

**A REFLECTIVE STUDY ON FACTORS THAT INFLUENCED THE  
MATRIC RESULTS IN PHYSICAL SCIENCES IN FOUR SECONDARY  
SCHOOLS IN A DISTRICT IN THE EASTERN CAPE**

**by**

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## DECLARATION

I, **NDOKWANA V.W.**, confirm that this dissertation A REFLECTIVE STUDY ON FACTORS THAT INFLUENCED THE MATRIC RESULTS IN PHYSICAL SCIENCES IN FOUR SECONDARY SCHOOLS IN A DISTRICT IN THE EASTERN CAPE is my original work and it does not include material previously presented for the award of a degree in this, or any other university. All sources used have been acknowledged in the reference list.

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NDOKWANA V. W

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Date



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## ABSTRACT

This is a reflective study of the factors that influenced the performance of learners in Physical Sciences National Senior Certificate examinations in four secondary schools in a district in Eastern Cape. The study considered factors that influenced the matric results for a period of five years in a district in the Eastern Cape (from 2010 to 2015) National Senior Certificate results. The study was conducted to identify the indicators that could positively influence physical sciences results after many years of underperformance in the subject. This study was underpinned by the theory of reflective practice. As part of an intervention strategy, learners completed an intensive programme of teaching during school hours, extra classes, practical work and assessment. The four school principals were purposively selected for interviews. Four Physical Sciences educators from the four senior secondary schools and 12 post-grade 12 learners from each senior secondary school were all interviewed. Post-grade 12 learners were randomly selected for interviews. The researcher used a reflective journal as a method of examining the reflections by the respondents. Teachers reflected on their teachings to improve their practices that make science learning more meaningful to both learners and teachers

The findings indicate that extra classes provided sufficient time to complete the syllabus, to conduct experiments and to administer practical tests. Regular assessment in theory and practical work showed the improvement in attainment of good physical sciences results in all the four participating schools. Instructional supervision from the managers also assisted in developing teacher skills. It was recommended that the DoE should use experts in teacher training and professional development activities. School management systems should play an active role in teacher support and the supervision of instructional work.

**Key Words: reflection, reflective practice, syllabus coverage, practical work, extra classes, assessment, supervision, Physical Science.**

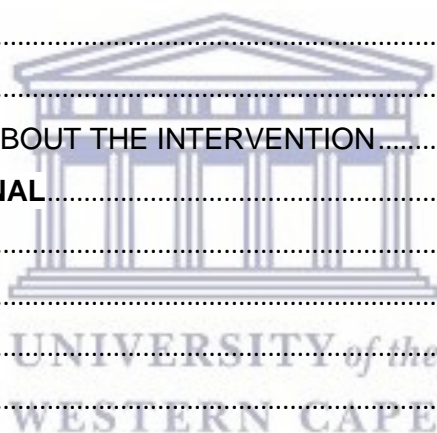
## ABBREVIATIONS

DOE	Department of Education
HODs	Heads of Department
NGOs	Non-Governmental Organisations
NPOs	Non-Profit Organisations
NSC	National Senior Certificate
SADC	Southern Africa D Community
SBA	School-Based Assessment
SGB	School Governing Body
OBE	Outcomes-Based Education
NCS	National Curriculum Statement
RNCS	Revised National Curriculum Statement
CAPS	Curriculum and Assessment Policy Statement
LOLT	Language of Learning and Teaching
IQMS	Integrated Quality Management System
ITMSS	International Technology Mathematics and Science Studies
SMT	School Management Team

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## CHAPTER 1

### RATIONALE FOR THE STUDY

#### 1.1. INTRODUCTION

The study reflected on the factors that led to the improvement of physical sciences matric results in a district in the Eastern Cape Province. This chapter provides the background and context of the study and describes the research problem leading to the research question. It also presents the significance and limitations of the study.

#### 1.2 BACKGROUND

The school where the researcher was based is an old school with a legacy of producing high quality results during the 1970s and 1980s eras. Prominent citizens in South Africa like Professor Somadoda Fikeni, an independent political analyst, passed their matric in this rural school. The researcher was a physical sciences teacher who had been teaching the subject for 15 years. The school is situated in a very poor, previously disadvantaged town in Mount Frere District in the former Transkei area. After many years of poor results in matric physical sciences, in 2010 the school improved drastically in matric physical sciences results.

The study came into being because of a continuous increase in physical sciences matric results after a long time of underperformance. The study is reflecting on the recent 5 years' matric results of the four schools that were participants and comparing this with the provincial results and the national results presented in Table 1 below. Table 1 shows that the National and Provincial results in physical sciences in South Africa had been a problem for quite a long time. School A is the school the researcher was working. Its physical sciences matric results from 2010 are showing a gradual increase from 57% in 2010 to 85% in 2014. Schools B, C and D are schools that had produced learners who had been successfully passing physical sciences at matric level since the inception of the National Senior Certificate (NSC). Their physical sciences results ranged between 60% and 90% in the period of five years.

Table 1: shows previous years pass percentages in physical sciences

	2010	2011	2012	2013	2014
NATIONALLY	61	54	73	67.4	61.5
PROVINCIALY	51	59	53	64.9	51.5
SCHOOL A	57	63	71	83	85
SCHOOL B	68	74	80	83	91
SCHOOL C	60	64	75	81	86
SCHOOL D	72	76	80	81	83

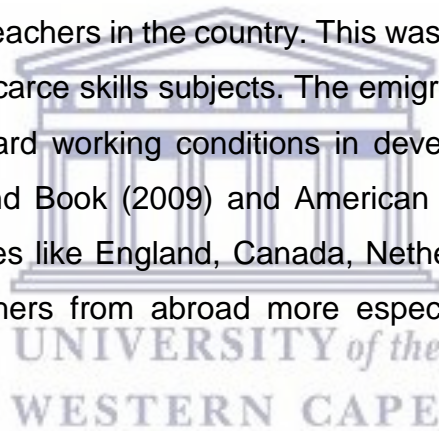
Table 1 illustrates the problem in attainment in physical sciences in two different levels in South Africa, that is Nationally and Provincially. Several factors contributed to the poor performance in physical sciences. The factors were intermingled, starting from language problem, lack of basic content knowledge, under-qualified and unqualified teachers, lack of laboratory usage, unfinished syllabi and contact time used for other businesses, to name but a few. The poor performance of learners in mathematics and physical sciences at the matric level had been a great concern to educationist and policy makers for many years (Branson, Leibbrandt & Zuze, 2008; Mji & Makgato, 2006; Naido & Lewin, 1998; Letseka, Breier & Visser, 2009). This clearly witnesses that South African learners were underperforming in the science field. The problem was common in learners from disadvantaged schools since they had a big failure percentage compared to other schools. This could be attributed to lack of motivation since there were no prominent role models and the large number of parents in rural areas was illiterate. This might be one of the reasons why South Africa was always at the bottom of the list in international technology mathematics and science studies (ITMSS). It was more challenging for African learners who were English second language speakers because they struggled to understand when the lesson was taught and it became worse when they were assessed. The learners could not read and understand questions that were asked, hence, they gave many wrong answers. Many wrong answers led to the poor performance more especially in mathematics, accounting and physical sciences.

For the past years, there had been a decline in physical sciences results in the National Senior Certificate (NSC) (Department of Education, 2001a). Kriek & Grayson (2009, 185) indicate that from 2005 to 2007 the number of learners who passed physical sciences at higher grade level has decreased and has affected learners' entry into science-based programmes in tertiary institutions. Underperformance in physical sciences was cascaded to provinces as it is displayed in Table 1. The percentages are showing a gradual increase in physical sciences matric results of the schools participating in the study. Several factors contributed directly to the poor performance in physical sciences. As much as learners managed to pass physical sciences many did not obtain admission to get entry into Bachelors studies. The department of education was also accused of lowering the promotion standards. For an example during the apartheid era in the mid- 80s when the researcher was in the high school the minimum passing mark in all the subjects was 40%. Currently, the minimum pass percentage is 30%. The province which trailed clearly behind the rest of all other provinces was the Eastern Cape; it had been consistent in its dismal failure.

Among other factors that played a role in this blatant failing behaviour was the mismanagement of finances, unmanaged curriculum and the personnel that did not honour time on task. Almost one in four Eastern Cape schools achieved an average overall pass rate of under 30 per cent, the percentage level at which a school was deemed officially to be a dysfunctional school. This was almost double the proportion of similarly failing schools in Limpopo, the next worst performing province, and two and half times the national average. By contrast, KwaZulu-Natal has driven this down to only eight per cent of schools, and Mpumalanga to 5.7 per cent – evidence of effective management interventions lifting the bottom end of achievement. On every significant measure the Eastern Cape ranks last, and achieved very poorly in physical science, accounting, mathematical literacy and in mathematics, lagging KwaZulu-Natal by 10 percentage points in the latter. There were only 10 schools in different districts in the country that achieved a collective pass rate of fewer than 60 per cent, and all of them were from the Eastern Cape Province. This was the same province that produced political leaders like Nelson Mandela and other ruling party stalwarts.

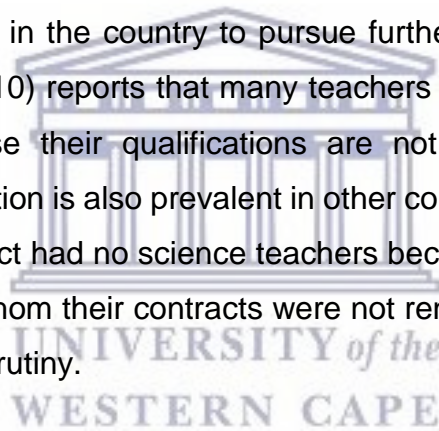
### **1.3. SHORTAGE OF SCIENCE EDUCATORS IN SOUTH AFRICA**

Morgan et al (2006) explain that it is a great worry to witness the high rates of international recruitment of teachers specialising in scarce subjects like the sciences. The migration of teachers is a concern to the above-mentioned writers because it can either emigrate (take out of the country) or immigrate (invite into the country) teachers with scarce skills. In this study the researcher was reflecting about four high schools that showed an improvement in matric physical sciences results out of many high schools in the district. The reasons for underperformance were many including the shortage of physical sciences teachers. The shortage of teachers was a worldwide problem, in the 1990s there were recruitments of teachers to countries like Malaysia, China, etc. to teach English. Appleton et al (2006) concurs with Morgan et al (2006) that evidence shows that international recruitments of teachers from South Africa was witnessed by headmasters who rated emigrating teachers as very good teachers; this suggested that recruitment was targeting best teachers in the country. This was one in many reasons why there was a shortage of teachers in scarce skills subjects. The emigrated teachers were attracted by good salaries and up to standard working conditions in developed countries. Manik (2005), Mulvaney (2005), de Villiers and Book (2009) and American Federation of Teachers (2009) suggest that developed countries like England, Canada, Netherlands, etc. use strategies that attract, recruit and retain teachers from abroad more especially science and mathematics teachers.



Many public schools were owned and managed by the provincial and district education officials at local level. Furthermore, the government policies would always determine the shortage of teachers and regulate the ways of acquiring them (Appleton et al., 2006b). Teacher migration escalated in the 1990s because of the data released by the government that there was an oversupply of teachers, the problem was addressed by the offering of voluntary severance packages. This encouraged teachers more especially those who were about to go on retirement and those who wanted to leave teaching profession opted to take voluntary severance packages to counteract oversupply. Other teachers were recruited by overseas countries while others applied for the teaching posts when they visited their families and friends abroad. The process opened a big vacuum and a decline in learner-teacher ratio hence the recruitment in neighbouring countries like Lesotho, Zambia, Zimbabwe, etc.

Later, the Indian expatriates arrived in South Africa. The problem started during the apartheid era when the *Blacks* were not allowed to pursue studies in sciences fields. Careers like science teachers were highly affected that is why South African government imported teachers from African countries like Ghana, Uganda, Nigeria, etc. and other Asian ethnic groups like Indians. The African science teachers and Indian teachers, who were also employed to counteract the insufficient local science teachers more especially in far rural areas like the one the study was conducted in, were faced with many challenges in a process to rescue the situation. The challenges ranged from language issues, peculiar way of speaking English and pronunciation of scientific words to allegations that some expatriates did not qualify to teach because they inherited their professional qualifications from their parents and grandparents. The South African qualifications authority (SAQA) is responsible for the evaluation of authenticity of both local and foreign qualifications for people in the country to pursue further studies or seek employment. Commonwealth Secretariat (2010) reports that many teachers coming from Zimbabwe are not employed as teachers because their qualifications are not recognised by South African qualification agencies, this situation is also prevalent in other countries all over the world (Keevy 2008). Most schools in the district had no science teachers because the posts were filled up by the SADC countries teachers whom their contracts were not renewed, it was reported that their qualifications were still under scrutiny.



#### **1.4. INTERVENTIONS IN SCIENCE EDUCATION IN SOUTH AFRICA AND EASTERN CAPE PROVINCE**

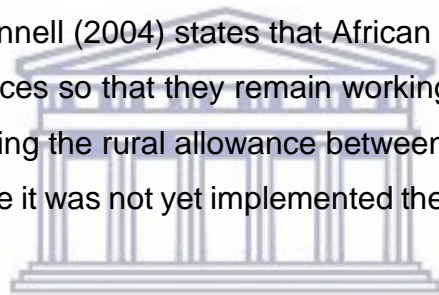
Manik (2010): 109) points out that schools and national education department in developing countries must use their discretion to create an attractive, healthy and supportive environment for South African teachers to stay in or run a risk of allowing the international recruitment agencies who are offering rewarding work and travel packages overseas to lure them. To secure mathematics and sciences teachers, the provincial and national departments of education offer the so-called Fundza Lushaka bursaries to train teachers in scarce subjects. The teachers got first preference over other bursary trained students when there were advertised posts to be filled



in schools. In my new school, we had a challenge where two educators could not be employed because their studies were not financed by Fundza Lushaka.

This impacted badly on the learners, they were not properly taught as the teachers were frustrated by the fact that they were not employable, they were stressed because the posts were reserved for Fundza Lushaka bursary holders who of course did not have the skills (electrical technology, engineering, graphic & design and visual arts) offered by the ones they didn't want to employ. If the Fundza Lushaka bursary holders had the above-mentioned skills, they would have been employed long ago.

Secondly, the district department of education used another intervention to keep teachers in remote (rural) areas. Rural allowance is a sum of money that beefs up the salary of a teacher who works in far rural areas. Bennell (2004) states that African countries including South Africa offer teachers with rural allowances so that they remain working in rural schools. In our district, there were still debates concerning the rural allowance between the unions and the department of education. In rural areas where it was not yet implemented the teachers moved to urban areas to teach.



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### **1.5. RESEARCH PROBLEM**

The study focused on physical sciences teachers, learners and school principals. It provided insight into the teaching and learning processes. The study was conducted to reflect on factors that led to the improvement of physical sciences matric results in one district in the Eastern Cape. The apartheid regime segregated South African people along the racial lines. Education and training during the apartheid government was characterised by the under-development of human potential, mostly and that of Blacks. The teaching and learning of Mathematics, Science and Technology were hit hard (DoE, 2001). It had been reported that outdated teaching practices and lack of basic content knowledge had resulted in poor teaching standards. The poor standards had also been worsened by vast number of under-qualified or unqualified teachers who taught in overloaded and non-equipped classrooms. The combination of all these factors has in turn produced a new group of teachers who are further disseminating the cycle of averageness (DoE, 2001).

To address the problem of poor performance of learners principally black learners in physical science, several activities had been taken at national and provincial levels, and by some institutions of higher learning (Mji & Makgato, 2006). This approach tended to make both learners and teachers to reflect on their experiences in learning. It was through this process that both learners and teachers acted like responsible citizens when they thought about their activities with the intention of improving the results.

Experience has taught me as a researcher that in the Eastern Cape Province one of the factors that hindered effective teaching and learning processes was the lack of resources, both human and materialistic resources. It was very wise to work hard as a physical sciences teacher to produce good results. Once the good results were produced consistently in both mathematics and physical sciences, the school was given a Dinaledi School of Excellence status by the Provincial Department of Education. The school would be provided with all resources that were required for mathematics and physical sciences teaching and learning. At the same time, it had the power to attract sponsors from both public and private companies that were passionate about education. On the same vein the schools that were performing well in mathematics, physical sciences and technology could also secure funding from Non-Governmental Organisations (NGOs) or in Non-Profit Organisations (NPOs).

Table 1 above illustrates the problem in attainment in physical sciences in three different levels in South Africa. It showed the National and Provincial results in physical sciences in South Africa had been a problem for quite a long time. According to Kriek & Grayson (2009: 185-186), in 2005 a total of 29965 learners passed physical sciences, then in 2006 the number of passes deteriorated to 29781 and in 2007 it continued to decline to 27122.

This notion clearly witnesses that South African learners are underperforming in the science field. The problem is common with *black* learners; they have a big failure percentage compared to other races. Practically, it is true that the input in a system must directly inform the output. The resourcing of *black* schools was the lowest of all other races hence the poor performance in physical sciences in *black* schools was prominent. The study was all about thinking loud about

good practices that had led to the improvement of matric physical sciences results. The poor performance of learners in mathematics and physical sciences at the matric level had been a great concern to educationist and policy makers for many years (Branson, Leibbrandt & Zuze, 2008; Mji & Makgato, 2006; Naidoo & Lewin, 1998; Letseka, Breier & Visser, 2009). To address the problem of poor performance of learners particularly *black* learners in physical sciences, several enterprises have been taken at national and provincial levels, and by some bodies of higher learning (Mji & Makgato, 2006).

Underperformance in physical sciences is spilled to provinces as it is seen in Table1. The percentages are shifting between 51% and 64%. Many factors contribute directly to the poor performance in physical sciences. As much as other learners manage to pass physical sciences but they do not obtain admission to Bachelors studies. According to the Department of Education (2010) in KwaZulu-Natal province only 26% of 122 444 learners who enrolled in schools managed to obtain university entrance. In 2009 all nine provinces across South Africa recorded a decline in physical sciences. The most frightening decline was in KwaZulu-Natal where the pass rate in physical sciences deteriorated by a margin of 50% compared to the previous year (Keeton 2010).

