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An exploratory study of instructional leadership practices within data driven schools: a case study of two Gauteng schools

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JOHANNESBURG

FACULTY OF HUMANITIES

An Exploratory Study of Instructional Leadership Practices within Data Driven Schools: A Case Study of Two Gauteng Schools.

BY

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(216116)

A research report submitted to the School of Education, Faculty of Humanities, University of the Witwatersrand in fulfilment of the requirements of the degree of Master of Education.

Supervisor: Dr Geeta Motilal

AUGUST 2020

DECLARATION

I declare that this research report is my own unaided work. It is submitted for the degree of Master of Education at the University of Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination to any other University.



……..

Charles Tshepo Motshaisa

August 2020

SUPERVISOR'S STATEMENT

This research report has been submitted with/ without my approval

G.Motilal

…….

Dr. Geeta Motilal (Supervisor)

August 2020

DEDICATION

This research study IS dedicated to my mother, Mrs Namolela Maria Motshaisa, my late father, Mr. Jan Sisoro Motshaisa, my brother, Mr. Moses Mpuraka “Jackie” Motshaisa, and my in-laws, Mr. Lucas and Mrs. Rachel Masango, all of whom have touched my life greatly. You have been a model of what constitutes hard work and dependability. Your wise counsel kept me going through my toughest days. To my queen wife, Mrs Ditabe “Sweety” Motshaisa, who have been my rock and pillar of strength throughout. You sacrificed so much towards my academic success and words cannot express how grateful I am. Your enduring love, devoted prayers and unwavering support sustained me through the course of my scholastic journey. I am forever indebted to you. My love for you is always guaranteed. To my two lovely sons, Mr. Tiisetso “Mr. T” Motshaisa and Mr. Lesego “LSG” Motshaisa, you guys rock! Thank you for showing so much interest in my studies, for the encouragement and support. Although both of you have walked the academic path, there are still more rivers to cross and mountains to climb ahead of you. Love, Peace and Happiness to you all.

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ABSTRACT

This is an exploratory study for understanding instructional leadership practices of school leaders enmeshed in data-based decision-making towards the implementation of effective teaching and learning. In view of low student academic achievements by South African students, the study examined the extent to which instructional leaders intensified school improvement efforts through Data-Driven Decision Making (DDM) to support instruction. This study is a qualitative, interpretive, case study conceptualised from Hallinger's (2003) Instructional Leadership Framework, Reeves' (2004) Antecedents of Effective Data Use Conceptual Framework and Framework for Data Driven Instruction by Light, Wexler and Heinze (2004). The theoretical frameworks served as conceptual and analytical lenses for gaining deeper insights into the shared leadership approaches of data informed Principals and the School Management Teams (SMTs) in schools. The study further investigated teachers' data use capabilities and support. The study used the grounded theory methodology for confirming established theoretical constructs around data driven instructional leadership practices of school leaders rather than for conceptual development. Five participants were sampled for this study; two Principals, two Heads of Department (HODs) and one Senior Education Specialist referred to as the District Official. The two case study schools were selected because they were among the most recognisable users of educational data in the District of Ekurhuleni North. The selection of the District Official, Principals and HODs considered diversity of management levels and experience in leading student academic improvement efforts from entirely various levels of the instructional system. Findings in this study, showed that principals and School Management Teams (SMTs) exhibited leadership traits that promoted a culture data use to support teaching and learning. However, teachers' effective data use was affected by lack of access to data management tools and consistent development and support. Further studies need to explore a wide variety of schools from different contexts (township, farm or rural and town schools) and school levels (primary and secondary schools). Additionally, different types of research participants (principals, HODs, teachers, policy makers, national, provincials, district officials, students, and parents) must be considered as the people who are expected to lead schools' efforts to increase student performance.

Keywords: Data-driven decision making, Instructional Leadership, School Management Teams, Student academic performance

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LIST OF ACRONYMS

DBDM- Data-based Decision Making

DBE- Department of Basic Education

DDD- Data Driven District dashboard

DDDM- Data-driven decision making

DDI- Data Driven Instruction

GWMES- Government-wide Monitoring and Evaluation System

IQMS- Integrated Quality Management System

NDP- National Development Plan

NSC- National Senior Certificate

PIMRS- Principal Instructional Management Rating Scale

PISA- Programme for International Student Assessment

SACMEQ- Southern and Eastern Africa Consortium for Monitoring Educational Quality

SA-SAMS- South African School Administration Management System

SASP- South African Standards for Principalship

SMT- School Management Team

TQM- Total Quality Management

UNESCO- United Nations Educational Scientific and Cultural Organisation

WSE- Whole School Evaluation

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CHAPTER 1 INTRODUCTION TO THE STUDY

1.1 Introduction and Background to the study

Governments have the responsibility of providing equitable and quality education to citizens. To achieve this ideal, many countries spent a greater proportion of their fiscus on education. Through research and innovation education ministries adopt novel ways of improving student academic success. The most effective measure of academic progress is done through assessing and testing students. Assessment-based forms of student learning are common internationally with no exception to South Africa (SA). Like many other international communities, SA measures the quality of its education against its counterparts through international benchmarking tests. In relation to other SADC countries like Mozambique, Kenya and Tanzania, recent widely recognised international benchmarking tests bodies ranked SA the lowest in student performance. Nevertheless, SA continues to learn and improve from these shortcomings. Major education reforms since the birth of democratic SA in 1994, proved how committed the education ministry was towards providing equitable and quality of education for all its citizens.

The pressure to improve student academic achievement was not felt by policy makers only, but at school level school leaders were also felt the pressure to raise student attainments. That resulted into the Department of Education introducing schools to data-driven models of improving teaching and learning such as the Data Driven District dashboard and the SA-SAMS. The Data-driven decision making (DDDM) or Data-Based Decision Making (DBDM) is a well-researched and scientifically proven approach for guiding instructional decisions of managers and teachers to mitigate against low student academic gains. Well-established literature reviewed in this area of research supported claims that purposive use of analysed educational data increased student attainment. In this context, quality and accountability were two most common concepts driving continuous school improvement efforts.

The United Nations Educational, Scientific and Cultural Organisation's (UNESCO's) 2017/18 Global Education Monitoring Report, together with numerous other researchers, agreed that external accountability regimes characterise education reforms globally. Accountability driven regimes formed the hallmark of education systems in countries such as England (Earl & Katz, 2006), Australia (Turner, Scoular, & Vista, 2018), Mongolia (Terbish, Baljinnyam, & Care, 2018), Nepal (Acharya & Vista, 2019) and South Africa (Weber, 2005) for many years. On one hand, system-wide standards-based testing and assessments of students were linked with

state accountability mandates. (Lee, Walker, & Ling Chui, 2012; Weber, 2005). On the other hand, the application of accountability regulations manifested themselves into performance management processes known as monitoring and evaluation, quality assurance, performance measurement or competence (Weber, 2005; UNESCO, 2017). Based on the outcomes of schools' performance measurements processes of this nature, schools were either punished or rewarded based on their student academic performances (Bernhardt, 2005).

Noteworthy is the fact that, although accountability linked regulations re-emerged strongly in the last few years, however they were not a new phenomenon in education. In fact, their footprints could be traced back to the early1980s up to the late 1990s in the United States of America (USA) (Jones & Kennedy, 2015) wherein the introduction of the Total Quality Management (TQM) system signalled new forms of quality management through educational reform policies (Hallinger & Wang, 2015; Jones & Kennedy, 2015; Louis & Robinson, 2012; Young & Kim, 2010).

Furthermore, as Hallinger and Wang (2015) illustrated, accountability driven mandates emerged more intensely in the 1990s when the new public management framework surfaced in the United Kingdom, before spreading across the rest of the world. Most recently, the USA's accountability linked reforms were escalated with the enactment of several key transformative regulations, some of which include the *No Child Left Behind Act* of 2001 and the *Race to the Top Act* of 2005 (Bernhardt, 2005). The introduction of such measures further signalled the federal government's intentions of intensifying system-wide continuous school improvement (Abrevaya & White, 2009; Blink, 2007).

Nationally, South Africa's accountability-enmeshed educational reform policies became highly visible around the year 2003 (Weber, 2005). Weber (2005) surmised that policies such as the Integrated Quality Management System (IQMS) and the Whole School Evaluation (WSE) presented at that time were aimed at enhancing schools' academic success. Lately, accountability of school principals was articulated and emphasised in the National Development Plan (NDP) and the national policy on South African Standards for Principalship (SASP) which reiterated the need for principals to take full responsibility for student attainment (National Planning Commission, 2012; Department of Basic Education, 2015).

The development of such policies gained traction in the midst of South Africa's low student attainment evident in the international benchmarking tests namely the Programme for International Student Assessment (PISA) and the Southern and Eastern Africa Consortium for

Monitoring Educational Quality (SACMEQ) (Spaull, 2013). Inevitably, policy makers had no choice but to mitigate the identified student achievement gaps reflected in under-performance throughout the public education system. Therefore, instructional leaders, as principals are known, together with other key role players in education, were persuaded to adopt evidence-based or data-driven approaches towards raising student outcomes (Lee et al., 2012; Louis & Robinson, 2012; UNESCO, 2017). By urging instructional leaders to explore new ways of thinking about data as an enabler for student success, it was based on research findings proving that meaningful use of analysed data unlocked student achievement potential (Bambrick-Santoyo, Bernhardt, 2005; Earl & Katz, 2006; Levin & Datnow, 2012; Mandinach & Gummer, 2016; O'Neal, 2012). Bernhardt (2005) pointed out at the importance of instructional leaders having to embrace Data-driven decision making (DDDM) instructional models if they are implemented within structured collaborative data inquiry frameworks towards increasing student success.

Ideally, within a collaborative data inquiry arrangement of this nature, instructional leaders were expected to work together with the school's data structures comprising a diverse mix of professionals which could include management teams, teachers, IT personnel and designated administrative staff (Boudett, City & Murnane, 2013; Levin & Datnow, 2012; O'Neal, 2012). This kind of collaborative process was recommended because it harnessed the collective intellectual capital inside the school towards much needed change in classroom learning.

By adopting the suggested approach, this meant that teaching professionals would work co-operatively in analysing data systematically, thus measuring student academic progress while identifying their learning needs (Bernhardt, 2005). In the course of sorting and disaggregating, analysing and interpreting the data, teachers would be better positioned to know whether educational goals had been achieved or not (Boudett et al., 2013). By making this a continuous data inquiry in which the majority of teachers also participated would most likely result in meaningful gains in teaching and learning (Bernhardt, 2005; Senge, 1990).

To this end, instructional leadership's perspective on using student achievement data changes from merely analysing data for accountability sake to reflectingly deeply on data as valuable information for guiding decisions towards transforming student learning (Bianco, 2010). This implies that purposefully structured schools' data inquiry processes, characterised by rigour and purpose, can enrich teaching and learning (Earl & Katz, 2006). In these contexts, data are investigated carefully to uncover the underlying information represented in student biographic

data, attendance data, patterns and trends of achievement, achievement gaps and educational needs. Based on this variety of data sets, informed decisions may be made towards ameliorating recognised student achievement gaps (Boudett et al., 2013).

It is the responsibility of instructional leaders to lead and guide their data leadership teams in meaningfully engaging with numerous data sets to make informed instructional decisions. Moreover, research studies found that instructional leadership practices focussed on Data-driven decision making count amongst the most productive competencies exhibited by principals of high performing schools (Bernhardt, 2005; Blink, 2007; Light, Honey, & Mandinach, 2006). Evidently, this was an indication that data-driven practices that are actively led by the data proficient principals, contribute positively towards school-wide improvement. In effect, instructional leaders play an influential role in inspiring change reflected in school-wide purposeful data actions towards differentiated teaching practices that enrich students' learning experiences (Mandinach & Gummer, 2016).

However, the dearth of data literacy skills among a high number of school leaders and teachers alike proved counter-productive and required a more meaningful system-wide data literacy policy strategy (Anderson, Leithwood, & Strauss, 2010; Blink, 2007; Botha, 2015; Boudett, City, & Murnane, 2006; Marishane, 2015; Wayman, Cho, Jimerson, & Spikes, 2012). In support of this view, Bernhardt (2005) argued that instead of schools engaging with data for improving instruction, many schools simply collected analysed data as compliance to education ministry mandates. In the same breath, Wayman et al. (2012), Levin and Datnow (2012) and Kanjee and Moloi (2014) all agreed, by stating that this occurred largely because schools lacked the capacity to use data constructively for instructional purpose.

Nevertheless, school leaders are constantly implored to engage with and acclimatise themselves with data tools or data management systems such as the DDD and SA-SAMS as a way of learning about how data can be used to optimise gains in student achievements as proposed by the Department of Basic Education. This is because Bernhardt (2005) found that teachers' proficiency in data use is far less meaningful than guiding instructional decisions. Again, it was found that mostly schools compile statistical data not because it adds value to the school system, but because of the state's accountability mandates (Light et al., 2006).

Ideally, it is expected of the Department of Education to co-ordinate and facilitate data professional development programmes to build the capacity of instructional leaders and teachers in the use of data (O'Neal, 2012; Bambrick-Santoyo, 2010). Empowering teachers

with data analysis skills while engaging them in school-based data discussions will ensure that data, in the hands of a well-informed and skilful teachers, become the most powerful information for bringing about meaningful change in classrooms (Bernhardt, 2005; Boudett et al., 2013).

In light of this introduction to the study, backed up by extensive work of data theorists, it has been shown that data driven instructional leadership practices of principals possess the potential for schools' overall academic success. A case study approach frames this study that focused on examining the instructional leaderships' roles within the two data immersive accountability-oriented Gauteng secondary school contexts.

1.2 Problem Statement

The main area of focus for the instructionally oriented school principal is the creation of an enabling and supportive environment towards enhanced teaching and learning (Bush, 2013; Heck & Hallinger, 2009). To solidify this argument, empirical evidence points to high student-performance being associated with data driven instructionally inclined instructional leadership approaches resulting from high accountability regimes in education (Boudett et al., 2013). In these contexts, data driven instructional leadership is respected for having deeper insights and understanding of the benefits of data for improving teaching and learning (Bernhardt, 2005). Similarly, Blink (2007) pointed out that instructional leadership and management becomes actively involved in leading change through meaningful data use. Moreover, Light et al. (2006) illustrated this point by stating that instructional decisions, based on data, have a positive impact on student academic progress.

It is for these reasons that it becomes necessary for instructional leadership to assume a facilitation and co-ordination role in establishing a data driven culture within the school towards the enhancement of pedagogic practice for enriching student learning. Essentially, teachers must be guided towards balancing between setting high quality assessments as these are relative to high student academic achievements, and properly analysing data from these assessments to reflect on their own practice while unearthing students' learning gaps (Earl & Katz, 2006; Kanjee & Moloi, 2014).

It is important within this collaborative shared learning frame of reference to ensure that formative assessment data are contrasted with summative assessment data to show a distinction between the two as it pertains to student learning (Mandinach & Gummer, 2016). On one hand, the formative assessment data may be thought of as information for understanding short term

academic gains of the student, at which point teachers may be required to reflect on to make necessary interventions (McLeod, 2005). However, a teacher will need more than one assessment to measure student progress as a single assessment will not give the most accurate picture of student learning needs (McLeod, 2005). On the other hand, analysed summative assessment data from tests and formal assessments reveal medium to long term academic achievements of the students towards meeting set educational goals and outcomes. However, data from end of the term or year test scores will not help the teachers and students much because by then it is already too late to consider remediation (McLeod, 2005). So, this means that data inquiry in schools must be undertaken continuously, regularly, and purposively throughout the continuum of student learning experience.

In context, student performance data are not the most reliable measurement of students' academic progress as they are based on short term gains as opposed to student achievement data taken for work that covers a wide range of knowledge and skills over a longer period (McLeod. 2005). Therefore, formal or summative assessments, including high stakes Grade 12 examinations, are essentially reliable measurements of student achievements and not performance driven tests. However, summative assessments' limitation is that these are not useful for identifying student-learning gaps (Department of Education, 2013).

Ultimately, through fostering a data culture, leading, and monitoring data practices within the school, principals can evaluate strengths and weaknesses in instructional practices. Following this course of action enables principals to make data-informed decisions in guiding interventions for supporting teachers and students in strengthening the quality of student achievements (Levin & Datnow, 2012; Mandinach & Gummer, 2016).

Fundamentally, instructional leaders need to exhibit practices, habits of mind and behaviours that influence the school culture towards undertaking a systematic, rigorous cycle of data gathering, analysis, interpretation, presentation and action taking for academic improvement (Boudett et al., 2013; Earl & Katz, 2006). However, as research findings shown in many schools' data are analysed mostly for accountability purpose instead of using analysed data towards positively influencing student learning (Marishane, 2015).

Once data from the schools has reached the designated departmental office of the Department of Education, data goes through a process of consolidation, verification, and validation before it is shared with relevant stakeholders (Bernhardt, 2005). Ideally, information contained in

generated reports about schools' analysed data are shared among various heads of directorates or units of the Department of Education, as well as school principals, teachers, and parents.

For the purpose of understanding data-based instructional practices of instructional leadership several questions have been posed.

1. Are schools provided with any feedback based on their submitted data or receive support for using data for instructional purpose or not? This is an area for investigation.

2. Do instructional leadership and management meaningfully lead and guide constructive engagements in which students' assessment and performance data are appropriately analysed and interpreted to gain insights into what is happening in the classroom? It is not very apparent and further inquiry through this study sought to reveal if instructional leadership does indeed lead data processes within the school.

3. Are decisions taken about learning improvement strategies are based on what students' achievement data revealed about teaching and learning in the classroom? It is not known at this stage and that necessitates this research study.

Research data indicate that collected students' achievement data are analysed and presented merely to comply with departmental requirements rather than for evaluating teaching and learning and for making decisions that enhance students' attainment at a level that is congruent to national standards (Blink, 2014; Marishane, 2015). A broad body of evidence indicates that in many educational contexts, this has been found to be the case. In this context, Blink (2007) noted that difficulties in schools centre on the inability of instructional leadership to make appropriate use of students' achievement data for decision making in ways that support teaching and learning, even though student achievement data are:

a) Significant indicators of students' academic attainment.
b) Pointers of potential weaknesses of pedagogic practices.
c) Highlighters of student's achievement gaps.

As such, instructional leadership and management in schools have a responsibility to impress upon their staff the value of using not only analysed student assessment data but different data sets as these are evidence enough for gaining understanding about teachers' practices and student learning (Boudett et al., 2013). From that thinking, it is evident that when various educational data are leveraged and used purposively, they can potentially increase student academic gains in many underperforming schools. Essentially, this calls for a re-think in the

way school leaders view and interact with data management systems or tools such as the Data Driven District Driven dashboard and the SA-SAMS of the Department of Basic Education (DBE), as these are essential data sources for informing schools about the state of their schools while providing principals with critical information about their schools (Department of Basic Education, 2012).

It is a requirement from the Department of Education that formal or systemic assessments' statistics or data must be aggregated, and generated reports submitted at specific scheduled times to the Department of Education (Department of Basic Education, 2012). Once the information from all the schools has reached the designated office, data goes through a process of collating, analysing and interpreting, ultimately leading to feedback being required to assist in decision making of the state of teaching and learning in schools. Ideally, generated reports on schools' analysed data must be shared with schools. However, whether schools do receive feedback from the Department of Education on analysed data or not, needs to be investigated. Whether instructional leadership and management engages with students' achievement data on site thereby make sense of instruction in the classroom is not known at this stage and requires further investigation.

