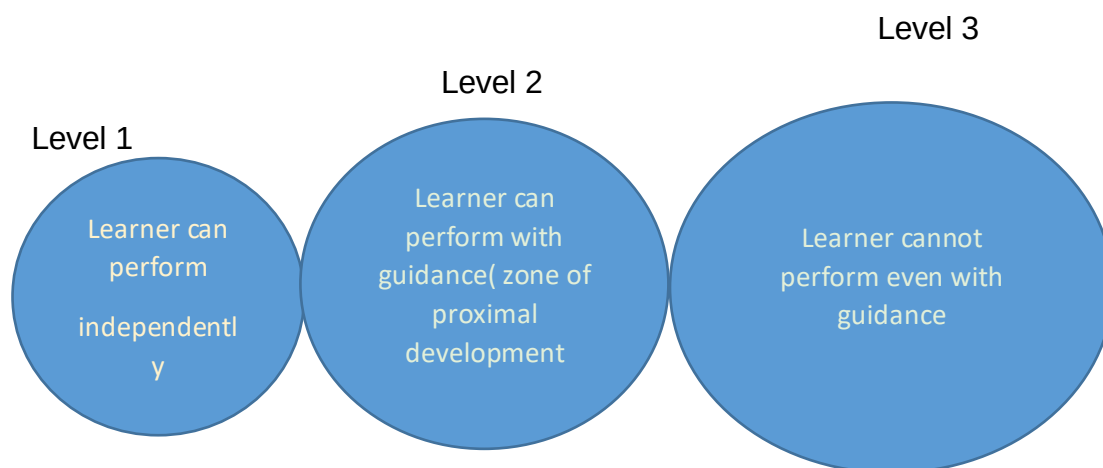


Figure 2.1: *Researchers' conceptual framework on the level of learning.*

This emphasises that learners must first be able to work out problems on their own before they are assisted, so they can learn from their mistakes and discover the concepts themselves. Social interaction (here learners develop teamwork and communication skills as they share their perspectives), shared goals (here learners collaborate to achieve a common goal or finish the task given to them by the teacher), shared responsibility (this compels learners to take responsibility of any action they do as a group and be accountable for the results either are positive or in their favour or against them). Therefore, this approach can be used in the Physical Sciences, where learners can work together on experiments, practicals, and projects, as it requires teamwork; hence, they will be required to interact more deeply (Wang et al., 2022). Social constructivism emphasises that learning occurs when people engage in activities with others, such as group work and hands-on projects. Learning is a social process (Vygotsky, 1978). In the illustrated Figure 3 below, social constructivism as a phenomenon anchored by three balanced forces. The first force is Peer teaching, the second force is Group discussion, and the third force is Hands-on activities.

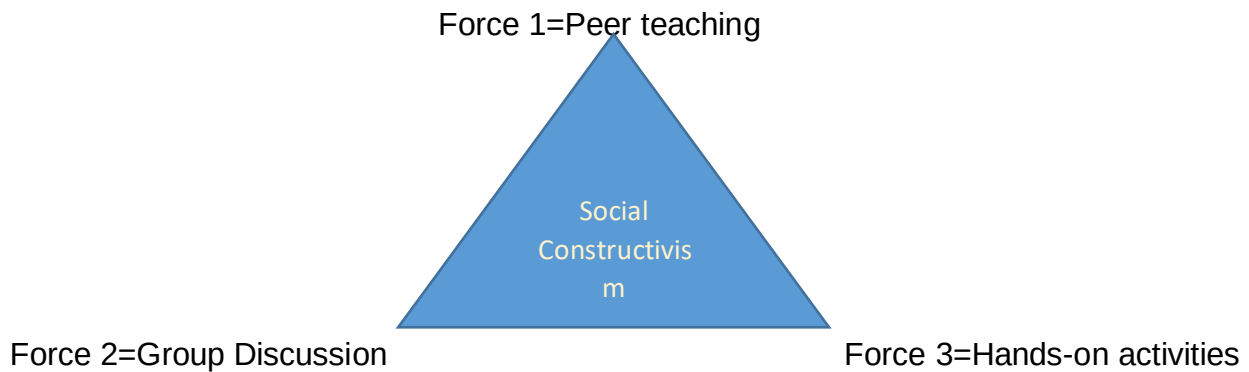


Figure 2.2: *Model view on Social Constructivism*

The Social Constructivism phenomenon cannot exist if one of the forces is removed. Therefore, learning is characterised by collaborative, social-constructivist approaches. According to Dong et al. (2021), Cognitive constructivism is a theoretical framework that describes how learners build understanding through their internal mental processes and cognitive structures. Larison (2022) suggests an intersubjective approach to science education, where learning is driven by meaningful interactions between teachers and learners, shifting the focus away from mere factual knowledge toward understanding science as a fundamentally human endeavour. By exposing learners to the interpersonal and collaborative nature of scientific practice, the broader learning community may develop a deeper appreciation and comprehension of the Physical Sciences. This perspective places significant emphasis on active participation, prior knowledge, learner diversity, and the personal construction of meaning (Schlichting et al., 2022). The key principles comprise learner-centred learning, consideration of prior knowledge, and a conducive learning environment. This is evident in the work of great theorists like Vygotsky and Piaget, who have made notable contributions through Vygotsky's social constructivist perspective and Piaget's cognitive development theory, while Glasersfeld also contributed to radical constructivism. Shokeen et al. (2024) proposed a radical constructivist cooperative inquiry framework, drawing from the combined theoretical foundations of collaborative inquiry and radical constructivism, in order to illuminate how learners learn through and within design-based activities. This framework rests on six core pillars: being learner-centred, dynamic, iterative, and collaborative, while also accounting for representations and outcomes. Rooted in Piaget's constructivism and informed by epistemological principles concerning how knowledge is formed, this approach challenges the notion of passive learning. As Dyasi (2021) noted, radical constructivism holds that knowledge is not simply absorbed through the senses but is actively built by the learner's own cognitive processes. More broadly, radical theory

seeks to inspire collective action, social movements, and activism by critically examining existing structures and proposing meaningful alternatives (Apostolopoulou & Fishman, 2022). Since it challenges existing norms and seeks to address the inequality created by the system, it is a significant framework. The next sections focus on the benchmarks of satisfactory performance in Physical Sciences and factors leading to underachievement.

2.3. The Benchmarks for Satisfactory Performance in Physical Sciences

Literature identifies several enablers of satisfactory performance in Physical Sciences. These include the availability of resources such as textbooks and calculators, a good and solid scientific foundation, support from school management teams, and the presence of trained teachers.

Concerning the availability of resources, Baloyi (2023) argues that having adequate resources in schools plays a pivotal role in the teaching of Physical Sciences. Such resources make it easier for teachers to deliver relevant knowledge, which in turn can contribute to satisfactory learner performance. This view is strongly supported by evidence from the South African context. Nemadziva et al. (2023) highlight that 80% of public schools in South Africa have a lack of resources for practical learning, making it difficult for teachers to implement enquiry-based teaching methods. This resource deficit directly undermines the quality of science instruction and limits opportunities for learners to engage meaningfully with the subject.

The availability of resources assists learners in exploring scientific concepts in real-world situations through practical lessons. In schools where there are science laboratories, learners understand scientific concepts better as they do them practically. This is confirmed by Nhlapo et al. (2025), whose mixed-methods study conducted in the Lejweleputswa District found a significant relationship between laboratory use skills and academic performance, noting that practical investigations are important in the teaching of Physical Sciences, despite challenges such as limited resources, inadequate laboratories, time constraints, discipline issues, and novice teacher experience. Learners learn and understand better if they conduct experiments because they observe results first-hand. Student engagement in laboratory courses has been shown to have a

positive impact on students' achievement in science, and laboratory practical activities stimulate and motivate students to learn more about science.

Furthermore, in schools where a learner owns his or her textbook, it is highly possible for that learner to perform better because he or she has plenty of time to study rather than sharing (Nilson et al., 2023). If the teacher issues classwork and asks learners to refer to a certain page, all learners can do the work timeously without failure, which grants the teacher an opportunity to move around and check individual performance. Besides the textbook, Physical Science involves significant application of Mathematics. As a researcher and a teacher, I have witnessed the importance of calculators for learners. When learners have access to good calculators and know how to use them effectively, this can significantly support their learning and performance.

On the question of a good and solid scientific foundation, learners with a good background in lower grades perform satisfactorily in Physical Sciences. Most of these learners study ahead of their teachers, and they often become peer tutors to other learners, which benefits them as well. This observation is well-grounded in the research literature. Brod (2021) notes that prior domain knowledge has long been known to explain large portions of variance in learning outcomes, with scholars describing it as the most important determinant of a student's learning success. At the same time, Simonsmeier et al. (2021) confirm in a meta-analysis of 8,776 effect sizes that prior knowledge can positively affect learning outcomes by guiding learners' attention, facilitating the interpretation and encoding of new information, and allowing for the efficient memorisation, processing, and retrieval of new content. A strong scientific foundation thus creates a cumulative advantage, enabling learners in Physical Sciences to engage more readily with complex content as they progress through the grades.

The other very important benchmark factor is that of support from the School Management Team (SMT) and well-trained educators. Departmental heads play a pivotal role as immediate supervisors to educators, to whom they address their concerns and grievances. If teachers are fully supported, learners perform satisfactorily. An SMT must always be aware of learner behaviour in classrooms. Kalane and Rambuda (2022), in a South African mixed-methods study involving 60 heads of department, found that factors such as a lack of administrative and financial support, insufficient supply of

learning support materials, and a lack of laboratories negatively impacted heads of department's ability to manage teaching and learning effectively. This evidence illustrates that where SMT support is inadequate, the knock-on effect on both teaching quality and learner performance is substantial. Kalane and Rambuda (2022) and Syharath (2012) further affirm that departmental heads oversee the teaching of specific subjects, coordinate and supervise educational programmes, and act as key change agents responsible for monitoring teaching and learning practices and providing continuing professional development for teachers.

The presence of well-trained and qualified teachers is equally crucial to satisfactory performance in Physical Sciences. A good sound knowledge displayed by teachers is essential. Evidence from teacher qualification research suggests that teacher subject-specific qualifications have a positive impact on student academic performance, with studies showing that students taught by certified subject specialists consistently outperform those taught by unqualified counterparts. This is particularly relevant in Physical Sciences, where both content knowledge and pedagogical content knowledge are necessary for effective instruction. Even in schools where a fully equipped laboratory is unavailable, it is still vital that teachers are supplied with the basic resources needed to deliver effective Physical Science instruction. Providing such resources can spark learners' curiosity and motivation toward the subject while also improving their overall academic outcomes. The classroom environment encompasses both the physical setting and the broader contextual conditions within which the teaching and learning process unfolds. When this environment is optimal, it becomes conducive to an effective learning process and allows learners to engage comfortably (Antoniuk et al., 2023).

2.4. Factors that Contribute to Unsatisfactory Performance in Grade 12 Physical Sciences

School environment factors can impact the learner's performance in Physical Sciences (Appiah & Beccles, 2022). This statement is supported by Thasmai (2013), who identified curriculum handling, resources, class size, learner dynamics, and parental involvement as factors that negatively impact Grade 12 learners' performance in Physical Sciences. Research has also highlighted that the accessibility and quality of teaching, the educational qualifications of teachers, and the socioeconomic status of learners play significant roles in determining performance. Additionally, attitudes toward

learning and various stimuli in the learning environment, along with the teacher's and school's characteristics, are critical factors that can lead to unsatisfactory marks in Physical Sciences (Kaur, 2023).

Furthermore, the research indicates that the components contributing to unsatisfactory performance have not been adequately addressed (Ngema, 2016). Based on the data gathered in Chapter 1, learner performance in Physical Sciences at the secondary school level, in particular Grade 12, remains a challenge in South Africa. It is possible that additional performance constraints have yet to be acknowledged. Some of these factors will be discussed in this chapter, including teachers' attitudes towards the Physical Science subject; challenges experienced in teaching Physical Science; class sizes and available resources; parental support and expertise; socio-economic factors; language challenges; and aspects based on other research conducted.

2.4.1 School-Related Factors (class size, resources, absenteeism)

Class Size and Resources

This study aims to investigate the factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences at the uMkhanyakude District. Class size and resources are among the factors closely examined in this section. A study carried out in the Ingwavuma District of KwaZulu-Natal Province, South Africa, revealed that larger class sizes tend to have a detrimental effect on learner performance, as valuable instructional time is lost to managing learner behaviour rather than being devoted to teaching or conducting Physical Science experiments. Kinanda (2024) observed that disruptive behaviours among secondary school learners adversely affect learners, teachers, parents, and community members. Drawing from personal teaching experience, smaller Physical Sciences classes are notably more manageable and conducive to effective instruction. It is also evident that in many instances, insufficient resources — such as limited access to textbooks or the chemicals required to demonstrate experiments — prevent learners from independently grasping and internalising key Physical Science concepts.

Accordingly, schools should also invest in adequate resources and infrastructure to facilitate practical learning experiences and enhance learners' understanding and performance (Kalani, 2023). These studies suggest that there are negligible differences in academic performance between schools that have adequate laboratory equipment

and those that rely on textbooks in the absence of such facilities (Harper et al., 2024). In a similar vein, South Africa's Department of Basic Education has expressed comparable sentiments, asserting that the lack of properly equipped Physical Sciences laboratories, apparatus, materials such as chemicals and biological specimens, and related equipment does not justify poor performance in the subject (DBE, 2022). While the DBE argues that lack of laboratories does not justify poor performance, this view conflicts with Baloyi (2023) and Kalani (2023), who found a strong positive correlation between laboratory access and learner achievement.

The relationship between laboratory access and learner achievement in Physical Sciences is empirically significant and should not be minimised. Nhlapo et al. (2025) found a significant relationship between laboratory use skills and academic performance among Grade 10 Physical Sciences learners, while Nemadziva et al. (2023) highlight that 80% of South African public schools lack resources for practical learning, making it difficult for teachers to implement enquiry-based teaching methods. This is further corroborated by a systematic review of 39 studies, which found that well-structured laboratory activities consistently supported students' learning of science content and the development of science practices (Nilsson & Sund, 2022). Attributing poor performance solely to teacher ineffectiveness, while ignoring laboratory resource deficits, risks misdiagnosing the problem and places the burden of systemic inequality on individual teachers and learners rather than addressing the structural conditions that constrain achievement in Physical Sciences.

The relationship between educators and learners in the classroom encompasses all pedagogical interactions initiated by either party, whether these occur during regular lessons or laboratory-based activities. According to Rosa, Magalhães, and Silveira (2024), parents or legal guardians are instrumental in shaping their children's education. School and the relationship between school and family have implications for learner performance, and effective learning can only occur if there is cooperation among teachers, parents, and learners, to avoid stress-related issues that could disrupt learning.

Lovin and Bernardeau-Moreau (2022) characterise stress as an emotional response arising from the interaction between individuals and their environment, describing it as a state of discomfort and tension triggered by external pressures. They contend that it

carries negative consequences, contributing to frustration and making it increasingly difficult to resolve problems. Furthermore, they portray it as both a physical and psychological condition experienced when a person faces a real or perceived threat or challenge. The author also shared that over the course of 21 years teaching Physical Science, he encountered considerable difficulty in identifying and developing classroom tasks capable of engaging learners both mentally and physically. His process began with gathering material from textbooks focused on applied scientific tasks, within which essential scientific skills — such as the ability to observe, analyse, and collect data, as well as the capacity to interpret data and draw informed conclusions — were treated as foundational competencies for learners to acquire.

The procurement of these skills alongside the expansion of progression skills through entreaties in these tasks was essential in making certain that learners understood every foremost scientific concept. Tleuberlinova et al. (2024) advocate that diverse factors influence the successful inculcation of national-patriotic values to younger schoolchildren in conditions of widespread digitalisation, and to create the necessary pedagogical conditions for the development of a national-specific axiological system in primary school children, teachers should consider many factors. In particular, the authors thought it necessary to pay special attention to the development of teaching staff skills required for the competent application of modern information technologies and further emphasised the obligation of pedagogical assignment, which is indispensable for learners to preserve scientific acquaintance acquired during Physical Sciences lessons.

The shortage of material resources in subjects such as Physical Science is a problem in many schools. In schools, learners usually share textbooks and other study documents. This is corroborated by Brew et al. (2021), who used a narrative review method to review the literature on the academic performance of learners at senior high schools and different factors affecting learners' academic performance in Physical Sciences. The study elucidated how these factors lead to unsatisfactory academic performance. The study further revealed that access to textbooks, libraries, functional laboratories, meal provision, and qualified teachers plays a significant role in influencing learners' academic performance at school.

Effects of absenteeism on learner performance

Sosu et al. (2021) define absenteeism as being absent from school premises during a regular school day, which includes instances where either a learner or a teacher is absent for just part of the day or the whole day. In contrast, Dee (2024) describes absenteeism as the failure to attend school for 10% or more of the total school days. This study addresses the issue of absenteeism by examining both learners and teachers, as effective learning results from the interaction between the two. The absence of teachers negatively impacts learners' academic performance, often leading to unsatisfactory outcomes.

Keppens (2023) indicates that sick leave, unexcused absenteeism, and school bans all adversely affect learners' academic performance. Additionally, the findings suggest that unexcused absenteeism is particularly harmful at the beginning and end of the school year, while sickness absenteeism tends to have a greater negative impact at the end of the school year. Absenteeism is associated with a range of important academic and socio-emotional outcomes, both during high school and later in adulthood (Ansari et al., 2020).

Dee (2024) categorises absenteeism causes into three main factors: personal (such as age, gender, illness, and learning barriers), socio-economic (including child labour, teenage pregnancy, food insecurity, and transport issues), and school (such as inadequate school facilities and poor relationships between educators and learners). The factors affect both learners and teachers, but the impact varies from individual to individual. Regardless of the type or reason for absenteeism, it is detrimental to learners' performance (Klein et al., 2022). This is particularly true in the Physical Sciences subject, where missing a lesson can lead to significant gaps in understanding that are difficult to recover from. The same applies to teachers; when they are absent from school, it negatively impacts learners' academic performance, resulting in unsatisfactory outcomes.

Frequent teacher absenteeism can also contribute to increased learner absenteeism, as learners may think that no effective learning will take place when the teacher is not present. This can lead to poor academic performance. The curriculum may not be fully covered, deadlines may be missed, and remedial teaching may not occur, all of which hinder learners' progress and contribute to unsatisfactory performance (Aslam et al., 2023). Additionally, when teachers are absent, they often do not have the opportunity to

mark or provide feedback on learners' work, leading to demotivation among learners. As a result, learners may see little reason to study diligently, further negatively impacting their academic performance.

2.4.2. Teacher-Related Factors (attitudes, training, methodology, language)

The Physical Science subject needs teachers who are well-trained, clear, and fully understand the subject content. This has an impact on what is delivered to the learners. If the teacher is well-equipped with the subject content. Learners perform satisfactorily. hence teachers' and learners' attitudes play an important role.

Teachers' Attitudes towards the Physical Sciences Subject to Enhance Learner Understanding

Teachers' attitudes towards teaching Physical Sciences are a crucial factor for learners' performance in the subject. In the Ingwavuma Circuit, Ngema (2016) observed that teachers' attitudes toward teaching Physical Sciences needed to be positive. Assem et al. (2023) explain that the influence of particular circumstances on an individual's preferences shapes the attitude they develop toward an object. They further argue that attitudes may be neutral, positive or negative. Similarly, Ferreira and Monteiro (2021) note that a person's ability to see, hear, act, and think is guided by the disposition of their mind, which they describe as attitude. Omoseebi's (2021) findings indicate that learners' preconceived attitudes toward Physical Sciences serve as a key motivating factor, influencing both their performance and perceptions of the subject. Keržič et al. (2021) add that strong achievement in Physical Sciences is often linked to a positive attitude. Consequently, a mindset fosters interest, confidence, and commitment to academic success. Conversely, Tang and Hu (2022) report that the absence of a positive attitude—combined with ineffective or overly complex teaching strategies—can negatively affect learner performance. Assem et al. (2023) further highlight that teachers who fail to adopt clear instructional approaches and positive attitudes may contribute to the development of negative learner perceptions, ultimately resulting in poor outcomes. Overall, attitudes play a critical role in shaping learners' behaviour and engagement in any subject.

Alrasheed (2021) observed that, in general, learners were positive towards science and technology. Paradoxically, the study also revealed negative attitudes toward specific

science topics. The results further identified several factors shaping learners' attitudes toward school science. Teachers must design and extend pedagogical activities that build on learners' existing knowledge and skills, as learners bring diverse backgrounds, experiences, and abilities to the classroom. Thus, teachers need a deeper understanding of learners' current levels of familiarity and competencies to make meaningful connections to new concepts.

According to Jacobs (2022), teachers work closely with learners, much like a facilitator who leads and guides learners without completing the tasks on their behalf. Ultimately, teachers are expected to assess each learner's performance fairly; therefore, they should begin by developing baseline assessments that help determine learners' initial levels of understanding for a given task. For example, an introductory assessment would be a task designed to evaluate Grades 8 to 11 learners' ability to set up an experiment according to the given instructions.

Ratcliffe (1998:55) suggests that establishing a small-group conferencing framework can enhance classroom discussions by fostering an additional form of awareness. Research has identified 43 challenges at the conceptual, procedural, and epistemic levels that learners—not only in elementary school but even at university—encounter during scientific experimentation. Kranz et al. (2023) further note that prior misconceptions and cognitive biases contribute significantly to these difficulties. Despite the global emphasis on practical investigation within science curricula, learners continue to face many challenges during experimental work.

One feature of such a framework could include organising sets of objects accompanied by a series of questions that learners must address. This approach may help teachers strengthen learners' comprehension of scientific concepts and make experimental conclusions clearer. Other classroom activities might include encouraging learners to connect their scientific learning experiences to real-world issues and to cultivate a sense of social responsibility. Teachers are also expected to support learners in deepening their conceptual understanding by prompting them to verbalise ideas, listen actively, and construct their own scientific arguments.

According to Denovan et al. (2024), the framework can further help develop structured reasoning and analytical thinking skills. These comprehensive processes have the

potential to enhance learners' grasp of Physical Sciences concepts through effective pedagogical interactions between teachers and learners.

Literature indicates that South Africa faces a significant shortage of Physical Sciences teachers, making it increasingly difficult to recruit suitably qualified local educators in this field. Amitai and Van Houtte (2022) report that a substantial number of Physical Sciences teachers leave the profession each year, resulting in the loss of highly qualified, skilled and experienced educators. This concern is supported by broader evidence indicating that approximately 7%–10% of teachers exit the profession annually, with attrition rates among science teachers being particularly high, reaching up to 30% within the first few years of teaching (Diliberti & Schwartz, 2025). This attrition contributes to teacher shortages, disrupts continuity in instruction, and ultimately undermines the quality of teaching and learning in Physical Sciences. Santoro (2021) attributes this high resignation rate to low salaries, heavy workloads, and the tendency of many experienced teachers to take early retirement. Nugraha (2023) further notes that stagnation within the Physical Sciences teaching profession contributes to this ongoing attrition. In addition, Osifeko et al. (2021) highlight a growing trend in the appointment of teachers who lack adequate training, which further worsens the challenges in the sector.

The SACE (2010:23) reports that some Physical Sciences teachers lack sufficient mastery of the subject content, and their pedagogical approaches are often obsolete. Ballarino et al. (2022) argue that this has a cascading effect, reflected in the noticeable decline in learner enrolments in Physical Sciences. Research by Arufe Giráldez et al. (2022) further shows that learners' perceptions of their teachers, along with their understanding of the subject matter, significantly influence academic performance. Consequently, poor learner performance can be linked to insufficient content knowledge among underqualified teachers, as well as declining enrolment trends. Kharlay and Philips (2022) assert that “experienced teachers are better teachers,” noting that experience plays a central role in preparing learners effectively for high-stakes examinations. Newly appointed teachers often struggle to teach Grade 12 Physical Sciences; however, with time and exposure, they gradually learn the instructional approaches required to improve learner achievement in the subject. Lubis and Ariansyah (2024) argue that teachers should possess the ability to create an enabling learning environment and adapt their instruction to accommodate diverse learning

styles. In addition, teachers need to know the school policies, including the CAPS. Simelane and Rankhumise (2022) contend that learners' academic achievement is partly influenced by the teacher's ability to sustain their interest in the subject. This, combined with strong pedagogical competence and sound content knowledge, is crucial for promoting effective learning.