## 1.6. RESEARCH QUESTION WESTERN CAPE

At a school level the readings in Table 1 illustrates increasing percentages that were showing improvement in matric physical sciences for a period of five years. The schools' physical sciences readings displayed the transition from underperformance that existed before the intense intervention. The study was conducted to find factors that led to the improvement of physical sciences matric results in the schools in the district. This approach tended to make learners, teachers and principals to replicate their experiences in learning. It was through this process that learners, teachers and principals acted like critical citizens when they thought about their deeds and corrected them. To understand and reflect on the factors that made these schools successful, the study was directed to answer the following main research question and sub-questions:

## **What were the factors that influenced the teaching and learning of matric physical sciences in four secondary schools in a district in the Eastern Cape Province?**

- (i) What were the perceptions of learners, teachers and principals regarding the syllabus coverage in the teaching of matric physical sciences?
- (ii). Which management strategies were employed by the school principals in facilitating the teaching and learning of matric physical sciences?
- (iii). What were the experiences and perceptions of learners, teachers and principals regarding the teaching of matric physical sciences using practical work?
- (iv). How did the extra classes and assessment impact in matric physical sciences learner performance?

### **1.7 SIGNIFICANCE**

This research study aimed at reflecting on good practices that were utilized by the four schools under the research project to improve the physical sciences results. The results of the study could provide possible solutions for poor performance in physical sciences and might also had solved problems that confronted teachers and learners during physical sciences teaching and learning process. Finally, it could make science teaching and learning more meaningful to learners, teachers and school managers.

### **1.8. LIMITATIONS OF THE STUDY**

The research study was limited to four schools in one district in a single province in South Africa.

### **1.8. DEFINITION OF TERMS**

- 1.8.1. Reflective practice is a means by which specialists can develop a greater level of self-awareness about nature and impression of their presentation, an awareness that generates opportunities for professional growth and development.
- 1.8.2. Learner performance refers to the learner's ability to demonstrate understanding and show that learning has taken place through an activity or task (Woolfolk 2007).

- 1.8.3. Physical science focuses on investigating physical and chemical phenomena through scientific inquiry, by applying scientific models theories and laws, it seeks to explain and predict events in our physical environment (DOE 2003).
- 1.8.4. Poor performance refers to learners obtaining marks below 30% in the National Senior Certificate examinations and thereby failing the subject (DOE, 2003)
- 1.8.5. Curriculum is defined as a field of study that is crucial to the health of schools and society, it can be defined narrowly as subjects that are taught in schools or it can be defined broadly as experiences that people require to be actively involved in society (Ornstein & Hunkins 2009).
- 1.8.6. Assessment is a process of collecting and interpreting evidence to determine the learner's progress in learning and to make judgement about a learner's performance (DOE 2003).
- 1.8.7. A reflective journal is the perfect place to jot down some of life's biggest thoughts. In a reflective journal, you can write about a positive or negative event that you experienced, what it means to you and what you have learned from that experience.
- 1.8.8. Supervision is defined as all efforts of designated school officials towards providing leadership to the teachers and other educational workers in the improvement of instruction (Ogunsaju 1983).

## **STRUCTURE OF THE THESIS**

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### Chapter 1- Rationale to the study

This chapter provides the context and the background information to the study. It also introduces the study, describes the problem formulation. It discusses aims, objectives and limitations of the study.

### Chapter 2 – The literature review

This provides the theoretical background to the study. The theoretical framework that underpins the study is outlined. Conceptual framework is also discussed extensively. Factors that influenced the improvement of physical sciences matric results are presented.

### Chapter 3 – Methodology

This chapter presents the data collection methods and procedures using relevant instruments. It provides the ethical considerations and consent procedures that were done.

#### Chapter 4 – Data analysis, data interpretation and findings

This chapter presents the findings of the study. The collected data was analysed into different themes, the perceptions of respondents were tabulated and converted into graphs.

#### Chapter 5 – Discussion of findings

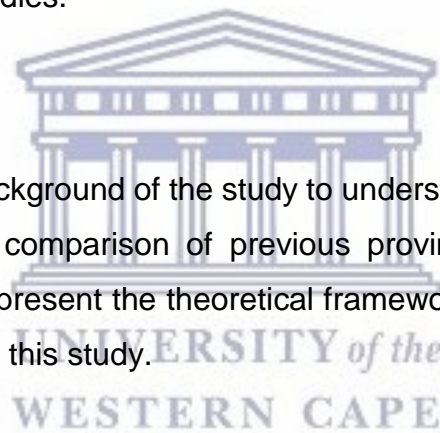
The findings were analysed and discussed.

#### Chapter 6 – conclusion and recommendations

This chapter provides implications of the study, draws conclusion and provides recommendations for further studies.

### **1.9. CONCLUSION**

Chapter 1 has discussed the background of the study to understand clearly the context in which the study took place with the comparison of previous provincial matric results in physical sciences. The next chapter will present the theoretical framework that underpins the study and reviews the literature relevant to this study.



## CHAPTER 2

### LITERATURE REVIEW

#### 2.1. INTRODUCTION

This chapter reviews studies relevant to the present study which entailed consultation of textbooks, journals, reports and other writings pertaining to the research topic. This review of the literature provides a foundation for both the theoretical and the practical underpinnings of the research. It also includes among others the discussions about how the current study will address gaps found in the literature, and summarises the main points that are made in the review of literature. According to Johnson and Christensen (2011:65) literature analysis can either be used to simplify the theoretical ground work of the research study, to assist in invention of the research question and the choice of the study population, or to stimulate new understandings and concepts throughout the study.

#### 2.2 RESEARCH QUESTION

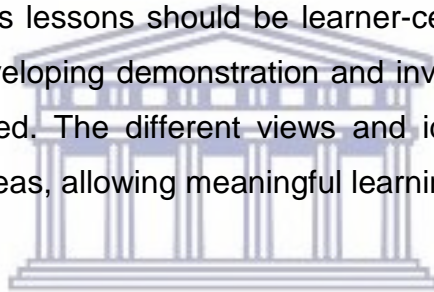
The study is using the reflective practice approach to make learners, teachers and principals to share their experiences in teaching and learning matric physical sciences. To understand and reflect on the factors that made the schools' physical sciences results to improve the study was directed to answer the following research question and sub questions: What were the factors that influenced the physical sciences matric results in four secondary schools in a district in the Eastern Cape Province?

- (i) What were the perceptions of teachers and learners regarding the syllabus coverage in the teaching of matric physical sciences?
- (ii). Which management strategies were employed by the school principals in facilitating the teaching and learning of matric physical sciences?
- (iii). What were the experiences and perceptions of learners, teachers and principals regarding the teaching of matric physical sciences using practical work?

- (iv). How did the extra classes and assessment impact in matric physical sciences learner performance?

### **2.3 THEORETICAL FRAMEWORK FOR THE STUDY**

This study is underpinned by the reflective practice theory. Reflective practice is defined as the process of learning through know-how and learns from experience towards gaining new insights of self or of practice (Boud et al 1985; Boyd and Fales, 1983; Mezirow, 1981, Jarvis, 1992). According to Moon (2004) reflection is part of learning and thinking. Reflective practice carries different meanings that range from the idea of professionals engaging in solitary introspection to that of engaging in critical dialogue with others. This study is placed within a qualitative approach and analyses reasons why matric physical sciences learners could improve physical sciences matric results. Physical sciences lessons should be learner-centred, should permit the active participation of learners. By developing demonstration and investigation lessons the cognitive skills of learners were enhanced. The different views and ideas of each learner could be developed through sharing of ideas, allowing meaningful learning to take place.



Larrivee (2000) argues that unless teachers develop the practice of serious reflection, they stay constricted in unexamined judgements, explanations, expectations and opportunities. Approaching teaching as a reflective practitioner involves incorporating personal beliefs and values into a professional identity (Larrivee, 2000, Gibbs' reflective cycle (1988: 293) is straightforward and encourages a perfect description of the situation, analysis of feelings, evaluation of the experience, analysis to make sense of the experience, conclusion where other options are considered and reflection upon experience to scrutinize what you do if the situation ascended again. (Gibbs,1988). Just like learners do, teachers learn by doing, reading and reflecting, by coming together with other teachers, by looking closely at students' work and their work. And by sharing what they see. This kind of learning enables teachers to make biggest leap from theory to accomplished practice. In addition to a powerful base of theoretical knowledge, such learning requires settings that support teacher inquiry and collaboration strategies grounded in teachers' questions and concerns (Darling-Hammond & McLaughlin, 1995),



Collaborative teaching technique was another good example of a reflective practice that the researcher has been practising with the colleague who was teaching physical sciences in the neighbouring school. We used to meet to prepare our lessons together. After school, we would meet again to reflect on lessons we taught during school hours, to check if the lessons had gone per plan. If there were challenges experienced, we would address them and appreciate the highlights. On weekends, we would exchange classes, I taught her class and she taught mine. Inputs from peers in an informal setting could be considered a mentoring experience.

Quinlan and Akerlind's (2000) study demonstrates the importance of considering the environment within which peer review of teaching and collaborative teaching activities are endeavoured. The results are witnessed by drastic improvement in matric physical sciences results in all four schools participating in a research study.

Thoughtful teachers take part in reflective practice to reason about their teaching and about ways to continually advance and carry out curriculum that is individually meaningful and culturally relevant to students (Allington, 2002). There are many reasons for teachers to progress as reflective practitioners. The most important reason is that teachers need to be reflective to deal with the unavoidable hesitations and complexities involved in everyday decisions that affect lives of learners. Reflective experts promote learning when they reflect, because the subject matter they are reflecting on is being revised in their minds and refreshed to be taught effectively again. Real teachers will need to engage in both critical inquiry and unselfish reflection.

Many scholars view the development of reflective practice as the underpinning for the highest proficient competence (Cole & Knowles, 2000; Jay, 2003; Larrivee, 2000; Osterman & Kottkamp, 2004; Steffy, Wolfe, Pasch & Enz, 2000; Valli, 1997, York-Barr, Somers, Ghore & Montie, 2001; Zeichner & Liston, 1996). This is because today's classroom represents increasing diversity among students, more especially in South Africa's new education system, a teacher must accommodate and adjust to this greater range of differences in ethnical groups, socio-economic status, developmental levels, motivation to learn and achievement. To be able to act responsibly to this huge variety of students' desires requires teachers who are reflective. Another reason for developing as reflective practitioners is that it frees teachers from routine and spontaneous

deeds, permitting them to act in a more deliberate and premeditated manner. This means that teachers are agents of change, therefore they should always work together to get rid of the usual ways of teaching in a teaching profession. That is why in this study the researcher blended different teaching strategies including; theory, practical work, assessment and collaborative teaching. This makes teaching more complex, interesting and difficult because teachers are not willing to look back to their teaching methods and effect new practices.

Schön (1987) describes the learning process as a compound social activity that cannot be compressed to simple-minded thinking. Reflection plays an integral role both in the action and learning from the action. The reflection proposed here involves an openness that requires teachers to challenge their own assumptions and continue to develop their skills. It is a reflection that requires the unambiguous documenting of the shifting understanding of the learning experience, not just as an individual experience but also as conversation. In an Accounting teacher narrative Sims (1999) indicates that it is expected that the learner will become a fundamental part of the narrative or story being promoted by the designer. Effective teaching and learning processes require both a teacher and a learner to improve relations that will promote learning and drive away all negative attitudes. In this study interacting with learners for longer hours in different teaching and learning sessions develops good attitude towards learning, more especially in subjects like physical sciences, mathematics and Accounting that are described as difficult subjects. The moment learners seem to gain positive attitude and confidence in the learning of physical sciences is the correct time of teaching them about reflection. Weasmer and Woods (2003) agree that teachers identified reflection as a primary outcome of the mentoring experience. King and Kitchener (1994) distinguish between optimal and functional reflection i.e. our participants demonstrated a capacity for higher level reflection, but also utilized lower-stage reflective activities regularly. This is a reflective thought that is open to questioning of self-interpretation and to greater openness and reliance on social reflection via peer and confidant communications, this is considered evidence of growth in reflective complexity.

## 2.4 STUDIES ON REFLECTIVE PRACTICE

The correct way to encourage the reflective processes for practice is an important adversity facing educators and researchers (Hatton & Smith, 1995). This is difficult because educators are feeling embarrassed to look at their previous lessons more especially if the lesson was not able to achieve its specific outcomes. Contrary to this school of thought, the lessons that have achieved their objectives will keep smiles upon those educators' faces for a quite a longer time. Good lessons can be highly reflective because they encourage continuous usage on the educator's side.

Hegarty (2011) argues that there is much research happening about keeping a record in a reflective practice, through the increase and the use of journals and folders for reflective learning. She further explains that many structures and simulations are used for encouraging and supporting reflective writing. In this study reflection is one of the theories that is encouraged and taught to educators so that they spend a lot of time thinking about classroom interactions and consider both the intended as well as the unintended consequences of their actions. The main aim is to engage in the thoughtful reconsiderations of everything that happens in their classrooms with an eye toward improvement (Larrivee, 2006 Boud & walker, 1998; Boyd & Fales, 1983; Moon, 2001; Nsibande, 2007) agree that reflecting writing techniques and the use of dialogue are considered by many researchers to be helpful for reflective practice because they promoted reflection from a state of abstract thought to one where reflection produces learning which can influence practice.

Reflection is generally known as a specific and extended form of thinking, which if used effectively by specialists can help them to make sense of engagements in practice and learn from them.(Boyd & Fales, 1983; Boud, Keogh & Walker, 1995; Dewey, 1933; Moon, 1999) reflection does not only help practitioners to learn from practice it can also be used to develop understanding and professional knowledge for change.(Loughran, 2002) The concepts of professional learning and reflective learning are very similar because both processes involve learning, are likely to lead to changes in practice. These concepts are strongly connected to reflective practice (Hoban, 2002; Moon, 2001). Researchers do not always agree about the most

effective methods for determining whether reflection and reflective learning has taken place, and whether practitioners are engaging in reflective practice (Pedro, 2005).

Reflection has been an ongoing technique of learning for decades but many people are not taking it seriously others are not aware that it can make a positive change in behaviour through learning new ways of doing things, hence I conducted the study. The reflection on the factors that influenced the physical sciences matric results in a district in the Eastern Cape will pave way for other scholars to reflect about reflections made to close the gap in reflection literature. The importance of reflective practice is acknowledged and is regarded as necessary for preparing professionals who can engage in lifelong learning, and ongoing appraisal and development of their practice (Davies, 2003). Through reflection on practice, and by using reflection for action, practitioners are believed to be more equipped to face the challenges posed by change and the uncertainty of practice. (Schon, 1983). Practice refers to one's repertoire of knowledge, attitudes, behaviours and skills in specific areas of performance. For teachers, these areas include managing the classroom, designing instruction, starting assessment strategies, and cooperating with students, colleagues and parents (Hegarty, 2011)

Reflective practice is viewed as the termination of all other forms of reflection in that it is undertaken not solely to rush back the past but to express future action Schon (1987) I fully agree with Schon (1987) because in a reflective journal or portfolio the previous events or entries recorded stay with your mind for quite a longer time and it becomes easier to refer to them use them in solving the future challenges that arise.

Terehoff (2002) maintains that the art and science of teaching adults is called andragogy has a philosophy different from the method of teaching children called pedagogy. She furthermore says that the philosophy of facilitating adult learning is based on a specific set of adult learning features and principles. The technique of assimilating of reflection into pre-service training and professional development of teachers, nurses, marketing, business, management and sciences makes it necessary for the officers to develop reflective writing skills, professionals must show positive changes in their practice (Atkins, 2004; Clouder, 2000; Moon, 2006; Peltier et al, 2005).

Sparks-Langer et al, (1996) distinguished among seven different types of language and thinking about pedagogy believing that analysis of students' language could shed some light on their ability to utilize terms and principles to explain classroom events. Korthagen and Vasalos (2005) used professional development exercise to help teachers to learn from their experiences. A combination of reflective questions, reflective writing and discussions was used. The student teachers were assisted to develop their skills of reflection to a stage where they demonstrated core reflection as they became more aware of themselves as practitioners, and could analyse critically problem situations (Korthagen and Vasalos 2005).

Donaghy and Morss, (2000) claim that physiotherapy students had to write an account of a client case using prompting questions to explain what had happened at a clinical level and reflect on what occurred at a clinical level and explained their decisions using evidence, clinical reasoning and dialogue. The use of frameworks and guiding questions are known to encourage and to extend the level of reflection. Lemon (2007) undertook an investigation to find out how would the self-generated questions help reflection. The constructing of personal, visual narrative around photographs which she reminded her about her teaching practice and used them as a stimulus to reflective inquiry. Through the process of asking questions and then answering them she could engage in goal-setting, self-assessment and became more open to new ideas. The process helped Lemon (2007) to view her practice from a different angle, and led to reflective action where she changed and reaffirmed her behaviours, set new goals and learned from the experience.

The above examples are the studies that deal with reflection in other disciplines and spheres of learning. All the above-mentioned researchers agree that reflective practice is like intuitive learning in physiotherapy students, nurses, student teachers, etc.

## **2.5. STUDIES BASED ON MANAGEMENT, LEADERSHIP AND SUPERVISION IN EDUCATION.**

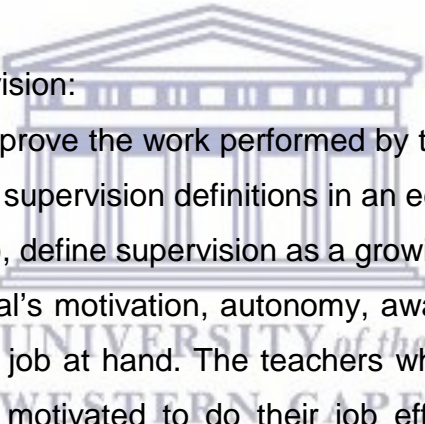
### **2.5.1. INTRODUCTION**

Like any other work place, reflective practice also requires management, leadership and supervision. Teachers in a school setting are the cornerstone of the education process. They make sure that school programmes and policies are carried out and educate the learners. In the process of educating the learners, the teachers prepare lessons, teach, assess, analyse results, and give full report on learners' progress.

### **2.5.2. MANAGEMENT, LEADERSHIP AND SUPERVISION IN SCHOOLS AROUND THE WORLD.**

Definitions of instructional supervision:

Supervision is always done to improve the work performed by the subordinates of a supervisor in a work-place. Below is a list of supervision definitions in an educational perspective;

- 
- (i) Pierce & Rowell (2005), define supervision as a growing process designed to support and boost the individual's motivation, autonomy, awareness and skills necessary to effectively achieve the job at hand. The teachers who participated in this study are well experienced and motivated to do their job effectively. The school principals maintained that their presence during the extra classes was necessary to give support, motivation and supervision. In the education field the major aim of supervision is to improve classroom instruction and to promote professionalism and development of teachers (Kassahun, 2014).
  - (ii) Glathorn & Mhama (1992) describe education supervision as a process of enabling the professional growth of teacher dealings and helping the teacher to make use of the reaction to make more effective decisions as desired.
  - (iii) Guthrie & Reed (1991), define educational supervision as the purpose of leadership concerned with improving, enhancing and strengthening teaching effectiveness.
  - (iv) Hoy et al (1986) view educational supervision as the set of activities intended to improve the teaching-learning process. The purpose is neither to make ruling about

the competence of teaching nor to control them but rather to work supportively with them. To avoid confrontation during the supervision process it is also significant to involve teachers when designing the supervision plan. Most of the principals used this strategy effectively during this study.