Undeniably, instructional leadership is under tremendous pressure from state education departments to improve student outcomes. Consequently, increased levels of data linked accountability among school principals define their leadership roles. As such, student achievement data becomes a key to turning around under-performance in their schools. Essentially, there needs to be a mind shift from conventional ways of improving student success to relying on effective data-based approaches towards impacting instruction in these institutions.

1.3 Rationale for the study

School improvement reforms of the past two decades have been permeated by numerous governments initiated legislative instruments, for ensuring that, school leaders report student performances to stakeholders and account to authorities (Bernhardt, 2005; Lee et al., 2012). To ensure adequate resourcing of schools towards effective functioning, governments continue to spend a greater proportion of their national budgets on education (Rabovsky, 2012). To a greater extent, unacceptably low student academic achievements documented in widely recognised international benchmarking tests and national assessments scores, reflect a deep contrast to the reciprocity (Spaull, 2013) that is expected by policy makers.

Ultimately, due to mounting pressure to bring about meaningful instructional change in schools; managers of effective curriculum implementation as principals and the SMTs are known for, turned their focus towards unconventional methods to raise student outcomes (Lange, Range & Welsh, 2012). Such radical shift in instructional focus reverberated well with what major researchers in the school effectiveness domain pointed out in relation to effective school leaders' ability to indirectly yet positively influence student learning (Hallinger, 2003). In this context, school leaders demonstrate traits and habits that are distinguishable by their ability to bring effective instructional change through innovate approach towards creating opportunities for all students to succeed academically.

Accordingly, many principals supported by credible research work in the field of data-driven instructional leadership showed interest in data or evidence-based forms of reflecting on teachers' pedagogic practices while at the same time making data-informed instructional decisions to enrich student learning experiences (Bernhardt, 2003; Earl & Katz, 2006; Levin & Datnow, 2012). Numerous studies on Data-driven decision making (DDDM) as a system for using analysed data to enrich and support student learning supports a view on school leaders' ability to create conditions that are conducive for enhancing data capabilities of teachers as pivotal towards increasing student attainment (Levin & Datnow, 2012). One such study is that of Wayman (2005) in which the role of school leaders in establishing schools' data culture was investigated. Wayman (2005) found that where the schools' data culture had clear links with student achievement goals, teachers' adoption was significant. Likewise, Earl and Katz's (2006) claimed that school leadership's ability to establish and lead data inquiry structures consisting of collaborative teams, contribute towards enhanced purposive use of data towards informing instructional decisions.

Notwithstanding the fact that capable school leaderships' efforts for enabling data use for teaching and learning contribute towards enriched student learning, however many barriers to purposive use of analysed data still exist among many education professionals (Earl & Katz, 2006). In support of this idea, Levin and Datnow (2012) suggested, that access to data served as one of the many barriers that teachers are grappling with in their daily struggles with data. Similarly, Mandinach and Gummer (2016) opined that incapability of school leaders, teachers, and departmental officials to analyse, interpret and use data to impact learning resulted from lack of frequent and enough capacity building initiatives.

It must be noted that little is known about the impact the leadership roles of district, principals and HODs have on student learning through data use given that all these interlinking roles are practiced at different levels of the instructional system. Reviewed literature around data-driven instructional leadership showed little international evidence and no local evidence of studies where three different yet interlinked collaborative instructional leadership and management roles were studied simultaneously. Many other research studies about school leaders' roles in establishing a culture of data-informed decision making focused only on the principal's instructional leadership role in leading a data culture with a school (Marishane, 2015). Furthermore, Lange et al. (2019) examined the practice of school leaders in creating conditions for enabling teachers' data use for effective teaching. Many other studies on data-based decision-making practices of school leaders will be explored in detail in the literature section of this study.

Given all the scenarios alluded to earlier, the study sought to investigate the data-informed leadership practices of school leaders and district official in transforming and supporting schools' data-informed improvement efforts within an aligned and collaborative framework.

It is envisaged that findings from this study will highlight data use capabilities and constraints experienced by school leaderships, teachers and district official as the entire schooling system continuum is grappling with low student academic success.

The contribution of this study to my professional development as a department of education official currently managing district-wide innovative technology-based teaching and learning programmes is immense and more so as I pursue a career in managing school leaders towards whole school development and support.

1.4 Significance of the study

Instructionally-inclined forms of leadership recently gained more global recognition within educational contexts that are mainly characterised with high accountability, standards aligned national assessments that are reliant on performance measurement data to evaluate both the student outcomes and school performance (Earl & Katz, 2006; Lee, et al., 2012). In the wake of accountability embedded educational reforms of this nature, it becomes increasingly necessary for school principals to leverage educational data to improve instruction and thereby raise student performance (Bernhardt, 2005; Blink, 2007).

Several legislations emphasise accountability on the part of school principals' leadership and management roles and describe their relationship with student performance (Department of Basic Education, 2015; UNESCO, 2017; National Planning Commission, 2012). To this end, Data-driven decision making (DDDM) as a strategy for making informed instructional decisions about student learning hold much promise for instructional leadership's efforts of improving student outcomes (Halverson, Grigg, Prichett, & Thomas, 2007; Levin & Datnow, 2012; O'Neal, 2012).

A considerable body of research reveals that instructional action guided by data-based decision making becomes effective in schools with school principals who model data use to support instruction (O'Neal, 2012). Findings from a study by Wayman (2005) conducted among USA school leaders demonstrated that principals' leadership role was instrumental in establishing a data culture within the school. Similarly, Young (2006) examined four USA schools in two districts and found that by aligning data with clearly set goals principals were able to foster effective data use amongst teachers. Likewise, Boudett et al. (2013) found that school leaders managing schools with high student success rates took data-informed instructional decisions for maintaining their student success rates.

Meanwhile, locally Marishane (2015), studied the data practices of principals in South African primary schools, Botha (2015) investigated the use of assessment data to improve teaching in primary schools whereas Kanjee and Moloi (2014) probed the perceptions and experiences of South African teachers' use of national assessment data to improve classroom teaching. Findings in all these studies revealed that the data driven instructional leadership practices of South African principals had little or no influence on student academic success. To that end, there was no empirical data that examined specifically the data practices of South African secondary school principals and the SMTs, especially in Gauteng province.

As such, this study sought to investigate the data driven instructional leadership practices of principals and school management teams (SMTs) within Gauteng secondary schools as informed by their schools' constant analysis of multiple data sets, such as student assessments, data from the Data-Driven-Districts (DDD) dashboard to increase student academic gains. This study probed in-depth school leadership and managements' ability to a) Establish school-based data structures driven by a strong collaborative culture, b) Select relevant data to guide teaching practices while enriching student learning, as well as c) The extent to which data were used

meaningfully and purposively to inform instructional decisions within the school (Boudett et al., 2013; Ng & Chan, 2008).

Additionally, the study investigated the degree of co-ordination and facilitation for school leaders as it pertained to teachers' data literacy capacity building and support. Furthermore, the study sought to enhance the knowledge domain within data-driven instructional leadership sphere. The study is significant in aiding school principals and SMTs to pursue continuous school improvement efforts through school-wide data inquiry practices informed by well researched international best practices and new theories of instructional leadership in education (Halverson et al., 2007).

1.5 Aims of the study

The aim of the study is to explore the role data plays to support instruction and how principals set systems and protocols for promoting data use within the school and how, together with senior management teams (SMTs), they lead data inquiry processes within a collaborative and shared leadership framework with the teachers. Furthermore, the study investigates data capabilities of teachers in relation to how data are collected, inquired and reflected upon and used in ways that support teaching and learning as well as how instructional leadership and the district facilitate and co-ordinate data literacy professional development within a supportive and enabling educational environment.

1.6 Critical research questions

The key question upon which this study is anchored is: How do principal practices influence data-informed decisions in ways that improve teaching and learning in the two Gauteng schools?

Sub-research questions

1. Which data sets and tools have principals and teachers experienced in improving teaching and learning?

2. How have data been used effectively to improve teaching and learning?

3. In what way and by whom are teachers capacitated and supported in the effective use of data to improve teaching and learning?

1.7 Clarification of key concepts

In clarifying key concepts, the researcher intended to provide clarity and understanding of the broader concept on data-driven decision-making (DDDM) practices of instructional leaders. The literature on instructional leadership's data-driven decision-making practices in schools was used as the base for grounding this conceptual development. By using the literature in this sense, it provided rich and detailed definitions for contextualising this study appropriately.

Accountability could be defined as an act of being answerable for one's actions or inactions to others, especially your superiors (Bernhardt, 2005). Educationally, accountability serves as a mechanism for holding instructional leaders and key stakeholders accountable for providing quality educational outcomes (National Planning Commission, 2012; UNESCO, 2017; Webber, 2005). Accountability driven reforms form an integral part of many education systems across the world. Its trails are evident in many parts of the world, including South Africa (Webber, 2005), the United Kingdom and Australia (Brill, Grayston, Kuhn, & O'Donell, 2018). Although accountability protocols were intended to strengthen schools' efforts towards enhanced student attainment, research revealed that external accountability mandates produced varying outcomes in student outcomes (Brill et al., 2018).

Aggregate in the context of data analysis means "summing up parts of results constituting of a whole sample or population" (Bernhardt, 2005, p. 267). Aggregating data forms the essential part of the data analysis process in the calculation of overall students' performance.

Analysis refers to the process of inquiry of "facts and data to provide a basis for effective decisions" (Bernhardt, 2005, p. 267). Data-driven decision-making as an approach for continuous school improvement describes data analysis as the process in which data are inquired and reflected upon to gain deeper insights into student academic progress.

Data in the contexts of understanding student achievement is looked at broadly as multiple sets of qualitative and quantitative information from which valuable insights into student learning are gained and that entail demographic data (ethnicity, enrolment, gender, home language); perception data (students, parents, teachers information surveys); student learning data (formative and summative assessments data, standardised tests) and school processes (school programs, teaching approaches), (Bernhardt, 1998).

Database could be regarded as "a storage mechanism for data that eliminate redundancy and conflict among multiple data files. Data are entered once and then it is available in all the programs that need it" (Bernhardt, 2005, p. 271). Captured data can be stored and retrieved from the database for the purpose of data analysis. Teachers, administration staff and instructional leadership and management either create new or use existing databases for capturing, organising and storing an array of schools' data sets.

Data driven decision-making (DDDM) relates to "making decisions based on demographic, student learning, perceptions, and school processes data. True Data-driven decision making has the guiding principles of the learning organisation at the centre of every decision". (Bernhardt, 2005, p. 271). Instructional leadership's efforts of raising student outcomes rely heavily on their ability to set effective school data systems and processes premised on a DDDM evidence-based model for enhancing teaching and learning

Data driven instruction refers to a "teacher's use of the results from various student assessments to plan instruction. Research has shown this process to be an effective way to improve instruction" (Thompson, 2010, p. 57). Owing to accountability protocols in education, there is an increased need for teachers and instructional leadership to base their instructional decisions on evidence rather than intuition, professional judgement or hypotheses (Bernhardt, 2005).

Diagnostic analysis means "a detailed analysis of student assessment data in relation to content areas, topics students could not master while they were being assessed" (Bernhardt, 2005, p. 272). Through analysing data diagnostically, teachers and school leaders can understand student learning gaps and educational needs (O'Neal, 2012). In so doing, they are enabled to take informed decisions which guide strategies for improvement (Earl & Katz, 2006).

Instructional leadership is an educational leadership theory premised on the idea that school principals are mainly curriculum focused in their daily management of the school with greater emphasis on improving student success rates (Green, 2010; Hallinger, 2003). Leading 21st century schools towards school success through DDDM is a result of a facilitative instructional leadership process, which embraces, leverages and harnesses social capital within the school (Green, 2010; Spillane, 2012). Instructional leadership: an educational leadership theory premised on the idea that when school management and leadership prioritise and support teaching and learning, student success is enhanced.

1.8 Delimitations of the study

Delimitations involve aspects which limit the scope of the study. Key aspects that are involved in restricting the boundaries of the study involve population, sample size, time, and money (Creswell, 2007). The study involved a small-scale sample and was limited to only two secondary schools in Gauteng province. The research study was conducted within a prescribed research timeframe of three months.

1.9 Organisation of the dissertation

The study was organised into various chapters, which are described below:

Chapter One: Introduction to the study. The introductory chapter to the study provided a background to the study. A variety of key elements of the study were explored that include the research problem, purpose and rationale, significance of the study, aims of the study, critical research questions, clarification of key concepts, delimitations of the study and organisation of the study.

Chapter Two: Literature Review and Theoretical Frameworks. The second chapter explored existing literature in relation to the research topic. While exploring existing literature, international, continental, and national literature were examined. The subsequent part of the chapter explored theoretical frameworks and conceptual frameworks by which the study was framed.

Chapter Three: Research Design and Methodology. In this chapter, an in-depth analysis of the research design and methodology focused on the following key elements; research paradigm, research ontology, research methodology, research sampling, sampling instrumentation, data generation methods, data analysis, issues of trustworthiness, ethical issues and limitations of the study.

Chapter Four: Data Presentation and Discussion. This chapter entailed presentation and analysis of generated data, the purpose of which was to gather evidence to gain insights into the researched phenomenon.

Chapter Five: Study Summary, Conclusion, Recommendations, and Implications for Further Research. In this chapter, a summary of key findings and conclusions are presented. Furthermore, this chapter detailed recommendations and implications for further research.

1.10 Chapter summary

The first chapter introduced the study with a detailed background, outlining the rationale of the study, stating the problem under investigation while providing the general structure and direction of the dissertation. The next chapter explored and reviewed the existing body of literature, ranging from international, continental to national literature.

CHAPTER 2 LITERATURE REVIEW AND THEORETICAL FRAMEWORKS

2. 1 Introduction

The previous chapter introduced the study about educational data as an enabler for making sound actionable decisions to impact instruction towards raising student outcomes. Within these accountability-embedded, assessment-based, and performance-driven educational contexts, school leadership (principals and school management teams or SMTs) find it important to leverage the power of data towards enhancing learner achievement.

In this section of the study, international, continental, and national literature about the research topic were reviewed. The thematic areas of focus, from which literature was referenced entailed three important aspects of the Data-Driven Decision Making (DDDM) strategy, vital for bringing about educational change in the classroom. The first thematic area of focus involved the data-informed instructional leadership practices of principals and leadership teams in promoting data use for teaching and learning through shared leadership and collective responsibility.

The second thematic area of focus placed teachers' data practices at the centre of the evidence-based decision making as a catalyst for self-inquiry and for enriching student learning. Consideration was given to gaining insights about teachers' data literacy often manifesting itself through their ability to use data effectively. This refers to their data skills, knowledge, beliefs, dispositions and habits of mind and barriers towards using data for pedagogy. Literature reviewed herein sought to provide valuable perspectives about teachers' abilities of taking academically sound actions or interventions. Ordinarily, this resulted from their ability to transform data into meaningful information and useful knowledge to understand student academic progress (Boudett, City, & Murnane, 2006; Light et al., 2004; O'Neal, 2012).

The final thematic area of focus for which the literature was reviewed, investigated teachers' data professional development, both theoretically and in practice. This process also examined the level of institutional support availed to teachers from both internally (schools) and

externally (Department of Education/ via partnerships). In the main, the key theoretical and conceptual constructs framed the study as a way of describing the schools' instructional leadership practices in the context of engendering greater school success through data-based decision making.

The study was theorised from three main theoretical constructs, namely the **Principal Instructional Management Rating Scale (PIMRS)** (Hallinger, 2003), **Antecedents of Effective Data Use Conceptual Framework** (Reeves, 2004) and the **Framework for Data Driven Instruction** (Light et al., 2004). The study underlined the importance of each individual theoretical construct in transforming educational goals within the schools through effective data use. Particular attention was given to how school leaders practiced instructional leadership within a collaborative framework that sought to improve student learning through sound data inquiry processes within the two Gauteng secondary schools.

In summary, this section of the study reviewed literature to gain invaluable insights into the school leaders' ability to lead school improvement efforts at the centre of which data played a critical role towards optimising student attainment. Moreover, within data driven school contexts of this nature, school leaders are expected to account for student results across all levels of the instructional systems within schools.

2.2 Body of literature

2.2.1 Data-driven instructional leadership

Literature reviewed internationally showed that system-wide education reforms in countries such as England (Earl & Katz, 2006), Australia (Turner et al., 2018), Mongolia (Terbish, Baljinnyam, & Care, 2018) and Nepal (Acharya & Vista, 2019) were driven from tests and assessments-based, data-driven and performance-oriented mandates (Earl & Katz, 2006; Turner at al., 2018). For the most part, in contexts such as these where policy makers are required to make very important national decisions that could potentially affect the futures of many students such as school improvement and support, data become vital enablers and catalysts for educational change.

At school level, data is central to teachers' analysis of students' academic progress; hence data form a greater part of daily instructional practice of teachers. The use of data by Principals and school management teams goes beyond just strengthening the effective implementation of curriculum programs but to guide management decisions that affect the overall functioning of

the school. To this end, it is worth noting that South African school leaders and teachers began experiencing technology-driven, data-based instructional approaches with the introduction of the Department of Basic Education's (DBE's) Data Driven Districts (DDD) dashboard in 2012 which is useful for gaining insights into schools' various data, for instance, data on student attendance, teacher attendance, student performance, among others (Department of Basic Education, 2012).

The DDD, as the dashboard is referred to, interfaces with the South African School Administration and Management System (SA-SAMS), a system-wide school data warehouse and Learner Unit Record Information and Tracking System (LURITS), an information management system used for keeping students' data across the system and for tracking every student in South Africa (Department of Basic Education, 2012). Within these educational environments, mostly quantitative (demographic, students' and teachers' attendance, assessment) and qualitative data are vital for "informing policy, planning and implementing, decision making, monitoring and evaluation of the education system" (Gauteng Department of Education, 2017, p. 5) and to meet educational imperatives as stipulated in the National Development Plan.

Continentally, evidence from a wider range of literature showed that Data-driven decision making (DDDM) formed an integral part of schooling systems in some African countries. Whereas the idea behind data-based decision making was to optimise efforts for maximising classroom instruction, however, findings of the study by Prew and Quaigrain (2010) proved that data were largely used in two aspects of the education system, and that was for administrative or accountability purposes instead of supporting teaching and learning. To this end, the study pointed towards data practices in Ghanaian schools in which data were regarded to be mechanisms for evaluating the degree of school effectiveness rather than for directly impacting day-to-day student learning (Prew & Quaigrain, 2010).

Equally, in many Nigerian schools, DDDM formed the backbone of a national planning strategy used to resource schools to improve educational outcomes, encapsulated within the Nigeria Millennium Development Goals Information System (NMIS) of Nigeria (Iyengar, Mahal, Felicia, Aliyu, & Karim, 2015). Likewise, empirical data from research studies of surveyed Ugandan school managers by Crawfurd (2016) and from the Systems Approach for Better Education Results (SABER) Egyptian schools' 2012 report indicated that data were

mostly used for measuring school effectiveness and evaluating school performance (Crawfurd, 2016).