Physical Sciences requires learners to understand scientific concepts and apply them accurately and precisely. This subject also requires learners to interpret data from diagrams, convert that information into written explanations, understand the underlying theories, and apply them accurately. Hence, language issues become a factor. Physical Sciences need learners to be able to read, write and liaise (Mpungose, 2023). Yu et al. (2022) argue that the medium of instruction used in teaching impacts learners' academic performance. They further note that meaningful academic achievement is more likely when learners are taught in their home language. Yu et al. (2022) caution against relying exclusively on English as the language of instruction, given that South Africa has 12 official languages and learners speak different languages at home. They also contend that many South African educators' inability to teach in more than one language has placed the education system in a vulnerable position, particularly concerning the quality of classroom pedagogical practices.

Lin and Lei (2021) emphasise that teachers must be proficient in English if it is to serve as the sole medium of instruction, as inadequate teacher proficiency can hinder learners' understanding of the subject content. Consequently, Maree (1994) recommends that teachers whose first language is not English should receive extensive English-language training as part of their teacher preparation programmes. Language is one of the key barriers in the teaching of Physical Sciences. Although the Constitution of the Republic of South Africa recognises cultural and linguistic diversity as a national asset and designates all 12 languages as official, Physical Sciences continues to be taught in only two languages in South African schools. The Department of Education acknowledges this diversity in its language policy (Liddicoat & Taylor-Leech, 2021), which seeks to promote multilingualism and respect for all languages used in the country, including South African Sign Language and other languages recognised by the Constitution.

Globally, many countries are multilingual and multicultural. In nations such as South Africa, Saudi Arabia, Uganda, and Tanzania, English serves as a common medium of instruction for speakers of diverse linguistic backgrounds. As a result, both teachers and

learners are required to learn English. Haufiku et al. (2022) note that challenges associated with English as a second language are widespread and often lead to ineffective instructional practices—an issue also evident in township schools in South Africa. Interestingly, many parents still prefer English as the language of instruction, believing that it offers their children better employment prospects due to its status as an international language.

In South Africa, assessments in Science, Technology, and Mathematics are administered in either English or Afrikaans (Tshikondela et al., 2025). Learners who are taught in their home language—typically English or Afrikaans—tend to demonstrate a stronger understanding of subject content and perform better academically. However, many Black learners are disadvantaged because neither English nor Afrikaans is their mother tongue, and this linguistic mismatch negatively influences their academic achievement, particularly in Physical Sciences.

Kossybayeva et al. (2022) argue that Physical Sciences teachers must recognise the significant role they play in supporting language development. They further suggest that teachers should prioritise equipping learners—especially those for whom English is not a home language—with critical writing skills by assigning tasks such as scientific reports, explanatory paragraphs, and short essays. Oral presentation of these reports in class is also recommended as a means of strengthening learners' language proficiency. Since language serves as a fundamental tool for communication, it also plays a central role in shaping cultural identity.

Learning Physical Sciences requires that learners continually develop proficiency in reading and writing scientific language (Pun & Tai, 2021). Moreover, because many South African learners study Physical Sciences in their second or even third language, they face significant language barriers that hinder their ability to understand scientific terminology. Lai and Zhang (2021) argue that limited fluency in scientific language compromises learners' ability to think critically, conduct experiments, and construct arguments grounded in evidence and theory. Learners often confuse scientific terms with their everyday meanings, leading to misconceptions about commonly used words such as energy or power. Scientific knowledge also includes numerous unfamiliar concepts and terminology that require learners to associate new sounds with new ideas, such as atoms or cells. As a result, teachers need to design activities that help learners

strengthen and expand their understanding of scientific vocabulary—particularly terms that are difficult to grasp due to limited exposure to scientific conceptualisation—so that they can use this language accurately in laboratory work and class activities.

Experience in the teaching of Physical Sciences is very important to note. Harefa et al. (2023) identified some positive and significant relationships between learners' interest in learning and their outcomes in Science education. The authors also found that learners' interest positively influences their performance in Integrated Science. Watts (2022) argued that examining learners' reasoning and engagement in Physical Sciences has been a source of inspiration for Physical Sciences education. They noted that there is substantial evidence supporting research in Physical Science education, particularly in Physics, in which many projects aimed to explore auxiliary ideas and focus on specific content areas rather than on unsatisfactory performance.

In this regard, it is necessary to categorise concepts and identify relevant resources and educational approaches to effectively address and correct learners' misconceptions, preconceptions, and auxiliary ideas. Gaining insight into the inappropriate reactions of both teachers and learners, coupled with the ability to predict and explain these misconceptions, preconceptions, and auxiliary ideas, is essential within the context of the Physical Sciences curriculum. Rata (2021) posited that a curriculum designed according to a subject's internal coherence offers considerable depth and breadth to national curriculum-specific aims (CAPS Physical Science). Also, this background facilitates a deeper understanding of learners, as their engagement with knowledge and revised approaches to understanding Physical Sciences content can promote cognitive development. Furthermore, Rata (2021) maintains that promoting cognitive development underscores the need to understand the specific aims and to develop learning principles that help teachers meet these objectives.

Tyler (2023) asserts that many South African teachers experience uncertainty due to a shift in the goals related to teaching in the context of science. This shift has moved from specific content objectives to broader, more generalised aims. As a result, teachers often feel a lack of confidence, which is attributed to their difficulties in meeting the specific aims set out in the curriculum. These challenges also affect teachers' morale, which, in turn, impacts their learners' academic performance. Identifying and addressing the specific pedagogical factors that hinder teachers from achieving optimal results is

essential. This awareness will help both educators and researchers in identifying and formulating potential strategies to address these challenges. In the following section, several challenges that affect the teaching performance of South African Physical Science teachers will be identified, highlighting the need for improvement.

The study by Córdova et al. (2023) examines the relationship between the objectives of the Physical Sciences curriculum and the learning challenges learners encounter, as well as the strategies they use to overcome them. Their findings indicate that learners who perform exceptionally well are often exposed to various stressors, coping mechanisms, and experiences of discrimination. Furthermore, their findings affirm that despite learners' high levels of achievement and interest in the Physical Sciences, these learners reported encountering personal obstacles, including a lack of confidence in their preparation and intellectual capabilities. In another study by Tran and Guzey (2024), learners expressed concerns that studying Physical Sciences could lead to interpersonal challenges related to race and gender differences. The authors further indicate that marginalisation persists even among those with high intellectual abilities, which are often presumed to facilitate access to higher education in the Physical Sciences field, where high-achieving learners recognise the complexities of marginalisation and its significant effects on their educational experiences.

These perspectives question the commonly held beliefs about inclusivity and equity in the Physical Sciences. Graves et al. (2022) suggest that a lack of positive attitudes towards these values contributes to learners' disinterest in pursuing degrees in the field, highlighting ongoing inequality and discrimination against marginalised groups in the Physical Sciences, which adversely affect learners' academic performance regardless of their abilities. Therefore, based on these preceding studies, Physical Science teachers should develop science activities that promote inclusivity and avoid marginalisation to enhance academic performance and encourage a more diverse group of learners to pursue degrees in the Physical Sciences post-Grade 12.

Goshisht (2024) found that learners studying Physical Sciences have developed various strategies to address the challenges that hinder their academic goals. These strategies include seeking assistance from trusted individuals and setting more attainable objectives. Such approaches help learners gain insight into the factors contributing to their poor performance in Physical Sciences. However, some learners cautioned that

lowering academic standards would undermine their long-term aspirations. When asked how they would cope at the college level, these learners indicated that they possessed the intellectual capacity to formulate and use these coping strategies effectively. These findings have important implications for teachers and researchers, as they highlight the need to equip high school learners with training and tools that will prepare them to overcome academic challenges at the tertiary level. The study also revealed that some high-achieving learners were discouraged from pursuing degrees in Physical Sciences due to perceptions that they could not succeed in the field.

Ndjangala et al. (2021) argue that teachers' poor planning and preparation significantly contribute to learners' unsatisfactory performance in Physical Sciences. They also highlight that the shortage of proficient teachers in this subject area exacerbates unsatisfactory performance issues. Factors such as teachers' inadequate understanding of content due to insufficient training, poor management of school infrastructure, and lack of access to pedagogical materials are some of the challenges that further hinder learners' success in the Physical Sciences. Additionally, the limited time that teachers and learners spend at school, along with a scarcity of teaching and learning resources, plays a critical role in the problem. Ineffective communication between education departments and various levels of education adds to these challenges. To help learners achieve higher academic standards, high-quality teacher training is essential. Unfortunately, many classrooms today are staffed by underprepared teachers who have received inadequate or no training. According to Banda and Nzabahimana (2021), there is a direct correlation between teacher preparation in Physical Sciences and learner achievement. The level of teacher preparation directly influences the amount of information imparted to learners and its organisation.

The Cognitive Load Theory maintains that unsatisfactory learning performance can be attributed to an overload that occurs in a short period of time; it also maintains that this can be attributed to the fact that the time taken to process and store new information by the working memory is significantly short. The working memory can only process a few new elements and can store them for a short period of time (Baddeley et al., 2021). According to Fuster (2022), if the storage (in schemas) and processing of new information are handled by a learner's working memory, this makes new memory space readily available to store the new information. It is only after this process has occurred

that successful learning can take place. The goals and accomplishments of children are supported by their parents. Parents do this by supporting their children and instilling in them an awareness of what they expect of them. It is therefore advisable that parents become more involved in their children's learning through motivation and encouragement, as well as regular meetings with the children's teachers.

The teaching methods employed by Physical Sciences teachers play a decisive role in determining learner performance. Inquiry-based learning (IBL) has received considerable attention in the literature as an effective pedagogical approach in science education. Antonio and Prudente (2024), in a meta-analysis examining inquiry-based approaches in science education, found that IBL had a large positive effect on higher-order thinking skills because learners were engaged in more comprehensive cognitive processes such as analysis, evaluation, and synthesis. These are precisely the skills that Physical Sciences demands, particularly in problem-solving tasks involving both physics and chemistry content. IBL encourages learners to question, hypothesise, experiment, and draw conclusions, processes that align closely with the practical investigation requirements of the subject's curriculum. Meulenbroeks et al. (2024) further demonstrated that in secondary school physics, inquiry-based learning increased learners' intrinsic motivation toward performing science practicals, particularly when the design of inquiry tasks addressed both investigative work and operational demands such as apparatus management. This is a critical insight for Physical Sciences, where motivation and hands-on engagement are known to be strong predictors of learner achievement.

Alongside IBL, the flipped classroom model has emerged as a promising instructional approach in science and mathematics education. In this model, learners engage with instructional content, typically through video lectures or readings, outside of class, freeing up lesson time for active problem-solving, discussion, and teacher-guided practice. Wright and Park (2022), in a systematic review of 30 empirical studies of flipped classrooms in K-16 science and mathematics classrooms, found that this pedagogical shift toward student-centred and active learning approaches positively supported student learning, though its effectiveness was closely tied to the quality of its design and theoretical grounding. This is particularly relevant in under-resourced Physical Sciences classrooms, where teachers often struggle to cover content and manage diverse learner

needs simultaneously. By moving content delivery outside the classroom, the flipped model creates space for the kind of structured practice and immediate feedback that lower-performing learners especially need. Huang et al. (2024) further identified structured inquiry tasks within flipped learning designs as pivotal for improving academic performance, stressing the necessity of robust professional development and administrative backing for sustained effectiveness. Together, IBL and the flipped classroom underscore that the quality and intentionality of teaching methods, not merely the quantity of content delivered, are central to achieving satisfactory performance outcomes in Physical Sciences.

2.4.3. Learner-Related Factors (attitudes, absenteeism, study habits)

Learners' Attitudes towards Physical Sciences

Learners' attitudes also play an important role in the learning of the subject. According to Fishman (2021), attitude is an evaluative response that significantly influences an individual's tendency to engage in a specific behaviour. This includes the degree of positive or negative evaluation associated with that behaviour. In the context of the Physical Sciences, attitude is recognised as a crucial factor contributing to learners' unsatisfactory performance (Abudu & Gbadamosi, 2014). The authors classify attitudes into three distinct types: positive, negative, and neutral. A learner who displays a favourable disposition toward a specific behaviour is said to have a positive attitude, which typically leads to satisfactory performance outcomes. Furthermore, when a learner exhibits both a positive attitude and commitment, they are more likely to develop an interest in both the subject matter and the teacher.

Tlhabane (2024) argues that a correlation exists between learners' attitudes and their performance. Additionally, the study suggests a significant relationship between the use of investigative and problem-solving strategies and improved classroom performance. The program positively impacted how investigative learning and problem-solving techniques enhanced learners' attitudes toward Physical Sciences, leading to better performance in the subject. This improvement was evident in learners' increased performance in Physical Sciences, as well as in the positive changes in their attitudes towards the subject and their teachers. In many cases, when learners have a negative attitude towards their Physical Sciences teacher, their academic performance in the

subject is likely to be unsatisfactory (Mystkowska-Wiertelak, 2022). Attitudes encompass multiple constructs, as demonstrated by Abudu and Gbadamosi (2014), who identified several key components, including learners' perceptions of their Physical Sciences teacher, anxiety relating to the subject, the perceived value of Physical Sciences, individual self-esteem concerning the subject, motivation, enjoyment of the discipline, the attitudes of peers and friends, parental attitudes, the nature of the classroom environment, achievement in Physical Sciences, and fear of failure. Furthermore, research by Mbonyirivuze et al. (2021) indicates that learners who choose to study Physical Sciences in high school typically exhibit positive attitudes towards the subject. Consequently, attitudes play a crucial role in learners' academic performance. In uMkhanyakude District, some learners exhibited negative attitudes towards Physical Sciences, which, in turn, might have discouraged others from pursuing the subject. In summary, unsatisfactory performance is often attributable to the aforementioned constructs.

2.4.4 Sociocultural Factors (socioeconomic, parental support)

Socioeconomic Factors

Ngema (2016) observes that socioeconomic factors, particularly poverty, play a crucial role in contributing to unsatisfactory academic performance. According to Nwobodo (2021), poverty can be understood as the extent to which an individual can live without crucial resources, which include social capital, emotional support, interpersonal relationships, knowledge and financial means. Simelane and Rankhumise (2022) argue that the household serves as the primary reference point for learners regarding both education and the development of social skills. They further suggest that a learner's academic performance is significantly influenced by the environment of their home. This study was conducted in deep rural area of uMkhanyakude District, where the employment rate is very low and people depend on the rainfall so that they plant and sell crops for living, and most of them they are depended on social grant with large families in their houses which then make it difficult for them to meet the learners' school educational needs even in subjects like Physical sciences, which contribute to the learners' unsatisfactorily performance. The research by Simelane and Rankhumise further depicts that homes of those who are affected by socio-economic factors are often overcrowded with children of different genders sharing the same house or room. This leads to learners not having enough space and time to do their schoolwork or just to

conduct a study as other children are chaotic. These conditions lead to unsatisfactory performance as the learner is not able to do his or her homework at home (Chinyoka & Naidu, 2014).

Additionally, Assem et al. (2023) contend that learners exposed to poverty often exhibit deficiencies in academic capabilities, as formal education becomes their main source of learning. Children from poor families encounter psychological bruise, this is the result of the lack of psychological nurturing, therefore they feel isolated from other learners because of depression. This can lead to the learners being aggressive or withdrawing socially, which results in unsatisfactory performance in Physical Sciences. Nyagwencha-Nyamweya (2022) have done comprehensive studies on socio-economic factors and their outcomes illustrated a close connection between poverty and an increase in mental health risks, which in turn affect the academic performance of learners in schools. Children born in poverty experience the effects of poverty early in life, which affects their physical, behavioural, and developmental health, which in the long run negatively affects their school performance. The gap between children from low economic status and those from families with high economic status keeps widening socially and academically as decades pass. Research also found that stressful living conditions can lead to depression, severe anxiety, and suicide in children, which is true in the region where this study was conducted.

They argued that children from low-income households often exhibit limited cognitive development—such as reduced vocabulary and weaker social skills—largely because they lack access to foundational schooling. This suggests that poverty, particularly the absence of essential educational resources, negatively influences learners' academic achievement, leading to poor performance (Nazari et al., 2024). Assem et al. (2023) support this perspective, noting that poverty hinders learners' ability to perform well academically. Jabar (2021) further reports that parents living in poverty are often unable to assist their children with schoolwork due to their own limited educational background. The study also highlights that overcrowded living conditions and the lack of adequate space in impoverished households restrict opportunities for meaningful learning interactions between children, their peers, and their parents. Jacob (2022) notes that such conditions prevent learners from studying effectively or completing their assignments. Similarly, Chinyoka et al. (2014) found that children from poor families are frequently burdened with numerous household responsibilities, leaving them fatigued

and with minimal time to study, which contributes to weak performance in subjects like Physical Sciences that require extensive practice. Another factor contributing to poor achievement is parental mobility; parents often relocate in search of employment, and each move forces children to adjust to a new environment and unfamiliar school settings, which disrupts their learning.

According to Sharma et al. (2024), learners from poor families suffer from a lack of proper sanitation, resulting in female learners being unable to attend school during their periods. This will result in consistent absenteeism, leading to unsatisfactory performance in Physical Sciences. Furthermore, the study indicates that learners from poor families have psychological instability because when they were infants, they were not raised in conditions that built their psychological and social stability. This weakens the development of social skills with other children, which in turn negatively affects their academic performance because they often fail to complete the work given to them, as they do not work collaboratively with others. In this case, in Physical Sciences, it is very important for learners to work collaboratively, such as during practicals, to explore new scientific concepts independently.

Learners from disadvantaged families tend to suffer from health and safety issues, which lead to illness and absenteeism in class (Kearney et al., 2023). This led them to miss important Physical Sciences lessons. This, in turn, affects their academic performance since they spend valuable time away from school. The study further revealed that inadequate parental supervision contributes to poor academic performance. Child-led families are common among disadvantaged families. As a result, learners supervise themselves without an elder person. Some of these children, particularly the older ones, take full responsibility for their siblings, leaving them unable to focus on their schoolwork and causing their academic performance to suffer. In some cases, these children end up committing crimes and sometimes become active in substance abuse. This can lead to aggressive behaviour towards teachers and other learners. The study's outcomes also indicate that learners from disadvantaged homes are performing unsatisfactorily in Physical Sciences (Motlalepula et al., 2022). This is because they cannot afford to purchase extra textbooks, pay for extra tutors, and other learning aids other than those received from school. These learners face many household chores after school, which prevents them from focusing on their studies (Kennewell et al., 2022).

Parental Support and Expertise

According to research, studies demonstrate that when parents are maximally involved in their child's academics, it is likely that the child is performing well and confidently at every stage of an academic journey (Ali et al., 2023). Parents are important stakeholders in the teaching and learning space of their children. According to Myende and Nhlumayo (2022), there is a consensus that parents are invaluable partners in the education of their children, but getting South African rural parents involved in education has remained difficult.

However, some studies mentioned that parental involvement was lacking, and it hurt teaching and learning, since learners did not do homework (Wilder, 2023). However, some parents make efforts to support their children despite having limited knowledge of Physical Sciences. It remains essential for parents to provide support and maintain communication with the school. Learners require support from both teachers and parents; however, this support is often limited where parents lack familiarity with scientific concepts, resulting in learners working independently at home. For instance, parents should assist their children at home by providing the research materials required by the subject teacher and by creating an environment that is conducive to studying.

Parents also play a crucial role in motivating their children. They should ensure that learners attend school regularly, as absenteeism makes it difficult to complete the curriculum. When learners miss lessons, teaching and learning proceed without them, causing them to fall behind in their schoolwork. As a result, school administrators lose time dealing with absenteeism procedures instead of engaging in educational subjects, and thus, their resources become wasted (Akkus & Çinkir, 2022). Parents and teachers must encourage learners to attend school regularly and be willing to dedicate additional time beyond the allocated lesson period. According to the teachers, many Physical Sciences concepts require extended explanation, as learners need extra time to fully understand the material (Banda & Nzabahimana, 2021). Therefore, the time prescribed for Physical Sciences is not enough for teaching and learning. Consequently, the allocated time for teaching and learning Physical Sciences is insufficient.

2.4.5 Curricular and Systemic Factors

This subsection focuses on the faculty curricular content and Physical Sciences research cooperation.

Factors Based on Previous Research Conducted

Ardura et al. (2023) examined the characteristics of 15-year-old girls who intended to pursue Physics beyond the age of 16. Do et al. (2023) identified four cognitive themes aligned with integrative Physical Science education: constructive learning, motivation and beliefs, social factors, and knowledge. Their study showed that integrated curricular approaches improved learners' academic performance while also fostering interest and motivation in Science and Mathematics. Delgado-Floody et al. (2022) argue that Physical Science education plays a vital role in modern society, as it contributes to improvements in quality of life. Krishnan et al. (2022) note that Malaysia consistently records lower levels of interest in Science and Technology compared with the United States. This lack of interest has resulted in a shortage of qualified engineers and technicians, which has been identified as a major barrier to Malaysia's economic growth.

This shortage of interest in Science and Technology could impede Malaysia's aspiration to attain industrialised-nation status (BOR, 2021). Although Malaysia has adopted an integrated approach to Physical Science education, limited research has been conducted to evaluate the effectiveness of this instructional model within the country. Malaysia also experiences challenges in Physical Science education that mirror those found in South Africa. According to the Trends in International Mathematics and Science Study, South African schools rank among the lowest performing internationally in Mathematics. In addition, Physical Sciences is often selected for learners by parents at the secondary school level, even when these learners struggle with Mathematics, despite the subject's strong mathematical foundation (Lee et al., 2024).

Concerns have also been raised about learners who perform well in high school Physical Sciences yet underperform in Engineering programmes at the university level. A study conducted by the Mathematics Department at a South African university on the teaching of calculus to first-year Engineering students found that many of the challenges affecting learners' performance originated from their prior Mathematics learning experiences in secondary school (Van der Hoff & Hardin, 2017).

Physical Sciences Research on Teachers' Cooperation

Numerous Physical Sciences teachers have been unsuccessful in their attempts to cooperate with other Physical Sciences teachers (Paulsrud & Nilholm, 2023). The lack of representation within the schools discourages learners from choosing Physical Sciences (Arif et al., 2021). Research cooperation through cluster concepts across schools for an integrated curriculum will enhance learners' access to information and resources. As such, all efforts should be directed toward facilitating collaborative research. These collaborations would aid in the changes to the approach and curricula of the Physical Sciences programs. Schools with better Science laboratory resources tend to be selfish; in other words, they do not want to allow other schools to use their facilities, so learners in disadvantaged schools end up disadvantaged, as they depend on theory rather than practicality. Teachers have different experiences and different approaches when it comes to delivering or unpacking scientific concepts to learners.

This study was conducted among novice science teachers and experienced teachers. The research by Lysberg (2023) reveals that a shared focus on learners' learning in teachers' collaborative exploration yields greater awareness and understanding of what comprises learners' learning. Thus, teachers are conceivably becoming better equipped to facilitate learners' learning by providing them with a generous set of learning opportunities. Outcomes highlight the essential role of critical reflection by revealing teachers' assumptions about teaching and learning and making these assumptions open to shared examination. When teachers collaboratively analyse practical challenges and exchange ideas or suggestions for potential solutions, they work collectively within a shared ZPD (Vygotsky, 1978).

2.5. Synthesis

This chapter presented a discussion of current relevant topics that have been conducted by different scholars or researchers in the field of study on the factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences. Topics were aligned with the data presented in the literature, which shed light on the factors contributing to Grade 12 learners' unsatisfactory performance. These factors were subsequently incorporated into a theoretical framework grounded in the constructivist theory adapted from Vygotsky (1978), who posits that learners acquire knowledge through three distinct ways.

The importance of the objectives has been discussed in the literature. The study's relevance has been disclosed after thoroughly contrasting the points of different

researchers on the concept of unsatisfactory performance. Therefore, good qualities of learning objectives were dispensed. The structures of constructivist theory (social, radical, and cognitive constructivism) as outlined by Vygotsky, as well as the cognitive process, were clearly discussed. These were so useful in the theoretical framework of this study. Moreover, the content of Physical Sciences and its outcomes, as outlined in the Department of Education's curriculum documents, were well-presented and clearly discussed.