- (v) Sergiovani et al (1995), have defined educational supervision as a talent that can discharge teachers' resourcefulness, responsibility, originality, internal obligation and motivation.
- (vi) The Education Ministry (1994), defined education supervision as the set of activities designed to attain educational ideas, to render the teaching-learning effective to reach and develop the curriculum, to help teachers to find out their teaching complications and come up with the solution themselves and develop professional progress.
- (vii) Harris (1985), defines educational supervision as what the school personnel do with grown-ups and equipment to continue or change the school operation in ways that directly influence the teaching process employed to promote pupils' learning. All the above definitions revolve around the checking whether teaching and learning are occurring effectively and give the desired consequence. This manifests itself properly when it shows supervisors as leaders who are mainly concerned with the function that ranges from planning to the implementation of curriculum, to training and retraining of teachers and school based supervisors. The Eastern Cape Education Department fails to train and retrain teachers and supervisors. It is worse with the newly promoted curriculum managers such as the heads of departments (HODs) and deputy principals, they are rarely retrained hence, underperformance prevails in most secondary schools. Supervisors should undergo a series of trainings so that they keep abreast with the changing information globally.
- (viii) Dicky (1953) defines supervision as the process of influencing all components and circumstances surrounding teaching and learning to produce better learning and the functions of providing learning crucial to effect perfection in the work of teachers.
- (ix) While, Wiles (1975) defined instructional supervision as an instructional behaviour supposed to be additional behaviour system officially provided by the organisation for collaboration with the teaching behaviour system to maintain change and improve the learning chances for learners.

The above definitions show that supervisors as leaders are mainly concerned with the function that ranges from planning to the implementation of curriculum, to training and retraining of teachers and school-based supervisors. This means that supervisors must undergo a series of trainings themselves so that they keep abreast with the changing world. Haile Selassie (2002) indicates that supervision provides a mechanism for teachers and supervisors; supervisors must see themselves not as critics of teaching performance, but rather as collaborators with teachers, teachers should not be viewed as consumers of research, but as generators of knowledge.

The idea is to direct learners toward ensuring that teaching and learning are getting on properly in the classroom and teachers are assisted to improve themselves by stimulating a conducive atmosphere for the classroom interactions. The objectives of supervision of instructional work are to always help in the establishment of community anticipation. Both the teachers and learners will be motivated and become inquisitive so that at the end, the aims and objectives of education will be achieved. Then, the community will be developed. On the other hand, teachers' and learners' concerns, interests and needs are catered for. Since the supervisors will find out all the problems and provide solution to them.

Learning to teach is a matter of attainment and refining of skills of conveying knowledge through the scientifically tested procedures. De Grauwe (2001), observes supervisors as employed unbiased managers and monitors to supervise and monitor whether the teachers are really using the approved methods in their classrooms and take corrective measures. Even in this study the actions of the teachers during the intervention were closely monitored, so that the strategies that were employed bear the desired consequences. The desired results were attained hence the reflection on the strategies that led to the improvement of physical sciences matric results in a district in the Eastern cape province. Zelehner and Gore (1990) et al argue that management begins with teachers who facilitate learning while simultaneously managing the multiple and conflicting social, political and economic ills that are displayed in the school premises. This is prominent in our schools and witnessed by both teachers and learners that schools are used as battlefields for political vendettas for politicians. Schools are used by political factions to display their dissatisfaction in the service delivery protests and campaigns. Again, schools are the



common playgrounds and viable business market place for drugs and liquor. Oliva (1997), concurs with the above researchers that supervision is meant to assist teachers to become professionals and make sound judgements, not only about curriculum, learners and the science of teaching, but also about the organizations and beliefs in which their work is located. Tesfaye (2003), argues that managers should be inventive enough to be able to organise ways of resolving instructional problems. He further says that supervisors need to be motivated enough to keep well-informed in knowledge compared to their assistants by taking part actively in workshops, seminars, doing crash courses and by also making observations that can help them to grow in doing supervision job. Limiting factors like the lack of human resource, novice supervisors, financial constraints and the lack of other school resources stagnate the effective implementation of educational supervision. In this research study the school principals used management and supervision skills to improve the teaching and learning process, also to observe and practise teacher development. The significance of the above-mentioned statement in the South African education system is two-fold: firstly, for the newly employed teachers (on probation) and lastly, for the professional development of teachers who have been in the education system teaching for a long time. The principals are obliged to encourage teachers to practise continuous learning. Moe (2005), concurs with the testimonial that teachers need to grow their knowledge and share good practices, ideas and experience with their fellow colleagues in their schools and from their neighbouring schools. Moreover, Corron (1998), further states that educational system be influenced by supervision to improve instruction, teacher superiority and learner accomplishment.

Clark (2006), sees teachers as the basis of value education. Firestone (1993) agrees with Clark (2006) and goes on to say that, this is possible when teachers are involved in research activities so that they equip themselves with skills to deliver lessons efficiently and effectively. However, Azih (2001) and Ezuizo (2014) argue that the teachers' effectiveness and competence solely depends on the form of support principals give to them during their supervision operations. The reason why schools perform differently lies with their different management styles the principals engage in their schools. Some principals are democratic enough to allow the creativity of teachers in designing and presenting their lessons in their classrooms. Other principals are autocratic enough to enforce their plans to teachers, the next thing will be the enmity, arrogance

and very bad working environment. Through planning, implementation and evaluation of management plans the principals may reflect, review and develop new strategies of teaching and learning. Green (2009) indicates that principals' supervisory skills inform their success or failure in their schools. This means that the principals can achieve their objectives in education by utilising sound management strategies. Oliva and Pawla (2004) suggest that when the teachers work together with their supervisors they learn that faults usually occur in a work place but the provision of support is a process that brings about effective learning and respectable relations.

Azih (2001), describes the challenges faced by managers of secondary schools in Aramba state, Nigeria. The challenges are ranging from the allegations that some principals treat their staff members like slaves. Others mistreat their staff members by criticizing and shouting them in front of learners. Some teachers are notorious of using offensive words in response to principals' instructions and they even demanded learning and teaching resources in disobedient, vulgar and insulting language. Even here in South Africa the supervision in schools has many obstacles since the times of the so-called inspectors who were visiting schools to look for mistakes and use vulgar language to scold teachers. In the new democratic South Africa supervision at school level faces a big struggle because teacher unions blame managers of abusing teachers' rights. They are claiming that supervisors like head of departments (HODs), deputy principals and principals use supervision to revenge the differences they have with some teachers.

## **2.6. THE REFLECTIVE JOURNAL**

According to Landeen, 1995, Hancock, 1999 a self-reflective journal helps students in reflecting on their clinical experiences and it also provides awareness for addressing theory-practice gap. The above statement is very important because reflection involves learning from experience. The experience learned in the form of theory is transformed into practice. For an example, roleplaying is another good example of converting theory into practice. During roleplaying learners act an event, or problem in a safe environment. This helps learners to see the problem from another perspective. Teachers should give attention to voice tone, usage of language, pinpoints feelings, emotions shown and gesticulations displayed. The self-reflective journal assists in developing the narrative skills, integrate theory, research and practice, release feelings

about clinical experiences and increase observation expertise (Landeem et al, 1995). Hannigan, (2001) agrees that experiential activities like role play can also assist in retrieving the implanted theories. The processes for reflecting-on-action are confined only by thoughts and contribute to processes for improving the outcomes of reflection. Reflection strategies include audiotaping, discussions, journaling, learning diaries, reading books that help develop self-awareness and reflective thinking, roleplaying and videotaping. To facilitate reflective learning, teachers must allocate time for learners to engage in discussions. Videotaping allows teachers to assess directly with visual, audio and to look at non-verbal gestures. Posture and pitch of voice tell something about the interviewee.

Holly (1989) defines a log as a record of data that is highly structured, factual account maintained over time while a diary is defined as a daily record of personal experiences and observations in which thoughts, feelings and ideas are communicated.



## **2.7. CONCLUSION**

This chapter provides the reader with a literature review that gives the theoretical background for the study. Several factors that contribute directly or indirectly to the improvement of physical sciences performance in a district in the Eastern Cape Province. It also looked at the management, leadership and the supervision of instructional work in education more especially high schools. In the following chapter, the research design, the data collection plan and methods, population sampling techniques, location and demographics are described together with the issues of ethical considerations. Consent matters are also taken into consideration.

## **CHAPTER 3**

### **METHODOLOGY**

#### **3.1. INTRODUCTION**

This chapter presents the research design of the study. The study employed qualitative research method with a self-designed semi-structured interview and a reflective journal. A discussion of the research design selection and description of sites, the data collection methods and procedures, population and sampling techniques were included.

#### **3.2. RESEARCH METHODOLOGY**

Per Borg and Gall (1987) the research methodology is defined as a way of solving the research problem in a chronological order. Methodology shows the various steps that were implemented in the study to collect data in a logically planned manner. The main research method which was used to conduct this research was a qualitative research method. Qualitative research is the research that relies primarily on the collection of qualitative data i.e. non-numerical data such as words, pictures, participants' opinion, verbal information and human experiences. In this research study data was gathered through the utilization of interviews and a reflective journal.

##### **3.2.1 CASE STUDY**

Case study was used for giving an answer to the research question. Stake (1998) views the uniqueness of case study amongst other research studies in that it puts its focus of attention on the individual case and not the whole population. Zainal (2003) agrees with Stake (1998) that a case study selects a small geographical area or limited number of individuals as subjects of study. They further warn that although the case study method may look misleadingly simple, requiring familiarity with existing theoretical knowledge of the field of enquiry and the skill to segregate significant variables from relevant ones. It can be and the effects may be wrongly attributed to factors that are merely connected rather than causally related. Caution must be exercised to avoid prejudice. The study conducted by the researcher used the case study approach for the four schools in a district. These were the schools that consistently produced good results in physical sciences in the district for the period of five years. The schools had

undergone the intervention strategy that studied the relationship between strategies (extra classes, syllabus coverage practical work, assessment and supervision of teaching & learning process) and the improvement of physical sciences matric results.

### **3.2.2. PARTICIPANTS AND STUDY CONTEXT**

The study was conducted in a historically disadvantaged district; people were experiencing socio-economic problems, multicultural diversity and multilingual dialects were also prominent. English was used as a first additional language. The target population for the study were the four senior secondary schools in district in the Eastern Cape Province. A convenient sample of four high schools from the district was chosen. This sample was chosen in respect of improved performance in matric physical sciences for the period of 5 consecutive years after so many years of underperformance. In fact, the four schools had been producing high pass rates in matric physical sciences.

### **3.2.3. POPULATION**

A research population is fundamentally a collection of individuals that can participate in the research study. There are many senior secondary schools in my district; however, a population of four senior secondary schools were selected to get the sample.

### **3.2.4 SAMPLING**

Four secondary schools in the district that have been consistently producing good results in physical sciences for the period of five years (2010 – 2014) were purposively selected for the study. Each of the four schools each one teacher teaching physical sciences in matric. All four teachers had proper teaching qualifications with at least 5 years teaching experience. They were also chosen purposefully. The 3 learners chosen from each school were the post-grade 12 who passed their matric in 2014 NSC examinations.

The learners' characteristics are appearing in Table 3. The selection of all post-grade 12 learners was aimed at getting a heterogeneous sample, which had a variety of terms of socio-economic background, language affiliation, age and gender. The learners must have gone through the

intervention strategies that were used to improve physical sciences matric results. Table 2 summarises the sample of respondents chosen.

*Table 2: Sampling criteria*

<b>PARTICIPANTS</b>	<b>PRINCIPAL</b>	<b>EDUCATORS</b>	<b>POST-GRADE 12 LEARNERS</b>
SAMPLE	4	4	12
TECHNIQUE	PURPOSIVE	PURPOSIVE	PURPOSIVE
CRITERION	POPULATION	2014 GRADE 12 PHYSICAL SCIENCE EDUCATORS	RANDOMLY

Table 3 describes the learners per their gender, where girls constituted a 66,7% while the boys formed one-third of the post-grade 12 sample. The girls are ranging between the ages 18 and 21. The boys' ages are between 19 years and 24 years

*Table 3: Sample of post-grade 12 learners*

<b>Gender</b>	<b>Age range</b>	<b>Sample</b>	<b>%</b>
Girls	18 – 21	8	66.7
Boys	19 – 24	4	33.3

Teachers were selected based on being qualified to teach Physical Sciences in grade 12. Teachers had a minimum of 5 years' teaching experience, teaching physical sciences at matric level. The selected teachers in four schools who participated in this study were working in the same environmental conditions and dealing with the learners with the same socio-economic background.

**Table 4: Sample of science teachers**

SCHOOL	GENDER	SUBJECTS TAUGHT	EXPERIENCE(YEARS)
A	Male	Physical sc. and life sc.	13
B	Male	Physical sc and mathematics	8
C	Female	Physical sc	13
D	Female	Physical sc	12

The principals of the four participating schools were chosen purposively, their characteristics are tabulated in Table 5.

**Table 5: Sample of principals**

SCHOOL	GENDER	TEACHING EXPERIENCE	YEARS AS A PRINCIPAL
A	Male	26	17
B	Male	30	16
C	Male	23	10
D	Female	27	12

Table 5 shows the characteristics of the sampled physical sciences teachers. Each school has at least one physical sciences teacher who was teaching in grade 12. They taught physical sciences with either life sciences or mathematics. Two females were teaching only physical sciences from grade 10 up to grade 12. They had enormous experience in teaching physical sciences, from a minimum of 8 years to 13 years. Table 5 summarises the discussion made about the teachers.

### 3.3. DATA COLLECTION PLAN

Michael and Isaac (1982) define a research design as a plan to be used in the study. It describes the nature of the raw data that is collected. The data that is collected should be accurate, precise and admirably purposeful. The amount of data is very important; it must neither be too small nor too much. It must be enough to give the desired outcomes. Table 6 illustrates the steps that were taken to collect data in the research using various instruments for the different respondents. The data was collected to try to answer the research question of the research study. The analysis of data was done through coding.

Table 6: The data collection plan table.

RESEARCH QUESTIONS	What were the factors that influenced matric physical sciences results in a district in the Eastern Cape Province?			
RESEARCH SUB-QUESTIONS	<ul style="list-style-type: none"> <li>➤ What were the perceptions of principals, teachers and learners regarding the syllabus coverage in the teaching of matric physical sciences?</li> <li>➤ Which management strategies were employed by the school principals in facilitating the teaching and learning of matric physical sciences?</li> <li>➤ What were the experiences and perceptions of teachers regarding the teaching of matric physical sciences using practical work?</li> <li>➤ How did the extra classes and assessment impact in matric physical sciences performance?</li> </ul>			
STEPS	METHOD	INSTRUMENT	RESPONDENTS	ANALYSIS
1	INTERVIEW	INTERVIEW SCHEDULE	POST-GRADE 12 LEARNERS	CODING
2	INTERVIEW	INTERVIEW SCHEDULE	EDUCATORS	CODING
3	INTERVIEW	INTERVIEW SCHEDULE	PRINCIPALS	CODING



4	REFLECTION	REFLECTIVE JOURNAL	RESEARCHER	CODING
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The data collection plan in (Table 6) demonstrates the steps that were followed to collect data which will answer the research question. Four steps were followed when collecting data. Steps 1 to 3 used interviews as a method of collecting data from various sampled respondents. The interview methods used interview schedules as the instruments for collecting data. All the collected data was analysed through the colour coding method, where similar themes from different respondents that appeared were coded by using the same colour highlighter. Lastly, the reflection was used through the reflective journal. In the reflective journal, entries from the different respondents also showed different themes that were also colour coded.

### 3.3.1. CONSULTATION

The researcher met with all the respondents in person or through the relevant correspondence, i.e. letters were sent to the school principals (requesting for permission to conduct a research study) see Appendix E, the letters to parents of learners (consent letters to allow learners to participate in the interviews) see Appendix C and letters to the teachers (to participate in the interviews) see Appendix G.

### 3.3.2. PILOT STUDY

To gain a greater sense of confidence and maximum benefit from using the interviews, it was crucial that the instruments were piloted (for clarity and to eliminate ambiguities). Piloting was used to evaluate the effectiveness of the instrument and the value of the questions to elicit the right information to answer the primary research question. The interview schedules for learners, teachers and principals were piloted with other schools that were not participating in the research study.

### **3.3.3 INTERVIEWS**

Powney and Watts (1987) define an interview as a conversation initiated by the interviewer for the specific purpose of obtaining relevant information and focused on content specified by research objectives of systematic descriptions, predictions or explanations. In this study the researcher chose to use one-on-one semi-structured interview to collect data from participants. An interview is one of the most reliable instruments to gather information based on facts, feelings, opinions and attitudes of people.

### **3.3.4. ADVANTAGES AND DISADVANTAGES OF SEMI-STRUCTURED INTERVIEWS.**

#### **(i) ADVANTAGES**

The interview type that was used was a semi-structured interview where the researcher asked questions from the interview schedule, in addition the researcher could deviate from the questions to get enough data. Again, semi-structured interviews allow for follow up questions to clarify the question and to get more valid and reliable data. During an interview, the interviewer can read the body language, tone of voice, eye contact, gestures and facial expressions of the interviewee. At last, semi-structured interviews allows for the acquisition of a large amount of data collected. The data might be flexible, sensitive, reliable and easy to analyse.

#### **(ii) DISADVANTAGES**

Semi-structured interviews cannot guarantee the honesty of participants when they answer the questions because some of the learners in this study the researcher taught them physical sciences, so they might try to please the interviewer. Secondly, open-ended questions are difficult to analyse the answer supplied depends on how did the participant understood the question. Lastly, flexibility during an interview might lessen the reliability.

The main interview questions in each interview schedule were written down and reviewed by other researchers to ensure clarity and avoid ambiguity. Interview sessions were audio-taped, to maintain consistency, to avoid data distortion and data loss. The interviews were done two times using the same respondents.

## STEP 1

I interviewed the 3 post-grade 12 Physical Sciences learners in each participating school in the district using the interview schedule in Appendix C.

## STEP 2

The learners' interview was followed by the interview of the 4 teachers who were teaching grade 12 Physical Sciences in the schools in the district. They had to reflect on best practices in teaching physical sciences. The researcher used the interview schedule in Appendix B

## STEP 3

Lastly, the 4 school principals were interviewed by using the interview schedule in appendix A.