While it became evidently clear throughout a significant portion of literature that was analysed, that access to multiple data sets from various data sources was not a problem in many educational settings, however, data were used less to improve student learning compared to administrative and strategic planning, reporting, accountability, resourcing, and policy improvement (Crawfurd, 2016; Iyengar et al., 2015; Prew & Quaigrain, 2010; Vegas et al., 2010). It is important to note though that, meaningful use of data result into improvement of student outcomes, particularly schools with strong focus on evidence-based solutions for transforming teaching and learning.

A substantial body of literature written about the future of learning proposed a need for a shift from conventional forms of learning to modern or 21st century skills-embedded approaches mostly needed within the technology-driven data-embedded schools (Scott, 2015). Research studies in this area revealed that a future ready workforce would have to be prepared with new ways of learning within which modern technologies formed a critical part. According to Scott (2015), new learning approaches incorporated skills that were essential for the development of learning, personal and social skill sets. Further research inquiries demonstrated that a workforce that was digitally literate, collaborative, critically and creatively thinking, communicating effectively, problem solving, has initiative, is resilient, empathetic and compassionate, improved its chances of participating in the global economy (Scott, 2015). To this end, Scott (2015) argued that these were the kinds of skills every 21st century worker needed to possess to be able to participate in the global economy.

To make this model of learning a reality, governments focused on putting data management systems in place across the education sphere. This was done towards the improvement of the quality of education for its citizens (Weber, 2005). In context, while on one hand governments equipped schools with the necessary tools to improve student outcomes, on the other hand that placed a greater responsibility on the shoulders of principals to manage and support data-driven instructional programmes towards effective school success (Hallinger & Wang, 2015; Coburn & Turner, 2011). As a result, instructional leadership practices increasingly shifted away from traditional approaches focused on understanding learning from teachers' professional judgement but to data-based models of curriculum delivery necessary for providing real evidence about teaching and learning (Boudett et al., 2006).

For that same reason, more instructionally focused school leaders found it sufficiently desirable to spent reasonable amount of time engaged in student data analysis to gain better insights into student academic progress (McLeod, 2005). However, for this type of approach to be sufficiently effective in schools, it required practical implementation of data strategies supported by distinct leadership daily routines, habits and practices that are essential for bringing about improved student outcomes, such as Hallinger's (2003) model for principal's instructional leadership and others.

Hallinger's (2003) model of instructional leadership presents tenets on an enabling school climate that thrives on the characteristics of an effective instructionally focused principal, *inter alia*:

a) Instil continuous learning culture to students and the staff, protecting instructional time.

b) Evaluating and monitoring instructional programme daily.

c) Supervising instruction through high visibility, feedback, input, and support.

d) Tracking students' academic progress.

e) Promoting staff development.

By practicing instructional leadership practices that incorporate these key ingredients, as suggested by Hallinger (2003), this increased the chances of schools attaining schools' academic goals (Blasé & Blasé, 2004; Blink, 2007; Jones & Kennedy, 2015; Lange et al., 2012; Louis & Robinson, 2012).

Data-driven decision making (DDDM) or the Data-based Decision Making (DBDM) model is a preferred approach towards raising student outcomes through which instructional leadership aims to impact student learning through collaborative data inquiry processes (Blink, 2007; Mandinach et al., 2006; O'Neal, 2012). Data-driven decision making involved "making decisions based on demographic, student learning, perceptions, and school processes data" (Bernhardt, 2005, p. 271). DDDM provides teachers and school leaders with information about various aspects of student learning (McLeod, 2005). Therefore, it is critical for instructional leaders to understand that in education, data goes far beyond student assessment data, but that data come in various forms that include "perceptive data (teacher surveys, student data, parent data, news articles, media coverage, school websites, discipline incidents), demographic data

(gender, ethnicity, attendance, enrolment, economic status) and programme data (institution and culture placement)" (Jones & Kennedy, 2015, p. 4).

As such, it becomes necessary for instructional leaders to understand data in its truest context and the roles in which data literacy capacity building among teachers may potentially empower them to transform data into meaningful actions towards elevated student success (Bambrick-Santoyo, 2010). To this end, school leaders need to sufficiently demonstrate attributes and habits of daily practice in preparing and executing their schools' data action plans (Bernhardt, 2005). For schools to be able to develop a culture of collaborative data inquiry, it becomes vital for school leaders to adopt an inclusive approach to data inquiry processes wherein all the stakeholders participate in the process (Spillane, 2012).

Furthermore, with the inclusion of data capable individuals within the school without looking at their titles is another form of stimulating collaboration between teachers and leaders (O'Neal, 2012). Establishing an effective school data culture requires principals and management teams to set up proper systems, processes, protocols, and routines for guiding the data processes within the schools (Earl & Katz, 2006; O'Neal, 2012).

However, consensus reached among data researchers is that effective data driven instructional leaders were known to have a canny ability to:

a) Instil a culture of lofty expectations and continuous learning (Blasé & Blasé, 2004).
b) Share the school's data vision, (Earl & Katz, 2006),
c) Schedule data activities within agreed times and space (O'Neal, 2012).
d) Lead, manage, or delegate authority to oversee data programmes (Hallinger, 2003).
e) Exemplify data practices (O'Neal, 2012).
f) Create conditions that enable others to be motivated to use data (Earl & Katz, 2004; Lange et al., 2012).
g) Monitor and provide feedback towards improving data practices among teachers (Blasé & Blasé, 2004).
h) Establish or adapt existing data leadership structures to lead data practices (Lange et al., 2012; O'Neal, 2012).
i) Encourage collaboration among various departments, faculties, teams, and others to embolden continuous peer-learning, thus fostering a community of practice (Spillane, 2012).

j) Prioritise capacity building (Green, 2010) to enhance the data literacy of teachers and leaders while providing necessary resources and continuous support.

To this end, principals and management teams ought to be at the forefront of creating conditions that enable schools' efforts towards enhancing student success through data use (Earl & Katz, 2006; Levin & Datnow, 2012).

Such data-based decision-making practices take the shape of rigorous data inquiry processes manifesting through aggregation, analysis, and interpretation of data for effecting school success (Levin & Datnow, 2012; Sebastian & Allensworth, 2012). By engaging in the data inquiry and reflection process of this nature, school leadership base their instructional decision making on clear information and evidence as a basis for making decisions and choices that improve teaching and learning rather than relying on assumptions (Blink, 2007; Earl & Katz, 2006; O'Neal, 2012). In endorsing this view, a research study by Wayman (2005) found that principals' leadership roles in fostering a data culture within a school resulted in high student attainment.

To further illustrate this point, research findings by Young and Kim (2010) revealed that the successful establishment of strong schools' data culture were a consequence of the principals' intentional and deliberate actions in aligning data practices with clear set goals. In other words, appropriately structuring and planning internal data management practices increased the chances of meeting schools' organisational goals (Spillane, 2012). Similarly, empirical data from a 2006 study of Kerr, Marsh, Ikemoto, Darilek and Barney proved that instructionally oriented school leaders were pivotal in the uptake of data driven interventions, particularly within a distributed leadership framework. School leaders' positive attitude towards data were attributed to creating a viable school data climate in ways that raised student outcomes (Levin & Datnow, 2012).

Through leading efforts for data use in such a manner, principals needed to lead by setting a good example through modelling data driven thinking pathways that inspired school-wide data practices (Levin & Datnow, 2012; O' Neal, 2012). Evidence from broader literature reviewed showed that a vibrant school data culture was relative to the principal's characteristics (Spillane, 2012). Essentially, within this frame of reference for data-informed school leadership a need arose to ensure that data were analysed more purposively with a view to understanding issues that contributed to students' low performance (Bambrick-Santoyo, 2010; Earl & Katz,

2006; O'Neal, 2012). Accordingly, Coburn and Turner (2011) found that school leaders' efforts of leading data analysis processes contributed towards important levels of student success.

As it is the case with most distinguished data proponents particularly, Bambrick-Santoyo (2010), Blink (2007), Boudett et al. (2006), Datnow, Park and Kennedy-Lewis (2012), Light et al. (2004) and Mandinach et al. (2006), data in the hands of individuals with the capacity to interpret it into information and knowledge become a sufficiently powerful instrument for improving the quality of teaching and learning.

Nevertheless, further argument ensuing in the educational data domain theorises that, principals' practices driven by the need to lead and guide teacher's purposive data-use is an enabler towards deepening student learning (Levin & Datnow, 2012). For the same reason, Earl and Katz (2006) urged school leadership and education officials to make instructional decisions based on data as taking these steps was contributed positively towards school-wide improvement. This inferred that science or evidence, and not own individual opinions and subjectivity, go a long way in informing decisions about which curriculum aspects required teacher attention and which ones required teacher support. Following this action, data guide the process through which conclusions are reached and judgements are made about instruction.

Similarly, Levin and Datnow (2012) argued that principals who integrate data-based decision-making into their leadership capabilities positively influenced student outcomes. Data are scientifically proven to be effective in gaining insightful information about the overall teaching and learning dynamics and complexities within the classroom (Earl & Katz, 2006). In context, principals' and teachers' ability to focus on data inquiry and analysis assist in mapping out school improvement strategies; an argument advanced by many data theorists such as Bambrick-Santoyo (2010), Blink (2007), Boudett et al. (2006), Coburn and Turner (2011), Datnow et al. (2012), Earl and Katz (2006) and O'Neal (2012). Moreover, the process of in-depth data inquiry into various aspects that shape student academic progress enabled the school to budget wisely and procure necessary resources, develop suitable intervention strategies for students and staff development programmes to improve school success (Blink, 2007; Boudett et al., 2013; Earl & Katz, 2006; Mandinach et al., 2006; O'Neal. 2012).

However, after carefully reviewing South African literature research inquiries conducted by Botha (2015) and Marishane (2015), it was found that principals and school management teams lacked capacity to lead and guide data analysis processes. Botha (2015) found that, although schools used mostly analysed assessment data for reporting student performance and

accounting to authorities, the school's data management processes were not structured, guided, and led by school leaders. Equally, findings from Marishane (2015) revealed that there was a dearth in data-driven instructional leadership.

Nonetheless, the research study conducted by Botha (2015) focused on data use in teaching of the primary Mathematics curriculum without paying attention to the roles of school leaders. Similarly, elsewhere O'Neal (2012, p. 1) advanced that policy makers used various forms of data sets for "professional development planning, budgeting, curriculum development, classroom instruction and administrative leadership". Likewise, during all the data mantra, Levin and Datnow (2012) pointed out that the main barrier affecting many principals is their inability to use data effectively. Barriers associated with low levels of data use amongst principals were due to poor data literacy (Earl & Katz, 2006) and the lack of support.

On the contrary, numerous data sceptics disagreed and advanced that data use in education had no real effect in producing positive academic gains to student learning, for example, Neuman (2016) postulated that:

a) Student assessment data were not useful in motivating students.
b) Data-informed instruction was narrowly focused on failed test items rather than on deep learning.
c) Data analysis took away most of the teaching time due to being test-focused.
d) Analysis of assessment data encouraged teaching for assessment instead of focusing on skills development.
e) Labelled and marginalised students based on their academic performance

Furthermore, Kohn (2010) argued that:

a) Assessments from which data were analysed lacked focus on developing high order thinking skills.
b) Data were burdensome for already overworked teachers.
c) Teachers' creativity and professional competencies in designing assessments were ignored in favour of prescribed ones.

Moreover, Kamenetz (2016) cited three things that devalued data for teaching and learning as:

a) Demotivating academically challenged students.
b) Data collection by technology companies opening schools up for marketing abuse.
c) Student data opened to scrutiny by outsiders, because of low levels of privacy.

Contrary to protestations of data detractors, data advocates insisted on arguing for instructional data-informed forms of school leadership to lead school efforts towards turning around low student achievement rates in schools. Accordingly, Earl and Katz (2006) submitted that, data literacy was an essential aspect of principalship that was serious about increasing student achievement. To this end, Earl and Katz maintained that principals ought to distinguish between various forms of data from which to make sense of student learning, and demonstrate certain data use skills, habits and practices encompassed in the:

a) Development of new thinking pathways about data, in terms of which meaning, and purpose become the focal points while demonstrating the ability to select appropriate data.
b) The ability to decipher data correctly in recognising if information was accurate or not and still be able to make informed decisions based on estimates and probabilities.
c) The ability to understand numbers, statistics, or quantitative data in terms of the message they were conveying, conventions and rules used to describe statistical information as it pertained to student achievement. "If leaders are going to use data to enhance rather than distort educational decisions, they have a responsibility to understand the principles that underlie the statistics" (Earl & Katz, 2006, p. 19).
d) Recognition of other forms of data which implied that school leaders needed to develop an awareness of data beyond statistics but instead look at qualitative data (opinions, anecdotes, observations, surveys) as vitally important educational data upon which to inquire through a process of systematic analysis, categorisation, codification and interpretation to guide instructional decision making.
e) Making interpretation paramount which involved a data analysis process for taking raw data and turning it into information which could be viewed from different vantage points, thus dissecting and interrogating data by formulating hypothesis, extrapolating, conjecturing, reasoning, drawing logical conclusions, identifying patterns and trends, challenging dominant views and beliefs, identifying logical flaws, developing strong views, contesting ideas and bringing in new ways of thinking about data.
f) Paying attention to effectively communicate student achievement data to different audiences.
g) Reporting student progress to parents who in turn, were required to make sense of the data (interpret). A data literate leader was conscious of the kind of data parents wanted to have, its presentation and messaging.

2.2.2 Teacher's data practices

School leaders that promote teachers' capacity building have proven to be effective towards the development of data literacy inside the school (Bambrick-Santoyo, 2010; Blasé & Blasé, 2004; Boudett et al., 2006; Earl & Katz, 2006; Halverson et al., 2007; O'Neal, 2012). Such leaders were known to guide and support school-wide changes through data inquiry processes that draw on the data skills of the broader teaching staff within the school (Earl & Katz, 2006). Within this data driven leadership set up, schools were conceptualised as learning organisations thriving on bringing about educational change through professional development (Senge, 1990; Spillane, 2012).

In effect, highly effective school leaders needed to demonstrate great agility and efficient responsiveness towards building a sustainable data culture founded on well-thought out professional development strategy (Earl & Katz, 2006; Halverson et al., 2007; Mandinach & Gummer, 2016; O'Neal, 2012). Their focal point centred on creating conditions within the school towards enhancing teachers' data literacy (Earl & Katz, 2006). Lange et al. (2012) suggested that for schools to implement effective data use, certain conditions needed to be created by school leaders and that entailed *inter alia*;

a) The cultivation of a data culture founded on principles that fostered trust among teachers.
b) Prioritising teachers' professional development within a supportive environment towards capable use of multiple data sets and tools.
c) Establishment of collaborative data teams from a cross-section of the teaching staff operating within routinely scheduled and structured data plans.
d) The ability to increase chances of teachers accessing an array of data sets from which to gain understanding, produce information and knowledge about student learning.

2.2.3 Data literacy

Nonetheless, the concept of data literacy for teaching remains chiefly under-researched as Mandinach and Gummer (2013) and Kippers, Poortman, Schildkamp and Visscher (2017) explained. Despite researchers' attempts being made to clarify the elements constituting data literacy, confusion between assessment literacy and data literacy remains largely evident (Mandinach & Gummer, 2013). While on one hand, data literacy defines teachers' ability to "set a purpose, collect data, analyse data, interpret data and take instructional action, on the other hand assessment literacy defines "the ability to use assessment data only" (Kippers et al.,

p. 22). Although these two concepts are interlinked, they should not be understood to have the same meaning as that is misguiding to school's efforts of using Data-driven decision -making (DDDM) or Data-based Decision Making (DBDM) strategy for improving student attainment.

Mandinach and Gummer (2016) argued, the data literacy concept in the context of enhancing classroom teaching could be looked at in terms of knowledge, skills, and dispositions necessary for enabling development of teachers' data capacity. Mandinach and Gummer (2016) concluded that once such an understanding had been established, school leaders and teachers would be enabled to conceptualise data literacy better and focus on researched data in building capacity within the school.

Following this dichotomy and in attempting to bring clarity on what constituted data literacy practices of teachers, Mandinach and Gummer (2016) interviewed numerous United States (US) data experts, teachers and school leaders and analysed several documents and resources. The process was intended for understanding the data literacy practices as it pertained to the knowledge, skills, and dispositions for enabling teachers' data capabilities. From the findings of the study, Mandinach and Gummer (2016, p.1) concluded that data literacy involved a process wherein educators "continuously, effectively, and ethically access, interpret, act on, and communicate multiple types of data from state, local, classroom, and other sources to improve outcomes for students in a manner appropriate to educators' professional roles and responsibilities".

Similarly, Kippers et al. (2017) surveyed Dutch secondary school leaders, teachers, and data professionals to source better insights into data literacy practices of teachers focusing on their data capabilities and struggles. They found that teachers fared better in some aspects of data literacy than others, simply because they lacked the necessary training and support in data use for teaching and learning. What was discovered in both studies was a confirmation of the established view that capacity building from teacher preparation programmes to practicing teachers was lacking across the educational system (Kippers et al., 2017).

The North Carolina Department of Public Instruction defined data literacy as "one's level of understanding of how to find, evaluate, and use data to inform instruction" (Mandinach & Gummer, p. 1). As Mandinach and Gummer (2016) further explained, the problem with these definitions was their generic and limited nature in how they focused on skills and components (Kippers et al., 2017) needed for enabling the data-based decision making process effective in learning. By Mandinach and Gummer's (2016) account, these definitions failed to

conceptualise data literacy for teaching (Mandinach & Gummer, 2016). Following Mandinach and Gummer's (2016) research which was inspired by Shulman's 1987 work, thereafter Mandinach and Gummer (2016) developed a conceptual framework to sufficiently abstract and comprehensively define teachers' data literacy called Data Literacy For Teachers (DLFT) (Mandinach & Gummer, 2016).

Subsequent to the development of this data literacy framework (DLFT), Mandinach and Gummer (2016) were able to sufficiently define data literacy for teaching as "…the ability to transform information into actionable instructional knowledge and practices by collecting, analysing, and interpreting all types of data (assessment, school climate, behavioural, snapshot, longitudinal, moment-to-moment) to help determine instructional steps. It combined an understanding of data with standards, disciplinary knowledge and practices, curricular knowledge, content knowledge, and an understanding of how children learn" (Mandinach & Gummer, 2016, p. 2).

In the beginning, DLFT was conceptualised into three specific domains or data knowledge and skills, being; content knowledge, pedagogical knowledge, and data use for teaching. However, with more research work done, DLFT progressively advanced into seven knowledge areas for data use (Mandinach & Gummer, 2016). As Mandinach and Gummer postulated, teachers' capacity to adequately assimilate data use for teaching relied on instructional leadership's ability to focus capacity building on the seven knowledge domains and skills suggested herein which were explained in the subsequent section.

In addition to the seven knowledge areas were what Mandinach and Gummer (2016) refer to as dispositions or habits of mind which data literate teachers are expected to demonstrate during their data practice. These were categorised as:

a) Belief that all students could learn, and what could be done to help them reach their full academic potential.

b) Belief in data, by valuing data for gaining understanding of student achievement gaps ensured that teachers took appropriate action to remedy the situation.

c) Belief that improvement in education required a continuous inquiry cycle; through understanding that teaching was cyclical, only then would teachers strive to continuously evaluate their own practice for purpose of modifications.

d) Ethical use of data, including the protection of privacy and confidentiality of data; this meant protecting students' data with regards to privacy and confidentiality. Protection and security of information becomes top priority.

e) Collaboration (vertically and horizontally); working within this collaborative framework enabled teachers to value teamwork and shared responsibility in their involvement within the data inquiry process.

f) Communication skills with multiple audiences, communicating student results and performance to various stakeholders, colleagues and authorities becomes an essential disposition for data driven teachers.