This study is primarily grounded in Vygotsky's zone of proximal development theory, which postulates that each learner has three levels of learning for each subject. This theory benefits both teachers and learners by allowing learners to understand a scientific concept and for their teacher to group them and discuss it. Even during practical sessions, groups are useful because learners can share their ideas. Another benefit of this theory is that learners learn to work independently in the first zone before attempting the second level, where support from the teacher or a peer is required. This literature study culminated in the adoption of a theoretical framework to classify the lesson objectives of Physical Sciences teachers. That is through factors that contribute to unsatisfactory performance in Grade 12 Physical Sciences, the teachers' attitude towards Physical Sciences, learners' attitudes, the challenges experienced in teaching of Physical sciences, teachers and learners' absenteeism, class size and lack of resources, parental support and expertise, socioeconomic factors in both teachers and learners at school, language challenges, as well as the factors which are based on some research by other scholars.

The literature converges strongly on several factors that contribute to unsatisfactory performance in Grade 12 Physical Sciences. Resource deficits (particularly the lack of laboratories, textbooks, and qualified teachers) emerge repeatedly as significant barriers to effective science instruction. Teacher-related factors, including absenteeism, inadequate content knowledge, poor lesson planning, and insufficient professional training, are consistently identified across multiple studies as direct contributors to poor learner outcomes. Socioeconomic conditions, large class sizes, language barriers, and limited parental involvement are equally well-documented as compounding influences that operate beyond the classroom but nonetheless shape learner achievement in meaningful ways.

Despite this broad consensus, the literature contains notable tensions. The extent to which resource shortfalls, as opposed to pedagogical quality, bear primary responsibility for poor performance remains debated. Some scholars argue that skilled, motivated teachers can compensate for inadequate infrastructure, while others provide empirical evidence that laboratory access and material resources have a direct and measurable effect on achievement. Similarly, the role of constructivist approaches such as inquiry-based learning is widely endorsed in theory but inconsistently implemented in practice, with some studies noting that under-prepared teachers struggle to facilitate meaningful inquiry without structured professional support.

Despite the volume of research on Physical Sciences performance, several gaps persist. Few studies examine how these multiple factors interact simultaneously within specific South African rural or semi-urban school contexts. The lived experiences of Grade 12 learners themselves (particularly how they navigate competing challenges of language, poverty, and teacher quality) remain underexplored. Moreover, limited research has examined how school management team support specifically moderates or buffers the effects of resource deficits on Physical Sciences achievement at the Grade 12 level.

This study directly addresses these gaps by examining the factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences within a specific contextual setting, drawing on the perspectives of both teachers and learners. Grounded in Vygotsky's Zone of Proximal Development, the study adopts a theoretical framework that accounts for the social, cognitive, and collaborative dimensions of science learning. By integrating multiple factors, including teacher attitudes, learner attitudes, absenteeism, resources, language, and parental support, into a single analytical framework, this study provides a more holistic account of underperformance than studies that examine these variables in isolation. In doing so, it contributes context-specific evidence that can inform targeted interventions to improve Physical Sciences outcomes at the Grade 12 level.

2.6. Chapter Summary

This chapter focused on aspects of the teaching of Physical Sciences in the classroom and also applied a theoretical lens to highlight the role of influential factors, such as those that contributed to unsatisfactory Grade 12 Physical Sciences results. In addition, the focus was on how learners interpreted and made sense of classroom activities to

deepen their understanding as the teacher delivered the lesson. The following chapter presents the research design, methodology, and data collection procedures, including the specific techniques employed for gathering and analysing the data.

The chapter that follows presents the research design and methodology used in this study.

CHAPTER 3: RESEARCH METHODOLOGY AND DESIGN

3.1. Introduction

This chapter focuses on the research methodology and design that have been used to elicit data for this study. The following aspects are addressed in detail: research paradigm, research design and approach, population and sampling, sample size, data collection methods (including observations and semi-structured interviews), data analysis and interpretation, trustworthiness of the study, and ethical considerations.

3.2. Research Paradigm

A research paradigm refers to the framework or model that guides the process of conducting research (Pańkowska, 2023). It comprises a set of beliefs, assumptions, and understandings within which theories and research practices operate. Most paradigms stem from either the Constructivist or Interpretivist research traditions (Junjie & Yingxin, 2022). Each research study adopts a paradigm that informs the development of appropriate methods and ensures that the investigation is carried out logically and credibly.

This study adopts the Constructivist/Interpretivist paradigm, which recognises the existence of multiple realities shaped by participants' contexts rather than a single, objective reality. Constructivists argue that human behaviour is inherently complex and cannot be predicted through predetermined probabilities; nor can it be treated as a controlled scientific variable (Ashimalu et al., 2023). The interpretive worldview focuses on generating knowledge by understanding and interpreting the meanings individuals assign to their actions and experiences.

Therefore, this study was conducted using the interpretivist/constructivist paradigm to establish a picture of the Grade 12 Physical Sciences learners and teachers in time and place. It is used predominantly for qualitative analysis of reasons. An exploratory qualitative research design was adopted to gain an in-depth understanding of participants' perspectives and experiences regarding the factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences. This approach is

appropriate where little is understood about a phenomenon from the inside, and where the aim is to explore meaning rather than measure variables (McMillan & Schumacher, 2001). The data were collected through semi-structured interviews and observations. The interview guide comprised open-ended questions that the participants had to respond to. The interview questions also included prompts to guide participants in shaping their responses. The following assumptions guided this study:

Ontology: A relativist position was taken. According to Mijić (2022), multiple constructed realities exist. Reliability was assured to be subjective and constructed, *inter alia*, by the participants' experience and the social context. For this reason, a variety of data information is used to include the elucidation of responses from the participants, with an attempt to cater to different proportions, including a range of tests prepared to elucidate human response to various stimuli.

Epistemology: Sol and Heng (2022) argue that epistemology focuses on the relationship between the researcher, the participants, and the phenomenon being investigated. To develop a comprehensive understanding of the phenomenon, the researcher engaged in multiple interactions with the participants. The researcher negotiated participation and obtained the participant's consent. Getting to each participant's classroom to observe the teacher in a class while delivering the lesson and the interaction between the teacher and learners to collect responses, and lastly interacting with the participants face-to-face using the interview guide questions and collecting the information verbatim using an audio recording cell phone to individual semi-structured discussion interviews. Obtaining responses directly from participants through face-to-face audio recording gave the researcher a better understanding of participants' perspectives without missing any word overcoming human error and misinterpreting the participants' viewpoints and to better interpret the findings in the correct context.

Methodology: The methodology refers to the processes and procedures followed to conduct the study (Mishra & Alok, 2022). The semi-structured interview discussions yielded themes and sub-themes that were recoded, transcribed, and interpreted using a thematic analysis as described by Benjamin (2023). This chapter involved the qualitative approach, population sampling, target population sampling method and technique, data collection instruments and techniques, data analysis and interpretation, Trustworthiness of the study and ethical considerations. According to Thomson (2025), "qualitative

research is where words and sentences are used to qualify and record information about the world. These words might come from recorded interviews or focus groups, written responses to open-ended questions, diaries, letters, stories and other forms of literature, or from the field notes of a diligent observer of social phenomena.” The researcher’s data unpacking in this approach was dependent on participants’ views to gather information. Purposive sampling was implemented because it allowed the researcher to voluntarily select participants for the research study and to properly assemble and analyse the data.

3.3. Research Design and Approach

Research design is the plan and the procedure for research that spans the decisions from broad assumptions to detailed methods of data collection and analysis (Creswell, 2018). The study followed a qualitative approach, using an exploratory case study design to investigate the factors contributing to Grade 12 learners’ unsatisfactory performance in Physical Sciences results in four selected high schools in the uMkhanyakude District, KwaZulu-Natal, under the Ingwavuma Circuit. Through a case study, the researcher’s elucidation by virtue turns into part of the research (Creswell, 2017). The researcher used the uMkhanyakude District to investigate the factors contributing to Grade 12 learners’ unsatisfactory performance in Physical Sciences.

The qualitative researchers seek to amplify the voices of the people who participate in their research. They are also interested in the lived experience of individuals, groups, and communities that they study; hence, it is preferable to record interviews. The researcher collected data from participants through classroom observation while they were teaching and audio-recorded face-to-face semi-structured interviews, which were then transcribed. Semi-structured interviews were used to gather data. The interviews helped the researcher collect data aligned with the study’s objectives to investigate the factors contributing to Grade 12 learners’ unsatisfactory performance in Physical Sciences.

3.4. Population and Sampling

This subsection focuses on the study's population and sampling of participants.

3.4.1 Population

The uMkhanyakude District in the KwaZulu-Natal Province comprises four circuits, namely Hlabisa, Ubombo, Umhlabuyalingana, and Ingwavuma. This study was situated

in the Ingwavuma Circuit, which comprises 38 secondary schools that offer classes up to Grade 12. This study was conducted in the Ingwavuma Circuit, involving four (4) schools from a population of 38 high schools. The population is the entire set of objects or people that is the focus of the research study and about which the researcher wants to determine certain characteristics (Marcus, 2022; Bless et al., 2015). Barnsbee et al. (2018) mentioned that the target population is the group of individuals whom the intervention intends to conduct research and draw conclusions. Furthermore, the population is a larger pool from which a specimen is drawn, which could assist in generalising from a cluster of individuals about whom we want to draw the conclusions (Blanche et al., 2006; Babbie, 2007; Merriam, 2009; Yin, 2014)

3.4.2. Sampling

This study used a non-probability sampling. Non-probability sampling is the selection of subjects based on their availability, accessibility, proximity, and suitability for providing the data required for a study (Bhardwaj, 2019; Shorten & Moorley, 2014). Purposive sampling is a tool for participant selection and a type of non-probability sampling that is most effective when one needs to study a specific domain with acknowledged expectations within it (Creswell et al., 2016; Tongco, 2007). In addition, Sharma (2017) stated that purposive sampling is a group of sampling techniques that rely on the researcher's judgement when selecting the participants to be studied. Overall, this study used purposive nonprobability sampling (Yin, 2014). The reason for the purposive sampling was that the researcher believed that to ensure credibility, the data should be collected from Grade 12 Physical Sciences teachers and learners, since they were the relevant participants with appropriate knowledge, skills, and experience to help understand the factors that contribute towards unsatisfactory performance in Physical Sciences Grade 12.

The biographical information, as shown in Table 4.1, was administered to male and female teachers aged between 23 and 60 years who were qualified to teach Physical Sciences at the Grade 12 level. These teachers had completed an education qualification in Physical Sciences at a college or university. Learners participating in the study were aged 18 to 23 years and were enrolled in Grade 12 Physical Sciences at Ingwavuma Circuit. The sampled schools' overall pass rate for all subjects ranges from 60 to 70%, with Physical Sciences the lowest-performing subject, at 40 to 50%. The concern was based on the culture of teaching and learning, as in Grades 10 and 11,

there is reluctance, and most attention is focused on Grade 12. In most cases, Physical Science is taught by PGCE educators who may lack pedagogical expertise but are good at content. The content is heavier than part of a school-based curriculum. For example, engineering content is taught to learners who have nothing to do with the school curriculum. Management seemed to be ineffective in organising internal developmental workshops, team teaching, and monitoring and evaluation.

3.4.3. Sample Size

Kumar et al. (2013:49) described sample size as the total number of subjects in the sample, or the number of respondents or observations to be included in a study. Remarkably, sample size affects how well the results reflect the population. In qualitative case studies, sample size is determined by information richness, not statistical generalisability (Guest et al., 2006). In his study, the selection of four (4) teachers was conducted with the help of the principals and district officials. The teachers were categorised into two, i.e., experienced and novice. The first category included two (2) of the most senior and experienced Grade 12 Physical Sciences teachers, who have at least three years of teaching the subject and at least a postgraduate qualification with Physical Sciences as a specialisation. The second category included two (2) novice Grade 12 Physical Sciences teachers with one or two years of teaching experience and at least an undergraduate qualification with Physical Sciences as a specialisation. Two Grade 12 learners (18 years or more) who were performing well in Grade 12 Physical Sciences across the gender line from the uMkhanyakude District schools, and two Grade 12 learners whose performance was not satisfactory in Grade 12 Physical Sciences. The selection of learners was done with the help of the principal and teachers. This was done to allow the researcher to collect and analyse the data thoroughly, and because the two schools chosen appeared to be the lower-performing schools in the Ingwavuma Circuit.

3.5. Data Collection Methods

Data collection methods are the ways in which data is collected, using instruments to solicit information that is further analysed and reported (Mazhar et al., 2021). In this study, face-to-face semi-structured interviews and observations were conducted with teachers and learners, using data-collection guides. In this study, classroom lesson observations were conducted, during which the researcher observed teachers' and learners' interactions during lesson delivery.

3.5.1. Semi-structured Interviews

In this study, data were collected through semi-structured interviews with participants. Magaldi and Berler (2020) define semi-structured interviews as exploratory interviews. An interview guide containing questions and prompts was prepared to investigate the factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences. Participants were interviewed using a question guide composed of open-ended questions, which allowed respondents to respond verbally. An audio recording device was used to capture their responses, and the data were subsequently analysed using thematic analysis.

The data collection involved eight participants: four teachers from four different schools and four learners from each corresponding teacher's school in the Inkosi Sambane circuit. The interviews focused on exploring the factors contributing to the unsatisfactory performance of Grade 12 learners in Physical Sciences at these schools. Individual semi-structured interviews were conducted to explore participants' insights. The study explores the factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences at certain schools in the uMkhanyakude District of KwaZulu-Natal, as perceived by both teachers and learners. It also considers their understanding of these factors. Follow-up interviews were conducted to clarify any points that required further explanation from the initial meetings. Additionally, member checking was conducted after transcription to validate the interview content. The interview schedule included elements designed to investigate these factors from a constructivist perspective.

Face-to-face semi-structured interviews were conducted with willing teachers and learners after school hours to ensure they did not interfere with the school's schedule. With the participants' permission, the interviews were digitally recorded. Participants were informed of their right not to be audio-recorded, and consent was obtained beforehand. The researcher used audio recordings to ensure accurate data collection. The semi-structured interview questions were used to investigate the factors contributing to poor performance in Physical Sciences among Grade 12 learners. Each participant was audio recorded during their spare time. The interviews lasted between 45 and 60 minutes, though some participants concluded earlier or required additional time.

3.5.2 Observations

Observational research is very useful and feasible for practitioners; hence, it can be combined with other data collection methods (Urquhart, 2015). The value of observation is that it allows researchers to study people in their natural environment to understand the phenomenon from their perspective. Observation requires the researcher to spend considerable time in the field, potentially adopting various roles to gain a more comprehensive understanding of the people being studied. Observation is considered scientific when it serves a particular research objective, is systematically planned and recorded, and is subjected to checks of its validity and reliability (Farid, 2022). There are two types of observation, namely participant observation and direct observation (Elhamma, 2024).

Participant observation occurs when the researcher becomes an observer, observing both the participant and the situation simultaneously and at the same place. On the other hand, direct observation, also called non-participant observation, is conducted without any interaction between the people being observed and the researcher during data collection. Therefore, in this study, the researcher used a direct observation (non-participant), meaning the researcher was a spectator (not taking part in teaching) in the classroom as the lesson progressed. The class was very quiet, which gave me a great opportunity to capture precise information. The researcher observed some Grade 12 teachers teaching Physical Sciences topics, including Organic Chemistry, Projectile motion, Electricity and magnetism, and Acids and bases, across all four selected schools. An observation sheet was used to gather information during the observation period, and the notes were taken to facilitate gathering extra information.

3.6. Data Analysis and Interpretation

According to Yin (2015), the qualitative approach comprises five steps for the researcher to follow. The five data analysis steps are (1) Compiling data (that is where face-to-face interview occurs), (2) Disassemble data (transcribing from audio record), (3) Reassemble data (that is where the researcher group information gathered during interview from different participants), (4) Interpret data (presenting the results in order to answer the research questions in place on factors contributing to Grade 12 learners' unsatisfactory performance in schools of Ingwavuma Circuit), (5) Conclude (the researcher presents presumptions based on the findings from the interview).

This study adopted Yin's (2015) five-step framework to guide the analysis of data collected through semi-structured interviews and observations with Grade 12 Physical Sciences teachers and learners at selected schools in the uMkhanyakude District. The first step, compiling, involved gathering data through face-to-face interviews, which were audio-recorded to ensure accuracy and completeness. In the second step, disassembling, the audio recordings were transcribed verbatim, breaking the data down into manageable units that could be examined in detail. The third step, reassembling, involved grouping and organising the information gathered from different participants according to emerging patterns relevant to the research questions on factors contributing to unsatisfactory performance in Grade 12 Physical Sciences.

In the fourth step, interpreting, the researcher analysed the reassembled data to construct meaningful responses to the research questions, drawing on participants' own words and experiences to illuminate the factors under investigation. Themes and sub-themes were identified during this phase and are presented in Table 4.2, which organises the findings into main categories and their related sub-categories as they emerged from the data. The fifth and final step, concluding, involved the researcher presenting well-reasoned conclusions based on the patterns and insights derived from the interview and observation data, ensuring that the conclusions were firmly grounded in the evidence gathered from participants rather than in prior assumptions.

Yin's (2015) framework provided a coherent and systematic structure for moving from raw data to meaningful findings, making it particularly appropriate for this exploratory qualitative study. By following these five steps consistently, the researcher ensured that the analysis remained transparent, replicable in its logic, and responsive to the lived experiences of the participants in relation to the factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences.

3.7. Trustworthiness of the Study

According to Adler (2022), trustworthiness is defined as the methodological accuracy and adequacy of the research inquiry. In qualitative research, the quality of research is measured using trustworthiness. As the main aim of this study is to investigate factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences, then trustworthiness was safeguarded through strategies of credibility, confirmability, dependability, and transferability.

According to Little and Green (2022), credibility claims that the trustworthiness of a study is controlled once co-researchers or readers encounter the potential, they can concede it. Reliability refers to the consistency of a tool, i.e., the extent to which the outcomes are comparable each time it is used (McMillan & Schumacher, 2006). In a nutshell, this instrument was sent to a home English language specialist to check for grammatical errors, and it will be sent to home English speakers to ascertain whether they understand the wording of the instrument in the same way.

Confirmability refers to findings that are clearly derived from the data, depending on the researcher's interpretations (Lim, 2024). Thus, in this study, confirmability was guaranteed through the consent forms which were first disseminated to all participants after receiving the confirmation letters of approvals which were: Ethical Clearance from the UNISA Review Committee, Approval from the DBE (Department of Basic Education) Provincial Head Office (KZN) and Approval from the Districts Directors of Education Department to ensure that the data solicited via the consented participants would make it possible for the research to yield the investigated results for legitimacy points. In this study, the researcher submitted the inquiry tool to the supervisor for validation. The supervisor, an expert in the natural sciences, reviewed the research tool. He assessed the tool's structure and provided feedback for the researcher's attention. The researcher addressed the feedback and made the necessary changes to the tool as required by the supervisor. As a specialist in natural sciences, the supervisor ensured that the tool's content aligned with the project's objectives.

Dependability refers to "the consistency and reliability of the research findings and the degree to which research procedures are documented, allowing someone outside the research to follow an audit and critique the research process" (Sadowski, 1986). In this study, dependability was ensured through the use of reflective, articles, Department of Education reports, such as reports published annually, journals, thesis, Block News, seminars, webinars, and newspapers based on the subject in question to ensure that no information was omitted during the interviews and that the researcher and the supervisor reached consensus in relation to the findings. According to Ahmed (2024), transferability refers to the extent to which research findings can be generalised to other contexts or situations. Transferability was achieved by employing a qualitative, exploratory approach. A purposive, non-probability sampling technique was used to recruit physical

science teachers and learners whose current perceptions are relevant to this study. These characteristics served as the main specific inclusion criteria.

3.8. Ethical Consideration

The level of attention on ethical conduct has both increased and broadened in response to society's expectation of greater accountability (Tsui & McKiernan, 2022). The researcher followed the following UNISA General Ethics principles: "Essentiality and relevance, Maximisation of public interest and of social justice, Competence, ability and commitment to research, Respect for and protection of the rights and interests of participants and institutions, Informed and non-coerced consent, Justice, fairness and objectivity, Respect for cultural differences, Integrity, transparency and accountability, Risk minimisation and Non-exploitation."

Ethics, conventionally, is about the belief in what is satisfactory or criminal, appropriate or inappropriate, noble or unruly. When a study is conducted through an institution such as a higher education institution or school system, endorsement for undertaking the research needs to be obtained from the organisation before any information is collected. Thus, the researcher submitted an application to the University of South Africa's review ethics committee for ethical clearance. The approval letter has been obtained and attached as Appendix A. Ethical processes were followed during this research, in line with the applicable policies and procedures of the Ingwavuma Circuit in the uMkhanyakude District, KZN province, and the University of South Africa's review ethics committee. Permission was obtained from the Ingwavuma Circuit manager or the uMkhanyakude District director. Participants were given their informed consent. Respondents' anonymity, privacy, and confidentiality were also assured. Audio recordings were made during the interviews. The researcher applied the following ethical principles:

The primary researcher was responsible for ensuring the study adhered to the ethical standards. In this study, the teachers and learners have a right to privacy; the researcher advised the participants of all aspects of the study that might influence their willingness to participate and answer all questions on the subject, including issues that may have adversarial effects or concerns. The nature and purpose of the study were clearly explained to both teachers and learners prior to the interviews. Consent forms were distributed, allowing participants sufficient time to read and understand the contents before signing. The researcher maintained a friendly and honest disposition throughout

all interactions. Furthermore, measures were taken to protect participants from any form of physical or psychological discomfort, harm, or danger. There were no risks associated with this study; the information acquired from the participants was kept confidential. None of the information provided in this study reveals participants' identities or residences, and both teachers and learners participated voluntarily without remuneration.

3.9. Chapter Summary

This chapter presented a detailed qualitative exploration and critically outlined strategies used for this case study design. The researcher discussed the observations and semi-structured interview methods that were used to collect and analyse the data. In this chapter, research paradigm, research design and approach, population and sampling, data collection, semi-structured interviews, observations, data analysis and interpretation, trustworthiness of the study, and ethical considerations were discussed in depth. I accounted for the options I made for the research design, sampling, and data collection methods. Issues of trustworthiness and credibility were based on the standards of diligence, including dependability, credibility, confirmability, and transferability.

CHAPTER 4: DATA PRESENTATION AND INTERPRETATION

4.1. Introduction

Chapter 3 clearly defined the research methodology used to collect data and the research design of this study. This chapter critically presents and interprets the findings and the results of the study, which comprised data extracted from the teachers' interviews, classroom teacher-learner interaction observation, and learners' interviews. Themes were used to present data in line with the research questions. A qualitative approach via thematic analysis was used in this investigation, and the data collection tools are attached. The data were collected from lesson observations of Physical Science in classrooms during teaching and learning, face-to-face interviews with Physical Sciences teachers who were teaching Grade 12, and Physical Sciences learners who were doing Grade 12 in four selected high schools in South Africa in KwaZulu-Natal, under the uMkhanyakude District at Ingwavuma Circuit were used to investigate the factors contributing to Grade 12 learners for unsatisfactory performance. The study findings emanating from the semi-structured interviews using a purposive technique between the researcher and the participants pertaining to the learning and teaching of Physical Sciences were well-presented.

Table 4.1(a): Biographical information of the Teacher participants.

Participant code	Age	Gender	T/E (in years)	Grade 12 T/E (in years)	Distance from home to school (in km/m)	Qualifications	Mode of transport
TP1M	31	M	2	2	5km	BSc (Chem) PGCE(P/S)	Hitch-hiking
TP2M	29	M	5	5	500m	BEd (Natural Sciences FET	Walk on foot
TP3F	40	F	12	3	7km	BSc (Chem) PGCE(P/S)	Driving own car
TP4M	48	M	28	20	0 km(boarder)	BEd (Maths and Science education	Walk on foot

Table 4.1(a) above presents the biographical information of the teacher participants, elicited just before the questionnaire was administered. Table 4.1(a) presents the participants' codes, ages, genders, teaching experience (T/E), Grade 12 teaching experience, the distance travelled to and from school, the teachers' qualifications, and the mode of transport they use to get to work.

Table 4.1(b): Biographical information of the Grade 12 Physical Sciences Learners' participants.