## STEP 4 REFLECTIONS ABOUT THE INTERVENTION

As educators, we cannot make pronouncements about what we used to change if we do not look back and scrutinize what we do (Barry, 1997, p.524). Teachers learn by doing, reading and reflecting (just as students do) by collaborating with other teachers, by looking closely at students' and their work and by sharing what they see. This kind of learning enables teachers to make the leap from theory to accomplished practice. In addition to a powerful base of theoretical knowledge, such learning requires settings that support teacher inquiry and collaboration and strategies grounded in teachers' questions and concerns (Darling-Hammond & McLaughlin, 1995, p. 598). With this research project, the researcher wanted to reflect upon his own experiences as a teacher to extract information that might further contribute to his own and others' understanding of what it means to be a successful and effective teacher. He intended to examine school culture in relation to teaching and modes of inquiry. The focus was on change because it is believed that change comes from learning change. I wanted to explore my past in order that I might recreate myself in the present and future. I wanted to remember, reflect and write about the professional experiences that had shaped who I am today. Past experiences had taught me that if I reflected upon a problem, posed questions, identified common themes and extracted the truth then I could possibly find my way out during hard situations.

### 3.4. REFLECTION JOURNAL

The second instrument I used was the reflective journal. Neville, Willis and Edwards (1994) put across that when the researcher is present in an environment where the research instrument is

implemented, the researcher gets first-hand information on what is really taking place. Observing the proceedings of the interview allowed me moments to develop my reflection journal. Dhurumraj (2013) explains that when data is collected using instruments like interviews, observations and reflection journal, non-verbal communication gestures like hesitation, facial expressions, emotions like, fears excitement, hopes, etc. are clearly noticed in everyday actions and reactions of participants in the learning environment. Utilizing a reflection journal in my study I could observe and record gestures mentioned above more especially when a participant is faced with a “difficult question”. Rich, untampered or undistorted data is collected.

### **3.5. RELIABILITY**

Reliability is defined as the degree to which a research instrument produces unchanging and unwavering results. Babbie (1983) believes as tools of social research, the questionnaire and interviews are strong on reliability. The interview is proven as a strong tool because the interviewer can ask follow up questions to dig up more information and to check that the respondent is not trying to please you by his/her responses. Contrary to Babbie (1983), Bulmer and Warwick (1993) argue that the reliability of the techniques is not guaranteed if respondents do not understand the questions very well, or if respondents fail to respond in terms of the alternatives provided, or still if the subjects do not trust either the purpose for which the research is conducted or the researcher. The reliability of these methods is therefore objective, being determined by the ability of the researcher to cultivate the trust of the subjects to provide useful and truthful information. In this study, I ensured reliability by taking the instruments to non-participating respondents to detect whether the language is clear and questions were unambiguous.

### **3.6. VALIDITY**

Validity refers to how well an investigation measures what is supposed to measure. Validity according McMillan & Schumacher (2001) refers to the degree to which the interpretations and concepts have mutual meanings between the participant and the researcher. I used triangulation by using multiple theories and perspectives to interpret and explain the data. Two instruments that were triangulated were interviews of all the different respondents and reflection journal, to ensure the validity of data.

### 3.7. DATA ANALYSIS

Data analysis identifies and describes patterns and themes from the perspective of the participant or participants and attempt to analyse the patterns and themes (Creswell, 2007: 23). During the process of data analysis, the data was organised categorically and chronologically reviewed repeatedly and coded continually.

### 3.8. CODING

Table 7 shows how the respondents were coded during the data analysis. The four schools, four principals, four teachers and eight post grade 12 learners were allocated special codes for this specific research study.

The respondents that were interviewed were coded as follows; school A principal number [SAP#1], school B teacher number 2 [SBT#2] and school D learner number 8 [SDL#8], the codes were also summarised by using the table 7

*Table 7: The coding of respondents*

RESPONDENTS	CODES
SCHOOL A PRINCIPAL NUMBER 1	SAP#1
SCHOOL B PRINCIPAL NUMBER 2	SBP#2
SCHOOL C PRINCIPAL NUMBER 3	SCP#3
SCHOOL A TEACHER NUMBER 1	SAT#1
SCHOOL B TEACHER NUMBER 2	SBT#2
SCHOOL C TEACHER NUMBER 3	SCT#3
SCHOOL D TEACHER NUMBER 4	SDT#4
SCHOOL A LEARNER NUMBER 1 [3]	SAL#1, SAL#2 & SAL#3
SCHOOL B LEARNER NUMBER 2 [2]	SBL#1 & SBL#2
SCHOOL C LEARNER NUMBER 3 [2]	SCL#1& SCL#2
SCHOOL D LEARNER NUMBER 1 [1]	SDL#1

Data was also categorised into themes. By using same colour, I coded manually same themes from different instruments. I also transcribed data. For the respondents who responded in vernacular, that information was translated to English with the help of an expert in that field.

### **3.9. ETHICS**

The consent letters asking for permission to conduct research were sent to the circuit manager, school principal, educators, post-grade 12 learners and school governing body (the parent component). The participants had the right to privacy and protecting their identity. I respected the confidentiality and anonymity of my research respondents. I also ensured that participants in this research study participate voluntarily. All respondents were free to withdraw from participating. Everything collected as data was made available to the participants through an electronic device.



### **3.10. CONCLUSION**

Chapter three discussed the research methodology employed in the study. It focused on the qualitative paradigm which followed a case study approach. It also outlined research designs and described the selection of research participants. Data collection and data analysis were used as a vehicle to the findings and the discussion of results in the next chapter.

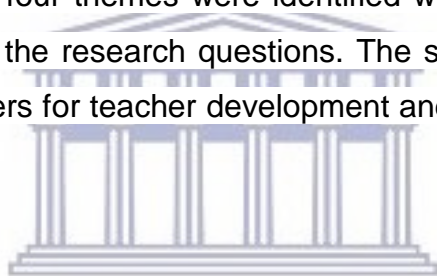
## CHAPTER 4

### RESULTS

#### 4.1. INTRODUCTION

The previous chapter has outlined the data collection methods that were used in the study. Chapter 4 provides the data collected through the assistance of the research instruments and it is presented in the form of tables, graphs and text. The chapter presented findings to best outline the data responses to the research question: What are the factors that led to the improvement in matric physical science results in four schools in a district in the Eastern Cape province?

The data were grouped and matched based on the themes and patterns that emerged through the analysis process. A total of four themes were identified with supporting data. All the four themes were directly related to the research questions. The supervision of instructional work was done by the school managers for teacher development and supporting of teachers in their various disciplines.



#### 4.2. THE TEACHING AND LEARNING STRATEGIES USED TO IMPROVE THE PHYSICAL SCIENCES RESULTS.

The study was meant to reflect on 5 recent consecutive years of schools' matric results that were participating being compared with both the provincial and the national physical sciences results in table 1. The strategies that were employed involved among others, the extra-classes (morning, afternoon, evening & Saturday classes), practical work, syllabus coverage, assessment and the supervision of instructional work. The strategies were described below one-by-one.

#### **4.2.1. EXTRA-CLASSES**

Extra classes were the arranged time intervals that were used to teach learners beyond the normal tuition time. The extra classes were mainly utilized to cover up the syllabus, to do practical work, practical tests, revision work and individual attention for learners who were either struggling or learners who missed some lessons. Lastly, the assessment tasks that could not be featured in the normal tuition time were conducted during extra classes. The tasks that were administered were the theory tests, practical tests and school based assessment (SBA) formal tasks. The formal SBA tasks were prescribed by the education department.

#### **4.2.2. PRACTICAL WORK**

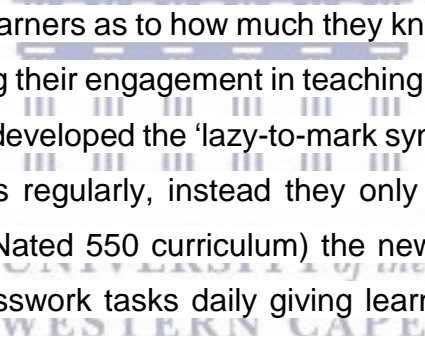
Per the data collected in Table 5 and Figure 3, as much as the laboratories were not fully equipped with basic needs like running water, fire extinguishers/fire blankets, science equipment, etc. some practical work was done. Most of the practical lessons that were conducted did not only catch the learners' attention in class but they also improved their understanding of the topics and concepts being addressed by the practical work. Learners found physical sciences very much enjoyable when practical lessons were done. Most learners reported that practical lessons that were done encouraged them to spend their own time to study physical science and improve their understanding. Other teaching tools like DVDs, telematics videos, YouTube videos and PHET simulations were also used to supplement for the shortage of laboratory material. Learners were very excited to learn new things more especially if they came through using information technology. But, it was teacher's duty to control that excitement so that it does not overflow beyond the lesson and distract the teaching and learning process. It was also important to groom and redirect learners' love for technology from the social media activities that had no bearing in their curriculum to spend their time using technology to learn, more especially physical sciences. The social media like the WhatsApp was used to do WhatsApp groups that helped learners to contact each other. Learners could help one another by posting questions and answers. Simulations and You-tube videos of physical sciences and other subjects were shared by learners voluntarily. Others used Facebook for sharing information. Tutors from programmes like Geleza Nathi on SABC television also used their Facebook accounts to share lessons and to answer questions asked by learners. Social media addresses individual attention gap that is not filled in the classroom during tuition time because of overcrowded classrooms.



### **4.2.3. SYLLABUS COVERAGE.**

The syllabus coverage was defined as the total work (list of topics) that should be taught to learners for them to prepare for their final examinations in each academic year. The reality of the matter was that finishing the syllabus in time was a remedy for improvement. Learners got motivated to study and try to master the topics taught and become confident to face any form of assessment. They even asked for assessment tasks from their teachers to show him/her how much they are motivated in the subject. It also shows how much more the learners are eager to acquire knowledge about the subject. Teachers who fail to complete syllabi are failing the learners in a subject. Learners lose their confidence and superiority.

### **4.2.4. ASSESSMENT.**



This was the way of examining learners as to how much they knew about the content taught and the skills they had acquired during their engagement in teaching and learning as well as practical work. Nowadays, teachers have developed the 'lazy-to-mark syndrome'. They did not administer assessment activities to learners regularly, instead they only did SBA assessment tasks for compliance. Before (during the Nated 550 curriculum) the new curricula were introduced, the teachers were administering classwork tasks daily giving learners homework (informal tasks) daily. Weekly tests, monthly tests and quarterly tests were also good habitual actions done to improve the results not only in grade 12 but, to all the grades.

Contrary to what was done before, the CAPS curriculum only prescribed tasks in the policy document that were done for SBA moderation purposes. These SBA tasks were very few to prepare learners for the examinations. This spelled out that there was a lack of curriculum management by the department of basic education. This was a call to the department of basic education to go back to basics by reinstating the best practices that were done to produce good results and quality education later. Regular assessment tasks encouraged learners to learn and compete to achieve best marks in class, more especially in informal assessment tasks like class works, homework, class tests and assignments. This strategy was also exposing learners to

different questioning styles, question types and proper ways of answering questions, such that they (learners) scored high marks in physical science examinations.

#### 4.2.5. SUMMARY OF STRATEGIES

The strategies that were used were interdependent on each other. Each strategy enhanced learning differently but together they made learning meaningful and interesting. For an example, teaching learners to conduct experiments was equipping them with ways of retaining knowledge acquired and equipped them with skills to work independently. In turn, this helped each learner to retrieve the knowledge during an assessment activity. Spending time attending extra-classes results in studying, revising again and again until such time the learners felt they understood the concepts and were ready for their final examinations. On the other hand, when the teacher finished the syllabus, the learners' morale was boosted, the learners developed the self-driving force within themselves to work hard to improve the attainment in physical sciences marks. Lastly, the teaching strategies were intertwined and inseparable like the two sides of the same coin.

#### 4.3. EXAMINING LEARNERS' ACHIEVEMENTS

The four participating schools had displayed a consistent improvement in physical sciences matric results in a period of five years. The tables below are illustrating the five-year period (2010 – 2014) of the performance by the schools in a district which the study is reflecting on. Table 8 shows the learner achievement in physical sciences National Senior Certificate for 2010 - 2014.

*Table 8: School results in physical sciences for the period 2010 to 2014*

YEARS	2010	2011	2012	2013	2014
SCHOOL A	57	63	71	83	85
SCHOOL B	68	74	80	83	91
SCHOOL C	60	64	75	81	86
SCHOOL D	72	76	80	81	83

Table 8 above is depicting the performance percentages of matric physical sciences for the period of study by the four high schools, i.e. school A, school B, school C and school D. Due to

some realities and constraints the study is limited to a maximum of five years. All the four schools have been providing good results in the National Senior certificate results.

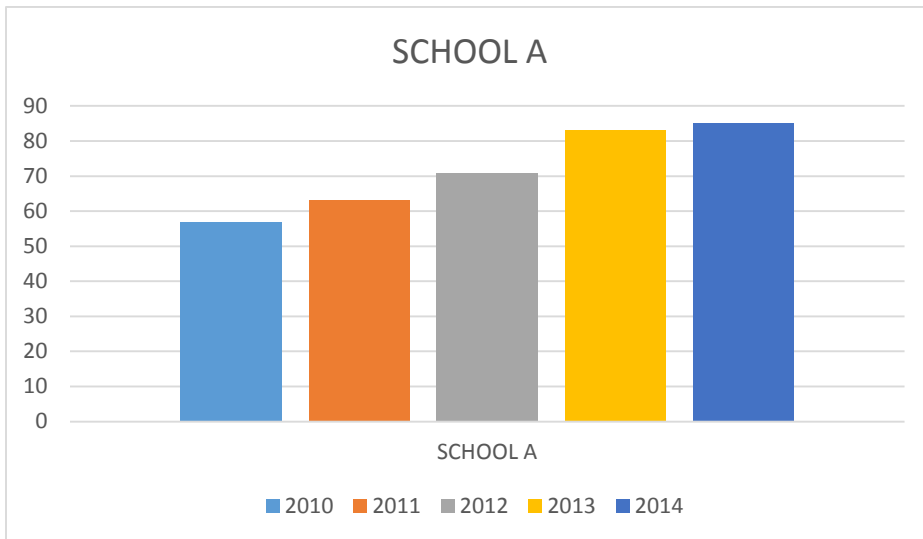


Figure 1: Graph of physical sciences results in School A for the period 2010-2014

As highlighted in Figure 1 above, School A has improved its matric results in physical sciences from 57% in 2010 to 85% in 2014. The graph shows a consistent improvement of the results from year to year with an average increase of 5,6%.

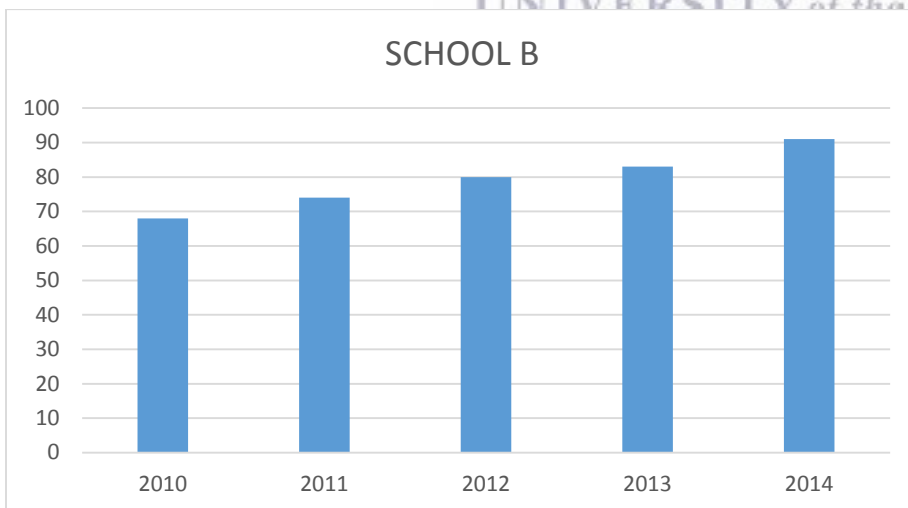
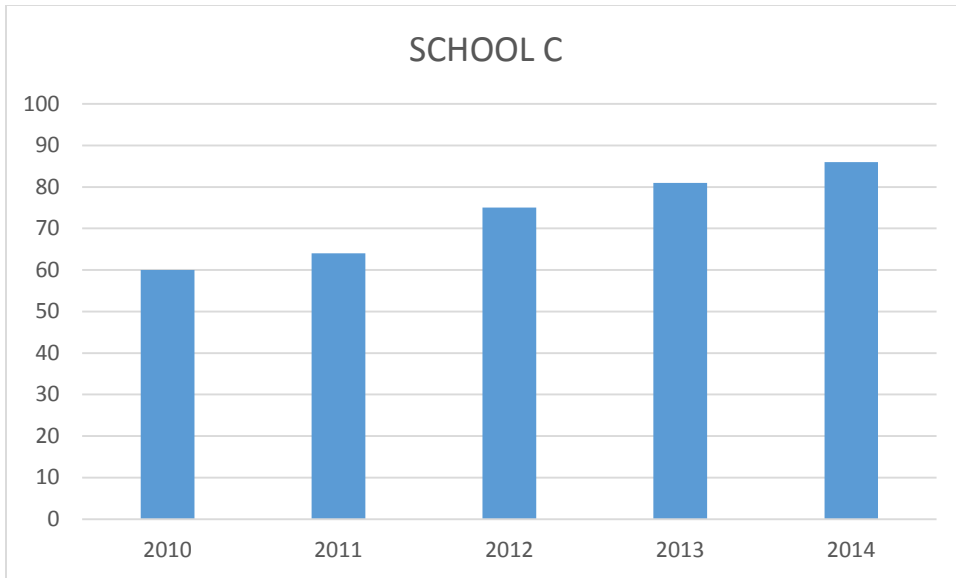


Figure 2: Graph of pass rates in physical sciences from 2010-2014 at School B

As outlined in Figure 2 above, School B has improved from 68% in 2010 to 91% in 2014. Pass percentages added up to the average of 4,6% for the period of 5 years.



*Figure 3: school C results in physical science for the period from 2010 to 2014.*

Figure 3 above represents the individual results for school C. In school C, the physical sciences results have risen from 60% in 2010 to 86% in 2014. This improvement was found to be at an average of 5.2%

School D is also showing an improvement from 72% in 2010 to 83% in 2014 with an average increase of 2,2% for a five years' period as illustrated in the bar graph below.