Several data-informed cycles and steps emerged from the works of DDDM/ DBDM researchers' attempts to empower teachers with data literacy skills for transforming raw data into actionable steps included the Data Wise project (Boudett et al., 2006, 2013). Furthermore, after the extensive research work by Kippers et al. (2017) resulted in the University of Twente, Netherlands developing a data use intervention framework to enable teachers' ability to implement data-informed instructional decisions. The framework is a cyclical iterative data inquiry process encompassed within a set of five interlinking data capable skills, *inter alia*:

a) *Set a purpose*, this is the first data literacy skill denoting the collaborative data inquiry process and this entails teachers' knowledge of why data can become useful insights into understanding factors that influence student learning. Within this continuum, teachers learn to share goals and hypothesise about potential causes of low student achievement rates and set goals they want to achieve to remedy the problem.

b) The second skill involves *collecting data* and that refers to teachers' ability to collaboratively collect and engage with multiple data sets (quantitative and qualitative data) within the various continua of the data inquiry process for problem identification and solution finding in terms of student learning difficulties.

c) The third data literacy skill, as proposed by Kippers et al. (2017), entails *analysing data.* This process tests teachers' ability to interpret data through prioritising specific data sets, organising data in various formats while at the same time, examining their quality and validity to justify why such data should be deemed useful in the improvement of teaching and learning.

d) The fourth critical element of data literacy is called *interpreting data* which focuses on transforming data into meaningful information. In other words, teachers' ability to read and interpret multiple data formats from which to draw conclusions, thereby leading to actions of intervention that is vitally important for their data literacy development.

e) The fifth skill within the data use for intervention cyclical process is also an important starting point towards going back to the first step (set a purpose). This step is referred to as *taking instructional action*, meaning that teachers' data literacy can be measured by how best they are able to create knowledge from the data collected about student learning gaps and needs and how this can guide their interventions towards achieving the desired student outcomes (Kippers et al., 2017).

The five data literacy skills as proposed by Kippers et al. (2017) are shown in Figure 1 below:

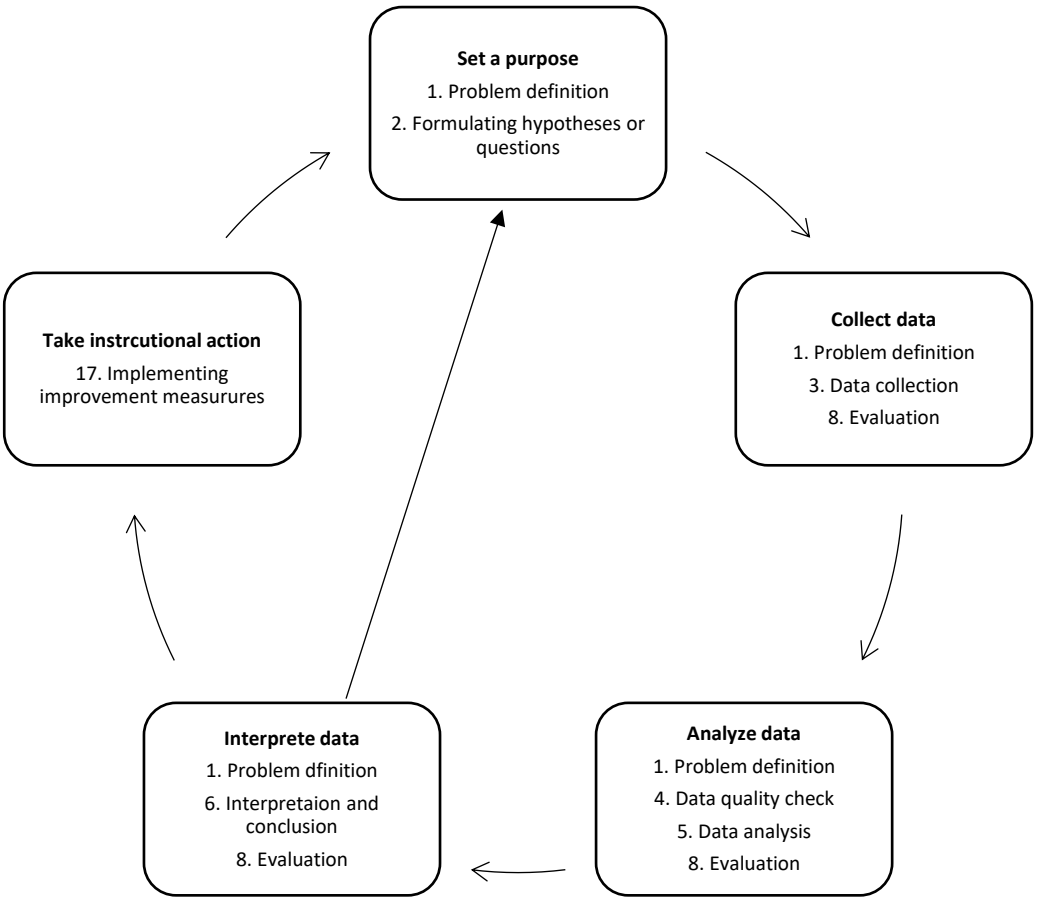


Figure 1: Framework for linking components of data literacy with data use intervention developed by Kippers, Poortman, Schildkamp, and Visscher (2017)

Additional inputs in terms of enhancing teachers' data literacy skills included the work of Mandinach and Gummer (2016), from which the "Data Literacy for Teacher" (DLFT) collaborative data inquiry cycle was formulated. Mandinach and Gummer (2016) defined data literacy as a means by which teachers ought to demonstrate the suggested seven knowledge areas with their five interwoven skills sets within a cyclical data inquiry process. According to Mandinach and Gummer, teachers who are proficient data inquirers are known to possess the seven key knowledge areas, *inter alia;* knowledge of the general instruction process, knowing the curriculum, knowing pedagogy, content area knowledge, knowing students' individualities, knowing learning environments, knowing the value and purpose of education.

Moreover, the five key data literacy skills encompassing "Data Literacy for Teaching" framework are further defined in relation to sub-skills linked to each individual skill. The data literacy skills mostly needed in data-based instructional decision making, is represented in Table 1:

Table 1: Data Literacy for Teachers (Mandinach & Gummer, 2016)

Data literacy skills	**Sub-skills**
a) Identifying problems or framing questions	i) Identifying curriculum aspects that are hindering student academic progress and finding suitable remediation. ii) Understanding student learning in relation with both the individual's and school's contexts. iii) Working in collaboration with parties of interest in student learning, their inputs are helpful in decision making. iv) Being conscious of keeping students' data private by knowing who or not to share such data.

b) Use of data	i) Awareness of various data sources and the ability to evaluate numerous data. ii) Skilful in regular data generation iii) Master development of high-quality assessments and how data from various assessments (formative and summative) can be used meaningfully. iv) Design suitable assessments for yielding valid and reliable data. v) Understanding data in terms of its distinctive characteristics and qualities. vi) Use multiple data sets including qualitative and quantitative data which a teacher must triangulate for accurate understanding of the situation. vii) Understand different levels of data and purposive use of each data set. viii) Derive better insights from both quantitative and qualitative data sources ix) Be able to access, store and manipulate data from multiple data sources. x) Consider data quality, select appropriate data xi) Manage, prioritise, analyse, organise, and interpret data xii) Aggregate and disaggregate data for intended purposes.
c) Transforming data into information	i) Make sense of data to guide actions ii) Identify trends and patterns from data iii) Be savvy in statistical data analysis iv) Take data-informed action to solve problems.

	v) Hypothesise, make inferences, and draw conclusions from data. vi) Interpret data meaningfully. vii) Competent in using different data formats viii) Summarise, synthesise, and provide data-based explanations
d) Transform information into decision	i) Make decisions to determine the course of action to take ii) Track students' academic progress iii) Identify students' educational needs iv) Differentiate teaching strategies as informed by collected data v) Implement changes in relation to classroom contexts
e) Evaluate Outcomes	i) Measure outcomes of data-informed instructional decisions ii) Evaluate outcomes of actions taken to solve problems identified in the initial stages of the data inquiry cycle iii) Assess changes pre and post decision making iv) Determine improvement in student performances v) Always guided by an iterative data inquiry cycle

Additionally, research in the area of data literacy identified dispositions and habits of mind central to the effective data use in schools that teachers need to exhibit. Accordingly, Mandinach and Gummer presented them as:

a) A belief in the ability of every student to learn, mostly because of their instructional decisions that have a positive effect on student performance.

b) Belief in data inquiry to enrich their own pedagogic practices
c) Understand teaching to be a continuum of learning cycles intended to bring about improvement
d) Awareness of ethical considerations, confidentiality, and privacy of data
e) Strive to engage in collaborative data inquiry discussions to find solutions through examining data
f) Communicate student performance data effectively to various targeted audiences.

These multiple data literacy skills reflect critical building blocks sufficiently needed by every school leader and teacher in the effective implementation of data-based instructional decisions to support student learning.

2.2.4 Teacher professional development and support on data use

Teachers are inundated with data use, so much so that an underlying assumption posits that teachers are skilful in leveraging data in ways that enrich students' learning experience. While during pedagogic practice, teachers handle multiple data sets (O'Neal, 2012). However, the role of data towards teaching and learning often eludes teachers as their view of data, based on their data experience, suggests that data were for reporting about student performance to parents and officials, thus complying with departmental mandates (Botha, 2015; Marishane, 2015). Moreover, a greater portion of teachers, principals and management teams lacked the necessary data skills (Earl & Katz, 2006; Marishane, 2015).

For schools to have an impact on student learning through the use of analysed data, it is necessary to have a change in approach to how teachers collect, organise, analyse and interpret data (Bambrick-Santoyo, 2010; Bernhardt, 2005; Boudett et al., 2013; Earl & Katz, 2006; O'Neal, 2012). This means having to use data with a sense of purpose and meaning. This could be achieved in contexts where teachers and school leaders received the necessary data literacy skills and support (Dunlap & Piro, 2016; Kippers et al., 2017; Mandinach & Gummer, 2016).

2.2.5 Barriers to data use in schools

While it is extremely necessary for teachers to become data literate, research inquiries however submitted that in most educational contexts, teachers and school leaders were still far from possessing the seven knowledge areas as proposed by Mandinach and Gummer (2016). According to Wayman and Jimerson (2014) it is worth noting that, teachers were struggling with mastering the basics of data inquiry to inform their own practice.

To highlight this argument, research by Earl and Katz (2006) found that many of the teachers lacked formal data literacy training on using different data sets and not just students' assessment data. Further findings from the US Department of Education's National Educational Technological Trends Study (NETTS) in which district officials, principals and teachers were interviewed, found that teachers' data capacity building programmes inadequately prepared teachers to become data literate (Means, Padilla, De Barger, & Bakia, 2009). Similarly, a study by Earl and Katz (2006) indicated that teachers struggled with data use for teaching and learning owing to a lack of an established data inquiry culture within schools. For the most part, teachers "…mistrust data, fear data and lack the skills to use data wisely and effectively" (Earl & Katz, 2006, p. 3).

To illustrate this point further, findings in the 2009 research inquiry by Jacobs, Gregory, Hoppy and Yendol-Hoppey on teachers' data use perspectives to inform instruction revealed that a substantial number of teachers were incapable of appropriately using student achievement data to enhance teaching and learning (Broyles, 2016). Accordingly, after studying the data capabilities of novice teachers, Dunlap and Piro (2016) concluded that a host of those teachers were incapable of using data towards instructional decision-making.

Following these findings, it becomes even more extremely urgent and necessary for policy makers and school leaders to prioritise capacity building for teachers as this would sharpen their data use skills to impact student learning (McLeod, 2005). To realise this important consideration, policy makers along with school leaders need to harness their resources and energies towards continuous capacity building. The first critical consideration to make before training teachers would be analysis of teachers' data use needs before rolling out any training program.

Nevertheless, school leaders are expected to continue leveraging collective ideas from a wide range of teachers on how to improve instruction through data use, stimulating teachers to analyse data collaboratively while sharing strategies for improving student learning (Lange et al., 2012). By so doing, teachers need to harness the social and intellectual capitals within the school towards establishing collaborative data structures (Earl & Katz, 2006; O'Neal, 2012).

In similar terms, Spillane (2012) and O'Neal (2012) encourage distributed models of data leadership as being effective towards leading functional and productive data focused initiatives. Both Spillane (2012) and O'Neal (2012) believed in structuring data leadership teams in the mould of Professional Learning Communities (PLCs). Using this as a point of reference,

O'Neal (2012) suggested that in establishing PLCs, school principals should consider either incorporating newly appointed data team members within existing schools' structures or establishing new data teams afresh through wider staff consultations.

O' Neal (2012) felt strongly that the school data inquiry process must be guided by a suitable plan drawn up with the schools' contexts in mind while considering the needs of a school. Increasingly, a greater mass of literature demonstrated that when instructional leadership optimally lead, guided, and supported the schools' data efforts, significant gains in enhanced student learning and general school performance improved (Mandinach & Gummer, 2016).

The two key questions to answer are:

a) How should principals lead and foster an organisational culture that valued and used all kinds of data to optimise pedagogic practice?

b) What does "data literate" mean in respect of teaching and learning?

This study sought to investigate, firstly, the schools' data culture, in particular, the schools' data practices and the role school leadership played in leading collaborative data efforts. Secondly, teacher's professional development in data use for teaching was explored in the study.

2.3. Theoretical Frameworks

A theory could be described as a frame of reference or lens for envisioning or conceptualising the research inquiry (Creswell, 2007). In outlining the theoretical underpinnings for this study, a variety of theoretical and conceptual frameworks were highlighted; Firstly, *Instructional Leadership Framework* encapsulated within the *Principals Instructional Management Rating Scale (PIMRS)* which conceptualised core practices and values necessary for the principals to effectively lead teaching and learning in ways that enhanced the school's instructional programmes (Hallinger, 2003). At the core of this paradigm we find three overarching dimensions for instructional leadership fundamental for maximising schools' programmatic effectiveness thereby leading to high student performance, *inter alia*:

a) Defining the school's mission - described as clearly defining and communicating schools' goals to the stakeholders within the school,

b) Managing the instructional programme which encompasses co-ordinating curriculum programme, supervising and evaluating instruction and monitoring student progress, as well as holding staff accountable for student achievement,

c) Developing a school learning climate is defined as a process for protecting instructional time, rewarding teaching, and learning efforts while promoting professional development and maintaining high visibility. Principals' ability to demonstrate these attributes, together with leading school's efforts of leveraging data to inform decisions to bring about educational change within the school are vital towards school effectiveness.

What became evident and encouraging in both case study schools was that Principals and HODs were able to exhibit four of the most important instructional leadership practices for improving teaching and learning through data use, namely;

a) Aligned schools' data vision with student achievement targets,
b) Monitored student academic progress through analysing student assessment data while diagnosing students' learning gaps towards appropriate learner support provisioning.
c) Coordinated and facilitated entire staff collaborative data discussion meetings professionally.
d) Ensured teachers were held accountable for student academic achievement.

Fundamentally, Hallinger's (2003) leadership construct emphasised the critical importance of instructionally inclined forms of leadership for the establishment of a value-based culture of learning. Within this construct, school instructional leaders were expected to set and maintain high expectations to the use of data to raise student outcomes. In the same token, Waters, Marzano, and McNulty (2003) beseeched leaders and managers in schools to adopt instructionally focused approaches towards enabling effective data based teaching and learning and that included:

a) Protection of instructional time by prioritising teaching and learning over everything, time on task, learner centred teaching approaches, increased accountability to student achievement towards an effective instructional programme.

b) Incentivising teachers for effort and commitment measures against student outcomes.

c) Creation of conducive conditions and fostering a culture of learning within the school in return for rewards.

d) Promotion of professional development towards teachers' personal growth.

e) Maintaining contact and interactions with teachers and students alike

Although rewarding teachers was not evident in the researched schools; Seal secondary school and Turtle secondary school, of vital importance was that teaching, and learning were prioritised, and teaching time observed throughout the research process.

2.3.1 Instructional Leadership

According to Leithwood, Anderson and Wahlstrom (2004, p. 7), "leadership is second only to classroom instruction among all school related factors that contribute to what students learn at school". Similarly, du Plessis (2013) advanced that vital towards the establishment of data enabled schools is the ability of instructional leaders to create enough opportunities for the students to learn within a conducive school environment. By extension, that included fostering the culture of data use for teaching and learning within the school with clear intention to increase student academic gains (Mandinach & Gummer, 2016).

Furthermore, O'Neal contended by saying that, not only has it become necessary for principals, together with the schools' management teams, to establish effective systems, protocols, processes and routines of daily practice for supporting data use to improve instruction, but it was also important to clarify the school's data vision and plans within the school community. In this situation, this meant linking that vision with clearly set goals and performance targets while at the same time aligning these with accountability (Earl & Katz, 2006; O'Neal, 2012). The success of all these ideas would hinge on school leaderships' ability to communicate well and establish a clear set of rules, guidance, and direction. Fundamental to that, would be the school leaders' creation of conditions that enabled and supported collaborative data inquiry processes within schools (Bernhardt, 2005; Blink, 2007; Boudett, 2013; Earl & Katz, 2006; Hallinger, 2003; Mandinach & Gummer, 2016; O'Neal, 2012; Spillane, 2012).