Participant code	Age	Gender	Grade started P/Sciences	Distance from home to school (in km/m)	No. of people sharing house	Have a child?	Are parents alive?	Are you staying with them?	Mode of transport
LP1M	18	M	10	200m	6	No	Yes	Yes	Walk on foot
LP2F	18	F	10	3km	5	Yes	No	No	Public transport
LP3F	19	F	10	50m	8	Yes	No	No	Walk on foot
LP4M	18	M	10	0 km(boar der)	4	No	Yes	No	Walk on foot

Table 4.1(b) above presents the biographical information of the learner participants, elicited before the interview guide questions were asked. This table indicates the codes of learner participants, their age, gender, the distance travelled by learners from home to school and vice versa, the number of people sharing a house at home, if parents are still alive, if the learner is staying with his or her parents, and the mode of transport they use to get to school.

4.2. Presentation and Discussion of Themes and Sub-Themes

A detailed discussion of the themes and key findings identified in this study is presented in this chapter. Gathering data from two participant groups—teachers and learners—generated rich insights, and the researcher carefully examined the data to identify themes and sub-themes, as shown in Tables 4.2(a) and 4.2(b). This process enabled a clearer understanding of how the data relate to the research questions, aims, and objectives. The data were revisited frequently to ensure that the interpretation remained firmly grounded in the participants' perspectives. According to Oranga and Matere (2023), qualitative research often produces substantial volumes of information, and the processes of condensing, organising, and interpreting this data constitute the most demanding phase of the study.

Thematic content analysis was employed to analyse the data, and a descriptive-narrative approach was used to present and interpret the findings. Eldh et al. (2020) note that researchers may use interview quotations to illustrate the “why, when, or how” of a phenomenon, to demonstrate the strength of participants' views, and to highlight similarities, differences, and the diversity of perspectives. They further observe that qualitative studies commonly incorporate such quotations from interviews and related data sources. The themes and sub-themes identified are displayed in Tables 4.2(a) and 4.2(b), followed by an in-depth discussion aligned with the study's objectives.

Table 4.2(a): The four themes and their sub-themes generated from teacher participants.

No.	Themes	Sub-themes
1.	Getting ready for tuition delivery of Physical Sciences	-Preparing, planning, teaching and learners' performance in Physical Sciences -Hindering factors and activities for learners -Impact of class activities
2.	Physical Sciences' scientific concepts	-Teachers 'challenging concepts -Addressing the problematic scientific concepts -Interrelating scientific concepts -Counteracting factors in the delivery of scientific concepts
3.	Teachers' view on possible factors	-Resulting/ causing factors and concepts relations -Addressing factors -Teachers' action to overcome unsatisfactory performance
4.	In-depth teaching of Physical Sciences	-Techniques in teaching Physical Sciences - Impact of teaching techniques and the frequency with which learners receive activities

Table 4.2(b): The five themes and their sub-themes from learner participants

No.	Themes	Sub-themes
1.	Getting ready to study Physical Sciences.	-Learners' preparations for studying -Doing activities while studying -Engaging fellow classmates
2.	Understanding scientific concepts	-Teachers' methods of teaching -Challenging concepts while studying -Overcoming challenging concepts -Educators' input on learners' concept understanding -Learner-to-learner interaction -Strategies used while studying -Keeping mastered concepts in long-term memory
3.	Assistance received from home	-Parents involvement
4.	Frequency of assessment	-Frequency of receiving homework and class work. -tests writing frequency.
5.	Learners' views.	-Other factors disadvantaging learners' academic performance

4.3. Data Presentation and Interpretation

A semi-structured interview was conducted to gather qualitative data through face-to-face engagement with participants. Purposive sampling was employed to select participants who best represented the characteristics and focus of the study. This approach was well-suited to the research, as it enabled the researcher to select individuals most likely to provide valuable insights.

The findings of this study reveal that the factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences in the uMkhanyakude District are multifaceted, as reflected in the emerging themes from both teacher and learner participants. Teacher-generated themes highlight issues related to inadequate lesson

preparation, challenges in delivering complex scientific concepts, and varying teaching strategies, including limited scaffolding of foundational knowledge and inconsistent alignment between teaching and assessment practices. While some teachers employ targeted interventions, others rely on increased workload or extended contact time, with varying effectiveness. From the learners' perspective, themes point to insufficient study preparation, difficulties in understanding abstract concepts, limited parental support, and inconsistent engagement with assessments. Additionally, learner-reported factors such as absenteeism, lack of motivation, and socio-contextual challenges further compound poor performance. Collectively, these themes respond directly to the main and sub-research questions by illustrating both the instructional and contextual factors influencing performance, the strategies employed by teachers to address these challenges, as well as learners' perceptions of and responses to the barriers affecting their academic achievement in Physical Sciences.

4.3.1. Interviews: Teachers' Responses

This subsection presents the analysis of data obtained from semi-structured interviews conducted with Grade 12 Physical Sciences teachers at selected schools in the uMkhanyakude District. The interviews were designed to elicit teachers' firsthand experiences, perspectives, and insights regarding the factors they identified as contributing to learners' unsatisfactory performance in Physical Sciences. Following Yin's (2015) five-step analytical framework, the interview responses were compiled, transcribed, reassembled, and interpreted to generate meaningful findings that speak directly to the research questions of this study. The analysis is organised according to the subthemes outlined in Table 4.2a, which emerged from the data during the interpreting phase and reflect the key issues raised consistently across participants' responses. Each subtheme is discussed in turn, supported by direct excerpts from the interview data to ensure that the findings remain grounded in the voices and experiences of the teacher participants.

4.3.1.1. Theme 1: Getting ready for Physical Sciences Tuition Delivery

Preparing, Planning, Teaching and Performance of Learners in Physical Sciences

For a productive lesson to occur (i.e., for learners to perform better) in the classroom, the teacher needs to thoroughly prepare and plan the lesson before outlining the information to learners. I doubt any teacher can just walk into the classroom and teach without proper planning and preparation. Preparing can be used to determine the types of activities the teacher will give to his or her learners and the motives behind them. Also, to check whether the activity planned for learners is doable, assess the time required to complete the activity and explore alternative solutions that may arise from learners' responses. Teachers were asked to outline how they prepare, plan, and teach Physical Sciences, and their responses are presented below:

Teacher Participant 1 (TP1M) said, *"I do self-introspection, make lesson handouts, make illustrations and download videos. Then when I start preparing for my lesson, I use Annual Teaching Plan (ATP), examination guideline, curriculum, and policy statement (CAPS) document and past question papers, my learners are performing unsatisfactory every time they write a new chapter, as a result I need to repeat a lesson"*. The teacher 1(TP1M) complied with the preparation requirement before going to the classroom and deliver the lesson. Teacher Participant 2 (TP2M) said, *"I am using ATP, CAPS document, past question papers and exam guideline in preparing and planning for the lesson. I also use their home language while I teach for more clarity, and they seem to understand easily. Before I start a lesson, I assess their prior knowledge to see their level, and I make some adjust, their performance is moderate; they need to improve more"*. This teacher demonstrates commendable practice by acknowledging that Physical Sciences is taught in English, a language with which many learners, particularly those from Black communities in rural areas, are not familiar. Thus, he must be able to use both the foreign language and home language for clarifying concepts, though he must use at least 20% in his lesson in his home language and 80% English to allow mastering of the concepts. Teacher Participant 3 (TP3F) said, *"I check their prior knowledge on the subject, I use my ATP, exam guideline, national protocol on assessment, CAPS documents, previous year exam quantitative analysis. I check if the lesson will need the demonstration before I go to the class. I also check if the class is arranged according to the lesson expected to be delivered. For example, I check the presence of the periodic table of elements in learners' textbooks. I write and prepare a lesson plan or the structure of the lesson to be delivered."*

I prepare the class work to be given to learners during teaching and learning, and homework after teaching and learning to practice at home. I frequently use the previous year's question papers; they perform above 50% the majority of them, but there are some who do not move from 30%".

It appears as if this teacher is confronted with the persistent challenge of learners who struggle to engage with and respond to higher-order questions — those that require analysis, evaluation, and application of scientific concepts rather than mere recall of factual information. This observation suggests that while some learners may possess a basic familiarity with Physical Sciences content, their depth of conceptual understanding may be insufficient to meet the cognitive demands of Grade 12 examination questions.

Teacher Participant 4 (TP4M) said, *"I review curriculum standards and learning objectives and then assess their prior knowledge of the learners. I set clear learning objectives and choose the topics and activities to be done. I introduce the lesson and the topic to generate interest. I believe in lecturing, demonstration and discussion"*. Teacher 4 (TP4M) is a dynamic teacher since, after giving information, he then allows learners to discuss where learners are able to come up with their options based on the lesson already delivered.

Hindering Factors and Activities for Learners

When the teachers were asked if there are factors that hinder them from performing well, or that make them perform well, and that do they give activities to their learners while teaching, they harmoniously answered as follows:

Teacher Participant 1 (TP1M) said, *"Yes, when learners cannot even recall what they learnt from the previous grades, also when learners are absent themselves from school. Upon my planning and preparations, I prepare and give daily activities to my learners in the form of class work and homework and some activities we do together in the form of question and answer"*. The teacher confirmed that he gave learners work and class work, which is good, but it is not clear as to what type of activities he gave his learners, such as questions and answers, and under what circumstances? Teacher Participant 2 (TP2M) said, *"Yes, there are, like teaching without proper resources, such as textbooks. The activities given to learners help me reach the goal set, follow the annual teaching plan*

(ATP), *linking the previous concepts examined by the examiners with the current one which are being taught*” and Teacher Participant 3 (TP3F) concur with TP2M by saying, *“Yes, when planning I prepare some activities from the previous year’s exam papers”* and again Teacher Participant 4 (TP4M) also concurs with TP3F by saying, *“In curriculum mapping, is where I outline topics and learning objectives, whereas in lesson planning I create a detailed lesson plan by collecting materials and equipment’s that will enable me to create assessment and rubrics”*.

All the teachers, according to the data extracted, plan the activities to be given to learners as education requires teaching and assessment to measure the level of understanding of what one has learned. This planning is a fundamental professional responsibility, as well-structured activities ensure that teaching is purposeful, paced appropriately, and aligned with the curriculum requirements of the Curriculum and Assessment Policy Statement (CAPS). However, the mere existence of planned activities does not guarantee effective learning outcomes; the quality, relevance, and cognitive demand of those activities, as well as the extent to which teachers provide meaningful feedback, are equally critical in determining whether learners progress toward satisfactory performance in Physical Sciences.

Teacher Participant 1 (TP1M) said, *“I normally give them homework and class work from the previous year’s exam papers”*. It is a norm in the teaching profession that learners be assessed before (baseline assessment) or after (post assessment) teaching. Therefore, this teacher is doing exactly what is required, even though he never mentioned how he ensures that learners write the work and which method is used to control that work. Once more, this teacher seems to focus mainly on homework and classwork for assessment, forgetting tests in any form, whether it be class tests or home tests, as well as practical ones. Teacher Participant 2 (TP2M) said, *“I give my learners practical assessment, homework, class work, and formal and informal tests”*. TP2M concurs with TP1M in administering class work and homework as forms of assessment, but he goes beyond and gives them practical, formal and informal tests. When learning by doing practically, you hardly forget that matter; it is easily remembered. Therefore, from the data elicited from this participant, he revealed that practical assessment is also given to learners. This

helps them to explore new concepts on their own. Informal tests are the pieces of assessment that are aimed at checking the learners' understanding and measuring the progress before writing the examination. If informal tests are well administered to the learners, then in the examination (that is regarded as a formal assessment), they do wonders.

Teacher Participant 3 (TP3F) said, *"I teach and assess. After every lesson, there is class work and homework are also given to learners, they write tests every week. Home tests are also given to them"*. This participant concurs with TP1M and TP2M in administering class work, homework, and tests as a form of assessment. She never mentioned anything that is practically related, hence Physical Sciences is more practical, but she seems not to have considered practicality as the key to overcoming unsatisfactory performance in Physical Sciences. Teacher Participant 4 (TP4M) said, *"I rely on class work and homework"*. This participant concurs with TP1M, TP2M, and TP3F on administering class work and homework as forms of assessment. No tests and practicals are administered here to overcome unsatisfactory performance. The act of this participant raises a question as to how learners can perform satisfactorily in Physical Sciences if they do not even know what an exam looks like. These teachers are discouraged because they are the ones who fail the nation.

Impact of Class Activities

Teachers were asked how the tasks or activities given to learners support their teaching practice. Their responses are presented as follows:

Teacher Participant 1 (TP1M) said, *"It helps me recognise learners who are struggling with certain chapters or concepts. Those who are underperforming, I then teach them separately during the planned extra time until they master the concepts."* Teacher Participant 2 (TP2M) also said, *"It helps me observe if I develop in the teaching field and if I do bring change to the lives of the learners. It also teaches me how to meet the learners' standard of assessment"*. The teachers can recognise learners who are struggling to master certain concepts, which is highly appreciated. Not all teachers will do that. Therefore, other teachers lack motivation from the DOE in the form of remuneration.

Teacher Participant 3 (TP3F) said, *“The activities that I normally give to my learners contain the features which the examiners usually use when setting the exams, so it is easy to prepare the learners for the tough assessment during the final examination, hence they pass. For example, both papers, the one for the mechanics and Chemistry have a formula sheet which the learner must know how to use during the exam, rounding-off to two decimal places as often asked by the examiners and unit conversion, this help learners do correct application during the exam time. These help me achieve the goals and objectives set”*. This kind of teacher shows the quality time spent on analysing the trend in which the examiners set the past examination papers and the qualities of being a well-experienced teacher who studies how the questions are asked and uses that information to train her learners.

Teacher Participant 4 (TP4M) said, *“The activities such as discussion, quizzes and games reinforce learners’ understanding of the concepts and assist in solidifying the emerging knowledge. Also, problem-solving activities, projects, and case studies allow learners to apply theoretical concepts to real-world scenarios, promoting critical thinking and deeper understanding. Activities like tests and feedback sessions assess learners’ progress and understanding by allowing for adjustments to instructions and better support.*

This teacher demonstrates a clear understanding of his practice, and it would be beneficial for other teachers in the education sector to emulate his approach. His ability to reflect critically on his own teaching, adapt his strategies to the needs of his learners, and maintain a structured and purposeful classroom environment are qualities that are central to effective Physical Sciences instruction. Such practice aligns with what the literature identifies as the hallmarks of a competent and professional educator — one who not only delivers content but continuously seeks to improve the learning experience and outcomes of every learner in his care.

Teacher Participant 3 (TP3F) adopts an examination-oriented approach, emphasising alignment with examiner expectations using past paper trends and technical skills such as formula application, rounding-off, and unit conversion. This reflects a structured, experience-driven strategy aimed at preparing learners specifically for high-stakes

assessments. In contrast, Teacher Participant 4 (TP4M) employs a more learner-centred and holistic approach, focusing on interactive activities such as discussions, quizzes, and problem-solving tasks to deepen conceptual understanding and promote critical thinking. While TP3F prioritises exam readiness, TP4M emphasises conceptual development and active learner engagement, highlighting a clear pedagogical difference between outcome-driven and process-oriented teaching practices.

4.3.1.2. Theme 2: Physical Sciences' Scientific Concepts

Teachers' Challenging Concepts

It is widely acknowledged that no teacher, however experienced, can claim complete mastery of every concept within a subject as broad and demanding as Physical Sciences, which spans abstract theoretical content, complex mathematical applications, and practical investigative skills across both physics and chemistry. Teacher confidence and content knowledge are known to vary across topics, and this variation can directly influence the quality of instruction learners receive. When participants were asked whether there were any concepts or chapters, they found particularly challenging to teach, they responded as follows:

Teacher Participant 1 (TP1M) said, *"Yes, since am new in the subject (motion in one dimension- projectile motion and photo-electric effect), these concepts give me hardship when I am about to prepare myself for the lesson. Even though I try my best but cannot explain them to their full potential, actually I am lacking a lot. I do not feel comfortable when I am about to teach these concepts"*. Some of the teachers require adequate capacitation before being assigned to Grade 12 Physical Sciences classes. Grade 12 is a true reflection of the school's academic standards, as the final examination encompasses all chapters of the curriculum. It is therefore essential that teachers demonstrate comprehensive content knowledge across all topics, as any gaps in their understanding may have an adverse impact on learner performance.

Teacher Participant 2 (TP2M) said, *"Electrochemistry (in Paper 2) is the most challenging concept, which gives me sleepless nights. I fail at how to introduce it, and at the same time, cannot make learners understand the differences between an electrolytic cell and an electrochemical cell"*. From the data extracted from TP2M it is crystal clear that some

learners performed unsatisfactorily due to the teacher's incapacity to deliver the subject content.

Teacher Participant 3 (TP3F) said, *"Yes, there are. In Paper 1, it's a momentum- it is difficult for me to explain this concept, especially if I am about to do a practical investigation of it. The second concept is in Paper 2, it is a titration, it is difficult to explain this concept, and the major problem is that we do not have science laboratories and science equipment. Even if we had this equipment, I would request someone who is well-experienced in doing practical investigation because I never did any"*. It has been revealed from TP3F that some teachers with a Post Graduate Certificate in Education (PGCE) have a serious problem with the school-based curriculum in how to impart knowledge, and lack the subject content. If the teacher is having a serious problem in Papers 1 and 2, and in addition is unable to perform relevant subject practical imagine what would happen to the learners. Obviously, there is no way learners will perform satisfactorily.

Teacher Participant 4 (TP4M) said, *"Chemistry, which is Paper 2 is the challenging one"*. It is clearly noted with concern that the whole Paper 2 is challenging the teacher, which is why some schools will never ever have satisfactory results in Physical Sciences because year after year, learners wrote Paper 2 without proper teaching of the right ATP and Examination guidelines being followed because of difficulties experienced by the teacher. This means that learners can perform satisfactorily in Paper 1 and suddenly drop in overall performance on the subject (Physical Sciences) due to unsatisfactory performance in the Physical Sciences (Chemistry) Paper 2.

Addressing the Problematic Scientific Concepts

A deeper exploration was undertaken to examine how challenging concepts are addressed, recognising the importance of ensuring that learners achieve a clear understanding without compromise. The responses are presented as follows:

Teacher Participant 1 (TP1M) said, *“I do practice and teach these concepts, after that I ask a well-experienced teacher from another school to teach the same concepts in my presence so that I can learn. I make use of networking with other schools’ teachers who are good at these concepts and does work for me because I gain experience”*. It is clear beyond a reasonable doubt that in this circuit at Ingwavuma, there are a few teachers who are really specialists in Physical Sciences, as most of the responses extracted indicate that quite a few Physical Sciences teachers are not struggling in both papers. Therefore, there is much to be desired as to what kind of Physical Sciences content these teachers have learned at the tertiary institutions that qualified them to teach Physical Sciences at school. Learners are more likely to perform satisfactorily when their teachers have a strong command of the scientific content of Physical Sciences. Ensuring that there are minimal gaps in teaching and learning creates a conducive environment in which learners can thrive academically.

Teacher Participant 2 (TP2M) said, *“I get someone to teach these concepts on my behalf”*. It is surprising that the DOE at Post Level 1 has been sending teachers to schools without allowing the schools to recruit relevant teachers and found that the DOE is busy sending teachers who are not fit enough to teach Physical Sciences, and this trend has been going on for more than ten years and schools were fed with incompetent Physical Sciences teachers. The trend for the DOE has deteriorated the Physical Sciences results due to employing without verifying whether the teachers qualify to cope with Physical Sciences School-Based contents.

Teacher Participant 3 (TP3F) said, *“Some lessons need learners to do the observations in the laboratory. I take them to the schools with laboratories to do observations. I ask them to bring their gadgets and load data so that will get into YouTube and look at the videos of the practical, then as a teacher I explain while watching”*. It has been depicted that there are schools that have no science laboratories and learn Physical Sciences without doing practicals if the teacher does not make arrangement of taking the learners to other schools with science laboratories or call the mobile science laboratory car. It is also clear that if the learners do not come with the gadgets with data, that means there will be no practical conducted in the school for the entire year. If there is no data, there is

no practical; if there is no money for transportation to science laboratory schools, there will be no practical.

Participant 4 (TP4M) said, *“I divide complex concepts into smaller manageable chunks and use the diagrams, illustrations and animations to help to illustrate abstract ideas. I create relatable analogies to simplify complex concepts. I provide opportunities for learners to practice, and then I demonstrate how concepts apply in real-world scenarios”*.

The teacher, by listening to him, seems to be a good teacher, since a teacher must have ways and means to simplify concepts so that learners understand them better. This ability to break down complex and abstract Physical Sciences content into accessible, meaningful explanations is one of the most important qualities a science teacher can possess, particularly in contexts where learners may already be disadvantaged by language barriers or limited prior scientific exposure. A teacher who can translate difficult concepts into relatable, everyday terms not only aids comprehension but also builds learner confidence and motivation toward the subject. This quality reflects what the literature describes as strong pedagogical content knowledge — the capacity to know not only what to teach, but how to teach it in ways that are responsive to the specific needs and contexts of one's learners.

Interrelating Scientific Concepts

Teachers were asked if learners can interrelate scientific concepts, and they responded as follows:

Teacher Participant 1 (TP1M) said, *“I can see that Physical Sciences is not their (learners) thing, they have a poor background related to scientific concepts”*. The data collected from this participant makes it clear that most learners lack a solid background in scientific concepts.

Teacher Participant 2 (TP2M) said, *“When planning I normally forget Cognitive Levels 1 and 2, which makes some learners fail even to answer very simple questions”*. This teacher has a problem of failing to teach the basics because when beginning the lesson, he must start with basic concepts that will enable the learners to answer Cognitive Levels

1 and 2 first before going to Cognitive Levels 3 and 4 because to answer Cognitive Levels 3 and 4 the learners are required to use Cognitive Levels 1 and 2 since Cognitive Levels 3 and 4 require application from Cognitive Levels 1 and 2.

Teacher Participant 3 (TP3F) said, *“Yes, some learners find it difficult to interrelate scientific concepts during teaching and learning. They also fail to see the conceptual linkages within the subject. For example: Kinetic energy in Physics (mechanics) and kinetic energy in chemistry (physical properties and collision theory). If a learner can understand that the context of these concepts is the same in both papers, they can relate and have good performance”*. This teacher can look at the ways concepts link across subjects. Therefore, when presenting scientific concepts, one must provide sufficient context to make them seem connected or relevant. The emphasis must be placed in Grades 8 and 9, where the concepts are being introduced. Teacher Participant 4 (TP4M) said, *“Learners failed to adequately connect concepts, leading to a depth in understanding. Also, there are conceptual gaps that arise where learners miss crucial connections between ideas, resulting in confusion or misunderstanding”*. It is normal that learners would have misconceptions or misunderstandings of scientific concepts, as mentioned by TP4M. At times, learners present concepts in an incoherent or illogical sequence.

Counteracting Factors in the Delivery of Scientific Concepts

Teachers were asked if they were encountering difficulties while delivering scientific concepts to learners and while assessing, they responded as follows:

Teacher Participant 1 (TP1M) said, *“My learners come up with something new they never learnt in the classroom, something that is not science-related, they develop their own content. Learners cannot relate scientific concepts with real-life situations”*. TP2M also mentioned that, *“I fail to make learners understand by themselves or to make their own image from scientific concepts being delivered by me as a teacher”*. It is common for learners to enter the classroom with myths and misconceptions, and it is the teacher's responsibility to correct them. However, myths play a crucial role, as learners enter the classroom with background information that the teacher can use to begin the lesson.

Teacher Participant 3 (TP3F) said, *“My school is in a rural area, we do not have a science laboratory where scientific investigation can be conducted, but we rely on YouTube videos. At the same time, we do not have Wi-Fi connection in our school, and we are using our own gadgets. Sometimes I have to transport learners to other schools with good resources. Overcrowding in classrooms is a serious issue; I do not pay full attention to those who are struggling. Another thing, learners do not have calculators as Physical Sciences is calculations related”*. Under no circumstances would you expect satisfactory performance if the ratio of teacher learners is still 1:100, which means one teacher is responsible for teaching one hundred learners in a small classroom with poor or no furniture. This is the result of poor infrastructure. It is clear that the schools are not treated equally, and some of the schools lack proper infrastructure and also a shortage of teacher learner support materials. On the other hand, overcrowding in undersized classrooms remains a significant challenge, as it results in many struggling learners going unattended. This is among the critical factors that the DOE has yet to adequately address.