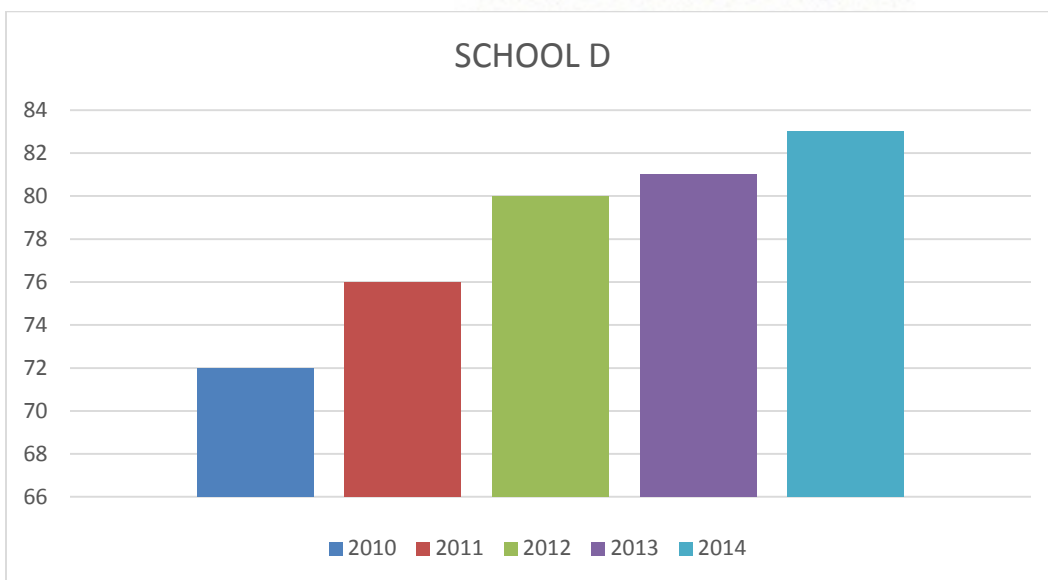


Figure 4: the graph shows physical sciences results for school D for the period from 2010 to 2014.

**REFLECTION OF LEARNERS**

**4.4. STRATEGIES EMPLOYED TO IMPROVE LEARNERS’ RESULTS IN PHYSICAL SCIENCES**

**4.4.1. LEARNERS’ PARTICIPATION AND PERCEPTIONS ABOUT STRATEGIES EMPLOYED.**

Twelve post-grade 12 learners were sampled from the four participating high schools in a district. Eight learners were interviewed while the three learners could not pitch up. The twelfth learner pulled out during the interview because of the family problem that was reported to him through a cell phone.

Table 9: showing the learner participation in interviews

Number of learners sampled	12	Percentages
Interviewed	8	66,7
Not interviewed	3	25
Pulled out	1	8,3

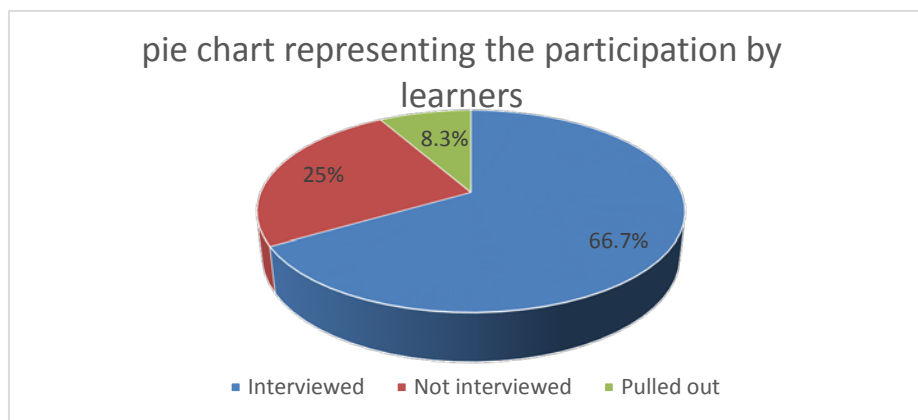


Figure 5: A pie-chart is portraying learners’ participation in the interviews.

The figure 5 above represents post-grade 12 learners, where 66,7% shows those who participated. 25% of learners couldn't avail themselves for interviews. One learner that pulled out constitutes 8.3%

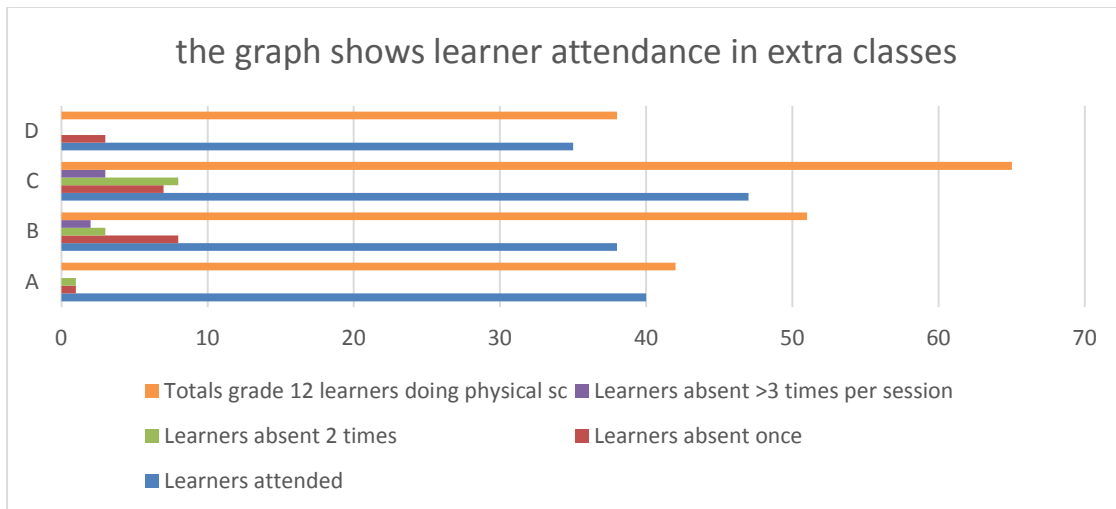
#### 4.4.2. THE LEARNER PARTICIPATION IN EXTRA CLASSES

The attendance for extra classes was not 100% in all the four schools taking part in the research. The reasons by the learners not attending regularly are stated below.

*Table 10: Showing the learners attendance in extra classes.*

	School A	School B	School C	School D
<b>Total grade 12 learners doing physical science</b>	42	51	65	38
<b>Learners attended</b>	40	38	47	35
<b>Learners absent once</b>	1	8	7	3
<b>Learners absent 2 times</b>	1	3	8	0
<b>Learners absent &gt;3 times per session</b>	0	2	3	0

The table 10 above is showing the total number of grade 12 learners in each of the four schools. Learners were not all attending extra classes. There were those who absented themselves once, twice, thrice and more than three times per session. Looking at the table above, school A has good attendance compared to other schools while school C has a largest number of absentees per session.



*Figure 6: The four schools extra class attendance.*

The graph above is analysing the attendance and non-attendance of extra classes by learners in the four participating schools. Some had valid reasons for non-attendance, ranging from parents who could not afford transport fares for learners to attend the extra classes to those of learners who were not motivated enough to attend classes regularly and those who were truly committed and bound to head their homes (child-headed homes).

The results obtained clearly showed that there were learners who did not attend extra classes in physical sciences. The learners that were interviewed mentioned the fact that extra classes were not affordable because of various socio-economic reasons, namely: a single parent staying with a large family that cannot be catered for financially, or working parents earning very little salaries as domestic workers and unskilled labourers it might also be because of child-headed homes, or a pensioner who lived on old-age social grant. One child expressed his reason for not attending the classes as a socio-economic reason because the parent was working for a little salary which was not able to serve all the family needs financially. The learner substantiates his reason with the following quotation:

*There is only one working parent in the family who works as a domestic worker. She cannot afford transport fare during the week and on extra classes. [SCL#2]*

Another learner expressed her deepest regret for not attending an extra class session as a most unfortunate situation she has no power over it.

*I live with my grandmother, a pensioner, who supports a family of ten members with her old age social grant, so there is no taxi fare for attending extra classes. Grandmother can only save for the five school days (crying[SAL#2]*

Social ills experienced by learners in our communities sometimes superseded the right to education for the learners.

*One child said that he cannot attend extra classes because he heads a family therefore there is no time for household chores and attend extra classes, because other family members are below the age of 12 years. [SBL#1]*

Learners' responses had shown clearly that they needed to fulfil their basic needs in Maslow's Hierarchy of needs before they could achieve intellectual development. Other reasons for not attending physical sciences extra classes were: the lack of individual attention to cater for individual problems in the subject, moreover learners were also complaining about the lack of experienced physical sciences teachers, lastly congested classes and limited contact time.

*Very large number of learners in one class. [SDL#1]*

*Too little time spent for a difficult subject like physical sciences i.e. only 1- 2 hours per session. [SAL#2 &SCL#1]*

#### **4.4.3. SYLLABUS COVERAGE**

It is important to finish the physical sciences syllabus in time. If it was finished in time, precious time was utilized for revision and drilling learners on strategies they can use to approach questions and score better marks. This was done by interacting with different previous years physical sciences question papers. Hundred percent (100%) of learners fully agree that fully covered syllabus in time helped to boost their morale and confidence towards preparing for their examinations. The following quotation attested to the above statement:

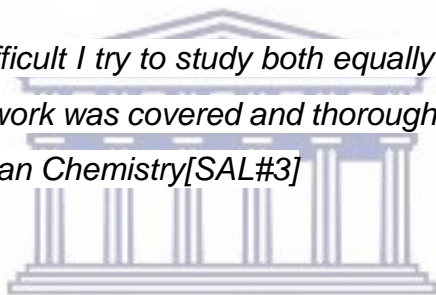


*Our teacher gives us a list of topics that are going to be done at the beginning of the year, this helps us to know whether the syllabus is finished or not. When it is finished, we are forced to study on our own. [SDL#1]*

These were some of the views of the learners concerning the physical sciences curriculum and syllabus coverage: Learners had different tastes in physical sciences, that is, there were those who like physics while others like chemistry. When the whole syllabus was finished, both groups had an advantage of performing best in the field of his/her choice. The unfinished syllabus affected the physical sciences performance negatively.

*I am more comfortable with Chemistry than Physics it would be better to separate them into different subjects. If the Chemistry syllabus is finished earlier, I can pass physical sciences with flying colours because it is not tricky. [SAL#1]*

*As much as physics is difficult I try to study both equally so that I achieve a better mark, more especially if all the work was covered and thorough revision was done. I usually get more marks in Physics than Chemistry[SAL#3]*



#### **4.4.4. PRACTICAL WORK**

Out of eight learners that were interviewed, all showed the interest and important role that was being played by the conducting of practical work in their learning process. Practical work was time consuming, but, the results of doing it were pleasant to the learners as the recipients of education. Physical science was one of the subjects that required both theory (content knowledge) and practical work (experiments and simulations). The importance of practical work was witnessed by learners from the four different high schools that were interviewed; they said the practical work caught their attention in class and improved their understanding of the concepts being demonstrated. The learning of physical sciences became interesting and enjoyable when the practical lessons were conducted. They also confessed that practical work done encourage them to read more to improve their attainment of marks. This is what they had to say when interviewed:

*Yes, I do engage in practical work activities and they assist me a lot in understanding basic concepts in physical sciences [SBL#1]*

*Wow! it is interesting. Practical work improves understanding on the subject content knowledge [SAL#1]*

The laboratory atmosphere is exciting and motivating to learners. Because of this relaxed atmosphere, they learn some knowledge and skills unaware. Classroom conditions are annoying to other learners.

*We get excited with just the entering the laboratory. Using different senses in the laboratory simplifies difficult terms and remembers well during tests and examinations. [SBL#2]*

*Practical lessons and simulations were easy to make understanding of concepts in learners; it also arouses interest and curiosity in learning physical sciences. Classroom conditions without experiments are very boring [SDL#1]*

Learners became motivated to try to do even the un-prescribed practical tasks. Practical tasks helped in the effective teaching and learning processes. One of the learner's quotes substantiated the above statement:

*It is easy to remember an answer from a question in a topic where a practical lesson was done. [SCL#3]*

*Abstract concepts stay in the mind for a long time. Also, become self-motivated to do own research [SBL#2]*

It was also discovered that practical assessment played a key role in learning and achieving results in physical sciences. Assessment plans drawn and implemented helped learners to prepare themselves for the academic year assessment tasks. The principle of readiness was important to support the evaluation of learners through assessment tasks, learners who were ready to be tested stand a chance of performing well. It was found that 100% of learners that were interviewed agreed unanimously that assessment is essential for effective improvement of physical sciences results. The following quotation confirms the above statement:

*Assessment should be done as frequently as possible, starting with classwork, class test, controlled test and quarterly controlled tests. [SDL#1]*

*It is nice to have assessment tasks after each topic taught. [SAL#3]*

## **REFLECTION BY TEACHERS**

### **4.5. PHYSICAL SCIENCES TEACHERS AS PARTICIPANTS AND THEIR PERCEPTIONS OF STRATEGIES EMPLOYED TO IMPROVE ACHIEVEMENT IN PHYSICAL SCIENCES.**

#### **4.5.1. SYLLABUS COVERAGE**

Firstly, syllabus coverage is the total work (list of topics) that must be taught to learners for them to prepare for their final examinations. It is a matter of must for each teacher to finish up the syllabus of his/her subject for each academic year. Syllabus coverage for physical sciences is much significant to improve physical sciences matric results. These are the few quotes from teachers, based on the syllabus coverage theme:

*I do not have any problem in finishing the syllabus earlier than the pacesetter prescribes; I know how important it is to finish the syllabus. Because I attend all my periods in each class. I also lookout for unattended periods. [SAT#1]*

*It is not easy to finish syllabus because of many disruptions during the tuition time. These include special meetings, workshops, absenteeism and other school activities. The time allocated to teach physical sciences is very small for its long syllabus but through many efforts like attending extra classes I engage in, I manage to finish syllabus earlier. [SBT#2]*

*Pacesetters do not really give time for assessment, teaching time is consumed by assessment in every term. Usually at the beginning of the third term I finish my Physical science syllabus, it is very important gesture to finish the syllabus more especially in physical sciences. [SDT#4]*

#### 4.5.2. PRACTICAL WORK

Secondly, practical work is one of the vital ways of teaching and learning physical sciences. For a science learner to engage in observation as a science skill, a learner needs to observe a demonstration lesson done by the teacher or a learner conducts an experiment on his/her own. Demonstration of lessons and conduction of experiments form an integral part of the teaching and learning process in a physical sciences classroom. Testing of ideas is not confined to pen and paper, but rather active involvement of learners in investigative lessons (Vhurumuku 2010). Teachers had mixed feelings about practical work ranging from the lack of skill of doing it to the high understanding levels displayed by learners who have done practical work.

*The single experiment I conducted covers a lot of content knowledge. After it has been done correctly satisfaction prevails. [SCT#3]*

*The impact of practical work is noticed when learners perform well in their assessment tasks. The learners' reasoning improves after each experiment conducted. [SDT#4]*

All the four science teachers could avail themselves for interviews. That means 100% of the whole science teachers sampled were interviewed. The quotes by the teachers back up the notion that there are a lot of problems that the conduction of practical works in schools. One of them could not reply whether practical work is essential and important or not, instead he busted with anger because there are no laboratories in most schools. The following are some of their responses:

*I cannot do some practical work because the equipment and apparatus are not sufficient to conduct the experiment, so, I decided not to start doing them because I will get stuck. [SBT#2]*

*I did practical work twenty-five years ago, during my tertiary studies. [SCT#3]*

*It is difficult to prepare a practical lesson because of congested classes. [SAT#1]*

One teacher felt that the practical work has no impact on learning because he has been teaching physical sciences for the past years without a laboratory to perform them, but learners kept on producing good results in the subject. He was quoted as follows:

*It is difficult to prepare a practical lesson because of congested classes. It takes more than thirty minutes to group learners, arrange them and distributing apparatus. [SAT#1]*

Out of four teachers, three teachers saw need for the extra classes while one teacher feels that extra classes are not necessary, because when you follow your annual teaching plan as it is work is covered easily; therefore, extra classes were not necessary. Many physical sciences teachers highlighted the significance of conducting extra classes as a means of finishing the syllabus and as an extra time to administer assessment tasks to learners. Extra classes also helped with the conducting of practical lessons and practical tests.

Table 11: Table shows the importance of practical work by the respondents.

	Learners	Teachers	Principal
Essential	100%	75%	100%
not essential	0%	25%	0%

Table 11 above displays the perception of respondents about the practical work. Hundred percent (100%) of school principals and learners felt that practical work is very important in the teaching and learning of physical sciences. 25% of teachers perceive practical work as a waste of time since some teachers were not competent to perform them while another percentage of teachers are frustrated because there are no fully equipped laboratories in their schools.

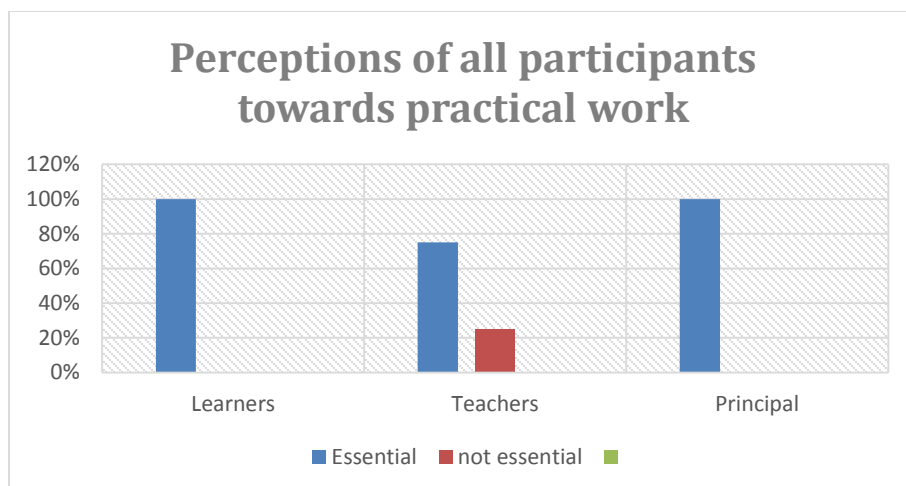


Figure 7: Summarises the perceptions of the respondents about the practical work

The figure above summarises the feelings of participants on practical work as one of the strategies used to enhance teaching and learning of physical sciences to grade 12 learners.