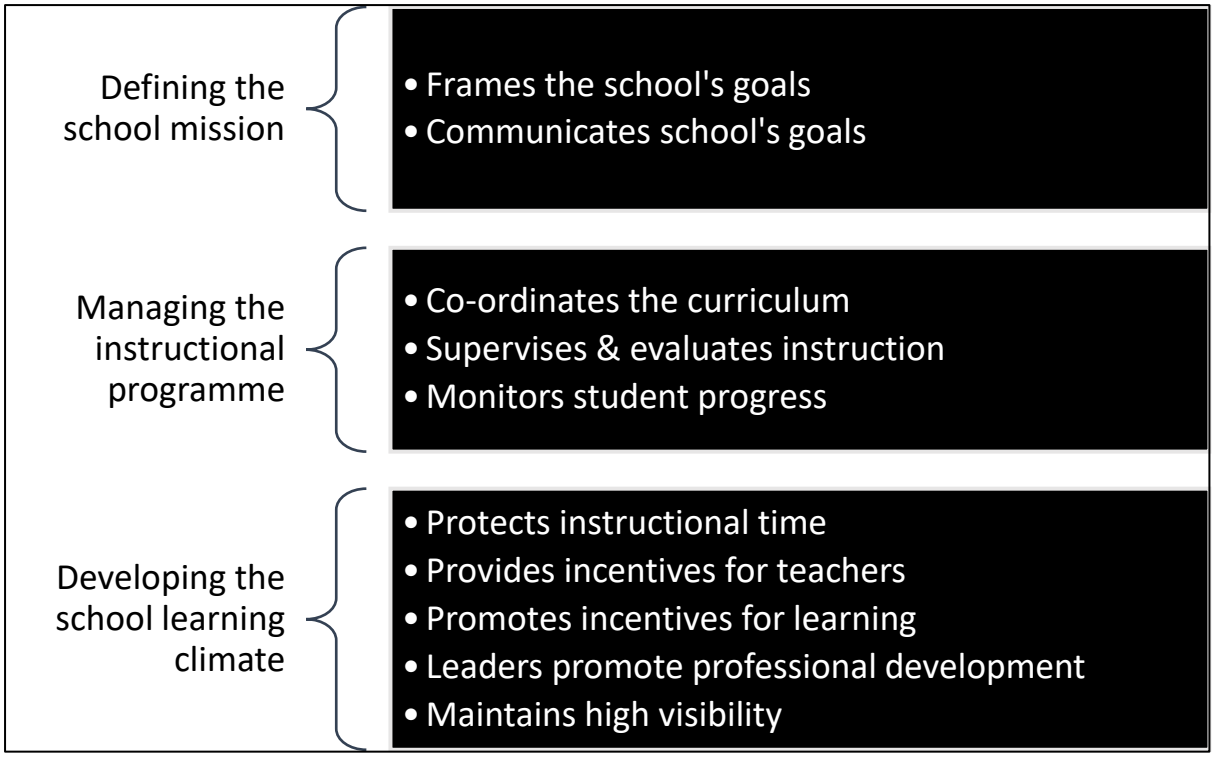


Figure 2: Principal Instructional Management Rating Scale (PIMRS) Conceptual Framework (Hallinger, 2003)

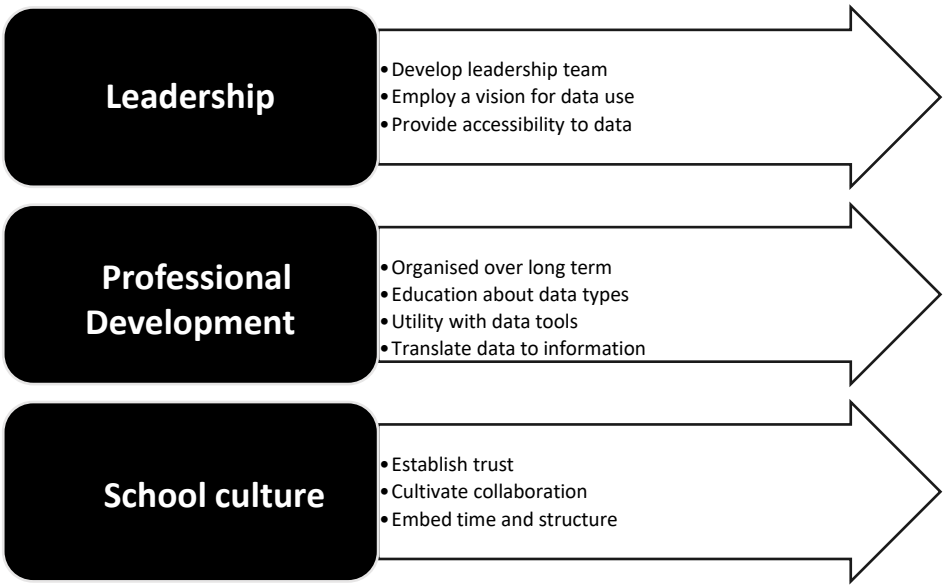


Figure 3: Antecedents of Effective Data Use Conceptual Framework, adapted from Reeves' (2004) original antecedents of excellence

2.3.2 Antecedents of Effective Data Use Conceptual Framework

The *Antecedents of Effective Data Use Conceptual Framework*, a 2004 adapted version of Reeves' original work titled *Antecedents of Excellence*. *Antecedents of Effective Data Use*

Conceptual Framework presents dimensions for guiding data-informed school leaders in taking a deliberate and meaningful course of action by establishing organisational data culture and daily routines of practice while at the same time, cultivating data use habits within the school towards school success (Reeves, 2004).

Leadership, professional development and *school culture* are the three core dimensions given expression in the Antecedents of Effective Data Use Conceptual Framework defined in terms of several fundamental data leadership and literacy skills every instructional leader should aspire towards (Lange et al., 2012; Light et al., 2004). As with the original Reeves's (2004) Antecedents of Excellence, true instructional leadership is that which understands that achieving students' success cannot be ascribed only to test scores, but through a chain of professional practices, beliefs, values, habits, and daily routines, among many aspects that positively influence student learning. Data-informed instructional leaders within this frame of reference base their understanding on the fact that school-wide meaningful change is not coincidental but consequential to leadership's deep understanding of the value data possess through which results may be achieved by:

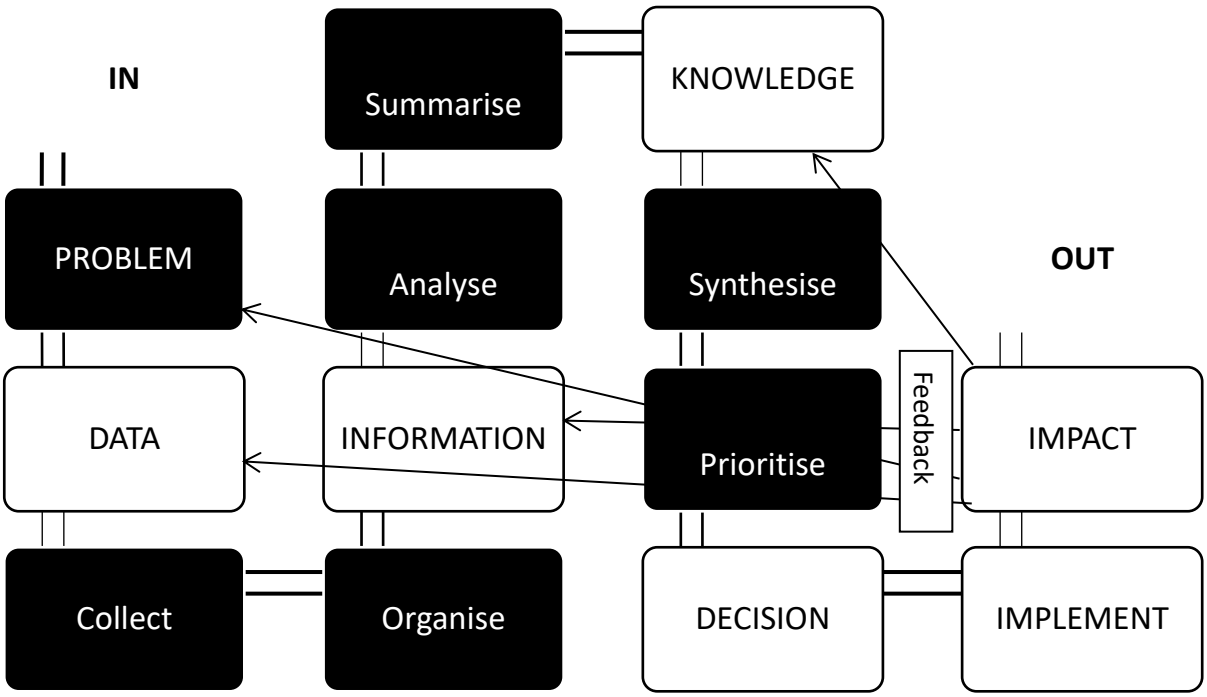
a) Collective participation of teachers, students, parents, and stakeholders in student learning.

b) Understanding of all the factors that influence student outcomes such as dispositions, daily routines, habits of mind, curriculum programme, teaching practice, among others.

c) Leadership's ability to learn from setbacks through rigorous examining of data to identify student learning gaps.

d) Taking appropriate instructional decisions in ways that yield positive academic success while assisting in the maintenance of results.

e) Understanding that success is not a product of luck or is coincidental but is resultant from well-thought out data-based solutions.



CLASSROOM
BUILDING
DISTRICT

Figure 4: Framework for Data Driven Instruction (Light, Wexler &, Heinze, 2004), adapted from Ackoff's (1989) conceptual framework

2.3.2 Framework for Data Driven Instruction

The *Framework for Data Instruction* is a conceptualisation of a rigorous inquiry process for aggregating and analysing data and how the process informs future action for improving outcomes at different levels of the educational system (Blink, 2007). The development of this conceptual framework which resulted from the work of Light et al. (2004) denotes a data cycle for understanding how data in district, school and classroom data based environments becomes useable information as evidence to inform instructional decisions. The work of Light et al. (2004) of developing a basis that brought understanding of data use in organisations and for managements in general, and particularly in schools drew inspiration from the works of Ackoff (1989), Drucker (1989) and Breiter (2003). Core to the Framework for Data Instruction are

three concepts merged from different fields of research, *inter alia*; "Management Information Systems, literature in the fields of organisational and business research which underlined this whole conceptual framework with technological affordances and socio-technical relations for understanding data tools and factors teachers bring to the data synthesising process", (Light et al., 2006, p. 2-3).

Following the logic in Ackoff's (1989) theory, translating data into meaningful information and knowledge assists teachers in defining the course of further actions and interventions to take in improving teaching and learning within the school (Light et al., 2006). Additionally, Ackoff (1989) further postulated that data in the raw state lacked significance unless data were appropriately contextualised, analysed and interpreted into meaningful information for gaining knowledge about the situation. Based on these knowledge creation processes, informed decisions could result into appropriate action, should data guide the decision-making process.

To illuminate this fact more succinctly and within the context of classroom teaching, Light et al. (2004) theorised this by saying that, "in relation to test information, the teacher's ability to see connections between students' scores on different item-skills analysis and classroom instruction, and then act on them, represents knowledge" (Light et al., 2004, p. 3). The Antecedents of Excellence framework from which the Framework for Data Instruction was premised, is significant towards effective data driven instructional leadership (Light et al., 2004).

All three theoretical frameworks, namely, Instructional Leadership Framework, Antecedents of Effective Data Use Conceptual Framework, and the Framework for Data Driven Instruction were preferred frameworks for the study as they provided a schema for instructional school leadership practices, characterised by habits of excellence that have proven to engender high performance in accountability-enmeshed and data-informed school contexts (Light et al., 2004). By implication, theories outlined herein have a possibility of providing insightful guidance and invaluable information for school leadership towards enabling a vibrant data driven learning culture for both teachers and students within a supportive and collaborative school environment. But most importantly, these have a potential to fundamentally enable school leaders and management to effect systematic instructional changes for self-reflection, enrich student learning while raising student achievements through meaningful data use.

Moreover, with the ubiquity of technological data tools or sources in education, transforming schools towards high academic excellence is becoming an increasingly important part of the

school leaderships' function. These data tools or sources enable school leaders to access educational data to impact teaching and learning with ease (Blink, 2007; Earl & Katz, 2006). With a clearly defined vision and an established school data-based decision making culture, espousing values and ethos synchronised with antecedents of excellence would go a long way in guiding the school's improvement efforts towards high student achievement (Hallinger, 2003; Halverson, et al., 2007).

2.4. Chapter summary

In this chapter, a wide range of literature relevant to the study was reviewed, focusing on thematic areas of focus that encompasses data-informed instructional leadership practices of school leadership with regards to the roles they play to establishing and leading sustainable data culture**,** teachers' data practices in reference to the skills, knowledge, beliefs, dispositions and habits of mind teachers need to become data literate and teachers' data professional development from schools and the Department of Education.

The theoretical underpinnings on which the study was grounded were explored which included Instructional Leadership (PIMRS' three dimensions for instructional leadership), Framework for Data Driven Instruction, Antecedents of Effective Data Use Conceptual Framework which provided conceptual and analytical perspectives for understanding Data-driven decision making (DDDM) approach applicable in high accountability, assessment driven, performance based educational contexts. The chapter following this one, examined the research methodology and design framing this study.

CHAPTER 3 RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The previous chapter presented a literature review and theoretical frameworks underpinning the study. This chapter explored the general design and methodology of the study. This chapter focused on theoretical considerations, namely, research paradigm, design, methodology, research sampling, data generation, data generation methods, including data presentation and discussion. Additionally, the chapter provided descriptions of the research sites and participants. In conclusion, aspects of trustworthiness, ethical issues, and the limitations of the study were also addressed.

3.2 Research paradigm

According to Guba and Lincoln (1985), research paradigms could be described as the "basic belief systems or worldviews that guide researchers not only in choices of methods (methodology) but in ontology (nature of reality) and epistemology (the relationship between the knower and the known)". Similarly, De Vos, Strydom, Fouche and Delport (2011) and Creswell (2007) presented research paradigms as collections of the researchers' knowledge and perception (epistemology), idea of reality (ontology), their values (axiology) in shaping the research process they undertake (methodology) as they investigate the research problem.

To this end, this study developed philosophically from a "set of beliefs that guided action" (Guba, 1990, p. 17) for my research study. Equally important for informing this research process, were participants' worldviews and their ideas about the social phenomenon under investigation. For the most part, data collection and analysis were done through a socially constructed process which drew on participants' lived experiences through interviews, questionnaire and document analysis. This inquiry was premised on the philosophical thinking of Kuhn (1962), Creswell (2007) and Kivunja and Kuyini (2017), who suggested that for the qualitative research process to be meaningful it must be approached from a clearly defined paradigmatic or philosophical standpoint. Accordingly, this study was approached from an interpretivist cum constructivist paradigmatic view.

Fundamentally, research paradigms framed and shaped the writing and the conduct of this study (Creswell, 2007). The theoretical sensitivity for guiding this study stemmed from my own set of basic ideas and concepts about the research problem thus leading to the formulation

of critical questions that needed in-depth responses from the participants in this research process.

In this qualitative study, a sound design process began with explicitly stating philosophical assumptions, paradigms, interpretive or theoretical frameworks as a set of beliefs and values I brought into this inquiry (Creswell, 2007). Within this design process, three main paradigms, namely, interpretivism or social constructivism, pragmatism, or post-modernism and participatory or emancipatory paradigms, also known as critical theory, were highlighted (Creswell, 2007).

Of these three main ones, only the interpretivist or social constructivist paradigm influenced by the philosophical or knowledge claims of Berger and Luckmann (1967), Lincoln and Guba (1985), Crotty (1998), Neumann (2000), Schwandt (2000), and others (Creswell, 2003) framed the philosophical design of the study. A philosophical framework for guiding this process considered individuals' varied viewpoints in terms of their individual experiences about the research problem (De Vos et al., 2011; Creswell, 2007). This philosophical assumption landed itself on the idea that the interpretation of reality should be derived from the lived experiences of research participants and that it must be understood through their language (Schwandt, 2007) or expressions. This was premised from a symbolic interactionism, analytic induction, and grounded theory points of views (Schwandt, 2007).

3.2.1 Epistemology

The term 'epistemology' is rooted in the Greek word *episteme*, which means knowledge (Kivunja & Kuyini, 2017). According to Kivunja and Kuyini (2017, p. 27), epistemology describes "how we come to know something; how we know the truth or reality". In research, epistemology describes the process in which the inquirer investigates the nature of reality, truth, and knowledge. Burton, Brundrett and Jones (2008) stated that epistemology played a key role in describing the process of knowledge creation within a research design framework. Within this epistemological construct, I would ask factual questions, for enabling him or her to take a particular stance or position within the research context.

By asking questions which were concerned about knowledge, reality and truth, in relation to their nature and form required in-depth analysis of knowledge which meant asking questions such as, is it possible to acquire, create or personally experience this knowledge, reality or truth? In other words, how do I know what I know? In so doing, this described a relationship between the researcher (knower) and what to research about (unknown) (Kivunja & Kuyini,

2017). These questions were important to ask, as they were fundamental to framing the researchers' epistemological theory. Essentially, epistemologies could also be thought of as, "theories of knowledge and perception" (De Vos et al., 2011, p. 309), this refers to the "principles and rules" (De Vos et al., 2011) by which I was able to define the theoretical base for this study.

Many and varied theories of epistemology exist, *inter alia*, objectivism, interpretivism and constructionism (De Vos et al., 2011). On one hand, the objectivist researcher believes that reality could be researched objectively. However, on the other hand, the interpretivist researcher believes that knowledge is a socially constructed process through democratic means (Burton, Brundrett & Jones, 2008). This epistemological paradigm is also known as social constructivism or interpretivism. Interpretivism is premised on the idea that "reality should be interpreted through the meaning that research participants give to their life world…this meaning can only be discovered through language" (De Vos et al., 2011, p. 310).

In this study, a process of data gathering involved interviewing school management teams, principals and a district official as research participants within a process that acknowledged and appreciated the multiplicity of ideas and participants' lived experiences. The Principals or Deputy Principals, Heads of Department and the Senior Education Specialist (District Official) gave good account of their ideas and beliefs around data use in relation to how they believed data enhanced pedagogic practice, as well as how in the schools data were used or not used capably for student support.

Data was extracted from the participants through a socially constructed process of face-to-face individual interviews. They all gave account of the individual experiences in data use to make instructional decisions as well as their roles in empowering and supporting teachers towards effective use of data for teaching and learning. The study investigated the managements' ability to foster a data culture manifested through the establishment of functional and sustainable data management structures inside the two schools.

3.2.2 Ontology

Ontology relates to "the nature of reality and its characteristics. When I conducted this qualitative research, I understood the importance of embracing the idea of multiple realities" as it related to the account of participants in the study (Creswell, 2007, p.16). In the course of this study, I focused on gathering data from various participants' expressions of different viewpoints based on lived experiences of the research phenomenon. A closer engagement with

the Principals, Heads of Department and the District Official (participants) to hear them articulate their thoughts about the student assessment data used to enhance teaching and learning was vital towards data gathering. This allowed me to gain deeper insights into participants' multiple perceptions of instructional practices of principals in raising student outcomes through Data Driven Decision-Making approach.

3.2.3 Axiology

Axiology refers to the way in which the researcher's values shape the entire research process (Creswell, 2007). Axiology could be thought of as what is valued about this study and its findings, and these were stated categorically and demonstrated in the course of this research (Creswell, 2007). The values espoused in this study entails integrity, honesty, respect, fairness, confidentiality, safety, trustworthiness and ethical consideration (Creswell, 2007). All these values guided the research process from the beginning to the end. Nevertheless, my biases and subjectivity as it pertained to own deep underlying perceptions and assumptions about the research problem became evident in the process of conducting this research inquiry.

3.3 Research design

Described broadly, research design "refers to the schema or plan that constitutes the entire research study. It includes a summary of the intended research topic and distinguishes between the research problem and the research questions that are derived from the problem" (Scott & Morrison, 2006, p. 58). However, De Vos et al. (2011) thought of a research design more precisely as a stage or phase within the research process or as a sum of researchers' decisions. A researcher may decide based on the nature and purpose of the research to adopt any of the following research designs, namely surveys, experimental designs, action research, mixed methods, ethnography and ethnography.

However, for this study a case study research design was selected because of its ability to enable researchers to conduct "an in-depth, multifaceted investigation…of a single social phenomenon" (Feagin, Orum, & Sjoberg, 1991, p.2). In this context, a single social phenomenon under investigation referred to the data-driven instructional practices of school leaders towards improving student attainment.

Although major contestations and little consensus exist amongst scholars about what constitutes a case study, accordingly Creswell (2007, p. 73), suggested that a "case study research is a qualitative approach in which the investigator explores a bounded system (a case)

or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information (e.g., observations, interviews, audio-visual material, and documents and reports), and reports a case description and case-based themes. For example, several programs (a multi-site study) or a single program (a within-site study) may be selected for study".