Teacher Participant 4 (TP4M) said, *“Yes, like learners who have been misinformed or exposed to pseudoscience and also learners being sensitive to cultural differences, learners struggle to understand intangible concepts”*. This is an indication that there are no basic Physical Sciences (Physics and Chemistry) parts that are treated meaningfully in Grades 8 and 9 even in Grade 10, learners are not taught what is in the learning programme because one cannot expect that learners in Grade 12 are still struggling with basic concepts that should have been dealt with in Grades 8 and 9 or Grades 10 and 11 and found that the fact that learners are struggling with concepts in Grade 12 is deplorable.

Teacher Participant 2 (TP2M) demonstrates a weakness in instructional planning, particularly in neglecting foundational cognitive levels, which undermines learners' ability to grasp basic concepts and, consequently, hinders their progression to higher-order thinking. In contrast, Teacher Participant 3 (TP3F) shows a stronger pedagogical awareness by emphasising the interconnection of concepts across different domains, helping learners develop integrated understanding and improve performance. Similarly, Teacher Participant 4 (TP4M) acknowledges learners' difficulties in linking concepts but

frames these as learning challenges rather than instructional gaps, highlighting issues such as misconceptions and fragmented understanding. Overall, while TP2M's challenge lies in insufficient scaffolding of basic knowledge, TP3F and TP4M focus more on conceptual linkage, with TP3F actively addressing it and TP4M recognising it as a learner difficulty.

4.3.1.3. Theme 3: Teachers' Views on Possible Factors

Resulting or Causing Factors and Concepts Relations

A critical dimension of effective Physical Sciences teaching is the extent to which learners are able to relate new scientific concepts to their prior knowledge and everyday experiences. When learners struggle to make these connections, understanding remains superficial and performance suffers. Factors such as socioeconomic disadvantage, limited exposure to science outside the classroom, and language barriers can all compound this challenge significantly. When teachers were asked whether learners were able to relate scientific concepts within the subject, and what disadvantaging factors they believed hindered this ability, they responded as follows:

Teacher Participant 1 (TP1M) said, "*Learners fail to interrelate scientific concepts, for example, in chemistry, in acids and bases where the equations are balanced it has a good relationship with stoichiometry, movement of ions in solution that is compared or similar to that of galvanic cell and electrolytic cell, all these matches to the electromagnetism in mechanics paper one.*" Teacher Participant 2 (TP2M) also concurs with TP1M by saying, "*There is a relationship between the particles of materials, charges on objects and the mass of an object. These concepts are found in both mechanics and chemistry*". These teachers seem to be good at seeing the relationships among scientific concepts in the subject.

Teacher Participant 3 (TP3F) said, "*Mathematics is more related to Physical Sciences; learners need to apply Mathematics methods to successfully perform calculations in Physical Sciences. There is a link between Physics itself in Grade 10, where there are sound, waves, and light, which is similar to the Doppler effect in Grade 12. Stoichiometry starts from Grade 10 up to Grade 12. Most scientific concepts are found in general education and training (GET) in subjects like Technology and Natural Sciences*". This

Participant TP3F can teach learners across all phases because she knows the trend on how subjects are related and their application to unlock the hardly understood concepts in a subject such as Mathematics, which is used to successfully perform calculations in Physical Sciences. This teacher also seems to know that Physical Sciences did not begin in Grade 10, but as far *back* as Grades 8 and 9 in subjects such as Technology and Natural Sciences.

Teacher Participant 4 (TP4M) said, *“Some concepts can be connected across different subjects like Physics, Chemistry and Life Sciences, and they can also be a connection of cyclical processes e.g., water cycle, evaporation and condensation”* Participant TP4M understands the relationship that exists between the scientific concepts, even though he does not clarify deeply in simple terms.

Teacher Participant 1 (TP1M) said, “No, everything is covered”. The teacher seems to be exhausted and has no more information to elaborate on.

Teacher Participant 2 (TP2M) said, *“It once happened one of the years, whereby one of my learners who was a better performer fell pregnant and upon her return to school she dropped from her well-known performance to unsatisfactory performance. Learners’ absenteeism is another factor that contributes to unsatisfactory performance. Also, home negligence of kids, the school is not taken seriously by some family members. More workload keeps teachers exhausted always. Teachers are demotivated because they normally conduct extra classes, but they are not funded. Sometimes we as teachers tend to be absent from school, sometimes we become absent in class but present at school”*. Indeed, the teacher seems to have observed multiple factors that contribute to unsatisfactory results, but the DOE is currently not taking any action about them. Some of these factors mentioned above by TP2M need one to undertake further studies that will look into some of the factors mentioned above.

Teacher Participant 3 (TP3F) said, *“There is one mobile laboratory which has been introduced around uMkhanyakude. We have to wait for a long time to be called with your learners to come and perform practical investigations, which in most cases we end up not doing practical investigations because there are many schools. Pregnancy is one of the*

major problems in our community, especially among Grade 12 learners. They fall pregnant and stay away from school for a long period because most of the time they visit the clinic for check-ups. Hence, they miss a valuable lesson. Learners are staying far away from school and they come late to school because they travel long distances and make it difficult for planning on the side of the teacher.” Participant 4 (TP4M) concurs with TP3F by saying that, *“The burning issue is the pregnancy where learners become absent for a long time and when they come back, they are unable to cope with their studies”*. It is clear that pregnancy, distance travelled to school, lack of infrastructure like laboratories and also communities that do not value education have a major contribution to unsatisfactory results, particularly in rural schools.

Addressing Factors

Teachers were asked to explain how they address the factors identified in Section 4.6.1 above, and their responses are presented as follows:

Teacher Participant 1 (TP1M) said, *“I select the best performing learners and make them group leaders so that they discuss the content together with the hope that they will understand each other as classmates”*. This is a teacher who understands that learners learn better when they receive information from their peers since he is able to allow the learners to teach each other to facilitate better understanding. As much as learners may get a chance to teach each other, they regard the teacher as a subject specialist. The teacher must make a presentation himself so as to make the learners gain his trust and confidence.

Teacher Participant 2 (TP2M) said, *“I prefer doing more practical activities and providing visual aids so that they would easily understand”*. Participant TP3F concurs with TP2M by saying that, *“I normally go to YouTube videos with my learners for more clarity and explanations per topic”*. As much as the teacher may use social media platforms, it is imperative that before using the social media platforms, the teacher himself must lay a foundation by introducing the lesson or topic and clarifying all the basic concepts involved in that topic and use social media as an added learning session. It is also crucial that the teacher should always contextualise the concept with everyday living circumstances in the learner’s environment.

Teacher Participant 4 (TP4M) said, *“While teaching my learners, I avoid jargon terminology, and I connect concepts to everyday situations. I provide opportunities for practice and reinforce understanding through exercises and applications”*. The view expressed aligns with that of TP4M, emphasising that the primary goal of teaching is to ensure learner understanding. The use of overly technical terminology is unnecessary, as simplified explanations are more effective in promoting comprehension.

Teacher’s Action to Overcome Unsatisfactory Performance

When the researcher asked the teachers how they overcame the issue of unsatisfactory performance in Physical Sciences, they responded as follows:

Teacher Participant 1 (TP1M) said, *“I give them more schoolwork in the form of class work and homework as well as more tests, I also give them feedback in a form of corrections.”* Teacher Participant 2 (TP2M) said, *“The diagnostic analysis helps me diagnose those who perform unsatisfactory performance. I further group them according to their strengths and weaknesses and teach them separately”*.

It is commendable that these teachers give work to the learners, in the form of homework and tests, but according to the teacher, he thought that giving more work would compel the learners to study, yet it is not the case. According to the researcher, the argument is that the learners are performing unsatisfactorily and at the same time, the teacher is overloading them with schoolwork, which then can lead to learners being demotivated because they can try the first tasks and fail and try the second one and also fail. Under no circumstances can the learners complete the work simultaneously. The teacher does not indicate how he controls the work to ensure that there is no information overload.

Teacher Participant 3 (TP3F) said, *“I extend my contact time with them in the form of morning classes, afternoon classes, weekend classes and even cross-night classes. Sometimes I invite tutors to come help them”*. This participant is a teacher who loves her work. She takes all the actions to overcome the unsatisfactory performance, but there is a loophole that it looks as if she is using a blanket approach, that she assumes that all the learners have the same problem, yet it is not the case.

Teacher Participant 4 (TP4M) said, *“I provide sufficient context for concepts to make them seem connected or relevant and provide enough opportunities to learners so that they apply and reinforce interconnected concepts. I accurately assess learners’ understanding of interconnected concepts”*. This is a teacher who seems to be on the right track and shows concern for the performance of the learners who works towards ensuring that learners achieve satisfactory results.

Teacher Participant 1 (TP1M) and Teacher Participant 2 (TP2M) adopt intervention strategies that differ in both approach and potential effectiveness. TP1M relies primarily on increasing the volume of work through additional classwork, homework, and tests, coupled with feedback, reflecting a quantity-driven approach aimed at reinforcing practice. However, this may risk overwhelming already struggling learners and could contribute to demotivation if not carefully managed. In contrast, TP2M employs a more diagnostic and differentiated strategy by identifying underperforming learners, grouping them according to their specific strengths and weaknesses, and providing targeted instruction. This approach demonstrates greater responsiveness to individual learner needs. Meanwhile, Teacher Participant 3 (TP3F) takes a time-intensive support approach by extending contact hours and incorporating external tutors, highlighting a commitment to remediation through increased instructional exposure. Overall, TP1M focuses on increased workload, TP2M on targeted intervention, and TP3F on extended support, illustrating varying levels of pedagogical responsiveness to unsatisfactory performance.

4.3.1.4. Theme 4: In-depth Teaching of Physical Sciences

Techniques of Teaching Physical Sciences

The teaching strategies employed by Physical Sciences teachers play a decisive role in determining how effectively content knowledge is transmitted to learners and ultimately retained. Effective pedagogical approaches can make abstract and complex concepts more accessible, particularly in under-resourced classroom environments where practical demonstration opportunities may be limited. When teachers were asked what teaching strategies, they use to impart content knowledge in Physical Sciences to their learners, they responded as follows:

Teacher Participant 1 (TP1M) said, *“I make an introduction using real-life examples so that learners will easily understand. I do a baseline assessment to check prior knowledge of the subject or concept to be taught”*. This participant needs to be applauded by first tracking the learners’ basic knowledge of the subject (Physical Sciences) or scientific concept. This habit allows a teacher to identify a gap and then fill it. Also, it shows the teacher where learners lack understanding and where their strengths are, so that the teacher will capitalise on those strengths and weaknesses and assist them without failure.

Teacher Participant 2 (TP2M) said, *“I make use of direct instructions and collaborative learning”*. This participant seems to believe in two aspects only, direct instructions and collaborative learning, and he never mentioned any alternative technique in case these two do not succeed, for example, the option a teacher may use if learners fail to take a direct instruction because the collaborative learning depends on how learners take instructions.

Teacher Participant 3 (TP3F) said, *“I do not teach to complete the syllabus or ATP; before moving to the next lesson, I make sure that all learners are able to solve problems on their own without my intervention. I award all learners with outstanding performance in front of the class. I group learners according to their performance and select a group leader who will assist them during group study. I make time for slow learners and assist them”*. It can be inferred from this participant’s response that some teachers prioritise completing the Annual Teaching Plan (ATP) or syllabus, often at the expense of learner understanding and progression. In such cases, learners may be left behind, with limited attention given to whether they are able to follow or grasp the content. In contrast, Participant TP3F demonstrates a strong commitment to effective teaching and learner comprehension. The presence of more teachers with this level of dedication could significantly reduce challenges within the education sector, particularly in Physical Sciences. Adopting similar instructional approaches more broadly may help minimise the factors contributing to unsatisfactory learner performance in this subject.

Teacher Participant 4 (TP4M) said, *“I conduct experiments and simulations to pretty illuminate the key concepts as well as principles. I engage learners in practical experiments and investigations in order to promote the unearthing and seeing things by themselves”*. According to the data elicited from TP4M simulations and experiments are administered for learners’ easy understanding. This teacher really promotes the culture that learners must explore concepts by themselves by exposing them to investigations and experiments.

Impact of Teaching Techniques and the Frequency with which Learners Receive Activities

When teachers were asked if the techniques used and the frequency at which the tasks given to learners yield positive results, they responded as follows:

Teacher Participant 1 (TP1M) said, *“I link my lesson with real-life situations so that learners will absolutely understand”*. We cannot deny the fact that anyone learn better if exposed to something in the real world. Since Physical Sciences’ concepts are scientific, it is imperative for the teacher to make use of the examples of what the real-world looks like and explain those concepts to their full understanding. Just to make an example, if the teacher has to explain what a collision theory is or how particles collide? The teacher needs to deviate from this concept and exemplify using moving cars, which are seen daily, so that learners will easily link the collision of particles.

Teacher Participant 2 (TP2M) said, *“Through assessment activities, every week my learners write a test, either Paper 1 or Paper 2”*. This is a good practice; learners hardly forget concepts when they keep on writing them because they always spend most of their precious time studying those concepts. A teacher might be good at delivering but if they do not assess the learners to measure their understanding, they are incomplete in their profession. A good teacher is one who teaches and assesses always.

Teacher Participant 3 (TP3F) said, *“My learners write tests every week. After a test, I do an analysis, and if it's below 80%, I repeat where it is required. After analysis, I do one-on-one consultations to investigate the main cause of failing a test. After each test, I bring feedback in the form of corrections or questions and answers”*. It is true that some learners

are shy to the extent that they cannot emerge from the pool of learners and say they misunderstand the teacher during any scientific concepts' presentation. Therefore, having one-on-one sessions makes it easier for learners to reveal the areas of misunderstanding to their respective teacher. The more important practice by this participant is that she believes in doing an analysis of the results, which is imperative when you are a teacher. Every teacher must analyse the learners' performance after assessing them in order to identify the areas which need to be improved.

Teacher Participant 4 (TP4M) said, *"I keep on soliciting feedback through discussions or one-on-one sessions to understand learners' needs and their preferences by establishing clear goals and expectations with learners at the outset, and regularly review progress together"*. Teaching is not about teachers delivering lessons to the learners or using the telling method only, but engaging learners by discussing with them, exposing them to the investigations, so that they will explore scientific concepts on their own. When teaching, the teacher should establish clear goals and communicate expectations explicitly to learners. Teacher Participant 1 (TP1M) said, *"Yes, they do"*. This participant admitted that the techniques he is implementing while teaching are working indeed, which needs to be applauded. The teachers must have various ways which they use to impart knowledge to learners.

Teacher Participant 2 (TP2M) said, *"Sometimes they do"*. This participant was uncertain whether there was a difference made by these techniques. The cause might be the way in which the techniques are implemented. But learner performance is also predisposed by inspiration and assertiveness, learning styles and preferences.

Teacher Participant 3 (TP3F) said, *"Partially yes, even if the learners perform, they still obtain Level 2, which is 30%-39% in Physical Science pass mark"*. Like Participant TP2M, the data elicited from Participant TP3F reveal that the techniques they were using were not striking the point as expected. Therefore, obtaining Level 2 in Physical Sciences shows that teachers need to administer different techniques to overcome unsatisfactory performance.

Teacher Participant 4 (TP4M) said, *“Yes, the techniques used in teaching significantly impacted learner performance from unsatisfactory to satisfactory performance”*. This participant admitted that the techniques he used did affect learner performance. It has come to my attention that operative teaching techniques can lead to increased learner engagement and motivation as well as the overall theoretical performance and progress of the learners.

Teacher Participant 1 (TP1M), Teacher Participant 2 (TP2M), and Teacher Participant 3 (TP3F) demonstrate distinct instructional approaches in supporting learner understanding. TP1M adopts a contextualised teaching strategy by linking scientific concepts to real-life situations, thereby enhancing learners’ conceptual clarity through familiar, everyday examples. In contrast, TP2M places strong emphasis on continuous assessment through weekly tests, reflecting a practice-oriented approach aimed at reinforcing retention and monitoring progress. TP3F, while also employing regular assessments, extends this approach by incorporating systematic analysis, targeted reteaching, and individual consultations, demonstrating a more responsive and diagnostic method. Thus, while TP1M prioritises contextual understanding and TP2M focuses on consistent practice, TP3F integrates assessment with feedback and personalised support, reflecting a more comprehensive instructional strategy.

4.3.2. Interviews: Learners’ Responses

This subsection presents the analysis of data obtained from semi-structured interviews conducted with Grade 12 Physical Sciences learners at selected schools in the uMkhanyakude District. The interviews sought to elicit learners' firsthand experiences and perspectives on the factors contributing to their unsatisfactory performance in Physical Sciences. Following Yin's (2015) analytical framework, the responses were compiled, transcribed, and interpreted to generate findings organised according to the subthemes outlined in Table 4.2(b), each discussed in turn and supported by direct excerpts from the learner interviews.

4.3.2.1 Theme 1: Getting Ready to Study Physical Sciences

Learners’ Preparations for Studying

On the question of how learners' study Physical Sciences, several exciting responses by the learners were noted. The responses came from a total of four ~~learners~~ from four schools (One learner per school) who were interviewed were that they refer to their notes that were given by the teacher or on textbooks and the exam's previous question papers. Out of the four learners, Learners 2 and 4 said, *"We focus on YouTube videos for better understanding"* These responses from the Learner Participants 2 and 4 imply that as much as teachers may teach and provide textbooks, learners have their own way of checking the accuracy of the teacher on subject matter using YouTube channels if they are electronically connected to social media. Having said this about information, institutions of learning need to train teachers rigorously. The Department of Education must ensure that all Grade 12 learners have access to either a hard copy or a soft copy of their prescribed textbooks. These textbooks should serve as a reference tool, enabling learners to compare their teacher's explanations and guidance against the textbook content. This practice will also allow learners to evaluate the accuracy and relevance of information sourced from social media learning platforms, and to assess the subject competence of their Physical Science teacher. Hence social media platforms have to be strengthened as they play a pivotal role in assisting the teacher in lesson presentation. Learner Participant 1 responded to the theme 1 question as follows, *"I simply rephrase my notes in my own words so that I am all aware of what I know and what I do not know, and I then stick to the unknown theory memorising it until I master it."* It is clear that learners are not learning to solve the problem and use memorisation. It is also clear that learners learn to pass, not to acquire knowledge to solve future problems. The responses extracted from Learner Participant 3, said, *"It depends on the topic studied at that time, like in Paper 2, I used my notes and textbooks to master the content very well and also watch videos on YouTube channel and Tik Tok videos so that I understand clearly and also used previous past examination papers to test my understanding"* It is depicted that the time has passed to for learners to rely much on teachers and the textbooks since technologies provide learners with extra tools that may aid teachers and the learners understanding of the topic or subject, particularly Physical Sciences.

Doing Activities while Studying

The researcher went on to check if learners, across their study, do the activities they come across, or if they just keep on reading notes, as they already mentioned. Doing activities that are subject concept-based helps learners share their responses with the investigator. Learner 1 (LP1M) in the question above said, “*Yes, I like singing while studying and creating games using concepts, I am studying for easy understanding of what is being studied.*” This indicated that they have their own ways of internalising the knowledge. When Learner 2 (LP3F) was interviewed, she stated that, “*Curriculum-wise, I do those activities, which are based on the concept being studied at that time. My parents give me privacy when I am studying. At home, I do not do the home chores.*” This means that 25% of learners have dedicated time for schoolwork, while the remaining 75% must balance academic responsibilities alongside household chores and other domestic duties. Learner 3 (LP3F) responded by saying, “*I keep on reading notes, I don’t do concept-based activities until my teacher tests me.*” It is clear that most of the learners read the textbook, but they do not answer the activities until they take a test and fail. Learner 4 (LP 4 M) said, “*I don’t do concept-based activities, even if I come across them, I skip them and continue with my notes until my teacher gives us classwork or a test. I will see by time how much I understand pertaining to the concepts in questions or examination*”. It might happen that the learners don’t know how to study and don’t have question papers, or the teacher may not be using the question-and-answer teaching method.

Engaging Fellow Classmates

There are so many practices involving learners when they are in a classroom. Some practices are good, and they do benefit them and can benefit even the whole class if done accordingly. The investigator asked the learner participants if they use certain strategies to engage their classmates to overcome unsatisfactory performance, and they responded as follows:

Learner Participant 1 (LP1M) said, “*I usually advise my classmates to stop the tendency of thinking that certain chapters are difficult so as to enable their minds to super function that*”. This means that learners have a negative attitude towards certain topics in Physical

Sciences, which will then create resistance to learning freely, resulting in unsatisfactory performance.

Learner Participant 2 (LP2F) responded as follows, *“We organise our own classes, we have groups, with group leaders who understand the concepts better. We supervise ourselves; we call our teachers whenever we have problems, we have a WhatsApp group where we share problems and solutions, and other useful study materials.”* This means that once learners show to be hands-on in a subject, then teachers sit back and no longer assist the learners to speed the learning process.

Learner Participant 3 (LP3 F) highlighted that, *“Yes, I make sure that on the topic that I clearly understand, I gather my classmates with lower marks and teach them, it helps me gain my strength and help them perform better. I share with my classmates some techniques to be used when studying Physical Sciences”*. This indicates that some learners learn better by teaching others. Learners are given a chance to teach each other if some show a better understanding of the Physical Science concepts, because learners learn better if they obtain information from different sources.

Learner Participant 4 (LP 4 M) said that *“Yes, we usually form groups at the hostel where we discuss the subject, especially how to tackle higher order questions. We then practice together and then mark to see how much we know”*. Learners gain confidence when they discover that they can tackle past examination paper questions on their own without the help of the teacher if they are given all the skills and tactics.

4.3.2.2 Theme 2: Understanding Scientific Concepts

Teachers’ Methods of Teaching

Teachers vary in how they deliver their lessons to learners. Some have the significance of drawing the learner’s attention from their introduction. When the investigator asked the learner participants to thoroughly give a full description of how their Physical Science lessons are delivered in class, they responded as follows: Learner Participant 1 (LP1M) said: *“My teacher delivers the lesson very well; he tries to accommodate everyone in class so that good results come out at the end of the year”*. This indicates that some teachers cater to learners' diversity in their teaching

style and methods.

Learner Participant 2 (LP2F) said, *“He introduces the topic, but the day before, he tells us to look at the topic to be studied, he treats us as if we are repeating Grade 12. This is because we started the Grade 12 syllabus in Grade 11, so he assumes we know everything. It is good to start Grade 12 scope in Grade 11, but teachers must pretend we never started this in Grade 11 and try not to rush; his pace is fast. The slow learners are not accommodated. My teacher teaches a topic for one day, which is supposed to take three days. We end up failing without any reason except that he rushed to finish the scope and leave us behind”*. This indicates that, despite having been taught the Grade 12 syllabus in Grade 11, learners still want to be taught the same material at a slower pace.

Learner Participant 3 (LP3F) said, *“She does not deliver it quite well to me. She is good in Paper 2, which is the Chemistry from the head to the toes, but when it comes to Paper 1 (Physics) part, she is struggling. I do not understand her that much, compared to the one who previously taught me Physical Sciences in Grade 10, who would teach Physical Science and leave no stone unturned”*. It is evident that learners are often the best judges of effective teaching in Physical Sciences, as they can compare how different teachers deliver the content.

Learner Participant 4 (LP4M), when asked the same question above, said, *“My teacher tells us the topic and then breaks it down into small parts and delves deeper into the topic by highlighting and putting emphasis on the information that we as learners tend to forget. After that, we do about three questions from different past papers, and then do the corrections, and after that, he leaves us with homework”*. It means that there is no proper teaching if the teacher ends by teaching three problems and then leaves the learners on their own. Effective teaching requires sustained engagement, guided practice, and timely feedback, a process that cannot be truncated without compromising learners' understanding and ability to work independently. When teachers withdraw too early from the instructional process, learners who have not yet fully grasped a concept are left without the scaffolding they

need, which over time contributes directly to gaps in knowledge and unsatisfactory performance in Physical Sciences.