All the school principals feel that it helps to conduct practical work for learners because their attitude towards science becomes positive and they seem not to fear Physical science as a subject. This is the principal's quote:

*I always encourage teachers to do practical work tasks by using the little available laboratory equipment because there are schools that do not have any form of laboratory material. [SCP#3]*

*One of the principals said in his school they go to an extent of using other funds (left overs) to purchase laboratory equipment. [SAP#2]*

## REFLECTIONS BY THE PRINCIPALS

### 4.6. THE MANAGEMENT STRATEGIES

The school principals played a pivotal role in managing and enforcing the implementation of the teaching and learning strategies. Disciplinary measures were taken seriously on both teachers and learners' conduct during the intervention period. All the transgressors were reprimanded by

the managers. More information on this matter is appearing under the topic 'managers' perceptions of strategies employed.

#### **4.6.1. PERCEPTIONS OF IMPLEMENTATION OF STRATEGIES.**

##### *Managers as respondents on strategies employed*

Out of 4 school principals the researcher was supposed to interview, he could interact with three of them. This meant that 75% of the principals expressed their views on the teaching strategies that were employed to improve the matric results in physical sciences. Table 12 below summarises the participation by principals in the study in terms of numbers and percentages.

*Table 12: Shows principals as respondents*

RESPONDENTS	NUMBER	Percentages
Sample of principals in the study	4	100
Number of principals interviewed	3	75
Number of principals not interviewed	1	25

#### **4.6.2. PRINCIPALS' PERCEPTIONS ON EXTRA CLASSES AS A STRATEGY THAT WAS EMPLOYED TO IMPROVE THE ATTAINMENT OF LEARNERS IN MATRIC PHYSICAL SCIENCES.**

The school principals were positive about the conducting of extra classes. While talking about strategies and tools utilized to improve their teaching the principal referred to needs analysis.

Teachers make their presentations on the list of their needs at the beginning of the term like the subject improvement plans and assessment plans. Planning by teachers helps the principals to assist the teacher to achieve his/her goals. The quote from the principal substantiates this view.

*This is where I fit-in my management strategy by looking at the needs and try to help the teachers to achieve their plans. [SCP#3]*

Several principals emphasised that the monitoring of the extra classes was an important aspect that led to improvement in learners' achievement in physical sciences, one principal alludes to this statement as follows:

*I am the first person to arrive at school for the extra-classes so that I monitor closely all the activities starting with the arrival time of both learners and teachers. [SAP# 1]*

Those who deviate from the extra-classes rules and regulations are reprimanded on the spot by principals. To this end, principals indicated that to make the extra classes effective they had to check up on learners and follow this up during the normal school day:

*I read the rules and regulations every morning so that they are embedded in the learners' and teachers' minds. [SAP#1]*

*Learners who are absenting themselves from the extra-classes are detained after school so that they do all the work they didn't do, continuing the bad habits, their parents are invited so that they intervene. [SAP#2]*

Table 13: The responses in percentages for extra classes by the respondents.

	Positive	Negative
Learners	80%	20%
Teachers	75%	25%
Principal	100%	0%

From the table above the school principals agree unanimously that extra classes were essential for the wide physical sciences syllabus, to cover it in time. The principals were also expressing the precious time they used during the extra classes to manage and supervise the work done by the teachers during the extra classes. Forty percent of physical sciences teachers did not see the need to attend extra classes because they could finish their work within the allocated time. 60% of teachers were encouraging the use of extra classes to finish the physical sciences syllabus in time. At the same time doing their assessment of both theory and practical work leisurely. Learners had mixed feelings about extra classes, 80% of them enjoyed to attend extra



classes because they were helpful to them, contrary to this statement 20% of learners felt that extra classes were demanding too much of their time and could not afford transport fares to school more especially on weekends.

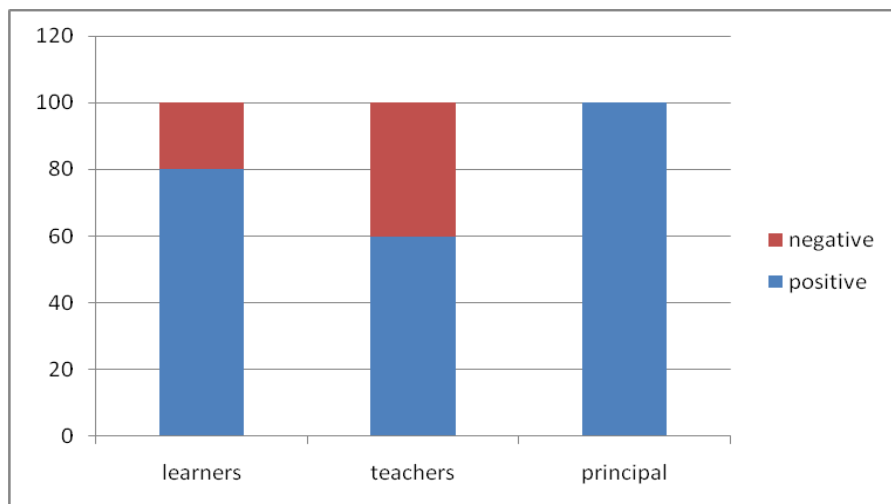


Figure 8 The bar graph summarises the respondents' attitude towards the extra classes.

#### 4.6.3. PRINCIPALS' PERCEPTIONS ON SYLLABUS COVERAGE AS A STRATEGY USED TO IMPROVE TEACHING AND LEARNING OF PHYSICAL SCIENCES.

The table 13 and the bar graph in figure 8 above show that all the school principals agree unanimously that it is very imperative for teachers to finish the physical sciences syllabus and revise their work for the learners to improve their performance in the subject.

The quotes from the principals' interview below gave testimony to the above statement.

*The finishing of syllabus in each subject is very important because finished syllabus motivates the learners and uplift their confidence to face any challenge in their subjects.*  
[SAP#1]

*Any teacher who does not finish the work he/she is supposed to do is committing crime against humanity.* [SCP#3]

Table 14: The Table on finishing the physical Sciences syllabus by teachers.

Finished the syllabus easily	Struggle to finish syllabus
25%	75%

The table above is illustrating that 80% of teachers struggle to finish their physical sciences syllabi because of many disturbances in schools during the tuition time. On the other hand, 25% of teachers found it very easy to finish their physical sciences syllabus.

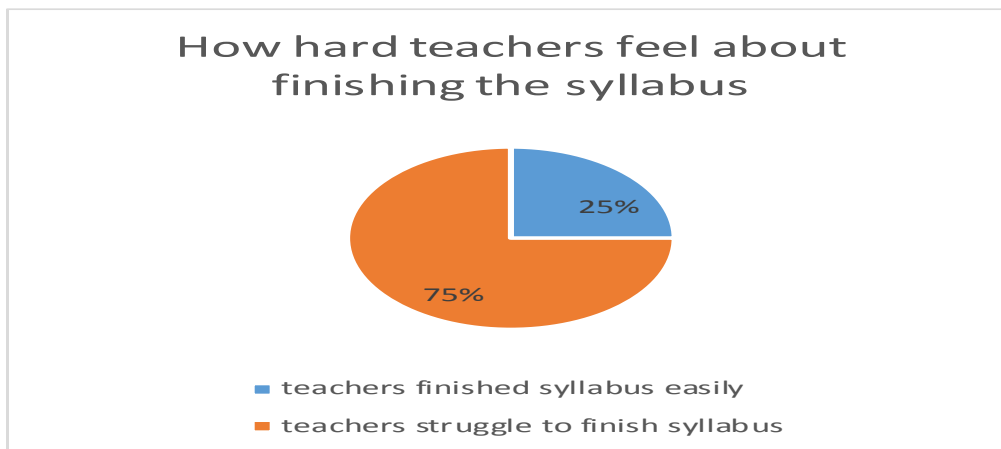


Figure 9: indicates the feelings of teachers on syllabus coverage

The figure 9 above represents the pie chart with a slice of 25% for teachers who were not belligerent to finish the physical sciences syllabus another slice of 75% for teachers who found it very hard to finish the physical sciences syllabus.

Physical science subject was believed to be the most difficult and lengthy field of study at matric level. Both teachers and learners agreed that the physical sciences subject is divided into two long, difficult sections i.e. physics and chemistry. It is also true that both sections are challenging to both teachers and learners. Hence it was hard to finish the physical sciences syllabus but, the teachers who managed to finish the syllabus in time increased the chances of doing revision with learners. For the learners to achieve good passing marks in physical sciences revision

lessons should be done thoroughly. The teachers who struggled to finish the syllabus attained low passes compared to those teachers who finished their syllabi in time. The finishing of syllabus, psychologically was key in building up the confidence of learners in the examinations they wrote. While the learners whose teachers could not finish, the syllabus become defeated before they went into the examination room. Therefore, syllabus coverage was the key strategy in acquiring good results in physical sciences matric results.

Per Table 10, 80% attendance was achieved by learners in physical sciences extra classes. The 20% absenteeism were the learners who were staying by themselves because their parents were working far away or they stayed in child-headed homes. This was illustrated by the learner who said he wanted to go and play soccer in a local football team and to watch television. Some of these learners who were absenting themselves or arriving late were not motivated enough to realise the importance of attending these classes or the impact they made.

*Table 15 below shows respondents' views about practical work in Physical sciences learning.*

	Learners	Teachers	Principal
Essential	100%	75%	100%
not essential	0%	25%	0%

Figure 10 shows that the school principals and learner agreed fully that practical work was very much essential for the enhancement of physical sciences grade 12 results. Teachers had split decision, 25% were frustrated because of the lack of laboratories, skills of doing practical work and shortage of laboratory material while 75% of teachers felt that it was important to do practical work for acquiring physical sciences content knowledge as well as laboratory skills.

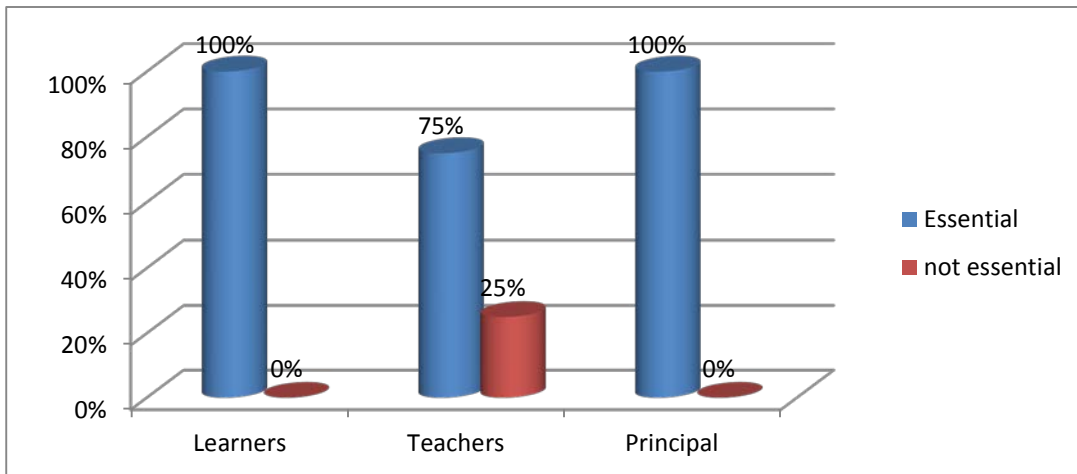


Figure 10: graph summarising the respondents' attitude towards the practical work.

Figure 10 above summarises the perceptions of the participants as it was indicated in the table 15. The principals and the learners agreed fully that practical work was essential to facilitate effective teaching and learning.

#### 4.6.4 PRINCIPALS' PERCEPTIONS ON ASSESSMENT AS A STRATEGY USED TO IMPROVE TEACHING AND LEARNING OF PHYSICAL SCIENCES.

UNIVERSITY of the

Assessment is one of the learning strategies that enhances teaching and learning process for a learner to improve the attainment levels in physical sciences. From the interviews, it was found that assessment was very important in promoting teaching and learning of physical sciences. Different groups of respondents that were interviewed agreed unanimously that assessment was the primary part of learning effectively. It must be administered regularly through informal and formal tasks. Hundred percent (100%) of principals indicated that there was a great necessity of to assess learners frequently. They responded to the interview schedule question. The question from the interview schedule of principals that was asked follows: **Looking at assessment plans provided by each subject policy, do you think they are enough to prepare learners for their final examinations?**

The following quotes were shared by the principals with regards to regular assessment:

*Nowadays teaching is lacking sound assessment programmes because teachers have developed the 'laziness syndrome. They are not administering tasks because they are lazy to mark. They are always complaining of big numbers and congested classes. [SBP#2].*

Another principal condemned the subjects' policy documents that were silent about the informal tasks that were supposed to be written by learners daily in the so-called critical subjects, like mathematics, physical sciences, to name but a few.

This is what she had to say:

*The department of education has contributed directly to the laziness of teachers and learners by not prescribing the informal assessment tasks in its subject policies, teachers do few or no informal tasks more especially if they are not monitored. [SCP#3]*

On the other hand, there were mixed feelings about assessment plans designed for the FET band. Fifty percent (50%) of teachers felt that there was a vast shortage of assessment tasks in all subjects per each academic year. The question that was asked to educators was as follows: **How are the performance levels of a grade 12 learners in physical sciences influenced by regular assessment activities? Explain.**

Teachers responded to the question on assessment in different ways. One teacher was quoted responding to the question as follows:

*Learners do not take the responsibility of studying further the topic I taught. They are brave enough to write tests without revising their work and fail. Performance levels depend on the learners' motivation to follow a career. [SDT#4]*

*My learners are competing among themselves in physical sciences; therefore, they do their work voluntarily and excel in their tests. I attribute their seriousness to the way I groom them from grade 10. They don't struggle in improving their performance levels in each term [SAT#1]*

For the question: **With the given current curriculum statement for physical sciences, is the contact time allocated sufficient to complete the syllabus and assess the learners? Any suggestion?**

Physical sciences teachers that were interviewed complained of the long physical sciences syllabus that overlaps to quarterly examinations time. Learners took a long time to understand concepts.

*The contact time is not sufficient to complete the physical sciences syllabus. The utilisation of extra classes becomes very useful in addressing this situation of contact time and assessment, without extra classes it is very difficult to achieve these tasks. Yes, I do manage because of extra classes. [SBT#2]*

*The current physical sciences curriculum statement is meant for the ideal situation where everything is perfect. In my school, there are cases where there would be no physical sciences teacher for some months. It is difficult because the learners who proceeded to the next class with content gap should be addressed in matric [SCT#3]*

Teachers' views on assessment diverged because of many factors that influence the teaching and learning of physical sciences in schools. As a researcher was also a physical sciences teacher I agree with both groups of teachers, those who said learners did not care about the subject, so they failed it; and those who said a group of learners who were motivated enough to study hard and improved their performance levels with ease.

Learners' perceptions were based on their assessment in both theory and practical work. Hundred percent (100%) of learners were of the view that continuous assessment was good for their learning and mastering physical sciences.

#### **4.7 MANAGEMENT, LEADERSHIP AND SUPERVISION**

The curriculum management and the delivery of subject matter were some of the key ways of facilitating teaching and learning in a school situation. But, it was least performed by the

curriculum managers to their subordinates. The following were the realities that were shared by teachers when they were asked in an interview to reflect on the moments they had with their supervisors in the classroom. There were three questions that were asked based on the supervision that should be done by the school managers in the principals' interview schedule. The first question: **How often do you visit classes to support teachers?**

The following were the direct quotes from the principals as respondents in an interview.

*We do not necessarily do formal visits by entering the classrooms to supervise, but, we normally check the work coverage, preparation notes and teacher attendance book. [SAP#1]*

*A minimum of one visit per term is afforded and maintained. Most of the time we are busy doing administrative work and other curriculum related issues. [SBP#2]*

*Teachers are visited formally once per quarter. Supervision reports and appraisal forms are kept for future reference. [SCP#3]*

*We do not supervise teachers, they are self-motivated. They are diligent enough to do their job. [SAP#1]*

The teachers in one of the schools freely reported that they had never been supervised for quite a long period.

**The second last question was asked from the principals' interview schedule followed:**

**Which strategies do you employ to improve teacher development?**

*Knowledge and skill are imparted to teachers through short term trainings, team teaching sessions, by using mentoring and coaching programmes. [SBP#2]*

*Since I don't have an administration clerk, I perform a lot of administration work. I hardly conduct class observations. I find it very difficult to support teachers. They only attend workshops in the district office. [SAP#1]*

Another question was asked from the principals' interview schedule; it reads as follows: -

**As a manager in a school, do you think it is necessary to supervise teachers even if they are experienced and have good qualifications?**

Supervision was done to find out if there are any gaps in the process of teaching and learning. It was the duty of the supervisor to try and close the identified gaps. The gaps ranged from the non-attendance of extra classes, non-completion of syllabi, underperformance in certain subjects and non-willingness to do assessment tasks. Per the Integrated Quality Management Systems (IQMS) all teachers were obliged to engage fully in the appraisal system.

*All teachers are supervised irrespective of whether the teacher is experienced or highly qualified. The supervision plan includes all staff members. [SCP#3]*

*Long-serving teachers do not want to be visited, instead newly appointed teachers are visited so that they gain experience in their new career. [SBP#2]*

The respondents' perceptions witnessed the fact that the main findings of the study really were the factors that influenced teaching and learning of physical sciences in matric.

#### **4.8. CONCLUSION**

This chapter discussed the data analysis. Data was categorised into different themes. The findings were highlighted in a mission trying to answer the research question and sub questions. All the respondents gave their opinions in each finding. The following were identified as the main findings that influenced the matric physical sciences results of the research project; extra classes, syllabus coverage, practical work, assessment and instructional supervision.

### **CHAPTER 5 DISCUSSIONS**

#### **5.1. INTRODUCTION**

The discussion chapter presents the summary of the findings in line with the problem statement, research questions and aims of the study. The themes that were found from the results are discussed. Direct quotes from the respondents were used to validate the findings discussed. The literature from different studies was used to show the similarities and differences between this study and others.



## 5.2. THE DISCUSSION OF THEMES

The themes that were identified in the findings were in accordance with the following research question: What are the factors that influenced physical sciences matric results in a district in the Eastern Cape Province?

To achieve the main purpose of the research, the researcher formulated the following research sub-questions

- i What are the perceptions of principals, teachers and learners regarding the syllabus coverage in the teaching of matric physical sciences?
- ii Which management strategies can be employed by the school principals in facilitating the teaching and learning of matric physical sciences?
- iii What are the experiences and perceptions of principals, teachers and learners regarding the teaching and learning of physical sciences using practical work?
- iv. How do the extra classes and regular assessment impact in learner performance in matric physical sciences?

## 5.3. PERCEPTIONS OF RESPONDENTS BASED ON RESEARCH SUB-QUESTIONS:

**How do the extra classes and regular assessment impact in learner performance in matric physical sciences?**

Hundred percent (100%) of the principals who took part in the interviews unanimously agreed that extra classes were essential and very important for both finishing the syllabus in time, doing practical work and for doing assessment frequently. Out of four principals who were sampled three were interviewed and agreed on the importance of extra classes and the fourth one didn't turn up. Therefore, all the three (100%) of the principals' responses favoured the utilisation of extra classes.