To this end, a case study may be interpreted as a process that involves a single individual or multiple individuals (De Vos et al., 2011). A variety of case studies from which researchers in in the field of qualitative research inquiry may select from exist, (Baxter & Jack, 2008; Creswell, 2007) and notable ones are; 1) single instrumental case study or case study for explanatory purpose which focuses on investigating the researched phenomenon by means of a single bounded system or individual case (Creswell, 2007). 2) The collective or multiple case study concerned with inquiring on multiple case studies or programmes in one site or in multiple sites (Baxter & Jack, 2008; Creswell, 2007). 3) The intrinsic or descriptive case study which investigates a particular case through a procedural process with emphasis on in-depth analysis of its descriptive details within a particular context is another one (Creswell, 2007; Yin, 2003), that focuses on the nature and the uniqueness of such an individual case.

For this study, I adopted a multiple case study approach in which two school sites involving four managers along with the district official became cases of research interest to establish the instructional leadership roles of principals and SMTs in creating conducive and enabling conditions for effective data use to enhance instructional programme within the schools. By examining varied levels of school leaders' practices within individual school cases that were well-known for integrating data in guiding instructional decision-making, ensured diversity of information about the research problem was sourced. From within these contexts, a diversity of rich data about the research problem were generated, analysed and presented.

In a qualitative study, a sound design process begins with explicitly stated philosophical assumptions, paradigms, interpretive or theoretical frameworks, set of beliefs and values the researcher brings into the inquiry (Creswell, 2007). My initial assumptions were that data practices the selected A qualitative research study may assume varied design approaches. The purpose of the study, nature of the research question, the skills and resources at the disposal of the researcher are all-important considerations for the qualitative researcher and influence the choice of a research design (De Vos et al., 2011). Unlike the quantitative research design which is a step-by-step process wherein the design determines choices and actions of the researcher,

the qualitative research design process is influenced by the choices and actions of the researcher (De Vos et al., 2011). Five traditions of qualitative research inquiry, as identified by Creswell (2007), include narrative biography, ethnography, phenomenology, grounded theory and case study.

This research investigation assumed a case study approach. This approach is most appropriate and suited for gaining insight, understanding about, and familiarising oneself with participants' social worlds, their lived experiences, words, and actions. In the context of data driven instructional leadership within schools which are governed by high accountability regimes, I have selected a multiple case study process in which two secondary schools in Gauteng province were studied. The two case studies involved two Principals or Deputy Principals and two school management team members or HODs from each school. The District official was also a participant in the research inquiry, albeit separate from the schools' leadership and management personnel. In doing so, this provided a multiplicity of perspectives on the research problem while at the same time, enriching the process of inquiry.

This process took into consideration the broader discourse on the role which instructional leadership and management played towards school improvement. Nevertheless, focus was placed on how school leadership, as a lever for leading and effecting change, was able to make meaning of student assessment data to enhance pedagogic practice. This was achieved through a qualitative data collection process that involved questionnaires, individual interviews, document analysis and audio-visual recordings of participants' responses about the research problem.

3.4 Research Methodology

Methodology in research describes a process for gaining knowledge, information and understanding (Krauss, 2005) about the research problem. For the purpose of this research and for gaining knowledge and understanding, I approached this case study from an interpretivist perspective by asking participants several questions to gather information from different rich perspectives about the research phenomenon (Creswell, 2007). This study adopted a qualitative research methodology wherein procedures and methodology were inductive and emerging, yet they were shaped by my experience in generating and analysing qualitative data (Kothari, 2004).

In the course of the research process I had to carefully evaluate the methods, techniques and data generation instruments being used to see if they serve the purpose for which they were

intended, and amendments were effected where needed. (Kothari, 2004; Creswell, 2007). For data generation I used questionnaires, interviews and document analysis. For the questionnaires, I used semi-structured questions with a combination of mostly open-ended and very few closed-ended questions. Interviews were recorded on audiotapes, transcribed and saved. The use of document analysis served to gather data that could not be sourced through questionnaires and interviews. This enabled me to gain enough information as it pertained to the data practices of principals and SMTs in support of student learning. Using varied data generation instruments also enriched the process of data collection and validation.

In my interactions with the Principals, Heads of Department or SMTs and the District Official, my objective was to find out about their instructional leadership practices in the context of establishing vision-directed and goal-guided data practices for leveraging analysed data towards student success. With principals' and SMTs' responsibilities of leading, managing and supporting collaborative data analysis processes within schools, it was important for me to understand how the practice of using data manifested in ways that supported student learning, thereby increase student academic gains. Furthermore, my intention was on finding out about participants' experiences when it came to internal or external forms of professional development and support in data use, if any.

3.5 Research Sampling

In the words of Kothari (2004), selected participants in a study make up the research sample or population. Sharma (2017) describes sampling as a research procedure that could be done through following non-probability or probability sampling techniques. Sampling techniques used by researchers include stratified sampling, random sampling, snowball sampling or cluster sampling. For this study, I preferred using purposive sampling that is non-probability (judgement/expert knowledge-based). Through this sampling technique I ensured that the research population group and size were appropriately selected (Sharma, 2017).

This approach allowed for easy adapting and changing data collection techniques during data collection (Sharma, 2017). The main advantage of purposive sampling is its suitability for investigating small samples within limited geographical boundaries (Lavrakas, 2008). Still, the most recognisable shortcoming of purposive sampling entailed its subjectivity in influencing the selection of a sample (Lavrakas, 2008), for example, participants for this study were selected based on my implicit presumption that participants are experienced in working with

data for managing and leading schools' curriculum programmes. That was construed to be adding value to the study.

Selecting the most appropriate sample (schools and participants) for this study or the right case study schools was done through asking colleagues to recommend schools that were known for accessing and inputting data mainly from the Data-Driven District dashboard and the SA-SAMS respectively. Accordingly, the two case study schools were selected from a list of Ekurhuleni North District schools with a high login rate into the Data-Driven District dashboard as well as schools that submit SA-SAMS data as per District's requirements. The two schools best suited this study because they both proved to be consistent users of the DDD and SA-SAMS data presumably to guide decisions that affect the functioning of the schools.

Selecting the right participants was done according to De Vos et al. (2011, p.342) who stated that, "researchers have to be inclusive and expansive when selecting individuals for interviews so that they can cover a range of perspectives". To this end, participants with varied management experience were selected the District Office and schools, namely the Senior Education Specialist, Principals and the HODs in both schools.

Selecting managers in various levels of instructional leadership ensured that I gained valuable insights into how varied management roles practiced instructional leadership using data as an enabler for student success. Furthermore, this allowed for corroboration of information from various sources and this was vital towards testing the validity and reliability of data.

The following key characteristics where taken into consideration when selecting participants; a) gender variations, b) management experience, c) positional titles and d) qualifications. I used criteria that considered balanced gender representativity (male and female), management experience of 5 years or more, Principal/ Deputy Principal, HOD and Senior Education Specialist (District Official). This being a small-scale study focused on various aspects of instructional leadership in managing data use in schools, hence it included only 5 (five) participants. Notwithstanding, the use of electronic questionnaires for data collection, however participants often take longer to complete and submit electronic questionnaires and when they do it would be after numerous follow up telephone calls were made. Additionally, had the study involved more the participants sampled, issues ranging from access to connectivity to data costs raised by participants would have delayed the completion of the study within specified times. As such, the findings of this study must not be used for generalisation purpose beyond the two researched schools.

3.5.1 Participants biographical information

Table 2: Biographical data

Positional title	Age	Gender	Grade(s) teaching	Highest Qualification	Experience in management role
Senior Education Specialist	54 years	Female	Office based	MEd in Educational Management	15 years
Principal S	50 years	Male	Not teaching	B Tech Educational Management	15 years
Principal T	52 years	Female	Not teaching	B Ed (Hon)	5 years
Head of Department S	48 years	Male	Grade 11	Advanced Certificate	7 years
Head of Department T	45 years	Female	Grade 11 and 12	B Ed Educational Management	6 years

Table 2 above shows participants in relation to their positional titles, management experience, age, gender, level of professional qualifications as well as the grades that they are teaching, where applicable.

3.5.2 Profiles of the District Official and researched schools

3.5.2.1 District Official (Senior Education Specialist)

The district official's role as an experienced assessment facilitator involves advocacy and mediation of the national assessment policies, guiding schools on assessment policy implementation, supporting the teachers and school management teams in understanding and applying policies, assessment strategies and techniques. Furthermore, she is a custodian of quarterly schools' performance analysed data which she receives from schools, verifies, collates and report about to the executive district management, schools, and other key stakeholders.

She is the co-ordinator and facilitator of the district assessment training workshops and meetings wherein individual school's analysed data are interpreted and discussed together with teachers and SMTs. She advocates for data-based decision making in guiding student intervention strategies in schools and mediates district-wide school performance data analysis processes. Together with the District Curriculum Head, she conducts school visits to share insights into schools' performance data through rigorous data inquiry sessions.

3.5.2.2 Profile of case study 1

Seal Secondary School is a public ordinary school in the Ekurhuleni region, East of Johannesburg in the province of Gauteng. The school enrols Grade 8 to 12 students and it is in a predominantly black urban township. Being a no-fee paying school means it is fully funded by the state. The current overall student population in this school is 1250 students.

The school caters for predominantly black students within a multi-lingual, multi-cultural and multi-national context. The background of most of these students could be described as low socio-economic and highly deprived. Approximately 2% of the student population is composed of migrant students from neighbouring Southern African countries whilst 98% of the students are local students.

The school provides students with daily meals provided through the state subsidised nutrition programme. The language of learning and teaching (LOLT) of the school is English. The overall pass rate obtained by the matriculation class of 2018 for National Senior Certificate was 74,5 %. The Grade 12 students' academic improvement programme, the Secondary Schools Improvement Programme (SSIP) provided by the Gauteng Department of Education takes place on Saturdays and during school holidays. The principal, two Deputy Principals and five Heads of Departments (HODs) make up the school management of Seal Secondary School.

It became clear throughout the interview that assessment data analysis forms an integral part of both schools' efforts to raise student outcomes. Evidently, records of statistical and diagnostic data analysis, minutes of meetings and presentations by management to the staff were viewed. These proved that the school analyses student formal assessments data on a quarterly basis and submit this data to the district office.

3.5.2.3 Profile of case study 2

Turtle Secondary School resembles Seal Secondary School in many ways, both the two schools are situated in predominantly black urban townships in the Ekurhuleni region, East of

Johannesburg in Gauteng province. They both offer tuition to students from Grade 8 to 12, most of whom come from the local community and surrounds within a multi-cultural, multi-lingual, and multi-national diverse setting. While a greater student population walk to school, many students rely on various modes of transport to travel to school.

To a greater extent the student population is locally based, with a few migrant students from neighbouring Southern African countries making up the student population. The school has currently enrolled 1323 students. The language of learning and teaching (LOLT) of the school is English. The overall end of the year pass rate obtained by the matriculation class of 2018 for the National Senior Certificate was 92,1%.

A greater part of the students come from highly deprived households rife with unemployment, poverty, and crime. The state's nutrition programme provided at the school serves as the main source of countless daily lunches for the students. The state's funded Secondary School Improvement Programme (SSIP) is the school's leading student academic support programme for improving Grade 12 students' achievements.

This programme, through which extra tuition is offered, takes place on Saturdays and during school holidays. The management of the school consists of the Principal, two Deputy Principals and six Heads of Departments (HODs). The school's data analysis process is led and co-ordinated by the Principal and the SMT and this happens through quarterly analysed students' achievement data presentations and discussions occur.

3.6 Data generation methods

Creswell (2007) described data generation methods as the methods for gathering data from a sample. Data generation methods commonly used by qualitative researchers include observations, interviews, checklists, field guides, document analysis, audio, and visual materials (Creswell, 2012, De Vos et al., 2011). To get the research questions answered with greater depth and detail, I preferred using a combination of questionnaires, individual interviews, and text documents. This enabled me to hear directly from the participants about the research problem. To establish data reliability, different data sources were triangulated through cross verification to determine the consistency of findings from the questionnaires and interview transcripts as well as text documents.

Before data generation ensued, letters for permission (**Appendix G, H, I**) were sent to the District Official, Principals and HODs of both schools to give consent to participate in the

study. The researcher ensured anonymity of participants was kept by using pseudonyms in place of participants' actual names. Participants were assured that research data was going to be kept confidential in possession of the University of Witwatersrand for at least five years. The researcher ensured that participants felt at ease knowing that they were going to be participate within a safe and non-judgemental environment throughout this research study.

3.6.1 Questionnaires

After obtaining permission that participants were willing to participate in the study, I requested for their email addresses to which I emailed the electronic questionnaires. I later phoned participants individually to ascertain receipt of the questionnaires and asked them to complete and email back within two weeks.

Questionnaires were essential for obtaining information from all the participants as it pertained to the research problem (Lavrakas, 2008). According to Lavrakas (2008, p. 652), questionnaires in a research inquiry reflect "a set of standardised questions, often called items, which follow a fixed scheme for collecting individual data about one or more specific topics". To this end, the formulated questionnaires for this study comprised of a set of standardised open-ended and closed-ended questions. The homogeneous nature of the questions was aimed at eliciting similar types of responses from the participants that were involved in this study (Lavrakas, 2008).

In ensuring the quality of the questionnaires, an established set of criteria was followed in designing them, *inter alia*: 1) Theoretical knowledge about the research problem by exploring the literature review and through qualitative research method. 2) By testing the validity and reliability of items in the questionnaire. 3) Through experience in questionnaire design or by using a host of well-designed and published questionnaires, and 4) Familiarity with the participants as they were important sources of information for the study (Lavrakas, 2008). In so doing, presented well-structured and qualitative questionnaires.

The questionnaire's structure allowed for logical question sequencing while the format entailed grouping questions based on the purpose of the study. Questions were grouped into several sections (Lavrakas, 2008, De Vos et al., 2011). The first part of the questionnaire outlined instructions for answering the questionnaire, thereafter section one documented participants' biographical data, followed by section two on schools' use of assessment data, next was section three about staff development and finally section 4 related to teachers' opinions about data.

3.6.2 Semi-structured interviews

Permission was sought form all five participants namely; the District Official, Principals and HODs of both schools through letters granting permission for participating in the study. Appointments were set with individual participants based on agreement on time and place of the interviews. On each occasion, two days before the day of the interview each participant were reminded of the appointments again to confirm their availability. Interviews enabled gathering of information directly from research participants through a face to face social interaction process (De Vos et al., 2011).

In so doing, together with the participants, we were able to engage in meaningful dialogues to communicate about the research phenomenon. By engaging freely in conversations that were non-prejudicial, established on trust, confidentiality and fairness enabled participants to feely express their views and share their lived experiences about their data-driven instructional leadership practices within the two researched schools. In so doing, I was able to leverage the power diversity from participants' responses thereby enriching this meaning-making process of data generation.

My use of semi-structured interviews was necessitated by the need to gain deeper insights into participants' perspectives on the research problem (De Vos et al., 2011). Within this interview framework, conditions under which participants were interviewed were enabling and conducive for them to give accounts of events, own opinions, beliefs, attitudes, and thoughts about the research problem. Semi-structured interviews that were conducted with Principals or Deputy Principals, Heads of Departments and the District Official ensured that rich data was sought from all of them. Interviews focused on the instructional leadership roles of principals to support instruction, data culture of the school and capacity building of the staff on data literacy.

3.6.3 Documents

Prior to conducting field research, the Principals in the researched schools were requested to prepare end of term schedules, assessment marksheets, minutes of data meetings, presentations and analysis of student assessment data. The purpose was to use these documents to gather information about school's data practices, scheduled data meetings (regularity, decisions taken, student and teacher support) and so forth. During data generation, information from these documents was written down in my diary and retrieved copies of the same documents. During

data analysis information from these documents was used to triangulate data between different data sources.

3.7 Data analysis

Analysed data reflected upon the data-informed leadership practices of instructional managers at different levels of the instructional system as conceptualised through the lenses of Hallinger's 2003 Principal Instructional Management Rating Scale, Light et al, 2004s Framework for Data Driven Instruction and Reeves' 2004 Antecedents for Effective Data Use. A core methodology used for analysing rich data for gaining in-depth understanding of the research problem was the grounded theory approach. By using the relevant literature enabled me to look for specific actions, habits from instructional leaders and managers in the district that enabled schools to create conditions that seemed supportive to teachers towards raised students' academic gains.

Data was analysed inductively using the grounded theory approach through constantly comparing various data sources with their interpretations (Mills et al., 2006), but most importantly to ascertain the validity and reliability between these data (Patton, 2002). During this intensive process many of the analysing data from notes and memos taken during field research, documents and interview transcripts, data were categorised and coded according to various patterns and themes (Kruger, De Vos, Fouche & Venter, 2005; Schwandt, 2007). Large amounts of data were coded into smaller categories of identified patterns first. Codification of data categories evolved from there and progressed into a process of going through the data line by line, circling ideas with similar meaning and labelling them appropriately (De Vos et al., 2011). Finally, the codified data gave rise to themes and sub-themes presented in depth in Chapter 4. Saldana (2009) describes a code as "a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data" (p. 3).

In analysing the data for the researched schools, I kept their names of the schools and participants confidential, instead of using actual school names I used pseudonyms to describe each school's characteristics, Seal Secondary School and Turtle Secondary School were used as metaphors to describe the depth with which these schools were able to use data to improve instruction. Participants were referred by their management positions such as Principal and HOD, Senior Education Specialist (District Official) next to them letters S, T and SES were attached, respectively.

3.7.1 Questionnaire data

Letters for permission (**Appendix G, H, I**) were sent to the District Official, Principals and HODs of both schools to give consent to participate in the study. The researcher ensured anonymity of participants was kept by using pseudonyms in place of participants' actual names. Participants were assured that research data was going to be kept confidential in possession of the University of Witwatersrand for at least five years. The researcher ensured that participants felt at ease knowing that they were going to participate within a safe and non-judgemental environment throughout this research study.

Electronic questionnaires consisting of a set of questions framed from the key research questions were distributed via emails to all five participants. All completed questionnaires were returned through email to me. The questionnaires consisted of four sections. The first section tabled participants' biographical data followed by a section about the schools' use of student assessment data. The next section consisted of questions that related capacity building of staff in the meaningful use of analysed data to support instruction. The concluding section consisted of questions on teachers' opinions on data use for teaching and learning.

Three from the five participants returned completed questionnaires to me as expected, whereas two other participants delayed their submissions citing internet connectivity issues. In mitigating against this challenge, I arranged with the participants that I will drive to their respective schools and collect the questionnaires from them using an external hard drive or flash disc. Having collected the complete data, I began analysing various forms of data from the questionnaires and comparing it with the data from interviews and documents.

Through categorisations, ordering and re-configuring of data, codes for describing patterns and themes emerged from participants' narratives, content and discourses. Further, classifications of codes resulted into new sub-themes that linked together with the main themes. Themes and sub-themes were explored in detail in Chapter 4. As a way of verifying the validity and reliability of collected data, I used triangulation techniques of looking for inaccuracies and inconsistencies within data response tools used in this study. This enabled me to reflect on data collection techniques and procedures more in-depth for further refinement.

3.7.2 Interview data

Letters for permission and interview schedules were sent to the District Official, Principals

and SMTs for obtaining permission to participate in the interviews. Each participant who participated in the study gave consent by completing and signing the letters for permission and the interview schedules. Data was generated through audio taping and analysed through a grounded theory guided technique of constantly comparing interview transcripts' data between participants to ascertain its reliability and validity. Data were broken down into smaller components of categories of similar ideas from participants' narratives and conversations, thereafter emerging codes of patterns and themes were appropriate labelled and classified accordingly.