Challenging Concepts while Studying

When learners were asked whether there are any challenging scientific concepts they come across when taught or learning Physical Sciences, 100% agreed that “yes,” there are scientific concepts that they find challenging. Even though they vary from participant to participant, most of them mentioned a common challenge, such as, *“We fail to understand some of the Chemistry chapters”*. However, Participant 3 said that, *“It is difficult to memorise Paper 2”* whilst Participants 3 and 4 mentioned that *“Acids and bases do not have enough time during teaching and learning”*. This means that teachers might spend more time in dealing with Paper 1 or it might have happened that learners themselves have difficulty understanding, which may have emerged from a scientific background, or it may have emerged from language understanding, since Physical Sciences is presented mainly in the English language, where most of the rural learners struggle at learning with understanding. Some of the learners choose Physical Sciences because their friends take it or because of the perceived status attached to the subject, namely, the belief that taking Physical Sciences signifies that one is more intelligent or capable. As a result, many learners end up in a situation for which they are not well suited, essentially becoming “square pegs in round holes.”

Overcoming Challenging Concepts

The investigator further asked the learners how they overcome these concepts and they indicated that they are challenging them. Again, there were overwhelming responses from the learner participants. Learner 1 (LP1F) responded to the question above that, *“I tend to consult with Physical Sciences teachers, watch online sessions for that chapter, and download notes.”* This means that the learner relies on online references to verify her understanding more than consulting the teacher. Learner number 2 (LP2 F) responded by saying that, *“I visit YouTube looking at the videos, doing more problems on previous years' question papers. I prefer to approach my fellow classmates who better understand the scientific concepts that challenge me”*. The

response given by Learner 2 depicted that learners have lost trust in verifying information from the teachers; they preferred online information over teachers. This might have happened because teachers are no longer appealing to learners or are not trusted when it comes to delivering subject matter.

Learner 3 (LP3 F), when interviewed, responded by saying, *“I use flash cards whenever studying Physical Sciences concepts as to remind myself whenever I forget. I try to teach these concepts to my fellow classmates so that I hardly forget them”* This implies that some learners use a variety of strategies in rehearsing information taught until they master it. Hence, Learner 4 (LP4M) responded as follows: *“I go to my Physical Sciences teacher and ask for help during school time, and I ask my fellow classmates who clearly understand the Physical Sciences concept better than me. After doing so, I watch Kevin math and sciencetutorial videos on YouTube to add to the information that I already accumulated. This helps me to understand the concepts better”*. This indicated that 75% of learners strongly believed in videos whilst 25% believed in teachers.

Educators’ Input in Learners’ Concept Understanding

As an investigator, I regard teaching as the process of unfolding in any form of setting. Therefore, teaching and learning do not end in the classroom, but it is an ongoing process between the teacher and the learner in any form or kind of setting, at any time. The investigator further asked if the learner received support from their teacher, except for the interaction within the normal school period scheduled for them as depicted on the timetable. The learner participants shared their views or experiences with the investigator.

Lerner 1 (LP1F) mentioned that during the interview, *“My teacher created a WhatsApp group to help us whenever we are failing to do some of the questions and find difficulty in studying, he shares different kinds of questions and solutions, even other study materials.”* Some teachers do justice to learners in supporting them, but there are learners who do not study.

Learner 2 (LP2F) said, *“I do not get much of his support, he introduces topics and do problems on the chalkboard. Whenever you have problems, you consult, and he gives*

us more time toward exams. Actually, during exams is when I need my own space and time to observe myself. I do understand some concepts that are to be covered by the teacher. I do not prefer teacher-centred lessons towards exams”.

This indicated that the teacher might have neglected the learners during the course of the year but began to be serious when the learners were about to write the examination. Moreover, learners at that time have already developed a lot of anxiety and are no longer interested in learning since they are preparing for their examinations. Learner 3 (LP3F) disclosed the responses that, *“I receive good support because when she sees that I am dropping from my performance, she motivates me and makes me realise why am at school, but when I fail her test, she becomes a dragon that spits fire, which also encourages me to study harder. Mind you, Physical Sciences is a challenging subject; if you do not study it, your result becomes unsatisfactory.”* This indicated that the teacher was able to shape the learners into what she wanted and encouraged them to work harder than before and meet future targets.

Learner 4 (LP4M) mentioned that, *“My teachers stay behind after school and attend to our needs. During the weekends, we have classes, and we also have morning and evening classes every day. He always provides us with study material, and he also motivates us to work hard and get a 100%, which is expected from us”.* The learner revealed that some teachers are dedicated within the pool of dishonest teachers. This has been depicted from the responses of Learner 4 (LP4M).

Learner-to-Learner Interaction

For a successful class, it is a good habit for learners to help one another to precisely master the scientific concepts and hardly forget them. When learners were asked if they assist one another, they overwhelmingly responded as follows:

Learner Participant1 (LP1M) said, *“There is a WhatsApp group for my classmates where we help each other, and that is where we deliver what we have mastered to see the improvement in those who actually seek improvement.”* Learner Participant 2 (LP2F) said, *“The teacher divides learners according to their abilities, that is, slow learners and fast learners. Those who are fast lead the group of slow learners through the arrangements we teach one another. Surprisingly, our classmates are easy to*

understand when explaining the concepts. I feel less nervous to approach my fellow classmate to repeat for me if I miss out the concept". And Learner Participant 3 (LP3F) said, "I adopted my own group of classmates so that I keep on teaching them, I divide concepts into smaller manageable parts so that I easily make them understand. I related these concepts preferably to real life situation so that they easily understand". Whilst, Learner Participant 4 (LP4M) said, "I usually do corrections at the board where I explain to other learners the concepts and sometimes sit with them in a group to do the different problems. I make sure that I'm always ahead of them on the concepts to be discussed". This implies that learners can easily share knowledge amongst themselves and understand each other more easily than understanding their teachers. It also further implies the point that some learners may explain or teach better than their teachers.

Strategies used while Studying

Due to the human dynamics, their behaviour and the manner in which they do things are different from each other. When the investigator asked learner participants about the strategies they use when studying Physical Sciences, Learner Participant 1 (LP1M) politely responded as follows, *"I try to study the notes very well, and after studying, I try to teach my fellow classmates what I have learnt for the benefit of my mind and theirs."* The statement depicted from Participant 1 with regard to the above-mentioned question indicated that for the learner to prove that information learned was decoded, they have to teach another learner for the information to move from short-term memory to long-term memory. According to learner Participant 2, when asked the same above question, she responded by saying, *"I go through the basics, like definitions and notes that I took from the class when my teacher delivers a lesson. I tackle the question from previous question papers. I do not tackle the whole question paper, but I refer to each question, which represents a particular chapter"*. Some of the learners can spot some questions that the teacher taught them in a specific chapter and look at the question on the question past examination papers and tackle them. Learner Participant 3 responded as follows: *"I mostly use previous question papers to check my knowledge. I engage with my fellow classmates who understand Physical Sciences better, and also watch videos too, which present different chapters. I sometimes set a test for myself to just check my own*

understanding. I make sure that I always practice Physical Sciences so that I hardly forget". This means that satisfactory performance does not lie with the teacher or how good the teacher is, but also the understanding and commitment of the learner in rehearsing and mastering the information play a significant role. Learner number 4 (LP 4M) stated that, *"I make notes and summaries, and do plenty of practice using past papers"*. This is an indication that learners, in order to match levels, refer to past exam papers, which help them to predict the upcoming exam by looking at the trend of the past examination papers.

Retaining Mastered Concepts in Long-Term Memory Every living species on Earth tends to forget. Likewise, the learners as they learn from term to term. It is highly possible that the concept learnt in Term 1 will be forgotten in Term 2 or Term 3. Hence, the learners must develop a strategy to prevent forgetting those concepts, because, in the end, they will need to recall them during the examination. When the investigator asked learners to share how they make sure that they hardly forget the mastered concepts, they responded as follows:

Learner Participant 1 (LP1M) said, *"When studying the current concept taught by the teacher, I used to move forward and backward. I do not only focus on the current concepts but also move back to revise the previous concepts so that I hardly forget them"*. This means that the learners believe in past examination papers.

Learner Participant 2 (LP2F) said, *"I keep on doing problems on previous topics, I do share this idea with other classmates, and hence, it is a good approach, and it does work"*.

Learner 2 concurs with Learner Participant 1 and Learner Participant 3 (LP F3) said, *"I keep on practising them, set concepts tests for myself. I also teach it to someone else so that I hardly forget it. I paste some of the definitions on the wall so that every time I go to bed, I sing them and sleep."*

Learner Participant 4 (LP4M) responded as follows: *"I practice these concepts every single day for about thirty minutes or an hour in order to store them in long term memory. I also read my study notes after about two days in order to remind myself about what I was taught"*. Thus, it has been proven beyond a reasonable doubt that rehearsing studied

information is crucial for mastering concepts. This is particularly true in Physical Sciences, where the cumulative nature of the content means that a weak grasp of foundational concepts in earlier grades inevitably undermines a learner's ability to engage confidently with the more complex and demanding material encountered at Grade 12 level.

4.3.2.3. Theme 3: Assistance Received from Home

Parent Involvement

The education of a child needs the joint support of teachers and parents. Some learners put more effort if they know that their schoolwork is regularly motivated by their parents or guardians, either at school or at home. When the investigator asked learners if their school is normally checked by parents or guardian they harmoniously responded as follows:

Learner Participant 1 (LP1M) said that, *“Not really, not often, but sometimes they do, maybe once a month.”* Parents want their children to go to school, but they are not keen to know what is happening at school on a daily basis.

Learner Participant 2 (LP2F) mentioned that, *“Yes, my mother keeps on checking my schoolwork telephonically. My parents do come to school meetings and sometimes use that chance to check but not on a regular basis. I do not stay with my parents at home, I stay with my grandmother and siblings. She cannot help me in my subjects, and she does not come to school.”* Parents are almost always concerned about their children's education; any indifference is seldom deliberate.

Learner Participant 3 (LP3F) stated that, *“No, I stay far away from them and they hardly come to school”*. It is clear that schools are used as dumping zones and as a rehabilitation place instead of being the institutions of acquisition of knowledge. Learner Participant 4 (LP4M) stated that, *“No, I live in a boarding school, but they do not come often.”* Parents whose children attend boarding schools tend to become reluctant in their involvement, assuming that teachers will take full responsibility for ensuring their children study; however, this is often not the case

Some expectations are that whenever learners are given homework at school, the parents or guardians should assist them in finding solutions and to ensure that the schoolwork is done correctly without failure. Overwhelming responses were received when the investigator asked learners if they received assistance from their parents or guardians.

According to Learner Participant 1 (LP1M), *“On what I do not know, I asked them for help and try their best to help where they can”*. Learners have no real role model they can associate with or that they can emulate since most of their parents are school dropouts or have no interest in education, or they never pass well in matric, which their children can copy from them, since very few parents have a clear vision about the education of their children.

Learner Participant 2 (LP2F) narrated that, *“I do not get any assistance, which is subject-based. My parents know nothing that has to do with Physical Sciences”*. Learners lack role models and find it difficult to ask parents for help if they do not know the Physical Science. Learner Participant 3 (LP3F) said, *“I do not receive any kind of assistance from my parents”* and Learner Participant 4 (LP4M) mentioned that *“No, since I am a boarder, I do not receive any assistance from my parents”*. Both Learner Participant 3 (LP3F) and Learner Participant 4 (LP4M) concurred in saying there is no parental assistance received. Their responses suggest a lack of home-based academic support, which may have implications for their learning experiences and overall performance.

Learner Participant 1 (LP1M) demonstrates some degree of agency in seeking academic support, as he actively consults others when he encounters difficulties, suggesting a level of initiative despite limited parental guidance. In contrast, Learner Participant 2 (LP2F) reports a lack of subject-specific assistance due to her parents' limited knowledge of Physical Sciences, highlighting a constraint rooted in parental educational background. Similarly, Learner Participants 3 (LP3F) and 4 (LP4M) indicate a complete absence of parental support, with LP4M's situation further compounded by boarding circumstances that limit direct family interaction. While LP1M exhibits proactive help-seeking behaviour, the other participants reflect varying degrees of dependency on unavailable or insufficient support systems, underscoring disparities in home-based academic assistance and its potential impact on learner performance.

4.3.2.4. Theme 4: Frequency of Assessment

Frequency of Receiving Homework

For satisfactory performance in Physical Science, the teacher was required to

assign homework to learners to provide additional practice. However, the frequency of issuing homework is not determined by the Department of Basic Education. When learners were asked by the researcher, they precisely responded as follows: *“Almost three times per week, even on weekends, we do receive homework via our WhatsApp group. Our teacher has a mentality that for us to master it, we must write,”* said Learner Participant 1 (LP1M).

According to Learner Participant 2 (LP2F), *“Not often, but he gives us at the end of each topic”*. Learner Participant 3 (LP3F) mentioned that, *“WOW! I receive a lot of homework that I sometimes fail to do it all because it is too much”*. Learner Participant 4 (LP4M) narrated that, *“Every day, after a lesson, we are given homework either from the revision document or textbook”*.

It is evident that most teachers consistently assign homework to learners as part of their instructional practice. However, it was also noted that, despite these efforts, many learners do not complete the assigned tasks. Many perceive the volume or difficulty of the homework as burdensome, which appears to discourage full engagement and completion. This suggests a gap between instructional expectations and learners' capacity or motivation to meet these demands.

Test Writing Frequency

As the process of teaching involves the assessment, the researcher was curious if the teachers administer the assessment after teaching in the form of tests. If they do, how frequently is that happening? The investigator went on to ask how frequently learners write tests in Physical Sciences. The learners confidently responded as follows:

“We write about three tests after each and every chapter”, said Learner Participant 1 (LP1M). Learner Participant 2 (LP2F) mentioned, *“Twice a week, we do get feedback in the form of corrections for the entire paper. In a month, we usually write eight tests or more.”* Learner Participant 3 (LP3F) stated, *“We write a test once a week, our teacher alternates Paper 1 and Paper 2.”* Learner Participant 4 (LP4M) stated, *“We write a test at the end of each and every topic”*. The teacher does administer tests, but at different

intervals.

4.3.2.5. Theme 5: Learners' Views

Other Factors Disadvantaging Learners' Academic Performance

As per the guiding questions for learners' interview guide, the investigator saw a need to have an open-ended question at last to cater for the ideas of the participants for other factors contributing to unsatisfactory performance in Physical Sciences, which were not covered in the questions asked. The learner participants responded as follows:

Learner Participant 1 (LP1M) said, *"The reality, sir, is that of high pregnancy among learners. Like in our class, one of my classmates who is brilliant fell pregnant and had to leave for maternity for three months, upon her return, she was blank. As a private candidate it was difficult for her to catch-up on the previous work, she used to obtain Level 5 or Level 6 but surprisingly she dropped to Level 3, hence her performance was unsatisfactory. Pregnancy leads to frequent absenteeism. Another thing, sir, is the issue of drugs to learners which cause the change in behaviour, ignoring the teachers, disrespecting them, hence leading to unsatisfactory performance"*.

It has been discovered that learners themselves noted that pregnancy and drugs have a significant contribution to unsatisfactory results since they contributed to uncontrollable behaviour and a series of absenteeism, and eventually led to unsatisfactory results. There is a conflict of interest between the teaching and legislation because the DOE do not want learners who are pregnant to be sent home and wait until they deliver, yet when they are kept at school during their entire pregnancy, they absent themselves and miss a bulk of information due to absenteeism. Furthermore, they disrespect teachers and set a bad example in the entire school.

This behaviour of pregnancy amongst learners is also culturally unacceptable. Therefore, the education of the RSA ignores the RSA norms, cultural values of the Black populace, which then contributes to juvenile delinquency. When it comes to drugs within the school premises, all schools prohibit the use of drugs, and the main reason is that schools want to maintain the good behaviour of learners in the school. If there is a deviation, that leads to chaos with the school in the sense that the school will be

uncontrollable and eventually become the home of juvenile delinquency.

For Learner Participant 2 (LP2F), *“Pregnancy on female learners has a negative impact. In my class, we have many female learners who are pregnant, hence they tend to miss the lesson because of absenteeism. Sir, how could you perform satisfactorily if you frequently absent yourself from school? Some of us use mood swings towards teachers. Absenteeism is another factor; there is a huge loss when learners are absent no improvement on catch up without a teacher. Teachers are sometimes present at school but bunk classes because of hangover. Department officials also cause the teacher absenteeism from the classes. We used to see the DOE officials and then all of a sudden, they call the teacher and leave us unattended. Teachers’ workshops cause them to be absent, and we suffer. When the teacher teaches three or two subjects during workshop times, he or she will leave many classes unattended. Here in school, teachers focus on Grade 12 only. In Grade 10 and Grade 11, we were neglected, hence we find Physical Science concepts challenging because we do not have a solid background”*. Teachers spent the valuable contact time of their learners attending workshops outside of their school. It emerged that alcohol abuse amongst teachers played a role in unsatisfactory performance because learners mention bunking classes, and teachers who are present in school but cannot attend classes due to hangovers.

Learner Participant 3 (LP3F) mentioned that, among other factors contributing to unsatisfactory performance, is the pregnancy. LP3F said, *“Female learners get disturbed because they have to visit the clinic and used to have off sicknesses resulting in absenteeism. Love affairs, Sir, this factor no one has ever paid attention to it, but trust me, it has a huge damage on the performance of learners, they hurt in such a manner that you end up losing focus on your studies, thinking about your boyfriend or girlfriend. Another factor is the one for teacher absenteeism due to workshops. This factor causes huge damage in our performance, sometimes a teacher attends back-to-back workshops for the whole week, hence we perform unsatisfactorily in Physical Sciences. Hangover for teachers, we used to realise that Mr X is drunk or has a hangover, because they just bunk the classes, they do not teach if they are drunk. In terms of discipline to us as learners, we as learners have more rights than our teachers because we know very well*

that the law is on our side, one mistake, the teacher is expelled, hence teachers cannot even discipline us for our wrongdoings". The teacher's drunkenness has a major role in the unsatisfactory performance of the learners in Physical Sciences due to the fact that they bunk classes because of the hangover, they don't attend classes, yet they are at school.

Learner Participant 4 (LP4M) narrated this way, "Sir, we do not have a structured program on how we write class tests and how homework is issued to us, we are doing eight subjects, each and every day all these subjects come up with homework, we end up spending more time on homework than studying, once you fail to do homework you get punished. If I can make an example, EGD Homework need at least two hours, we used to sleep in the morning at about 2h00 a.m. and expected to wake up at 4h00 a.m. definitely we go to class exhausted. Some learners use weed, which also disturbs them a lot. Also, the family background, as we are a boarding school, you find that parents miss out on the school fees payment, hence you will be kicked out or compelled to leave school premises permanently, which only psychologically makes a damage. Another thing, sir, is the issue of love affairs. I used to observe my fellow classmates pretending to study only to find that they are not, they even forget their homework. Another negligible factor is this of education official's arrival. I have noticed that every time an education official arrives at school, our teachers leave everything and attend to them, sometimes they also call us to go together to a certain place, and by doing that, the whole day is lost. Then, the issue of teachers attending back-to-back workshops, we used to remain unattended, and there is no plan to cover the lost time, sometimes we write an examination with some chapters unfinished, hence unsatisfying performance results." It is clear that from the data collected unsatisfactory performance is the result of unplanned learning programs e.g. Learner Participant 3 highlighted the issue of unstructured program for tests writing and homework issuing by saying, "As a teacher, I cannot expect that a learner studies eight subjects per day and give him/her eight homework tasks and at the same time on the following day write a test."

The matric final examination timetable also contributes to unsatisfactory Physical Science results, as learners are expected to write five and a half hours per day (i.e., two

long subjects per day). It has been noted by Participant 4 (LP4M) that the frequency of the DOE officials has a negative impact on unsatisfactory results in Physical Sciences, since from time to time they went to schools and removed teachers from the classrooms and at also removed learners from the classroom. Learning is disrupted by such visits. Love affairs have been depicted as a neglected factor, according to Learner Participant 4 (LP4M). Learners pretend to study, yet they are not; instead, they are thinking about love affairs and ignoring their work.

Learner Participant 2 (LP2F) and Learner Participant 3 (LP3F) identify different yet overlapping factors that negatively affect academic performance. LP2F places strong emphasis on social and behavioural challenges, particularly pregnancy, absenteeism, and negative learner attitudes such as mood swings, arguing that these issues significantly disrupt learning and continuity in Physical Sciences. She also highlights concerns about teacher absenteeism linked to unprofessional conduct. In contrast, LP3F focuses more on relational and institutional factors, such as the emotional impact of romantic relationships, frequent clinic visits leading to absenteeism, and disruptions caused by teachers attending workshops. While LP2F foregrounds learner-related behavioural issues as central barriers, LP3F provides a broader perspective that includes both learner vulnerabilities and systemic challenges, illustrating differing emphases in how the causes of unsatisfactory performance are perceived.

The next section presents observations of teacher–learner interactions in the classroom.

4.4. Observation on Teacher Participants

This section presents findings derived from the researcher's structured classroom observations of teacher-learner interactions at selected schools in the uMkhanyakude District. Observation served as a complementary data collection instrument, enabling the researcher to witness the dynamics of Physical Sciences teaching and learning as they naturally unfolded, rather than relying solely on participants' self-reported accounts. This provided an additional layer of evidence that enriches and triangulates the findings from the teacher and learner interviews presented in the preceding subsections.

4.4.1. Introduction

As expected, the researcher needed to observe teacher participants while teaching and learners' interactions in class. The observations were made in four schools according to the teacher participants. The schools were coded as follows: school number one as School A, school number two as School B, school number three as School C, and school number four as School D. Teachers were observed while teaching Grade 12 learners in each school. Based on his observations, the researcher noted the following at each school (Appendix H).

4.4.2 School A

In School A, the researcher observed TP1M while teaching Grade 12 on the topic called Acids and Bases. The lesson objective was for learners to differentiate between acids and bases. The duration assigned for this lesson was one hour. The 27 learners were well-arranged in four rows, allowing clear space for the teacher's easy movement. The lesson was conducted in a laboratory with conducive teaching and learning conditions, and the learning environment was clearly defined. The teacher used previous question papers as teaching material. The lesson content focused on acids and bases. The teacher, at the outset, defined acids and bases according to Arrhenius and the Bronsted-Lowry theories, but he never delved deeply into the distinction between the two concepts. During the lesson, the teacher focused only on those who were participating, neglecting those who seemed to have lost interest. The teacher asked the learners to make examples of acids and bases they know. Indeed, those focused learners participated fully.

The teacher partially promoted collaborative learning in his classroom. No strategies were used to promote the articulation of knowledge and skills. The teacher demonstrated enough knowledge on the topic presented. Tasks given to learners were appropriate for Grade 12. The teacher's approach to the subject matter helped the learners to understand different aspects of the subject matter. Slow learners were not catered to during the lesson presentation; the teacher's pace was so fast. The teacher used the narrating method, in which learners had little input, even though they were 100% involved throughout the lesson. Tasks were given during and after the lesson. It is crystal clear

that some teachers arrive in class unprepared. Some do not have the skills to impart knowledge to the learners, and at the same time, they do not understand the diversity of the learners they are teaching. The researcher noted this when the teacher delivered the lesson at a very high pace, leaving some learners behind.

4.4.3. School B

In School B, the researcher further observed TP2M teaching Grade 12; the lesson focused on the photoelectric effect. The lesson's outcomes were that learners should, at the end of the lesson, know the definition of this phenomenon (Photoelectric effect). The lesson was scheduled for one hour but was not enough to unpack the Photoelectric effect phenomenon. The lesson was conducted in a classroom where learners were not arranged, but 31 total learners were seated in pairs. The classroom setting was neither conducive to teaching and learning nor clearly defined. The teacher used a chalkboard to write and display data to learners. Previous question papers were the materials or resources available to aid in teaching and learning.

The teacher was teaching the photoelectric effect, the behaviour of electrons in metals, the definitions of frequency and work function, and the differences between metals when different frequencies of light are shone on them. During the lesson, the educator was disturbed by learners making noise; he had to pause the lesson and discipline them. By doing that, the momentum and focus of the learners and the teacher were disturbed. The researcher deduced from this behaviour that unsatisfactory performance may result if it continues for the whole period. The topic was clear to the learners, and the purpose was outlined to differentiate between threshold frequency and work function and carry out the calculations based on the application of the photoelectric effect phenomenon. The teacher mentioned a solar panel as an example of the photoelectric effect. The teacher was unable to connect the lesson to previous concepts, making it difficult for learners to quickly master the content. The learning environment was not conducive, as the teacher was also projecting his lesson on the data projector. The classroom was not dark, so the projected data was not clear to learners. The class environment should have been made darker or dimmer. The teacher did not promote collaborative learning in his class. The

teacher absolutely encouraged the use of strategies that promote the articulation of knowledge and skills.