Physical sciences teachers who were interviewed had mixed feelings about the importance of extra classes. Sixty percent (60%) of interviewed teachers were interested in attending the extra classes as they were helpful in achieving their curriculum targets. These targets included the

syllabus coverage, practical work and the regular assessment of learners (both theory and practical tests). One of the teachers witnessed the above statement as he was quoted saying:

*The time allocated to teach physical sciences is very small for the long syllabus but through many efforts like attending extra classes I engage in; I manage to finish syllabus earlier.* [SAL#2]

As much as there were teachers who agreed with the extra classes idea, but, forty percent (40%) of teachers who were feeling that conducting extra classes was the waste of time since they could do everything using the normal tuition time without any difficulty.

Hundred percent (100%) of learners agreed that fully covered syllabus in time helped to boost their interest and eagerness towards preparing for their examinations. The following quotation attests to the above statement:

*Our teacher gives us a list of topics that are going to be done at the beginning of the year, this helps us to know whether the syllabus is finished or not. When it is finished, we are forced to study on our own.* [SDL#1]

#### **5.4. PERCEPTION OF RESPONDENTS WITH REGARD TO SUB-QUESTION: What are the experiences and perceptions of principals, teachers and learners regarding the teaching and learning of physical sciences using practical work?**

The importance of practical work was witnessed by learners from the four different high schools that were interviewed. They said the practical work caught their attention in class and improved their understanding of the concepts being demonstrated. The learning of physical sciences became interesting and enjoyable when the practical lessons were conducted. This was what they had to say when they were interviewed

*Yes, I do engage in practical work activities and they assist me a lot in understanding basic concepts in physical sciences* [SBL#2]

*Wow! it is interesting! Practical work improves understanding on the subject content knowledge.* [SDL#4]

The laboratory atmosphere was exciting and motivating to learners. Because of this relaxed atmosphere, they learned some knowledge and skills unaware. Classroom conditions were annoying to other learners in the absence of practical demonstrations and experiments.

*We get excited with just the entering the laboratory. Using different senses in the laboratory simplifies difficult terms and helps us to remember well during tests and examinations. [SBL#2]*

Teachers had mixed feelings about practical work ranging from the lack of skill of doing it to the high understanding levels displayed by learners who had done practical work.

*The single experiment I conducted covers a lot of content knowledge. After it has been done correctly satisfaction prevails. [SCT#3]*

One of them could not reply whether practical work was essential and important or not, instead he burst with anger because there were no laboratories in most schools. The following were their responses:

*I cannot do some practical work because the equipment and apparatus are not sufficient to conduct the experiment, so, I decided not to start doing them because I will get stuck. [SBT#2]*

All the school principals feel that it helps to conduct practical work for learners because their attitude towards science becomes positive and they seem not to fear Physical science as a subject. This is the principal's quote:

*I always encourage teachers to do practical work tasks by using the little available laboratory equipment because there are schools that do not have any form of laboratory material. [SCP#3]*

Twenty-five percent of teachers did not see the need to conduct practical work while hundred percent of principals agreed unanimously that practical work was essential for effective teaching and learning of matric physical sciences.

Perceptions of respondents about the practical work.

Demonstration of lessons and conduction of experiments formed an integral part of the teaching and learning process in a physical sciences classroom. There was a collective agreement among the respondents that practical work was very significant to make teaching and learning

of physical sciences effective. Principals, teachers and the learners, all agreed to promote the utilisation of practical lessons and demonstration lessons to bridge the gap between theory and practical work.

All the school principals felt that it helped to conduct practical work for learners because their attitude towards science became positive and they seemed not to fear physical science as a subject. This is the principal's quote:

*I always encourage teachers to do practical work tasks by using the little available laboratory equipment because there are schools that do not have any form of laboratory material. [SCP#3]*

One of the principals said in his school they go to an extent of using other funds (left overs) to purchase laboratory equipment. [SAP#2].

The managers who motivated their teachers by buying them laboratory equipment from the little budget they had promoted effective ways of teaching and learning physical sciences.

Teachers had mixed feelings about practical work ranging from the lack of skill of doing it to the high understanding levels displayed by learners who have done practical work.

The single experiment I conducted covered a lot of content knowledge. After it has been done correctly satisfaction prevails. [SCT#3]. This implied that the learners gained in both intellectually (cognitively) and by acquiring practical skills.

The impact of practical work was noticed when learners performed well in their assessment tasks. The learners' reasoning improved after each experiment conducted. [SDT#4]

The quotes by the teachers below backed up the notion that there were a lot of problems that were facing the conduction of practical work in schools. One of them comprising 25% could not reply whether practical work was essential and important or not, instead he busted with anger because there were no laboratories in most schools. The following are their responses:

*I did practical work twenty-five years ago, during my tertiary studies. [SCT#3]*

These teachers were also showing ignorance in doing experiments thus why they spoke of a period of 25 years not doing experiments since their days in the tertiary institutions.

One teacher felt that the practical work had no impact on learning because he has been teaching physical sciences for the past years without a laboratory equipment to perform the experiments, but learners kept on producing good results in the subject. He was quoted as follows:

*Since I arrived in this school nine years ago, I did not conduct a single experiment; there are no apparatus and laboratory. But, I have been producing good results in physical sciences. I cannot do some practical work because the equipment and apparatus are not sufficient to conduct the experiment, so, I decided not to start doing them because I will get stuck. [SBT#2].*

As a researcher, I opposed the above teacher's utterances because learners become frustrated in tertiary institutions when they don't know how to conduct experiments. Learners can pass physical sciences without experiments but they need the skill of doing experiments for their tertiary education.

It is difficult to prepare a practical lesson because of congested classes. It took more than thirty minutes to group learners, arrange them and distributing apparatus [SBT#2]

It was difficult to prepare a practical lesson because of congested classes with limited resources more especially during the tuition time. [SCT #3]

The significance of practical work was perceived by learners from the four different high schools that were interviewed; they said the practical work made learners to concentrate and be attentive in class for teaching and learning to take place. Practical lessons improved their understanding of the concepts being demonstrated. The skills of conducting the experiment was also transferred from a teacher to the learners. The learning of physical sciences became interesting and enjoyable when the practical lessons were conducted. They also confessed that practical work that was done encouraged them to read more and learn physical sciences further to improve their attainment of marks. It could also encourage learners to pursue physical sciences careers This is what they had to say when interviewed:

*Yes, I do engage in practical work activities and they assist me a lot in understanding basic concepts in physical sciences [SBL#2] It is interesting! Practical work improves understanding on the subject content knowledge. [SDL#4]*

The laboratory atmosphere was exciting and motivating to learners. Because of this relaxed atmosphere, they learned some knowledge and skills unaware. Classroom conditions were boring to other learners.

*We get excited with just the entering the laboratory. Using different senses in the laboratory simplifies difficult terms and remember well during tests and examinations. [SBL#2]*

*Practical lessons and simulations make quick understanding, arouse interest and curiosity in learning physical sciences. Classroom conditions are very boring [SDL#4]*

**5.5. PERCEPTIONS OF RESPONDENTS REGARDING SUB-QUESTION:** What are the perceptions of principals, teachers and learners regarding the syllabus coverage in the teaching of matric physical sciences?

All the learners agreed unanimously that if the physical sciences syllabus is finished earlier they can study on their own. They also highlighted that they also appreciate the help from their teachers when teachers revise with them previous years' question papers, motivating the learners and drilling learners on how to answer questions correctly. The following quote ascertains the above statement on the learners' perceptions on syllabus coverage:

*As much as physics is difficult, I try to study both (physics and chemistry) of them equally so that I achieve a better mark, more especially if all the work was covered and thorough revision was done. I usually get good marks in Physics than Chemistry[SAL#3]*

The teachers were divided in their responses concerning the syllabus coverage because different schools have dissimilar cultures of teaching and learning, such that one group finish their syllabus easily using the tuition time and some extra classes. Another group cried foul because of many disruptions occurring in schools almost daily. These disturbances could range from sporting activities, music competition practises, union meetings, workshops, etc.

These are the few quotes from teachers, based on the syllabus coverage theme;

*I don't have any problem in finishing the syllabus earlier than the pacesetter prescribes; I know how important it is to finish the syllabus, because I attend all my periods in each class. I also lookout for unattended periods. [SAT#1]*

Physical sciences syllabus was one of the widest syllabus in matric curriculum; it was made worse by the interruptions mentioned above. Diligence, commitment and dedication were some of the characteristics that were displayed by some teachers to finish the physical sciences syllabus. So, it was very difficult to finish it because time constraints (other time consuming activities like, sport, music, staff meetings and union meetings) affected the tuition time.

*The time allocated to teach physical sciences is very small for its long syllabus but through many efforts like attending extra classes I engage in, I manage to finish syllabus earlier. But, it is very hard. [SBT#2]*

All the school principals (100%) agreed unanimously that it was very imperative for teachers to finish the physical sciences syllabus and revise their work for the learners to improve their performance in the subject. In the supervisors' management strategy, the principals were always concerned about supervising instructional work which also involved the syllabus coverage. They motivated teachers to finish up the physical sciences syllabus in time so that they could be able to revise with learners. The quotes from the principals' interview below are bearing testimony to the above statement.

*The finishing of syllabus in each subject is very important because finished syllabus boosts both the morale and confidence of both learners and teachers. [SAP#1]*

*Any teacher who does not finish the work he/she is supposed to do is committing crime against humanity. Once the learners become aware that the syllabus is not finished they lose hope and fail the subject with a justification that some questions that were asked were not taught at all in their school. [SCP#3]*

Hundred percent (100%) of the respondents saw a great need for the syllabus coverage, hence the teachers who were disturbed by other activities during the year strived hard to finish the syllabus. The reason being that the gesture of finishing the syllabus on its own was the motivation to principals, teachers and learners. It was common with the underperforming schools that they did badly in NSC results if the syllabus was not finished in all or most of the subjects.

**5.6. PERCEPTIONS OF RESPONDENTS REGARDING SUB-QUESTION:** Which management strategies can be employed by the school principals in facilitating the teaching and learning of matric physical sciences?

The principals showed a lot of inconsistency in doing supervision work in their schools. One of the principals indicated that formal class visits were not done; instead informal class visits were done in his school. Informal class visits were characterised by the checking of work coverage (syllabus coverage) preparation books, teacher attendance registers, etc.

The following are the direct quotes from the principals as respondents in an interview.

*We do not necessarily do formal visits by entering the classrooms to supervise, but, we normally check the work coverage, preparation notes and teacher attendance book. [SAP#1]*

*We do not supervise teachers, they are self-motivated. They are diligent enough to do their job. [SAP#1]*

*A minimum of one visit per term is afforded and maintained. Most of the time we are busy doing administrative work and other curriculum related issues. [SBP#2]*

The teachers in this school freely reported that they had never been supervised for quite a long period. In other schools, supervision was not done at all.

*Since I don't have an administration clerk, I perform a lot of administration work. I hardly conduct class observations. I find it very difficult to support teachers. They only attend workshops in the district office. [SAP#1]*

**5.7. PERCEPTIONS OF RESPONDENTS REGARDING THE ASSESSMENT.**

Different groups of respondents that were interviewed agreed unanimously that assessment was the fundamental part of teaching and learning physical sciences successfully. It should be administered regularly through informal, formal tasks and practical tests.



One principal condemned the subjects' policy documents that are silent on the informal tasks that are supposed to be written by learners daily in the so-called critical subjects, like mathematics, physical sciences, to name but a few.

This is what she had to say:

*The department of education has contributed directly to the laziness of teachers and learners by not prescribing the informal assessment tasks in its subject policies, teachers do few or no informal tasks more especially if they are not monitored. [SCP#3]*

On the other hand, there were mixed feelings about assessment plans designed for the FET band. Fifty percent (50%) of teachers felt that there was a vast shortage of assessment tasks per each academic year. The question that was asked to educators was as follows:

**How are the performance levels of a grade 12 learners in physical sciences influenced by regular assessment activities? Explain.**

Teachers responded to the question on assessment in different ways. One teacher was quoted responding to the question as follows:

*Learners do not take the responsibility of studying further the topic I taught. They are brave enough to write tests without revising their work and fail. Performance levels depend on the learners' motivation to follow a career. [SDT#4]*

*My learners are competing among themselves in physical sciences, therefore they do their work voluntarily and excel in their tests. I attribute their seriousness to the way I groom them from grade 10. They don't struggle in improving their performance levels in each term. [SAT#1]*

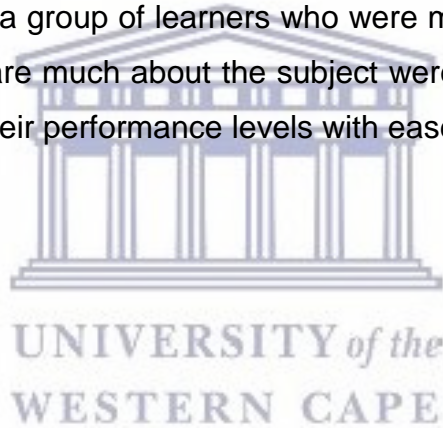
For the question: **with the given current curriculum statement for physical sciences, is the contact time allocated sufficient to complete the syllabus and assess the learners? Any suggestion?**

Physical sciences teachers that were interviewed complained of the long physical sciences syllabus that overlaps to quarterly examinations time. Learners take a long time to understand concepts.

*The contact time is not sufficient to complete the physical sciences syllabus. The utilisation of extra classes become very useful in addressing this situation of contact time and assessment, without it is very difficult to achieve these tasks. Yes, I do manage because of extra classes.*  
[SBT#2]

*The current physical sciences curriculum statement is meant for the ideal situation where everything is perfect. In my school, there are cases where there would be no physical sciences teacher for some months.it is difficult because the learners who proceeded to the next class with content gap should be addressed in matric* [SCT#3]

Teachers' views on assessment diverged because of many factors that influenced the teaching and learning of physical sciences in schools. The researcher was also a physical sciences teacher, so, I fully agree with both groups of teachers, those who said learners did not care about the subject and those who said a group of learners who were motivated enough to study hard. Therefore, those who did not care much about the subject were surely failing while those who were self-motivated improved their performance levels with ease.



The school principals were divided between two opinions. There were those who did supervision in an informal way and those who did not do it at all. It might also be assumed that the school principals that had been doing well in their NSC results were doing their supervision thoroughly. The government provided teachers, HODs and school managers and the non-teaching staff through the Department of Education by filling most of the vacant posts. The school supervision was provided by the education department to schools to monitor, assess improve teaching and learning. The teachers were guided by the departmental officials to perform their duties to achieve the education aims and objectives. For each school to achieve its aims and objectives school supervision should play a pivotal role, it should be done constantly and properly. The teachers became motivated to work harder on their own. The school supervisors should monitor the teaching and learning processes in a way that would also forge good relations with the teachers. The supervisors and the teachers were also advised to share their problems and devise means to solve them. Supervisors were also monitoring teachers' work to develop them and to identify those teachers who were doing their job well be recommended for promotion. However, those who did not master their job should be encouraged to attend relevant workshops to improve those skills lagging with. They might also be advised to attend conferences that would equip them with skills and address their problems. Lastly, the teachers who were still struggling with instructional processes were advised to register and study further to improve teaching skills. Both teachers and learners gained skills and theory of teaching physical sciences effectively where supervision was done. The main aim of doing supervision was to support and develop the teachers than inspecting them. Supervision process also helped in dealing with basic school needs such as the provision, maintenance and placement of both human and non-human materials. Supervisors assessed schools in various fields in a school situation. The supervision process would also be done in the school environment, the resources, the school development, staff development and school instructional materials.

Improper and inadequate supervision had detrimental consequences in the quality of education system. The symptoms of inadequate supervision were the lack of harmony in a school, sour human relations among staff members, no proper maintenance of school infrastructure and there would be no good relations between the school and the community. Furthermore, the lack of

supervision was one of the factors that led to poor performance by learners in schools more especially in NSC results.

In South African education system, the training of supervisors and inspectors was not satisfying, hence, in some schools the supervisors were not trained at all or they did not exist at all. The few that were available were never trained on the skills of supervision and inspection. Staff development suffered because of the inadequate training of supervisors. School principals supervised some school activities by utilising their own experience not through the formal training.

## **5.8. CONCLUSION**

The findings that were identified from the previous chapter were discussed in chapter 5 thoroughly. It was discovered that the respondents either agreed upon the finding or differed it became clear from the discussions that extra classes, syllabus coverage, practical work, assessment and supervision were the factors that influenced the teaching and learning of physical sciences in matric classes. All the factors worked as a unit in improving teaching and learning process. They complemented each other in trying to make the teaching and learning of matric physical sciences effective and meaningful. The respondents' perceptions brought insight into the understanding of education systems. Their debates about the findings added the value and substance in the research study.



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## CHAPTER 6.

### CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

#### 6.1. INTRODUCTION

This chapter presents conclusion, implications and recommendations of the research findings. The study was set to establish the factors that influenced the improvement of matric physical sciences results in four schools in a district in the Eastern Cape Province.

#### 6.2. OVERVIEW OF THE SCOPE OF THE THESIS

##### 6.2.1. Chapter 1: INTRODUCTION

The researcher is a teacher in one of the four high schools in the district that are studied. These high schools were identified because of the gradual improvement in physical sciences matric results. The study is restricted to physical sciences only for the period from 2010 to 2014. The improvement is observed after a long time of underperformance in the subject. The study reflects on the factors that influenced the matric results in physical sciences in four high schools in the district. The study looked back to challenges that caused underperformance particularly in physical sciences in the district, province and the country at large. These challenges are observed in *black* rural schools and township schools. Interventions were made to counteract the shortage of physical sciences teachers. Lack of curriculum management systems in education made matters worse. There were few or no instructional work supervisors to mentor and coach the new teachers and support the old teachers. An increase in the physical sciences fail percentage was observed. Curriculum management workshops were conducted as a turnaround strategy of remedying the failure rate situation in physical sciences more especially in matric learners. Teachers' instructional work was supervised and teachers were supported by both the school managers and the district officials. This led to a slight improvement in lesson delivery methods utilised and assessment techniques employed by physical sciences teachers. To address the research problem, the following research question needed to be answered: What

are the factors that influenced the physical sciences matric results in a district in the Eastern Cape Province?