3.7.3 Documents data

Relevant documents sourced from Principals in both schools such as minutes of meetings, Power-point presentations and assessment schedules were analysed thoroughly looking through the content, dates, resolutions taken on schools' data strategies, learner's support interventions as well as any challenges encountered ad ways to overcome them. All the information was written in the diary. Data was analysed and compared with all other data from questionnaires and transcripts to establish if there were any information gaps or inaccuracies. The purpose was to seek additional data where gaps existed. This approach also proved useful for data triangulation.

3.8 Issues of trustworthiness

To achieve the trustworthiness of the study I ensured that research methodology used for sampling, collecting data, content data analysis and presentation of study findings were objective and non-biased (Scott & Morrison, 2006; Fouche & De Vos, 2011). This understanding was framed along the ideas of Lincoln & Guba (1985) who suggested that trustworthiness in a study needed to reflect the credibility, authenticity, transferability, dependability, validity, reliability, and objectivity of the study.

In the words of Morrow (2005) when trustworthiness could be established in a study, such study has "multiple standards of quality" (p.250). As far as this study was concerned it was conducted ethically, through following established research methodology, in which generated and analysed multiple data sources' validity and reliability were established. Study findings were presented objectively without manipulation or bias. Issues of trustworthiness are further expounded and discussed in detail below.

3.8.1 Credibility

In my presentation of data about the research problem I ensured that data was presented as accurately as possible (Creswell, 2007). In this context, I provided a precise account of participant's real life experiences without misrepresenting the facts or distorting their account of events in relation to the data practices of instructional leaders to enhance teaching and learning in schools. The narratives of participants were presented as sincerely as possible, in a balanced manner and corroborated by evidential data.

In validating collected data, Lincoln and Guba (1985) suggested that among other things of great significance was the triangulation of procedures. In that sense, throughout this study, I kept on evaluating the procedures and techniques used to determine their suitability for the study. To ensure the deepening and enriching of response data, additional information was sought through asking follow-up questions or getting more clarification and explanations about the research problem from participants.

Furthermore, I cross-referenced data between various sources and contexts, thereby establishing the validity and reliability of data. Conclusions reached in this study were free of biases and prejudices as far as possible, and participants could make their own judgements as to whether the findings were reliable, acceptable or not. They could establish the study credibility by the authenticity in which their lived experiences were presented, analysed and discussed.

3.8.2 Transferability

Transferability relates to whether the findings of the research could be transferable or generalised to another context or situation, as contexts are different (De Vos, 2005). Through triangulation, varied data sources enabled findings of this study to be transferable to other contexts. The findings of this study were corroborated by various sources of data for enriching the study (De Vos, 2005). Creswell (2007) argued that, "to make sure that the findings are transferable between the researcher and those being studied, thick description is necessary" (p. 204). I achieved transferability of the study through comparing varied response data in ways that ensured results could be applicable in other contexts.

3.8.3 Dependability

Dependability of the study is when the study stays logical and stable under different conditions over time (Creswell, 2007). It was envisaged that the study would present similar findings even

if conducted under the same conditions with the same participants. In that sense, the study could be deemed dependable. I have ensured dependability of the study "through carefully tracking the emerging research design and through keeping an audit trail, being a detailed chronology of research activities and processes; influences on the data collection and analysis; emerging themes, categories or models and analytic memos" (Morrow, 2005, p. 252). I kept a diary and a notebook in which I wrote notes, drew sketches and mind maps highlighting themes and patterns as they were found. I requested the supervisor to check if the study met all the requirements for dependability.

3.8.4 Confirmability

In qualitative research, inquiry confirmability is premised on the notion that research is not objective (Morrow, 2005). As such, confirmability proposes that research "findings should represent, as far as is (humanly) possible, the situation being researched rather than the beliefs, pet theories, or biases of the researcher" (Gasson, 2004, p. 93).

Rather than presenting my own biased views about the research problem, I ensured that I presented participants' data and interpretations as accurately as possible. Quotations were used to distinguish my own voice from that of the participants when presenting their narrations, content and views. More established researchers, like my supervisor, were asked to verify that personal biases were not evident in the findings in the study.

3.9 Ethical issues

Ethical issues for this study entailed openness, honesty, anonymity and confidentiality, voluntary participation, no harm to the participants, deceiving of participants, analysing and reporting in publications, beneficence, respect and justice (Babbie, Mutton, & Strydom, 2011). All of these ethical considerations formed a basis for an agreement between I, as the researcher and the participants. I followed a stipulated process within specified timelines in acquiring the ethics clearance from relevant authorities.

In this context, the University of Witwatersrand Ethics forms were sought, completed, and submitted to the Ethics Clearance Committee before clearance could be obtained. Once the first submission was returned by the Ethics Clearance Office with recommendations for amendments, I worked on correcting the first submission for re-submission to the Ethics Clearance Committee. When all the requirements had been met, the Research Office at Wits granted an ethical clearance. Thereafter, additional clearance was applied for at the Gauteng

Department of Education through a prescribed process after which clearance was granted before I started with the research study at the selected schools.

Thereafter, I requested permission from school principals, HODs and District Official to conduct interviews with them and once permission was granted, I proceeded to conducting the research. Both permissions were obtained through a letter from the Wits Ethics Committee informing them of the nature and purpose of the study, timeframes, interview process and how data would be used. I assured them of anonymity and confidentiality and guaranteed them of a risk free and a harmless process. I explained to them that neither, their identities or that of their institutions would be revealed. I guaranteed confidentiality of information and explained to participants that information would be kept safe for a period of five years at the Wits university archives.

3.10 Limitations of the study

There were several limitations to this study, for instance interviewing principals and SMTs came with its own limitations, wherein principals' interviews took days to schedule and finalise, but it happened that appointments had to be cancelled a few times and re-scheduled again. Equally, interviewing HODs had challenges too, for example Seal secondary school HOD shared her office with a colleague and resulted in few interruptions into the interview. After a few stops, the interview proceeded without further interruption afterwards. I thought that such interruptions had a potential to disturb the flow of ideas during conversations.

The questionnaires consisted of a few closed-ended questions that proved problematic in providing enough information. In mitigating the problem, I had to ask several follow-up questions as responses to these questions often lacked substance and depth. Another constraint related to the submission of electronic questionnaires via email. This proved problematic because both HODs of Seal secondary school and Turtle secondary school could not email completed questionnaires back to me due to data and internet connectivity issues. As a result, questionnaires took long to return but I eventually used a flash disc to collect them from the participants.

A small number of participants involved in the study meant that findings of the study represented minority views. That failed to provide a broader sense of the role school leaders played in establishing and leading effective collaborative data processes for the implementation of instructional programs. Additionally, there were expenses that were incurred to cover travelling expenses and refreshments for participants and myself. These became limitations in

a sense that the expenses went beyond the set budget. Nevertheless, I had additional funds to cover all expenses to ensure the study was conducted successfully and concluded within the stipulated timeframe.

3.11 Chapter summary

This chapter explored the general design and methodology of the study. Consideration was given to theoretical considerations, such as research paradigm, design, methodology, sampling, data generation, sampling instrumentation and data generation methods including data analysis. Additionally, the chapter considered issues of trustworthiness, ethical issues, and limitations of the study.

CHAPTER 4 DATA PRESENTATION AND DISCUSSIONS

4.1 Introduction

The previous chapter presented the research and design methodology for this research inquiry. This chapter provided descriptions and backgrounds of studied case schools and presented and discussed analysis of findings from each school. Analysis of data presented captured the content, discourses, and conversations of participants about providing exemplary data-informed leadership in schools thus promoting the use of data to improve teaching and learning.

4.2 Data presentation and discussion

In presenting the data for the researched schools, I kept the names of the schools and participants confidential, instead of using actual school names I used pseudonyms to describe each school's unique characteristics based on their data use capability, Seal Secondary School and Turtle Secondary School were used as metaphors to describe the depth with which these schools were able to dive into the of use data to improve instruction. Participants were referred by their management positions namely; Principal, HOD, Senior Education Specialist (District Official) next to them letters S (Seal), T (Turtle) and SES (Senior Education Specialist) were attached, respectively.

Ethical considerations such as anonymity of participants to hide their true identities and confidentiality of information were guaranteed to the participants. Reliability, validity, and transferability of data were also important considerations throughout the data inquiry process.

Analysed data focused on both case study secondary schools including the district official pertaining to the instructional decision making of principals and SMTs towards increasing student academic gains through data use as well as institutional teacher data use capability support from schools and the district.

In analysing data, I focussed on identifying main ideas, narratives, discourses, concepts, and patterns from participants' responses and coded them into categories of themes and sub-themes (Gall, Gall, & Borg, 2007; Lichtman, 2006). Data sources, techniques and methods were triangulated throughout data generation and analysis through cross-checking of information between all the data sources to establish data validity and reliability.

4.4 Interviews data

Overall, five participants consisting of two HODs and two Principals of both Seal Secondary School and Turtle Secondary School together with the District Official took part in the research study. Principals were selected because data formed an integral part of instructional leaders' decision making for the effective implementation of curriculum towards attainment of student success. HODs' formed an important part of the interviews because of their management experiences of various departments in which analysed student assessment data are reflected upon frequently towards enhancing student performance.

By interviewing managers at different instructional levels enabled me to understand how they promoted and exemplified data use for teaching and learning in ways that enhanced teachers' data use capabilities. Moreover, this approach was also important for cross-verification of data between managers to establish the reliability and validity of data as I triangulated multiple data sets. Individually, during audiotaped interviews, every participant communicated his/her own lived experiences, roles each played in promoting the data culture in the school. They openly shared their thoughts on whether they thought reflecting on student assessment data could potentially enhance teaching practices in ways that increased the rate of student academic success.

Furthermore, the interviewed district official's experience in capacity building and school support on the effective use of analysed student assessment data to transform learning made her suitable to participate in the study.

4.5 Questionnaires data

Once permission was sought from the Provincial, District Offices of Gauteng Department of Education, Principals, HODs and District Official were also requested to grant me permission to conduct the study with them. For each individual participant electronic questionnaires **(Appendix A)** were prepared with separate set of questions for principals, SMTs and the District official to respond to and email back within an agreed timeframe. The selection of principals, HODs and the District official considered their experience in positions of management in which data is essential for guiding their decisions towards improving student learning. Of the five questionnaires distributed, two were for the principals, two for the HODs and one for the District official.

The three questionnaires from the two Principals including the District official were completed and emailed back to me on time. Owing to internet connectivity constraints experienced by the two SMTs in both research schools, emailing the questionnaires back proved difficult. In mitigating that challenge, I went to the schools and retrieved the questionnaires from the participants using an electronic device (flash disc)

4.6 Documents data

Principals in both Seal and Turtle Secondary schools were asked to present term schedules and assessment data analysis reports, data meetings presentations, and minutes of meetings data discussion meetings. After availing these documents, I thoroughly looked through these documents and found that Grade 10, 11 and 12 class and grade analysed student achievement data for end of the first and second terms of 2019. Additionally, copies of end of term student assessment schedules generated through the SA-SAMS data management software were sourced for analysis purposes.

Copies of data analysis Power point presentations meant for staff data discussions meetings with graphical representations of subject, class and grade performances data were also made available to me. I noted that both schools held meetings in which student performances of the previous terms were analysed at the beginning of every term. Minutes of meetings showed that decisions were taken on how to approach teaching and learning differently and what type of support could be provided to students to improve student learning. All the valuable information was written in my journal for further analysis. Together with data from interview transcripts and questionnaires, documents data was analysed and compared thereby ascertaining the validity and reliability of data essential towards drawing key conclusions for this study.

Data presentation and discussions reflected on the main research questions (as outlined in Chapter 1), specifically:

a. How principals' practices influence data-informed decisions in ways that improve teaching and learning?

b. Which data sets and tools have principals and teachers experienced in improving teaching and learning?

c. How have data been used effectively to improve teaching and learning?

d. In what way and by whom are teachers, capacitated and supported in the effective use of data to improve teaching and learning?

The main research questions about data driven instructional leadership practices of principals elicited a wide range of data responses as evidenced from the questionnaires, interviews and documents used for data generation and analysis. The overarching themes emerged from analysed data and the three most dominant narratives were presented as; **Leadership, School Culture** and **Development and Support** with underlying sub-themes outlined in Table 3 below. Theoretical frameworks and literature also guided the thematic analysis for this study.

4.7 Themes

Table 3: Themes and sub-themes

Themes	Sub-themes
1. Leadership	1.1 School's data vision, goals, and accountability 1.2. Understanding and knowledge 1.3. Access to data
2. School culture	2.1 Collaboration 2.2 Data structures
3. Development and support	3.1 Data literacy 3.2 Data use for teaching and learning 3.3 Institutional support

4.7.1 Leadership

Leadership was investigated in terms of Principals and SMTs leading schools' improvement efforts through clearly communicated **school's data vision** aligned with well communicated academic **goals** while ensuring **accountability** for student performance among managers and teachers. Furthermore, essential to establishing and leading and effective data practice in schools required Principals and SMTs with a deep **knowledge and understanding** of using various departmental data management systems in ways that could improve student academic success.

Moreover, in these contexts school leaders biggest challenge involved making multiple **data** sets **accessible** not only to the management but to the staff in general, particularly data from the SA-SAMS and the DDD dashboard. Therefore, the role of school leaders in making data sources accessible to staff became a major area for investigation within the dimension of data-driven instructional leadership practices of Principals and SMTs in the researched schools.

4.7.2 School culture

A key consideration for school leaders and management in data driven schools was to foster a data culture that was not only promoting data practices but that engendered creation of enabling conditions for teachers to use student assessment data together with all other data forms for self-reflection and improvement while increasing students' academic gains.

Schools that recognised the importance of building collegiality among the staff through **collaboration** within clearly scheduled data inquiry meetings lead by **structures** that are appreciated and supported by all were envisaged from the case study schools. That was the main reason this aspect needed to be examined between these schools.

4.7.3 Development and Support

Without building teacher's capacity to enable their data capabilities, their confidence in using data would be lacking and compounded with low morale. That is counterproductive to school's improvement efforts of increasing students' success rates. That is why it was vital for school leaders and policy makers to spare no effort to upskill teachers in the use of **data for teaching and learning** rather than for external accountability protocols. **Institutionally**, both **school management** and the **Department of Education** has a responsibility to improve the quality of education and one of the most important ways to do that is through **teacher professional development**. This was area was investigated as well.

4.8 Background of the District Official

The district official is a white lovely lady with a long blonde hair still in her early 50s. She recently obtained a Master of Education degree in the field of Educational Management and Leadership from the University of Witwatersrand. In her ten years of management experience she has been working for the Gauteng Department of Education as a Senior Education Specialist around Assessment in the Further Education and Training (FET) Phase. Her experience of supporting schools' improvement efforts using analysed assessment data towards increasing student success ensured she was a suitable participant for the study. Moreover, she

worked extensively with school leaders on these issues. This came through during the interview.

4.8.1 Leadership

The responses from the district official's interviews and questionnaire data suggested that she played a strong leadership role in guiding and training schools on how best to use assessment data to improve teaching and learning.

She emphasised the importance of aligning **school's data vision**, academic **goals** with the district's academic targets. She said,

> *In our district assessment meetings that we conduct once per term, we highlight the positives and negatives in terms of schools' overall performances and encourage schools to discuss their own analysed data by aligning their achievement goals with district targets, this they must do together as a staff and find ways of supporting struggling learners. That is the only way they can be able to improve their results* (District Official, SES)

4.8.2 School culture

According to Spillane (2012), a school culture that thrives towards achieving schools' set goals and objectives is established on collaboration and collegiality among its staff members including management.

When asked if the district nurtured a **data** collaborative **culture** within schools, District Official, SES stated;

> *In our district meetings with SMTs and Principals we show them the importance of PLCs, whereby all teachers in specific subjects sit together with their HODs, analyse and interpret end of term results. By doing so, they share ideas and best practices on what to do differently next time, in order to improve the performance of their learners* (District Official, SES).

4.8.3 Development and Support

Green (2010) regard prioritising **capacity building** and continuous **support** an enhancer to the data literacy of teachers and school leaders towards improving student attainment.

When asked if principals and teachers were capacitated in using analysed **data** to improve **teaching and learning**, District Official stated:

> *There we are proud to say that from three to four years back we focused on SA-SAMS training directly talking to performance analysis. This year we had training in May. We are going to have training in August...the skills we provide is through the trainings...when the training is done, we ask them to show us what they have done in their schools* (District Official SES)

In explaining whether the teacher's **professional development** provided to schools was effective, the district official indicated:

> *Our training is effective. Those schools that are attending the training and take the training back to the schools analyse data better. Let's say 40% of our schools are much more effective on data analysis than it was one or two years back* (District Official SES)

Interestingly, the District Official later conceded that instead of the district supporting schools to use data purposively, schools are pressurised to submit assessment data.

In explaining that, she said:

> *We all understand and know that data analysis is crucial especially in curriculum, but we are focusing on give us the data, and maybe we are not focusing on supporting them to use the data to perform. Maybe, we need to start there* (District Official SES)

As a result of such approach by the District, she said:

> *Many managers see data not as a means to improve teaching and learning but as a means to comply* (District Official SES)

Data-based decision making is considered an important part towards taking actionable interventions to help students improve in their learning experiences (Amakyi, 2013).

In explaining the difficulty of finding that schools were not analysing data for instructional purposes, the District Official SES said:

> *If a school, first of all know the learners in their school, they can act, they can take a learner from being a low performer to a high performer. The principals and teachers*

do not know the needs of their learners. So, the analysis they are doing is for compliance (District Official SES)

A number of research studies concluded that low or inadequate levels of data capacity building among teachers and school leaders existed in many educational settings. These included studies by Mandinach and Gummer (2016) involving US teachers, school leaders, Kippers et al. (2017) in which Dutch secondary school leaders, teachers, and data professionals were surveyed and the interviews of district officials, principals and teachers by the US Department of Education's National Educational Technological Trends Study (NETTS) (Means, Padilla, De Barger, & Bakia, 2009). Similar studies by South African researchers Botha (2015) and Marishane (2015) came to the same conclusion.

4.9 Context of Seal Secondary School

As I entered the school gates, a pleasant African male security guard welcomed me in his late 30s. The moment I gained entrance my eyes were greeted with lush green lawns surrounded by a colourful flower garden. The administration block seemed newly renovated, looking at the freshly painted security gates, ceilings, new tiled floors, modern lighting, and cabinetry. Security cameras were visible from corner leading to the main entrance hall making one feel like security was a priority for the school. After welcoming me the ladies in the front office ushered me into an expansive principal's office.

4.9.1 Leadership

On entering the Principal's office, I was met with a cabinet full of trophies and walls adorned with certificates of excellence, and that was impressive. I thought this must be an achieving school. The Principal was a charismatic and boisterous African male in his early 50s dressed in a dark blue suit, a white shirt, and a red tie. His cooperate look explained the firm handshake he gave me as I entered his office. He has been at the school for four years now, recently appointed after a year acting as a principal to substitute the former principal after he left. The principal, two Deputy Principals and five Heads of Departments (HODs) make up the school management of Seal Secondary School.