There was no proper sitting arrangement; learners were scattered, with chairs on top of the desks, and some learners couldn't see what was written on the chalkboard. The researcher observed that some learners were asking questions about what the teacher wrote on the chalkboard, but there were chairs on top of the desks, which prevented learners from seeing it clearly. The researcher observed that the teacher assigned tasks for learners to write and found this appropriate. The teacher was good at interpreting and elaborating on the information based on learners' experiences to promote the concepts in Physical Sciences. In his teaching, the teacher involved learners and gave them tasks while moving around to check whether they were being done correctly. The teacher demonstrated insufficient understanding of the lesson, leading learners to have many questions because they misunderstood the teacher's explanation. Hence, the teacher's approach partially helped learners to understand different aspects of the subjects. The teacher absolutely did not classify all types of knowledge and skills to cater to slow learners. He used a narrating method while delivering his lesson, though he had limited control over the teaching and learning strategies that promote an in-depth understanding of the subject content. He made examples of real-world situations. He assigned learners more work, but the researcher observed that they were unable to complete it because it was too much. The chances of writing for compliance purposes without understanding were high.

4.4.4. School C

In School C, the researcher further observed TP3F teaching Grade 12; the lesson was based on the topic called electric circuits. The lesson's outcomes were that learners should, at the end of the lesson, know the definitions of these phenomena, such as electric current, potential difference, resistance, series and parallel connections, and the difference between series and parallel connections. The lesson was scheduled for one hour; however, this duration was insufficient to adequately unpack the phenomena under discussion. Allocating a full hour to a single phenomenon would allow for more thorough

explanation and clearer understanding. The lesson was conducted in a classroom where learners were fully packed, leaving no space for the teacher to move between them; a total of 68 learners were seated in an unorganised manner. The classroom setting was not conducive to teaching and learning, and it was not well-defined. The teacher used a chalkboard to write and display data to learners. Textbooks were used as a reference by both the teacher and the learners.

The teacher was teaching electric circuits, extrapolating the behaviour of current on series and parallel connections, as well as in high and low resistors. During the lesson, the educator was disturbed by the learners who were making noise, not paying attention to the lesson delivered, and because of the congested classroom, she could not reach all places in the classroom, but kept standing in front of them. She had to pause the lesson and discipline them. By doing that, the momentum and focus of the learners and the teacher were disturbed. This behaviour suggests that continued unsatisfactory performance may occur if it persists throughout the duration of the lesson. The topic was clearly communicated to the learners, and its purpose was outlined as distinguishing between parallel and series resistors, as well as performing calculations based on the application of parallel and series connections. The teacher mentioned to learners that a parallel connection is used to electrify the houses in their homes.

The teacher was able to link the lesson with the previous concepts, which made it simple for learners to quickly master the content. The learning environment was not conducive since the teacher could not move freely in the classroom, as it was too congested. Most learners did not bother doing the activities given to them because they knew the teacher could not reach where they were. The class should have been divided into two to allow the free movement of the teacher while teaching and to enable the teacher to properly manage her class during the lesson presentation. The teacher did not promote collaborative learning in her class because of the congestion in class. The teacher absolutely encouraged the use of strategies that promote articulation of knowledge and skills, but very few of these learners mastered them.

Learners were seated randomly, scattered throughout the class, with others seated on top of the desks. Some learners couldn't see what was written on the chalkboard. Some learners were asking questions about something the teacher wrote on the chalkboard, but the learners seated on top of the desks prevented others from seeing it. The teacher assigned tasks for learners to write and found this appropriate. The teacher was good at interpreting and elaborating the information based on the learners' experiences in the promotion of the concepts in Physical Sciences. In her teaching process, the teacher involved learners and assigned tasks while standing still, as there was no movement due to class congestion. The teacher demonstrated sufficiently to make the lesson understandable, and learners were keen to understand the concepts introduced. Hence, the teacher's approach partially helped learners understand different aspects of the subject, given the high number of learners in a classroom.

The teacher made a concerted effort to address a range of knowledge and skill levels to support slower learners; however, the effectiveness of this approach was constrained by classroom congestion and the seating arrangement.

The teacher-learner method was used by the teacher while delivering her lesson, though she had partial control over teaching and learning strategies that promote an in-depth understanding of the subject content. The teacher made examples of real-world situations. She assigned learners more work, but they were unable to complete it because it was too much. The chances of writing for compliance purposes without understanding were high. The work given to learners as homework was about eight to ten pages, which is highly impossible for learners to write and complete with understanding, hence they would write for compliance purposes. From the observation, it can be deduced that unsatisfactory performance may be attributed to several factors, including limited classroom space, where teaching and learning primarily take place. Classroom congestion further contributed to challenges in effective lesson management during the presentation.

4.4.5. School D

Furthermore, the researcher observed the last teacher (TP4M) according to his schedule. The topic covered was Electrostatics. The main lesson's objectives were that learners should know where the charge will move when two charges exert a force on a single charge. To calculate the resultant force after that. Across all four schools, each lesson was assigned an hour. There were five rows, well-arranged with clear space for easy movement. There were 32 learners in this class seated in pairs. The class was conducive to teaching and learning, and the learning environment was clearly defined. The teacher used a smartboard to write and display data to the learners.

In terms of teaching and learning resources, the teacher used previous question papers and browsed online for other presentations. The content taught was based on the behaviour of the point charge when placed in the electric field. Finding the direction of the point charge. Calculating the electric field at a point. Finding the net electric field. During the lesson, the educator spoke while facing the smart board, so some learners never paid attention. The teacher was not facing the class while teaching, which led learners to misbehave. The lesson topic was very clear to learners from the onset. The main purpose of the lesson was to differentiate between electrostatic force, electric field, electric field at a point, and net electric field. The teacher linked the lesson to previous concepts, making it easier for learners to quickly master the content. The learning environment was conducive to learning and teaching and developed a content identity for both teachers and learners. The teacher strongly promoted collaborative learning in his classroom. The tasks given to learners were appropriate for the Grade 12 level. The teacher interpreted and elaborated on the information based on learners' experiences to promote the concepts in Physical Science.

Learners were one 100% involved; they were given the tasks to do, and the educator moved around to check if they were doing it correctly one by one. The teacher demonstrates sufficient knowledge of the subject matter, and he provides more examples to help make sense of the lesson. The teacher's approach to the subject matter partially helps learners understand different aspects of the content in line with their grade. The teacher did not classify all types of knowledge and skills to cater to slow learners, because

his teaching strategies, interactions, and activities given to learners do not provoke self-reliance in learners. The teacher used the narrating method and had partial control over the teaching and learning strategies that promote the in-depth understanding of the subject content in the classroom. He offered learners insight by giving them more examples of daily life activities practised at home. More tasks were given to learners for practice purposes. There was no motivation from the teacher who sought to encourage learners to use their local knowledge. Even though the teacher was using the narrating method, the teacher and learners eventually engaged with each other.

4.5. Synthesis

This chapter comprehensively discusses the study's findings, as captured during the face-to-face interviews. The biographical information of both (teachers and learners) participants is depicted in Table 4.1.1(a) for teachers' participants and Table 4.1.1(b) for learners' participants. Discussion of themes and subthemes related to the research question, aim, and objectives of the study. The interviews were conducted in four selected schools, with one teacher and one learner from each school. The semi-structured interviews were conducted to collect qualitative data through interaction with participants. The tools for analysing data, an interview guide, and an observation tool are displayed here. Themes were categorised into subthemes as indicated in Table 4.2(a) (four themes) and Table 4.2(b) (five themes), respectively. The respondents' responses were transcribed accurately (Point & Baruch, 2023). The first responses are from teacher participants, and the second responses are from learner participants. The last part of this chapter is observation-based. Class observations were made during face-to-face interactions between the teacher and learners.

Across all three data sources, teacher interviews, learner interviews, and classroom observations, several convergent patterns emerged that speak directly to the study's central research question. Most notably, recurring themes around instructional practice, learner engagement, and the classroom environment appeared consistently across both participant groups and were further corroborated through direct observation. Teachers and learners, while approaching the same classroom reality from different vantage points,

frequently echoed one another in identifying similar enablers and barriers to effective teaching and learning. This alignment across independently gathered data sources strengthens the credibility and trustworthiness of the findings, suggesting that the themes identified are not artefacts of any single data collection method but reflect genuine, grounded experiences shared within these school contexts.

Notably, however, not all findings were uniform or anticipated. Certain contradictions surfaced between what teachers reported during interviews and what was observed during classroom interactions, pointing to a possible gap between intended pedagogy and enacted practice, a tension that warrants careful interpretive attention. Similarly, some learner responses revealed unanticipated perspectives that diverged from teacher assumptions about learner motivation and understanding, highlighting the complexity of meaning-making within the classroom. These contradictions are not treated as methodological weaknesses but are instead regarded as analytically significant, consistent with a Constructivist/Interpretivist theoretical framework, which holds that knowledge is socially constructed and that multiple, sometimes competing, realities can coexist within the same educational setting (Creswell & Poth, 2018). By privileging the lived experiences and subjective meanings of participants, this framework enables the researcher to interpret both convergence and contradiction as meaningful windows into the social dynamics shaping teaching and learning in the selected schools.

4.7. Chapter Summary

This chapter was about data presentation and analysis. The data were extracted from numerous schools of uMkhanyakude District at Nkosi Sambane Circuit I, Northern part of KZN. The data depicted that, there are indeed numerous issues that need to be attended to such as: parents involvement in the education of their children, qualifications of teachers that do not match the curriculum needs of schools, poor studying methods and reluctance in learning by learners, poor training methods on the side of higher training institutions, teaching methods, lack of adequate content on teachers side, lack of teaching materials and infrastructure in most schools of uMkhanyakude District, Lack of Wi-Fi and teaching gadgets, and long distance travelled by learners. The other challenges identified

include insufficient subject content knowledge among subject advisors across numerous subjects, particularly Physical Sciences, a general shortage of subject advisors, the appointment of teachers based on seniority rather than merit, inadequate support from the Department of Basic Education (DBE) in schools, the failure to adopt cost-effective technological resources — such as transitioning from hard copy textbooks to electronic textbooks accessible via tablets or mobile devices — and the Department of Education's (DOE) delays in disbursing funds to schools.. All the factors mentioned above are interconnected and have collectively contributed to low performance in Physical Sciences. The next chapter focuses on the conclusion, recommendations, and suggestions for further study.

CHAPTER 5: SUMMARY OF DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.1. Introduction

This chapter gives a summary of the discussion of the research findings on the factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences in schools of the uMkhanyakude District. Various recommendations were made based on the findings, and conclusions were drawn in the preceding chapter.

5.2. Study Overview

The study investigated factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences in the uMkhanyakude District, drawing on lesson observations and face-to-face interviews with four teachers and four learners across four schools. The findings revealed several interconnected challenges spanning teacher preparedness, resources, curriculum delivery, and learner behaviour.

Teachers demonstrated awareness of lesson preparation tools such as ATPs, exam guidelines, CAPS documents, and past papers; however, none consulted the moderators' report, which is a critical diagnostic tool for identifying concepts most challenging to learners. Some teachers, particularly PGCE-qualified educators, displayed strong content knowledge but lacked effective teaching methodology. Furthermore, three of four teachers struggled with Paper 2 (Chemistry), while one struggled with Paper 1 (Physics), suggesting that content gaps directly compromise learner performance in the affected sections.

A significant resource deficit was observed across most schools. Teachers seldom conducted practical experiments due to a lack of laboratories and apparatus, resorting instead to teaching practicals theoretically. Schools in remote areas also lacked Wi-Fi connectivity, compelling teachers to use personal data for downloading learning materials. Learners similarly lacked basic resources such as calculators, which are essential for a calculation-intensive subject. Socio-economic factors, including parental unemployment and poverty, further compounded learners' academic challenges.

Regarding curriculum delivery, teachers were found to rush through content to meet ATP deadlines, neglecting slow learners and omitting lower cognitive levels (Levels 1 and 2) in their planning. Learners reported losing trust in their teachers' content delivery accuracy, leading some to rely on YouTube and TikTok for clarification. Absenteeism among both teachers and learners, learner pregnancy, substance abuse, and ill-discipline were additional factors identified as contributing to poor performance.

On a positive note, teachers extended contact time through morning, afternoon, weekend, and evening classes, and employed diagnostic analysis to identify struggling learners. Learners demonstrated intrinsic motivation by forming independent study groups, sharing materials via WhatsApp, and teaching one another. Peer teaching emerged as a particularly effective strategy, as learners grasped concepts more readily from peers than from teachers. Parental involvement, however, remained limited, largely due to illiteracy and physical distance from their children.

The study concludes that unsatisfactory performance in Physical Sciences results from a complex interplay of inadequate teacher methodology, resource constraints, socio-economic barriers, and curriculum delivery challenges, all of which require urgent, coordinated intervention from schools, the DOE, and tertiary institutions.

5.3 Summary of the Research Sub-Questions, Findings and Recommendations

The study provided an answer to the research's main question:

How can Physical Science teachers respond to factors that contribute to Grade 12 learners' unsatisfactory performance?

Each sub-question was addressed following this order: Research sub-question, findings, recommendations.

5.3.1 Research Sub-Question 1

What factors contribute towards learners' unsatisfactory performance in Grade 12 Physical Sciences?

Key Findings

The findings indicate that learners' unsatisfactory performance in Grade 12 Physical Sciences is influenced by a combination of teacher-, learner-, and system-related factors. These include gaps in teaching methodology despite strong content knowledge, ineffective lesson preparation and instructional strategies, and limited use of baseline assessments to support conceptual understanding. Learner and teacher absenteeism, as well as late coming, further disrupt the teaching and learning process. For example, Learner Participant 3 (LP3F), stated that *"Another factor is the one for teacher absenteeism due to workshops. This factor causes huge damage in our performance, sometimes a teacher attends back-to-back workshops for the whole week, hence we perform unsatisfactorily in Physical Sciences."* Additionally, learners' partial understanding of scientific concepts and their reliance on external sources such as social media for clarification point to shortcomings in classroom engagement and instructional effectiveness. Together, these factors contribute to persistent challenges in learner performance.

Discussion

The outcomes revealed that the participants demonstrated a diverse assemblage of opinions pertaining to factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences. However, the theme that emerged from the discussions was preparing for Physical Sciences for both teachers and learners. As seen in Sections 4.3.1.3 and 4.4, teachers seem to know which tools they need when preparing their lessons, demonstrating comprehensive familiarity with scientific concepts. Some teachers reported lacking teaching methodology, even though they have good content. A desirable solution is to utilise transfer learning, which can transfer the knowledge learned from a data-rich platform, which is a teacher to a learner (Liu et al., 2021). The manner in which teachers prepare, plan, and teach Physical Sciences, including even strategies used to impart knowledge to learners, results in unsatisfactory performance for learners.

Learners' absenteeism in class during teaching and learning played a huge role in unsatisfactory performance not forgetting the teachers' absenteeism as well as the late coming of teachers.

In a nutshell, their insights raised awareness of the importance of using baseline assessment before tackling new concepts. In contrast, learners demonstrated that they tentatively understand the scientific concepts, but they partially trust the information they receive from their teachers. As a result, some of them rely on YouTube and TikTok videos for more clarity on the concepts. This behaviour highlights an opportunity for further engagement with teachers on the methodology of Physical Sciences teaching. Schools need to invite Physical Sciences subject specialists to conduct an induction on how teachers should use tools such as examination guidelines, curriculum assessment policy documents, and annual teaching plans when preparing for lessons (Tolgfors et al., 2022). Schools also need to develop a learner's code of conduct that proposes strong consequences for learners' absenteeism. The DBE could introduce a biometric system upon entering school premises and upon entering classes to address teachers' absenteeism, late arrival, and skipping classes. The Department of Education needs to solicit subject specialists to create YouTube programs to serve as Video Verifying Assistant Teacher (VVAT) to assist novice teachers.

5.3.2 Research Sub-Question 2

How do teachers address the factors that influence the improvement of Grade 12 learners' performance in Physical Sciences?

Key Findings

The findings suggest that teachers employ a range of strategies to address factors influencing the improvement of Grade 12 learners' performance in Physical Sciences. These include increasing instructional support through additional classwork, homework, and regular testing, as well as using diagnostic analysis to identify and support underperforming learners. For example, Learner Participant 3 (LP3F), had this to say, *"As a teacher, I cannot expect that a learner studies eight subjects per day and give him/her eight homework tasks and at the same time on the following day write a test."*

Teachers further extend learning opportunities by offering extra classes beyond normal school hours and, in some cases, involving external tutors. Efforts are also made to strengthen learners' understanding of interconnected concepts. However, the effectiveness of these approaches depends on maintaining a balanced workload, adopting learner-centred teaching methods, and providing structured academic support to enhance both engagement and conceptual understanding.

Discussion

The study revealed in Section 4.3.1.1 that when teaching Physical Sciences content, teachers give learners more schoolwork in the form of classwork and homework, as well as more tests, which is a good practice. Encouragingly, the teachers also analyse their learners' performance through diagnostic analysis to help them diagnose those who perform unsatisfactorily. The study also found that teachers extend their contact time with learners in the form of morning classes, afternoon classes, weekend classes, and even cross-night classes, and sometimes invite tutors to come help them. Furthermore, teachers accurately assess learners' understanding of interconnected concepts, as witnessed by Sommerhoff et al. (2023).

Schools should develop a compulsory homework and classwork timetable to avoid overloading learners with schoolwork, which should prevent learners from failing to do it on time. This is witnessed by this statement: *"Workload expansion affects learners' well-being and potential burnout in learning programs, and specifically that learners perceive workload as directly related to their well-being and satisfaction"* (Thornby et al., 2023). When teaching Physical Sciences lessons, teachers should give a controllable and manageable amount of work, to ensure that learners can and finish it without feeling exhausted, and that the teacher can mark and finish it. Teachers should allow learners to discover the unknown concepts by themselves, not always standing in front and lecturing them. Teachers should take learners on field trips so that some concepts can be automatically addressed. The DOE should remunerate teachers who conduct extra classes in the afternoon, evening, on weekends, at night, and on holidays, since they are dedicated and risk their lives.

5.3.3 Research Sub-Question 3

What are learners' perceptions of the factors that contribute to their unsatisfactory performance in Physical Sciences?

Key Findings

The findings indicate that learners perceive their unsatisfactory performance in Physical Sciences as stemming from a combination of instructional, behavioural, and systemic factors. For example, Learner Participant 3 (LP3F) mentioned that, “*Love affairs, Sir, this factor no one has ever paid attention to it, but trust me, it has a huge damage on the performance of learners, they hurt in such a manner that you end up losing focus on your studies, thinking about your boyfriend or girlfriend. Another factor is the one for teacher absenteeism due to workshops.*” Learners report that teaching is often too fast-paced and assumes prior knowledge, resulting in limited accommodation for slower learners and inadequate coverage of complex concepts. The pressure to complete the Annual Teaching Plan further contributes to superficial teaching and gaps in understanding. Additionally, learner-related challenges such as ill-discipline, substance abuse, pregnancy, and absenteeism negatively affect engagement and continuity in learning. Teacher-related issues, including absenteeism, missed lessons due to external commitments, and unprofessional conduct, also disrupt the teaching process. Moreover, external pressures from parents and peers to select Physical Sciences, regardless of learners’ interests or abilities, compound these challenges and contribute to poor academic outcomes.

Discussion

As revealed in Sections 4.3.1.3 and 4.3.2.5, the study discovered that most teachers treat learners as if they are repeating Grade 12. This is because they started the Grade 12 syllabus as early as Grade 11, so they assumed learners knew everything. Murdiyani (as cited in INKLUSI, 11(2), 247–266) advocated that “*teachers should understand slow learners to reduce behavioural problems*”. Furthermore, teachers are too fast when teaching, and slow learners are not accommodated. Teachers teach a

topic for one day, even though it's supposed to take three days. This leads to learners failing without any reason other than the pressure to finish the scope (annual teaching plan), leaving learners behind. Moreover, learners' ill-discipline, substance abuse, and pregnancy lead to learners' absenteeism. Teachers who come to school drunk and skip classes, and at times they are absent. The pressure from parents and peers is that a learner must choose the Physical Sciences. High frequency of teachers' absences due to meetings held outside the school premises is another factor contributing to low performance in Physical Sciences.

Schools must implement policies that require teachers to differentiate their instruction, ensuring that learners of all aptitudes are adequately supported within the classroom. Furthermore, the Physical Sciences curriculum must be delivered as prescribed in the respective grade syllabus. Having said that, the curriculum must be taught as it is prescribed by the DOE. The curriculum developers need to consult with the teachers who are in the teaching field, because skipping some of the topics from Grade 11 and substituting them by Grade 12 curriculum may be seen as relevant. The DOE need to review the curriculum relevance every 10 years. Schools need to develop learners' code of conduct which speaks to learners' ill-discipline, substance abuse, learners' pregnancy as well as learners' absenteeism.

DOE needs to introduce breathalysers in schools to prevent drunk teachers and learners from entering the school and to lay charges against them. Keshf and Khanum (2021) emphasised that, *"Career guidance and counselling is vital for smooth career development"*. Therefore, parents and friends need not put pressure on learners to choose subjects that they don't have competence in and must not follow friends but must understand what they like and are capable of doing. Thus, guidance and proper counselling for choosing subject packages need to be provided accurately, considering an individual learner's intelligence quotient (IQ) and interests. The DOE must, at all costs, let the teachers out of the school or use modern technology, e.g., Zoom or Microsoft Teams, or make use of the last hour of contact time.

5.3.4 Research Sub-Question 4

In what ways do learners address the factors that lead to their unsatisfactory performance in Grade 12 Physical Sciences?

Key Findings

The findings indicate that learners actively employ a range of self-initiated strategies to address factors contributing to their unsatisfactory performance in Grade 12 Physical Sciences. These include demonstrating intrinsic motivation, encouraging one another to adopt positive attitudes towards challenging topics, and organising peer-led study groups to enhance understanding. Learners collaborate through discussion groups, including digital platforms such as WhatsApp, where they share resources, solve problems collectively, and provide academic support. For example, Learner Participant1 (LP1M) said, *“There is a WhatsApp group for my classmates where we help each other, and that is where we deliver what we have mastered to see the improvement in those who actually seek improvement.”* Additionally, those with a stronger grasp of concepts assist their peers, reinforcing their own understanding in the process. Learners also seek support from teachers when necessary and develop independent problem-solving skills, which contribute to increased confidence and improved academic performance.

Discussion

As revealed in Sections 4.3.1.3 and 4.3.2.5, the study found that learners have intrinsic motivation; they even advise one another as classmates to stop the tendency to think that certain chapters are difficult, so as to enable their minds to function optimally. Learners organise their own classes and groups with group leaders who understand the concepts better. They supervise themselves; they call their teachers whenever they have problems, and they even create WhatsApp groups where they share problems and solutions and other useful study materials. Learners who clearly understand some topics better gather classmates with lower marks and teach them, which in turn, helps them gain strength and hence, perform better. Learners do share some study techniques for studying Physical Sciences (Zamiri & Esmaeili, 2024). Learners gain confidence when they discover they can tackle problems on their own without the teacher's help, given all the skills and tactics.

Learner motivation was positively reflected across the four established components: Attention, Relevance, Confidence, and Satisfaction, indicating strong potential for this approach as an innovative pedagogical advancement in Physical Sciences education (Low et al., 2021). Teachers need to motivate learners as a foundation before the commencement of any lesson. The teachers, therefore, must allow learners to teach others while the teacher plays the coaching role in the classroom, promoting better understanding for the classroom and the learner explaining to the class. The teachers must teach and leave a gap for the learners to reflect on what they have learned. Schools need to ensure that teachers are always available where learners are, to provide proper supervision.

5.4 Contribution to the Body of Knowledge

This study amplifies the substantial body of literature on factors contributing to Grade 12 learners' unsatisfactory performance by examining the teaching methods used by teachers when teaching Physical Sciences and the challenges they encounter. Not forgetting the methods used by learners to study Physical Sciences and the challenges they encounter when studying. This study examined the impact of teachers' professional development on learners' performance and learners' attitudes towards Physical Sciences. It also addressed the main research question: How can Physical Science teachers respond to factors contributing to Grade 12 learners' unsatisfactory performance? This was done by reviewing the literature on factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences. A lack of adequate teacher development in curriculum delivery was identified.