### **6.2.2. Chapter 2: LITERATURE REVIEW**

The study was underpinned by the reflective practice theory. Several researchers (Boud et al, 1985; Boyd and Fales, 1983; Merizow, 1981; Jarvis 1992) defined reflective practice as the process of learning through know-how and learns from experience towards gaining new understandings of self or practice. This study reflected on the strategies that were used by the four schools in a district to improve the physical sciences matric results. The respondents were using the experience they gained during the intervention programme of changing the physical sciences matric results in the four secondary schools in a district. Larrivee (2000) argues that teachers stay imprisoned in unexamined ruling, explanations and opportunities until teachers develop the practice of serious reflection.

Gibbs (1988), encourages, in his reflective cycle a perfect description of the situation, analysis of feelings, evaluation of experience, analysis to make sense of the experience to scrutinize what you do if the situation arose again. This is a single loop cycle. Quinlan and Akerlind (2000), show the importance of considering the environment within which peer review teaching and collaborative teaching activities are endeavoured. The researcher and one of the teachers in four schools improved their physical sciences results through the utilisation of collaborative teaching.

In this research study the school principals used management and supervision to improve the teaching and learning process, to observe and practise teacher development. Moe (2005), agrees with the above statement that teachers need to expand their knowledge and share good practices, ideas and experience with their fellow colleagues from their schools and neighbouring schools. Green (2005), indicates that principals' managerial skills inform their success or failure in their schools. The reason why schools perform differently lies with the different management styles the principals engage in their schools. Some principals are democratic enough to allow the creativity of teachers to manifest in their schools. Others are autocratic enough to enforce

their plans to teachers, ultimately the working relations become sour characterised by arrogance, enmity and defiance.

### **6.2.3. Chapter 3: METHODOLOGY**

This chapter presents the research design of the study. The study employed qualitative research method with a self-designed semi-structured interview and a reflective journal. Borg and Gall (1987), define the research methodology as a way of disentangling the research problem in a sequential order. It shows a series of steps that were implemented in the study to collect data in an understandably planned mode. Zainal (2003) elaborates that a case study chooses a small geographical area or limited number of individuals as subjects of the study. The study was conducted in a historically underprivileged district, people were experiencing socio-economic problems, multicultural diversity and multilingual dialects are observed. A research population is fundamentally a collection of individuals that take part in a research study. Four senior secondary schools in the district have been consistently producing good results in physical sciences for the period of five years (2010-2014) were purposively selected for the study. Each school had one physical sciences teacher in matric. Three learners from each school were the post-grade 12 learners who passed their matric in 2014 NSC examinations. Four teachers who were selected are qualified to teach physical sciences in matric and have a minimum of five years teaching experience, teaching physical sciences at matric level. Four principals were selected purposefully. Various instruments were used to collect data from different respondents. Data was analysed through the colour coding method, where different themes that emerged were coded with different colours. The data was collected to try to answer the research question and its sub-questions. The interview schedules of different respondents were piloted for clarity purposes and to eliminate ambiguities. In this study the researcher chose to use one-on one semi-structured interviews to collect data from participants. An interview is one of the most reliable instruments to collect information based on facts, feelings, opinions and attitudes of people.

A reflective journal was also used during the interview to get the first-hand information on the proceedings of an interview, observing all actions and reactions of participants.

#### **6.2.4. Chapter 4: RESULTS**

This chapter provides the data collected through the assistance of the research instruments and presents it in the form of tables, graphs and text. The purpose of this chapter was to report about the analysis and interpretations of the data that was collected for this study. The descriptive analysis of data was derived from the transcribed interviews and a reflective journal. The data were grouped and matched based on themes and patterns that emerged through the data analysis process. The identified themes were directly related to the research sub-questions. The teaching and learning strategies that were used to improve physical sciences results were discussed. The teaching and learning strategies were: the extra classes, practical work, syllabus coverage, assessment and supervision. The principals had also utilised the supervision and management to facilitate, monitor teaching and learning, in developing teachers' skills and the implementation of the teaching and learning strategies generally.

The four participating schools' results were displayed in table 8 and compared for the period of 5 years of study. In each strategy, different respondents voiced out their feelings about each teaching and learning strategy while the principals commented about the supervision and management of the strategies. The perceptions and quotations of the respondents per each teaching and learning strategy were employed to make substance of the point that was mentioned.



#### **6.2.5. Chapter 6: DISCUSSION OF FINDINGS**

This section deals with the discussion of the findings. The discussions were based on the data that was collected and analysed. The discussed findings were substantiated by the direct quotes that were taken straight from the participants' perceptions during the interviews. The findings were categorised as the major findings because of different participants raising the same theme repeatedly. Graphs and tables were formed from the analysed qualitative data.

### **6.3. MAJOR FINDINGS OF THE STUDY**

The researcher has identified that there are several factors that contributed to the improvement of Physical Sciences matric results in matric classes in four high schools in a district in the



Eastern Cape Province. Below is a list of the major results of the study based on the research sub-questions:

***Sub-question 1: What were the perceptions of principals, teachers and learners regarding the syllabus coverage in the teaching and learning of physical sciences in matric?***

- The physical sciences syllabus must be finished before learners can start writing their final examinations.
- Finished syllabus is a morale booster for physical sciences matric learners.
- Finishing the physical sciences syllabus in time paves a way for the drilling of learners in answering previous questions.
- To cover the physical sciences earlier gives time for thorough revision.

***Sub-question 2: What were the experiences and perceptions of principals, teachers and learners regarding the teaching and learning of physical sciences using practical work?***

- Physical sciences classes should be kept to a minimum number of learners that will allow for individual interaction with a teacher and easy setting up for practical lessons.
- Knowledge and skills acquired from practical lasts for a long time.
- It is easy to remember and answer questions based on the experiment than
- It was found that better laboratory facilities are essential in a physical sciences class.
- Practical lessons are required to put theory into practice.

***Sub-question 3: How did extra classes and assessment impact in learner performance in matric physical sciences?***

- The study revealed that extra classes are essential to cover up the syllabus, conducting practical work, the administering of practical work and the conduction of practical work tests and provided enough time for the syllabus to be covered.
- The questions in areas such as the impact of extra classes, practical work, assessment, syllabus coverage and the supervision of instructional work.

- Regular assessment in both theory and practical was found to have a positive impact in attaining good marks in physical sciences all the four participating schools in a district.
- If learners are assessed regularly they do not fear writing tests and examinations, such that it becomes easier for them to attain good marks.
- It also improves the SBA marks.

***Sub-question 4: Which management strategies were employed by the school principals in facilitating and supervising teaching and learning strategies of matric physical sciences?***

- The study indicated that due to instructional work supervision the principals and departmental heads teachers worked so hard to improve teaching and learning.
- Instructional work supervision also assisted in developing the teachers.
- Supervision also helped to develop teachers through coaching and mentoring.
- Instructional supervision also assisted teachers to implement new teaching methods, like using audio-visual material, DVDs (Digital Versatile Disks), e-learning technology, teaching aids and telematics.
- The observations show that effective teaching and learning need constant supervision.
- It also assisted new teachers to gain experience in teaching.

#### **6.4. IMPLICATIONS**

The study concluded that extra classes had an impact on the improvement of physical sciences results in matric. The questions have been answered and the analysed data show that;

- Extra classes helped to improve teaching and learning.
- Extra classes give enough time to cover the syllabus in time.
- Extra classes assisted in the assessment of both theory and practical work.
- Extra classes contributed positively in the conduction of practical work.
- Supervision of instructional work has an impact on the teaching and learning.
- Supervision has an impact on the teacher development.
- Supervision has an impact on the mentoring and coaching of newly appointed teachers to gain experience in effective teaching.

- Proper educational knowledge comes from the well-developed teachers.

## **6.5 RECOMMENDATIONS**

The following recommendations were made based on the result of the findings of the research work.

Workshops and conferences on supervision of instructional work should be delivered for the teachers to have existing knowledge that will help them to give their greatest for the new era styles in education. The supervisors should have uninterrupted supervision in public schools.

The Department of Education should use experts in the teacher training activities and it necessitates a lot of fund that should be provided in the training for their development.

The school supervisors need to change the trend of utilising more time on administrative work than the teaching and learning activities.

## **6.6 IMPLICATIONS FOR FUTURE RESEARCH AND PRACTICE FOR TEACHERS.**

The study acted as a first step towards reflective practice and how teachers used reflection for the efforts of improving teaching and learning of physical sciences. The findings from this research study suggested that physical sciences teachers reflect on the best practices they performed and how they developed their teaching and reflective practice. The findings can be used to introduce new teaching strategies for teachers. It is discovered from the results that most supervisors do not supervise instructional work but, they rather do informal supervision. Supervisors should also act as facilitators in teacher development.

## **6.7. CONCLUSION**

The study presented the factors that contributed positively in the improvement of physical sciences results in the four schools in the district were the extra classes, syllabus coverage, practical work, assessment and supervision. Learners who covered physical sciences syllabus, had better chances to perform well than those who couldn't complete the syllabus. Those who covered the syllabus earlier in the year and spent more time on revision had a best performance

percentage of attainment in physical sciences than those who finished it just before the trial examinations.



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## APPENDICES

### Appendix A: INTERVIEW SCHEDULE FOR THE PRINCIPAL

SCHOOL NAME..... SURNAME AND INITIAL.....

YEARS IN TEACHING..... YEARS AS A PRINCIPAL.....

HIGHEST QUALIFICATION.....

1. Learners have been underperforming in physical Science in this school. Which teaching strategies do you think have made an improvement in the subject?
2. Which programs have led to improvement in Physical Sciences attainment in grade 12?
3. Which disciplinary measures do you take as a school manager to motivate and enforce punctuality and regular attendance by grade 12 learners during extra classes?
4. In your opinion, what role can be played by practical work in improving performance in Physical Sciences?
5. Are there any suggestions that you can make to the District department of education Physical Science officials to uplift the school results in physical sciences in your district?
6. Looking at assessment plans being utilized in schools that are provided by subject policies, do you think they are enough to prepare learners for their final examinations?
7. How often do you visit classes to check teachers in class teaching?
8. which strategies do you employ to improve teacher development?
9. As a manager in a school, do you think is it necessary to supervise teachers even if they are experienced in teaching and have good qualifications?

## Appendix B: INTERVIEW SCHEDULE FOR EDUCATORS

SCHOOL NAME..... NAME AND  
INITIALS.....  
YEARS IN TEACHING..... HIGHEST  
QUALIFICATION.....

1. As an educator of Physical Science, what are the major problems that you face when it comes to teaching the subject?
2. Does the availability of resources affect your teaching strategies used? Explain
3. How often do you do practical lessons?
4. Do you experience problems when it comes to conducting practical lessons? Explain
5. What impact do practical lessons have towards learning physical Sciences?
6. Are you confident when it comes to doing practical lessons and practical tests of Physical Sciences?
7. Do learners find it helpful to attend morning, afternoon, evening and Saturday classes to learn Physical Sciences? Explain
8. Do learners see the importance of writing tests in both theory and practical work? Does this have a direct impact in improving marks in Physical Sciences?
9. From your observation as an educator, does the socio-economic status of a learner affect his/her performance in Physical sciences? Explain
10. How are the performance levels of a grade 12 learners in Physical Sciences influenced by regular assessment activities? Explain
11. With the given grade 12 curriculum statement for Physical Sciences, is the contact time allocated sufficient to complete the syllabus and assess learners? Any suggestions?
12. In your opinion, what should be done to help improve the pass rate of Physical Sciences in your school?
13. can you remind us of the moments you shared with your supervisor during the class visits?

## Appendix C: INTERVIEW SCHEDULE FOR THE LEARNERS

SCHOOL NAME..... NAME..... LEARNER'S NAME..... GENDER.....AGE.....

1. How were you doing in physical sciences before the extra classes were started in a subject?
2. If you were not doing well, what is it that you did to perform well?
3. Did you sometimes have a negative attitude towards physical sciences class? YES / NO. What were the reasons for that attitude?
4. How did you experience science lessons generally?
5. How confident are you in dealing with physical sciences as a subject? Why have you answered this way?
6. How did you find physical sciences learning? Explain your answer.
7. How did your teachers make physical sciences classes more interesting?
8. Did you feel it is important for you to be assessed frequently in both theory and practical work? Explain.
9. Do you think it is necessary for learners to attend extra classes (morning, afternoon, weekend, evening and vacation classes)?
10. Why is it important to finish physical sciences syllabus in time?
11. How does the practical work enhance teaching and learning?

## **APPENDIX I: THE REFLECTIVE JOURNAL**

This instrument comprises of guiding questions in reflecting about the participants in the research study.

### **LEARNERS' REFLECTIVE JOURNAL QUESTIONS**

What do you enjoy about the physical sciences teaching and learning?

Name three words to describe your teacher's personality in relation to the teaching process.

How has your teacher changed since the inception of the intervention strategies?

What are the challenges in your physical sciences teaching and learning?

If a new learner has arrived in your class would you encourage him/her to join your physical sciences lessons?

How would you describe your class to that person?

### **TEACHERS' REFLECTIVE JOURNAL QUESTIONS**

What do you recall as the major event (highlight) of the physical sciences lesson?

What were your strongest impressions of the physical sciences lesson?

What are your most positive teaching moments of the day? (for your learners, learners and colleagues)

What were the most difficult moments of the day? Reflecting on them would you handle them differently in the future?

Write down some thoughts you have about a learner/learner you have in your class.

What will be a focus for you for tomorrow? (personally, and professionally).

Do you have any final reflections about today teaching and learning strategies?

### **PRINCIPALS' REFLECTIVE JOURNAL QUESTIONS**

What did I do?

Why did do it?

How can I do it better?



**Appendix D: PERMISSION LETTER TO THE SCHOOL PRINCIPAL**

150139 BADIBANISE STREET

P.O. BOX 68090

MOUNT FRERE

5090

01 MAY 2016

THE PRINCIPAL AND SCHOOL MANAGEMENT

RODE SSS

MOUNT FRERE

5090

DEAR SIR/MADAM

REQUEST FOR PERMISSION TO CONDUCT A RESEARCH STUDY

I hereby humbly beg to request from you and your management team to conduct a research study. I am a M.Ed. student at the University of Western Cape. In addition, I would like to be granted permission to use the available relevant facilities to conduct my study.

I will be glad if I can be granted permission between the 01 May 2016 and 31 May 2016 from 14 H 00 to 15 H 00. Thanking you in advance hoping that my request will receive your utmost attention and the confirmation of the granting of request will be highly appreciated.

Yours faithfully

Ndokwana VW

(Contact details) 0839796967

vndokwana@gmail.com

**Appendix E: PERMISSION LETTER TO THE PARENTS**

150139 Badibanise street

P.O. BOX 68090

MOUNT FRERE

5090

01 MAY 2016

TO WHOM IT MAY CONCERN

Dear parent

I am a M.Ed. student at the University of Western Cape, who is currently involved in a research study and would like to use post- grade 12 physical sciences learners in 4 schools in the district to conduct the research study.

This will involve semi-structured interviews to collect data from them. This will the school and learners in the process and the outcome will benefit the school and learners.

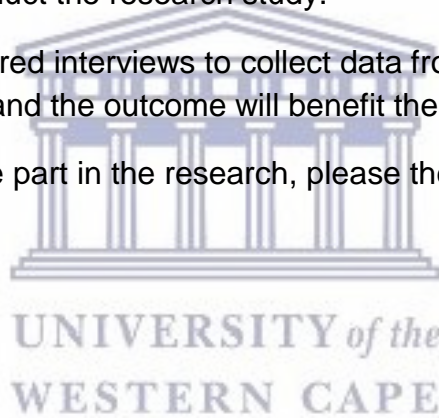
If you allow your child to take part in the research, please the return slip below signed.

Thank you

Yours sincerely

Ndokwana VW

0839796967



I .....hereby give consent that my child.....can be included in the research study and I also take note of the fact that it will not harm or disadvantage him or her during and after the study.

Signed..... Date.....

## Appendix F: Permission letter to the University of Western Cape

150139 Badibanise location

P.O. Box 68090

Mount Frere

5090

01 MAY 2016

The University of Western Cape

Bellville

Cape Town

7493

Re: Permission to conduct Research Project

I, Mr. Ndokwana Vusumzi, a post-graduate at the University of Western Cape, hereby request permission to interview and administer a reflective journal to a sample of 4 school principals, 4 educators teaching grade 12 Physical Sciences from 4 schools 8 post- grade 12 learners who were doing grade 12 in 4 participating high schools.

The identities of the participating respondents will be kept private while the findings of the study will be disseminated to the management of each school and the Eastern Cape Department of Education in both hard and soft copies.

Confidentiality is guaranteed and no harm to participants in the research will be mentioned. I will ensure that there will be no class interference and disruptions during teaching time.

I hope my request will receive your utmost attention.

Yours in Education

Ndokwana V

0839796967

Appendix G: Permission letters to the teachers

150139 Badibanise location

P.O. Box 68090

Mount Frere

5090

01 May 2016

TO WHOM IT MAY CONCERN

Dear sir / madam

I Mr. Ndokwana V a post graduate student at the University of Western Cape hereby asks for permission to interview you in my research project to gain insights in strategies you utilized to achieve effective teaching and learning that contributed to your improved physical science results. I intend to conduct interviews in a neutral venue. Between the first week and last week of May 2016.

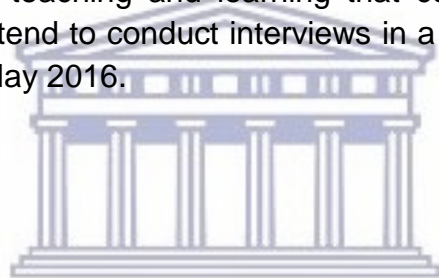
Thank you

Yours sincerely

Ndokwana V.W.

0839796967

vndokwana@gmail.com



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## Appendix H: Letter to the University of Western Cape Ethics Committee

150139 BADIBANISE LOCATION

P.O.BOX 68090

MOUNT FRERE

5090

04 April 2016

THE CHAIRPERSON- ETHICS COMMITTEE

UNIVERSITY OF WESTERN CAPE

BELLVILLE

CAPE TOWN

7493

Dear Sir/Madam

Re-Permission to conduct research

A post graduate student at the University of the Western Cape, humbly request permission to interview and administer a research study to a sample of 8 post- grade 12 physical sciences learners of 4 schools in a district in the Eastern Cape on the implementation of the reflective practice that led to the improvement of physical sciences matric results.

The identities of the participating school and learners will remain private while the findings of the study will be disseminated to the management of each institution and the Eastern Cape Education Department in a hard copy and an electronic copy format. I will ensure that there will be no disruptions or interference during tuition time during the school day. The participation of respondents is voluntary; everyone is free to withdraw if s/he feels uncomfortable and unwilling to participate any further.

Looking forward to a favourable response.

Thank you

Yours sincerely

Ndokwana V.W.

sirndoks@ymail.com

vndokwana@gmail.com