5.5 Limitations

This study has its limitations. According to Ross et al. (2019), a limitation is defined as the act of restricting or controlling something or someone. In this study, the following limitations were observed. The study was limited to the KwaZulu-Natal Province in the uMkhanyakude District. The uMkhanyakude District has 38 high schools. This study was limited to only four high schools in the Ingwavuma Circuit. This research study was based on four Grade 12 learners, one per school, enrolled in Physical Sciences, and four

teachers teaching Physical Sciences. This study was not indefinite but needed specific start and end times. In terms of age, the teachers interviewed ranged from 23 to 60 years, and the learners interviewed ranged from 18 years of age and above. Despite other approaches, the study relied solely on qualitative methods and a case study design.

5.6 Recommendations for Further Research

The short-term recommendations presented below focus on practical and immediately implementable interventions within existing school and district structures. These measures are intended to address the identified challenges in Physical Sciences teaching and learning, using available resources and administrative mechanisms to improve learner performance in the near term. They are as follows:

- Based on findings in Section 4.3.2.5, a sufficient number of learning hours is allocated for Physical Science in the school timetable.
- Based on findings under Section 4.3.1.3, the district curriculum advisory board is to look at the impact of the number of subjects to be taught in order to give support towards effective teaching of Physical Science and strike a balance in performance.

The long-term recommendations outlined below focus on systemic and structural changes required to sustainably improve the teaching and learning of Physical Sciences. These recommendations involve policy reform, curriculum development, and significant investment in resources and capacity-building, and are therefore intended to be implemented over an extended period.

- Based on findings under Section 4.3.1.3, the introduction of Physical Science as a subject at the entry level of primary schools.
- Based on findings under Section 4.3.2.2, the improved pre-service training of improved methodology at tertiary institutions could be used to prepare learner teachers who are to teach Physical Sciences in the FET Phase.

- Based on the identified limitations of this study discussed under Section 5.5, more provinces and districts should be included in the sample size in order to test whether the unsatisfactory performance is a general problem or not.
- Based on findings under Section 4.3.1.3, schools are to be assisted with resources in order to alleviate the impact of socio-economic factors on learners' unsatisfactory performance in Physical Sciences.
- Based on findings under Section 4.3.2.1, the relevance of the Physical Science curriculum is offered in the current century.
- Based on findings under Section 4.3.1.3, the contribution of basic school infrastructure to the learners' performance.

5.7 Chapter Summary

This research study, which investigated factors contributing to Grade 12 learners' unsatisfactory performance in Physical Sciences, in uMkhanyakude District, clearly answered the main research question after the aims and objectives were clearly mapped out. The data were collected through lesson observations and face-to-face interviews. The study's findings were structured according to the researcher's data presentation, analysis, and interpretation. It was found that teachers teach practical work rather than conduct it due to a lack of laboratories and science apparatus in schools, and that in schools where laboratories and apparatus are available, teachers lack the skills or knowledge to teach learners.

The findings and recommendations of this study were consistently viewed through the constructivist theoretical lens, which recognises that knowledge is not passively received but actively constructed by learners through experience, social interaction, and reflection. This framework acknowledged that teachers, learners, parents, and school environments each represent distinct realities that collectively shape learner performance, and no single factor can be understood in isolation. Consequently, the recommendations emerging from this study are deliberately learner-centred, prioritising strategies such as peer teaching, group learning, baseline assessment, and differentiated instruction that position learners as active participants in their own knowledge construction. Constructivism further affirmed

that practical experimentation, collaborative problem-solving, and real-life contextualisation of scientific concepts are not supplementary activities but essential pedagogical tools for meaningful learning in Physical Sciences. This theoretical orientation also validated the diverse and sometimes contradictory perspectives shared by participants, recognising that multiple lived realities coexist within the same learning environment, and that any meaningful intervention must be responsive to the full complexity of those experiences.

It emerged from the study that Physical Science teachers can respond to learners' unsatisfactory performance by improving their lesson preparation and teaching methodology, including the use of baseline assessments, differentiated instruction, and tools such as examination guidelines and annual teaching plans. Teachers can extend contact time through extra classes, diagnostic analysis of learner performance, and manageable classwork and homework loads, while also addressing absenteeism and late coming through institutional accountability measures such as biometric systems. Furthermore, teachers can further support learners by fostering intrinsic motivation, allowing peer teaching, and ensuring that the curriculum is delivered at the appropriate grade level and pace, so that slow learners are adequately accommodated and not left behind.

To meaningfully improve Grade 12 learners' performance in Physical Sciences, it is recommended that the subject be introduced at the primary school level to build a strong conceptual foundation from an early age. Complementing this, pre-service teacher training at tertiary institutions must be strengthened to equip prospective Physical Sciences teachers with improved pedagogical methodologies relevant to the current century, ensuring they are adequately prepared for the FET Phase. Furthermore, schools must be adequately resourced to mitigate the adverse effects of socio-economic factors on learner performance, as sufficient physical infrastructure and learning materials are fundamental prerequisites for effective teaching and learning.

The study recommends that the DOE should capacitate learner teachers while they are still studying and further equip them to conduct practical experiments. Moreover, train them on how to use annual teaching plans (ATPs), exam guidelines, and the Curriculum Assessment Policy Statement (CAPS) document when getting ready for tuition delivery. Once learners are fully equipped with study skills and teachers teach thoroughly without any shadow of doubt, the country will witness more learners performing satisfactorily in Physical Sciences, and hence, more learners will enrol in higher education institutions, in science-related courses in the future.

As already alluded to in Section 5.5, the study's findings are constrained by its limited geographical scope, having been conducted in only four high schools within a single circuit of the uMkhanyakude District in KwaZulu-Natal, with a small sample of four learners and four teachers. The exclusive use of qualitative methods and a case study design, combined with the study's fixed timeframe, further limits the generalisability of the findings to broader South African educational contexts. Consequently, future research should expand the sample across multiple districts and provinces and allow for a longer data collection period to produce more widely transferable conclusions.

5.8 Conclusion

In conclusion, this study has illuminated the multifaceted factors undermining Grade 12 Physical Sciences performance in the uMkhanyakude District and has demonstrated that meaningful improvement is achievable through deliberate, systemic action. When teachers are adequately prepared, properly resourced, and supported by accountable institutional structures, and when learners are motivated, appropriately paced, and equipped with effective study skills, the conditions for academic success in Physical Sciences are firmly established. The recommendations directed at the DOE, schools, and tertiary institutions collectively point toward a future where Physical Sciences is taught with confidence, competence, and consistency from primary school through to the FET Phase, ultimately producing more graduates who are ready and willing to pursue science-related careers in higher education. While the study's scope was limited, its findings offer a valuable and actionable foundation upon which broader, more expansive research can

be built to address the persistent challenge of unsatisfactory Physical Sciences performance across South Africa.

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APPENDIX A: PERMISSION TO CONDUCT RESEARCH IN KZN SCHOOLS

 **KWAZULU-NATAL PROVINCE**
EDUCATION
REPUBLIC OF SOUTH AFRICA

OFFICE OF THE HEAD OF DEPARTMENT

Private Bag X 9137, PIETERMARITZBURG, 3200
Anton Lembede Building, 247 Burger Street, Pietermaritzburg, 3201
Email: buyi.ntuli@kzndoe.gov.za Tel: 033 392 1051 Enquiries: Mrs B. T. Ntuli

Ref No.: 2/4/8/193

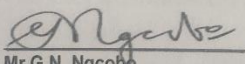
Mr Mzamo Wiseman Sibiya
P.O. Box 8117
EZIMPISINI
3976

Dear Mr Sibiya

PERMISSION TO CONDUCT RESEARCH IN THE KZN DoE INSTITUTIONS

Your application to conduct research entitled: **"INVESTIGATING FACTORS CONTRIBUTING TO GRADE 12 LEARNERS' UNSATISFACTORY PERFORMANCE IN PHYSICAL SCIENCE:"**, in the KwaZulu-Natal Department of Education institutions has been approved. The conditions of the approval are as follows:

1. The researcher will make all the arrangements concerning the research and interviews.
2. The researcher must ensure that Educator and learning programmes are not interrupted.
3. Interviews are not conducted during the time of writing examinations in schools.
4. Learners, Educators, Schools and Institutions are not identifiable in any way from the results of the research.
5. A copy of this letter is submitted to District Managers, Principals and Heads of Institutions where the Intended research and interviews are to be conducted.
6. The period of investigation is limited to the period from **22nd May 2024 to the 31st August 2026**.
7. Your research and interviews will be limited to the schools you have proposed and approved by the Head of Department. Please note that Principals, Educators, Departmental Officials and Learners are under no obligation to participate or assist you in your investigation.
8. Should you wish to extend the period of your survey at the school(s), please contact Mrs Buyi Ntuli at the contact numbers above.
9. Upon completion of the research, a brief summary of the findings, recommendations or a full report/dissertation/thesis must be submitted to the research office of the Department. Please address it to The Office of the HOD, Private Bag X9137, Pietermaritzburg, 3200.
10. Please note that your research and interviews will be limited to schools and institutions in KwaZulu-Natal Department of Education.


Mr G.N. Ngcobo
Head of Department: Education
Date: 22 May 2024

GROWING KWAZULU-NATAL TOGETHER

APPENDIX B: UNISA ETHICAL REVIEW CLEARANCE CERTIFICATE



UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2024/03/13

Dear Mr MW Sibiya

Decision: Ethics Approval from
2024/03/13 to 2027/03/13

Ref: **2024/03/13/17056942/32/AM**
Name: Mr MW Sibiya
Student No.:17056942

Researcher(s): Name: Mr MW Sibiya
E-mail address: 17056942@mylife.unisa.ac.za
Telephone: 0837156175

Supervisor(s): Name: Dr EC Ndlovu
E-mail address: ndlovvec@unisa.ac.za
Telephone: 0124296174

Title of research:

Investigating factors contributing to Grade 12 Learners' unsatisfactory performance in Physical Science

Qualification: MEd Natural Science Education

Thank you for the application for research ethics clearance by the UNISA College of Education Ethics Review Committee for the above mentioned research. Ethics approval is granted for the period 2024/03/13 to 2027/03/13.

*The **medium risk** application was reviewed by the Ethics Review Committee on 2024/03/13 in compliance with the UNISA Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.*

The proposed research may now commence with the provisions that:

1. The researcher will ensure that the research project adheres to the relevant guidelines set out in the Unisa Covid-19 position statement on research ethics attached.
2. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.



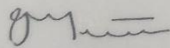
University of South Africa
Pretorius Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

3. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the UNISA College of Education Ethics Review Committee.
4. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
5. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing.
6. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
7. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
8. No field work activities may continue after the expiry date **2027/03/13**. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

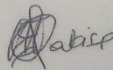
Note:

The reference number **2024/03/13/17056942/32/AM** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.

Kind regards,



Prof AT Motlhabane
CHAIRPERSON: CEDU RERC
motlhat@unisa.ac.za



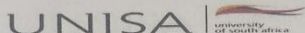
Prof Mpine Makoe
EXECUTIVE DEAN
qakisme@unisa.ac.za



Approved - decision template – updated 16 Feb 2017

University of South Africa
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APPENDIX C: LETTER TO KZN EDUCATION HEAD OF DEPARTMENT



P.O Box 8117
Ezimpisini
3976
08 April 2024

Head of Department
KZN Department of Basic Education
Private Bag x 9137
Pietermaritzburg
3200

Re: Request for permission to conduct research at: UMkhanyakude District-Education

Title of the research study: Investigating factors contributing to Grade 12 Learners' unsatisfactory performance in Physical Science.

Dear Mr G.N Ngcobo

I, Mzamo Wiseman Sibiyi, am doing research under supervision of Dr Eliot C Ndlovu, a Lecturer(Supervisor) in the Department of Science and Technology Education towards a Master of Education in Natural Science at the University of South Africa. I am inviting your schools to participate in a study entitled: *Investigating factors contributing to Grade 12 Learners' unsatisfactory performance in Physical Science.*

The aim of the study is to investigate the factors contributing to Grade 12 Learners' unsatisfactory performance in Physical Science.

Your Department has been selected because the Physical Sciences never reach 95% overall performance and the researcher would like to dig more on why Physical Science performance in your Department is unsatisfactory and come up with recommendations which can be implemented by the Department of Basic education to counter-act those factors so to improve the performance.

The study will entail the semi-structured interviews for both learners and teachers as well as the class observations while teachers are delivering their lessons.

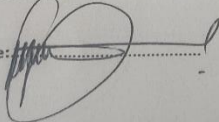
The benefits of this study are : Physical Sciences will be taught using different approaches , challenges leading to unsatisfactory performance in this subject will be addressed, Physical Science curriculum will be re-structured to overcome the unsatisfactory performance. There are no potential risks on this study. There will be no reimbursement or any incentives for participation in the research. Feedback procedure will entail the issuing of the study document to the participants once the study is completed and published.

Yours sincerely

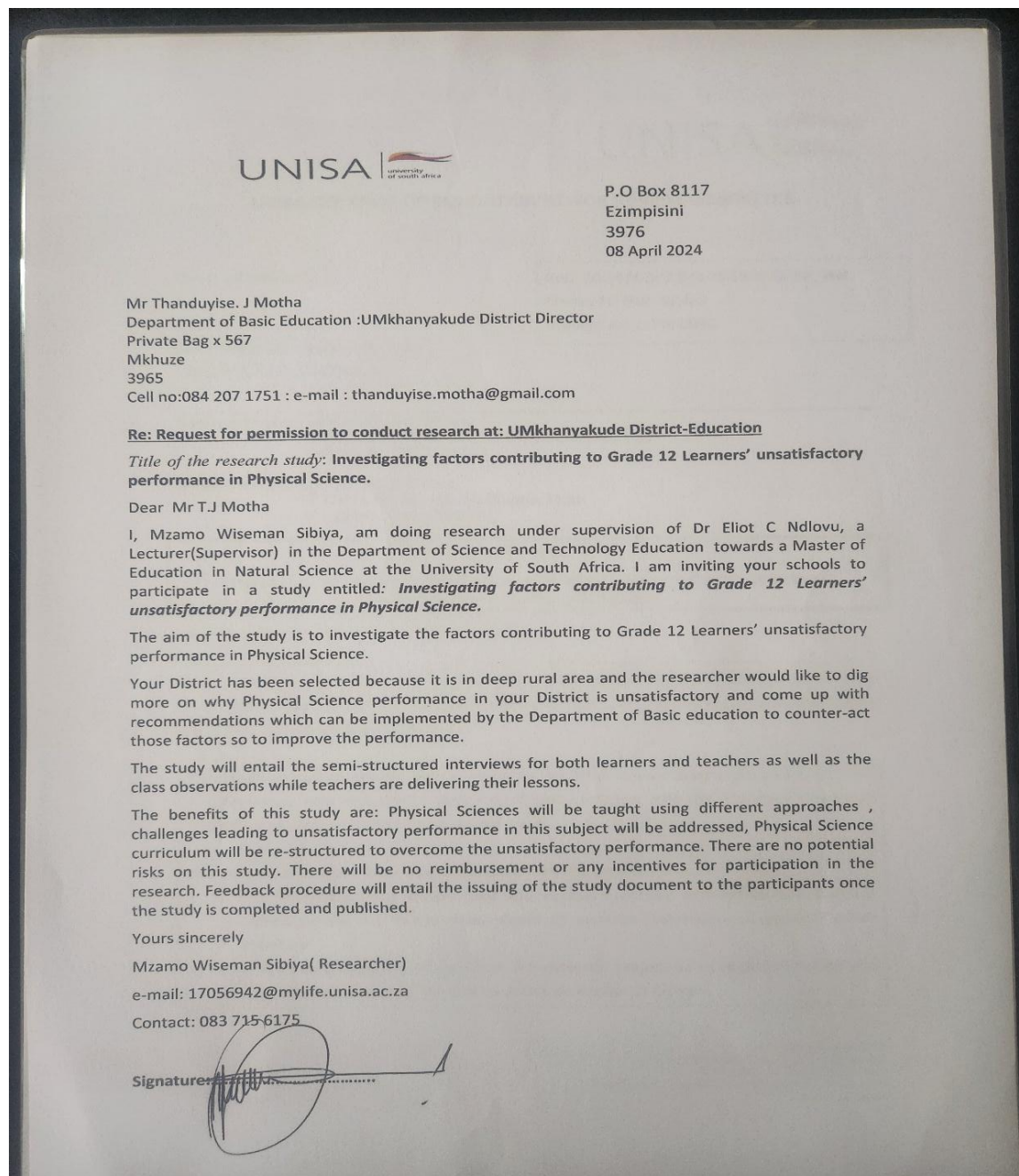
Mzamo Wiseman Sibiyi(Researcher)

e-mail: 17056942@mylife.unisa.ac.za

Contact: 083 715 6175

Signature: 

APPENDIX D: LETTER TO UMKHANYAKUDE EDUCATION DISTRICT DIRECTOR



APPENDIX E: REGISTRATION LETTER 2025



2110

SIBIYA M W MR
P O BOX 8117
NDUMO
3965

STUDENT NUMBER : 17056942

ENQUIRIES TEL : 0800 001 870

EMAIL : manddeunisa.ac.za

2025-02-28

Dear Student

I hereby confirm that you have been registered for the current academic year as follows:

Proposed Qualification: MEd NATURAL SC EDU (90063)

CODE	PAPER	S NAME OF STUDY UNIT	NQF crdts	LANG.	PROVISIONAL EXAMINATION EXAM DATE CENTER (PLACE)
Study units registered without formal exams:					
DPNSR96		MEd - Natural Science Education (Dissertation)	**	R	
DPNSR96		MEd - Natural Science Education (Dissertation)	**	R	
* Exam transferred from previous academic year					

You are referred to the "MyRegistration" brochure regarding fees that are forfeited on cancellation of any study units.

Your attention is drawn to University rules and regulations (www.unisa.ac.za/register).

Please note the new requirements for reregistration and the number of credits per year which state that students registered for the first time from 2013, must complete 36 NQF credits in the first year of study, and thereafter must complete 48 NQF credits per year.

Students registered for the MBA, MBL and DBL degrees must visit the SBL's BSOOnline for study material and other important information.

Readmission rules for Honours: Note that in terms of the Unisa Admission Policy academic activity must be demonstrated to the satisfaction of the University during each year of study. If you fail to meet this requirement in the first year of study, you will be admitted to another year of study. After a second year of not demonstrating academic activity to the satisfaction of the University, you will not be re-admitted, except with the express approval of the Executive Dean of the College in which you are registered. Note too, that this study programme must be completed within three years. Non-compliance will result in your academic exclusion, and you will therefore not be allowed to re-register for a qualification at the same level on the National Qualifications Framework in the same College for a period of five years after such exclusion, after which you will have to re-apply for admission to any such qualification.

Readmission rules for MEd: Note that in terms of the Unisa Admission Policy, a candidate must complete a Master's qualification within three years. Under exceptional circumstances and on recommendation of the Executive Dean, a candidate may be allowed an extra (fourth) year to complete the qualification. For a Doctoral degree, a candidate must complete the study programme within six years. Under exceptional circumstances, and on recommendation by the Executive Dean, a candidate may be allowed an extra (seventh) year to complete the qualification.

BALANCE ON STUDY ACCOUNT: 9045.00

Payable on or before:	2025/03/31:	0.00	2025/05/15: 2665.00	2025/08/15: 6380.00
Immediately: 0.00	2025/11/15:	0.00	2026/03/15: 0.00	

Yours faithfully,

Prof  Sepota
Acting Registrar





University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA, 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
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APPENDIX F: TEACHER'S INTERVIEW GUIDE

1. How is the performance of your learners in Physical Science?
2. Are there any factors that promote your good performance/unsatisfactory performance in Physical Science?
3. Are there any factors that you encounter in delivering the scientific concepts?
4. How do you deal with the factors to improve learner performance?
5. Are there any scientific concepts challenging you or your learners in Physical Science?
6. How do you make sure that these Scientific concepts are taught?
7. Are there any activities involved in the process of planning and teaching Physical Science?
8. How do these activities help you achieve the objectives of the lesson or topic taught?
9. Explain any relationship that exists between scientific concepts and learner performance?
10. Can you mention the kind of activities you normally give to your learners?
11. What teaching techniques do you apply when teaching Physical Science in Grade 12?
12. How do you ensure that these teaching techniques meet the learners' expectations?
13. Do the techniques used in teaching lead to the satisfactory performance by the learners?
14. Is there anything you can say about failures in dealing with the scientific concepts during your planning and teaching?
15. What do you do to assist learners to deal with unsatisfactory performance in Physical science?

APPENDIX G: LEARNERS' INTERVIEW GUIDE

1. What motivated you to choose Physical Science in Grade 12?
1. How do you cope with the subject matter content in Physical Science?
2. How is your performance during the assessments in Physical Sciences?
3. Are there some concepts that are challenging to you? (elaborate)
4. Is/are there any reason(s) you find these concepts challenging?
5. How do you overcome the challenging concepts in Physical Science?
6. What kind of support do you receive from your teacher to overcome these challenges?
7. What strategies that your teacher uses to engage you to improve your performance in class?
8. Do the strategies your teacher apply assist you to understand the concepts in Physical Science?
9. Explain how does your teacher teach the Physical Science lessons?
10. What do you do to make sure that you master the Physical Science concepts to the acceptable cognitive level for Grade 12?
11. Is there anything else that you would like to say that is not covered in this interview?

APPENDIX H: CLASS OBSERVATION TOOL

Lesson Presentation Observation Tool	
Before:	Comment/Explain
Prior review Grade: Lesson topic: Lesson objectives/outcomes: Duration of the lesson:	
Access to the classroom Seating arrangements: Number of learners: Space for easy movement:	
Classroom setting Conducive for teaching and learning: Learning environment clearly defined:	
Teaching and learning resources Is/are there materials and or resources available? Is any teaching material besides textbooks used?	

Is/are the materials and or resources relevant to the teaching of Physical Science?	
During:	
What is being taught?	
Is the lesson topic clear?	
What appears to be the main purpose of the lesson?	
Learning environment:	
Does the learning environment- conducive for learning Physical Science?	
develop a content identity for both teacher and learner?	
promote collaborative learning learning?	
encourage the use of strategies that promote articulation of knowledge and skills?	

Teacher: Are the tasks appropriate for Grade 12? Does the teacher interpret and elaborate on the information based on learners' experiences to promote the concepts in Physical Science? Learner involvement: Do learners cope with the strategies the teacher uses in class for understanding?	
Subject content competence: Does the teacher demonstrate enough knowledge of the subject matter content? (Elaborate)- Is the content and methods adapted suitably for the Grade 12 learners? Does the teacher's approach to the subject matter help the learners to understand different aspects of the subject content in line with their Grade? Does the teacher classify all types of knowledge and skills to cater for slow learners?	
Teaching strategies, interactions, and activities:	

Which teaching method(s) does the teacher use in his /her teaching? Does the teacher have control over the teaching and learning strategies that promote the in-depth understanding of the subject content in the classroom? (Elaborate) Does the teacher offer information and insights beyond what is available in the class? Give example(s). Is the teacher available to take suggestions from the learners or adapt methods to accommodate all learners? Do the developed tasks or activities help to promote in depth understanding of the concepts taught? Does the teacher motivate the learners to use their local knowledge? Are the learning barriers towards identified, and addressed during learning? Are the activities learners exposed to enable them to match the cognitive levels for the grade?	
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APPENDIX I: EDITORIAL CERTIFICATE

EDITORIAL CERTIFICATE

Author: Mzamo Wiseman Sibiya

Document title: FACTORS AFFECTING UNSATISFACTORY PERFORMANCE IN
PHYSICAL SCIENCES: INSIGHTS FROM A CASE STUDY OF GRADE 12 LEARNERS IN
UMKHANYAKUDE DISTRICT

Date issued: 26/02/2026

This document certifies that the above thesis was proofread and edited by
Prof Gift Mheta (PhD, Linguistics).

The document was edited for proper English language, grammar, punctuation, spelling and overall style. The editor endeavoured to ensure that the author's intended meaning was not altered during the review. All amendments were tracked with the Microsoft Word "Track Changes" feature. Therefore, the author had the option to reject or accept each change individually.

Kind regards



Prof Gift Mheta (Cell: 073 954 8913)