School leadership and management that reflected exemplary behaviour for adopting a systematic approach to data analysis processes in schools in on the right path towards increasing staff participation in data practices within the school (Bambrick-Santoyo, 2010; Earl & Katz, 2006; O'Neal, 2012).

In explaining how he exemplified promoting the use of data to support instruction, Principal S of Seal Secondary School pointed that by saying:

> *I am leading discussions on data analysis…I present to all the SMT, the managers in terms of all the stats* (Principal S)

Additionally, Principal S emphasised that over and above leading the discussions on data analysis, his principal's leadership role entailed energising the staff towards using data to enable students to succeed academically. He said:

> *The principal plays an integral role of encouraging and motivating both educators and the SMT in fact to achieve better results* (Principal S)

One of the most important instructional leadership's dimensions for enabling schools to become functional and productive is **accountability**. The principal spoke highly of his school achievements and attributed that to individual and team responsibility and accountability. Leaders in general let alone instructional leaders are not leading on their own but lead with and through teams. As such, there is a need for greater recognition by all staff members not only to regard themselves as individuals but also as team members involved in the affairs of the school. That does not only require allegiance to the team but mutual responsibility and accountability.

Principal S emphasised the importance of holding every staff member accountable for student performance starting with the HODs. About that he responded by saying:

> *The expectation is that from the department each and every HOD should sit with the department…at the first level they are the ones who should lead in terms of accountability, as educators account for what has happened and the HOD should be the first one to lead* (Principal S)

My first impression of HOD S was that he was a middle-aged African male with a striking level of passion to his management role. He spoke on issues of leadership and management within a department with so much clarity and passion. He is been an HOD in the Further Education Training (FET) Phase for the past 7 years. He taught Grade 11 learners at the school.

In support of the Principal's views on staff accountability for student academic results, HOD S emphasised that HODs were equally accountable. As such were expected to suggest on ways to improve student outcomes and on that he said:

> *When the results are being displayed…the HOD will comment as to why the results are not satisfactory and come up with systems that we are going to use to improve the results* (HOD S)

When quizzed about understanding about how useful the data from the DDD dashboard, CMM and SA-SAMS are for the school manager, Principal S explained by stating:

> *My understanding is all the data we are collecting, learners' attendance, together with the SBA (School-based Assessment) have to be captured on the SA-SAMS and after that, it would be sent to the district so that it will come with the analysis through DDD (District Data Driven) dashboard. It includes staff members' absenteeism. It (data) assists me as a principal in terms of developing strategies in terms of challenges and dealing with those challenges that may be found as one is going through the data* (Principal S)

At the same time, Principal S conceded that not all the members of the SMT and teachers were conversant with the SA-SAMS data tool as a source of information essential for decision making to enhance teaching and learning. He indicated the challenge faced by HODs in understanding the SA-SAMS data source. He shared his thoughts by saying:

At the present moment, there are still HODs who do not know what SA-SAMS is here for, what are the objectives of SA-SAMS and that is one of the serious problems we are having (Principal S)

To prove that fact, HOD S's explanation of what "DDD" and SA-SAMS entailed, showed that he had little understanding or experience using these data sources. He shared his views by stating:

> *It means we have to supply the district with an accurate data, say for learner enrolment, learner attendance, and teacher attendance, assessment of learners and results of learners* (HOD S)

Among barriers to effective **data use for teaching and learning**, Bernhardt (2004) identified lack of **access to data** warehouses by schools as counter-productive towards the improvement of teaching and learning.

When asked about accessing schools' information from Department of Education's data tools or sources, Principal S explained:

I think there is a Yes and a No. Yes, a person who works within the department have access to that and No, I don't think it is accessible for any person who works at the school. I think they need to ask for permission from the Department of Education to get that access (Principal S)

While HOD S shared similar sentiment about **data accessibility**, he somehow highlighted a problem faced by many teachers related to data access. He stated:

> *Yes, (data is accessible) to whoever wants to access it, there is a password, you need permission* (HOD S)

4.9.2 School Culture

Referring to school culture in the context of data-driven instructional leaders in schools, Reeves (2004) recognised the need for the establishment of an organisational culture that promoted data practices that support learning and teaching. This Reeves (2004) suggested could be achieved through team collaboration, support to school-based data structures and constant data inquiry practices.

When he shared the role of school leadership in cultivating a **data culture** within the school, Principal S said:

> *Each and very HOD should sit within the department… at the first level they are the ones who should lead in terms of accountability, as educators account for what has happened the HOD should be the first one to lead…it move into the level of the deputies and then it end up in the office of the principal* (Principal S)

Pertaining to teachers and HODs **collaborating** with one another on the data inquiry process within their schools' instructional system, Principal S of Seal Secondary School said:

> *It (data analysis process) involves all the teachers, HOD responsible for the subject, thereafter it will go to the deputy principal responsible before it gets to the principal* (Principal S)

Similarly, HOD S explained SMTs collective engagement within data within the staff data inquiry meetings on how to improve student results and about that he indicated:

> *The principal organises a meeting for all staff members… the HOD will comment as to why the results are not satisfactory and come up with systems that we are going to use*

to improve the results as a school and if he fails to do that we need to help as the SMT in terms of what is the best way of changing the results if possible (HOD S)

Additionally, HOD S further stated:

It starts with the educator in class…before we go and present the stats to the entire staff, every department work on their stats…so that each and every individual teacher understands…the performance of their learners (HOD S)

In view of his school's commitment to improve teaching and learning through data inquiry, data management teams have clear roles and responsibilities, but equally involved teachers as well. Principal S's school for embarking on data inquiry meetings stated:

That (analysed data) will go down to the teachers that are teaching the subjects and they will analyse the results. It will involve the teachers, the HODs (Principal S)

Interestingly, HOD S's experience within the data staff meetings painted a different picture from which it became clear that teachers were passive recipients of information instead of engaging together with data meaningfully. About this he responded:

Yes it is all staff members seated and watching the data projector (presentation) in the staff room…they are not involved, they are just audience watching…they are involved at the departmental level…they are allowed to ask questions but in most cases they do not participate (HOD S)

4.9.3 Development and Support

A study by Earl & Katz (2006) concluded that only a small proportion of teachers were able to transform raw data into useful information to enhance their teaching practice.

Principal S shared some thoughts on the challenges faced by teachers in his school in relation to data use for teaching and learning. He said:

I think the educators…are seeing that (data) as an extra administrative work…therefore I think the educators' attitude is not as expected because they see it as an extra administrative work…which is taking their time…they were supposed to be focusing in teaching and learning…I don't think we have reached a level of understanding that analysis should assist us as a school…the passion and the attitude

and the love of interpreting the data…I don't think is as positive we expect it to be (Principal S)

In corroborating this view, although HOD S pointed out at two contrasting views he shared in how teachers perceived data and their attitude towards the use of student data he noted:

Somewhere you do get resistance when it comes to intervention…when you tell them this interventions should be based on the problem of each learner…traditionally teachers just teach…we have got that bit of struggle when it comes to data they continue to do what they are used to on a regular basis (HOD S)

At the same time, when asked about attitude of teachers towards data use, he stated:

Generally, they accept it, they really appreciate it because after data you see that everybody is reacting (they respond positively) (HOD S)

As it related to **data literacy** levels of his SMT and teachers, Principal S's response from attested to the reality in his school when he said:

I don't think it (data) is used effectively…partially…it is not as positive as we expect it to be (Principal S)

Additionally, HOD S attributed teachers' inability to use data to lack of expertise. Expressing his frustrations, HOD S stated:

The things we are struggling with are in the SA-SAMS…people don't know how to use it; it is a serious problem (HOD S)

In articulating his schools' **capacity building** initiatives and support to teachers in mastering data inquiry to enrich students' learning experiences, Principal S said:

I think district support is 100% it's there because it starts from knowing how to capture CMM the district has done its work with training…they are very much supportive, we have assigned personnel for support who are visiting our schools always (Principal S)

4.10 Context of Turtle Secondary School

The school is a double storey building, with a beautifully decorated large entrance gate. The security personnel appeared from the security house adjacent to the entrance gate as soon as I entered the gate, he greeted me and asked me a few questions before making me sign the

visitor's register and pointed me to the parking area. The school premises are paved all around with few lawn patches here and there. Large attractive trees are planted next to the perimeter fence of the school, combi-courts (for basketball and netball) could be seen from the parking area.

As soon as the receptionist welcomed me, I was immediately directed to the newly furnished air-conditioned boardroom. Shortly thereafter, a very elegant chubby lady principal appeared holding a file and a diary in her hand. She must have been around fifty years old. After exchanging a few pleasant hugs, we settled down.

The management of the school consists of the Principal, two Deputy Principals and six Heads of Departments (HODs). The school's data analysis process is led and co-ordinated by the Principal and the SMT and this happened through quarterly analysed students' achievement data presentations and discussions

4.10.1 Leadership

When I first met Principal T, it was during several of my professional engagements I normally have with schools in the District. Principal T is an African female in her 50s. Her soft spoken and straightforward nature explained why she was respected for her school's high student academic performance in the district.

When quizzed about the Turtle Secondary School's **data vision, goals** and **accountability**, contrary to her colleague at Seal Secondary School, Principal T said that instead of personally taking the lead she delegated the authority of leading data discussion meetings to her managers. She clarified her point by saying:

> *The deputies (deputy principals) are leading data analysis processes, like the coming Thursday we are going have a meeting and they will be discussing that both FET (Grade 10-12) and GET (Grade 8-9), the principal assists and encourages the Deputies to be hands on so that everybody is on board* (Principal T)

HOD T of Turtle Secondary School is a 45-year-old African lady. She is a teacher for Grade 11 and 12 and an HOD for 6 years.

On Turtle Secondary School's principal's ability of allowing others to lead their school's data discussion meetings when she responded:

Our deputy principals take a lead (in the discussions around data analysis with the staff (HOD T)

However, it must be noted that while Principal T delegated authority to the deputy principals, she is not far from the process as she is actively participating in the data analysis discussions.

Similarly, sharing her thoughts about **knowledge** and **understanding** of **data sources** Principal T of Turtle Secondary School responded:

DDD is a tool to gather data in schools, it is made easy by the programme of SA-SAMS. This makes it easy for the district to have all the information they need from all the schools and then it goes into the dashboard. We have the learner performance tasks that are conducted done in class, learner attendance, educator attendance from all the grades…strategies of improvement, interventions that we do at the school… stats on the performance, attendance as well…everything that is happening in schools is there (Principal T)

In support of the principals' views about understanding the data sources, HOD T indicated:

In terms of everything that is taking place in the school, admissions of learners, the number of teachers we have in the school. It interlinks with SA-SAMS because in SA-SAMS we have all the information about the learners' performance, age of the learners, when it comes to the educators it has to do with their daily attendance (HOD T)

Interestingly, his colleague, Principal T, insisted that while **accessing data** directly from these data management systems requires permission, however such data or information was shared with all the teachers during data analysis meetings and about that she said:

It becomes easy once you have login details. The administrators and the principal have access, the Principal assists and encourages the Deputies to be hands-on so that everybody is on board. The data should not end up in the principal's office only, so I am forever there to see to it that the Deputies are also participating and that they share (information) with other educators (Principal T)

Although HOD T echoed similar sentiments, she also illustrated the data access exclusion by saying:

Yes, it does allow for easy access, the people who have access to SA-SAMS and the dashboard in our school is the principal, the deputy principal and admin clerks (HOD T)

4.10.2 School culture

Likewise, on his account of what his school had done right to stimulate **data culture** within the school, Principal T stated:

It starts with the teacher in the classroom…to the HOD…and sent to Deputies to verify…it does get to the principal…I always do my own analysis (Principal T)

Principal T explained the involvement and participation of teachers through **collaboration** in data analysis by saying:

Teachers are involved…right now before we go and present the stats to the entire staff every department, they work on their stats, they discuss that so that each and every individual teacher understands from their performance and the performance of their learners before it is flashed in front of everyone (Principal T)

Principal T of Turtle Secondary School summed it up and cited a data inquiry process inclusive of every teaching staff under strong supervision, governed by a clear quality assurance process: She said:

It (data analysis) starts with the teacher in the classroom, if it's on assessment whatever they assess on, they analyse, take it to the HOD who verifies and send to the deputies and the Deputies sometimes do their own analysis to verify. Everybody is involved from the classroom level…it does get to the principal; I always verify but most of the time I do my own analysis (Principal T)

Furthermore, HOD T from Turtle Secondary School also shared similar sentiments by responding:

We do diagnostic analysis and also analyse our results and then we also set up targets for various subjects…we will be analysing per question in terms of their performance…as to how many learners got level 7, how many learners got level 6, 5, etc…We are doing it both formally and informally (formative and summative assessments)…because the informal one is going to inform the formal one in terms of

what is it that can be improved. In fact, from the informal one we are learning where the learners are lacking and then improve on the formal one (HOD T)

However, HOD T of Turtle Secondary School experienced teachers' participation and involvement in data analysis differently from her colleague from Seal Secondary School. When quizzed about her experience she stated:

Yes, they do have a say, remember these are their subjects and the learners also belong to them…in fact they know what it is they are doing in class…they know the weak learners and strong learners (HOD T)

4.10.3. Development and support

Equally, in her account of district support towards her teachers' data capabilities, Principal T described it by saying:

Just by calling the district you are assisted into the programme…we were called into a meeting where we were trained, given the login details…we were trained on how to access the system…from the IDSO ("Inspector") of the school we get support she brings in the strategies she used when she was the principal (Principal T)

Principal T's account of teachers' lack of skills in analysing assessment data varied from her colleague at Seal Secondary School. She optimistically stated:

They do because in an event where an HOD is unable to make a presentation we usually request that it is not given to another HOD but it is given to any educator within the department to make that presentation so that they should know what is happening within their department. If there is any who do not know how we analyse and why we analyse probably it is a few that and probably I have not seen them (Principal T)

Additionally, in emphasising the ability of teachers to use data effectively, Principal T said:

In the case of Mathematics I know it happens…English and Physics I know the teachers always take that data and go back to class, use it in correcting or remediating in their teaching, in those subject I am quite certain…Grade 12 and 11 and in Maths it starts from Grade 8 (Principal T)

Furthermore, she stated:

> *Not in all the subjects but some because some of the educators did not value the analysis of data, it is only now that we are bringing them on board explaining to them so that they can understand deeply* (Principal T*)*

Principal T added by saying:

> *In the case of Mathematics, English, Physics...I know the teachers always take that data and use it and remediating in their teaching…Grade 12 and 11…in Maths down to Grade 8* (Principal T)

Asked about teacher's capacity building HOD T said:

> *The district is not providing enough support, as I have already told you, there are few people who have access to the use of the dashboard* (HOD T)

Findings from studies by Botha (2015) and Marishane (2015) concluded that many South African teachers and school managers lack the necessary skills and support on using data to improve teaching and learning.

4.11 Chapter Summary

The data presented in this chapter was generated through transcripts, analysed documents and questionnaire responses from participants. Research questions and theoretical frameworks guided the data presentation and discussions process in this study. Except for seniority in positions biographical data counted for nothing in terms of accessing multiple data sets.

Data responses from participants' interviews, questionnaires and documents showed that both schools were very similar in many ways. Principals and SMTs in both schools displayed strong leadership abilities in the way in which they fostered data culture in the schools. This was evidenced in the manner in which data meetings fit into school's schedule of meetings, the level of teacher's participation through collaboration as well as holding teachers accountable for student performance. Although Principal S and Principal T adopted varied data leadership strategies, both were very much participatory in the process. The level of knowledge and understanding in the use of data management tools (DDD and SA-SAMS) were varied and diverse among SMT members. Teachers in both schools faced similar challenges that included access to data management tools, capacity building and support. The chapter that follows present the main findings, recommendations, implications and conclusions of the study.

CHAPTER 5 STUDY SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The previous chapter detailed data presentation and discussions for this study. This chapter presents the study summary, conclusions and recommendations. The summary of the entire study is presented with conclusions reflecting on the main research and sub-research questions presented in Chapter 1. The recommendations presented in this chapter developed from the conclusions and the implications of the study. The recommendations and implications are meant to inform future practice and research about data-informed instructional leadership practices within high accountability embedded school contexts.

5.2 Study summary

The introduction of this research study was outlined in Chapter One in which the background to the study and the problem statement were presented and discussed. This chapter explored the purpose, rationale, significance, and the aims of the study. Furthermore, Chapter One presented the research questions, clarification of key concepts and theoretical underpinnings around which this study was framed. Finally, this chapter detailed the delimitations of the study and the overall organisation of the dissertation. The presentation and discussion of these critical elements of a qualitative research provided a basis for informing this study and entailed my intentions of conducting this study.

Chapter Two presented the body of literature in relation to thematic areas of focus on which this study was premised. These thematic areas of focus emerged from insights gained into the Data-driven decision making (DDDM) as an approach for bringing about meaningful change in teaching and learning. Themes developing from these insights comprised the data practices of school leaders (principals and school management teams), teachers' data literacy, teachers' development and support in data use.

Additionally, this chapter explored the theoretical and conceptual frameworks as analytical lenses for approaching this study. Collectively with the literature review, the theoretical underpinnings served as fundamentals for gaining broader perspectives and deeper insights into understanding the research topic.

Chapter Three explored the general design and methodology of the study. This chapter focused on theoretical considerations, namely, research paradigm, design, methodology, sampling, data generation, sampling instrumentation, and data generation methods, including data analysis.

Additionally, the chapter considered issues of trustworthiness, ethics, and the limitations of the study.

Chapter Four presented data and analysis about the research topic. The data presented was generated from interview transcripts, questionnaire responses and analysed documents. Data presented and analysed in this chapter resulted from themes and sub-themes as it pertained to key research questions for this study. To establish the validity and reliability of generated data, data from several data generation tools were compared through triangulation. In interpreting and giving meaning to data analysis, existing literature, theoretical and conceptual frameworks were interfaced.

Chapter Five focused on conclusion of the study while exploring overviews of individual chapters and drawing conclusions from the data that was presented and analysed in this study. Furthermore, in this chapter, recommendations, and implications of the study and for further research are presented.

5.3 Conclusions

Through this qualitative research inquiry in the two Gauteng schools, I sought to gain greater insights into school leaders' data-based instructional practices in response to external accountability mandates associated with high student outcomes. In the course of this inquiry three themes formed the basis on which the study was grounded, *inter alia*, principals' data driven instructional practices towards continuous school improvement, teachers' level of data literacy in relation to their ability to use analysed data to make sound instructional decisions and take actionable students' support. Additionally, the study looked into schools' and district's institutional development and support, aimed at improving teachers' data literacy. Conclusions drawn from the data presented and analysed in Chapter Four, guided by the main and sub-research questions, are discussed below.

5.3.1 Leadership

In exploring and understanding the data-informed instructional leadership practices of school principals in the researched schools, I conceptualised this study through the lenses of three conceptual frameworks, namely, *Principal Instructional Management Rating Scale* (PIMRS), *Antecedents of Effective Data Use* and *the Framework for Data Driven Instruction*. These conceptual frameworks put into sharper focus attributes, daily routines, actions, habits and conditions essential for promoting data use to improve instruction. Integrating key elements of

these three theoretical constructs resulted into three main dimensions necessary for bringing about student success through effective data use.

They could summarise as *Leadership, School Culture and Development and Support*. In this context, *Leadership* entailed school leaders deliberately taking three important data driven actions, *inter alia*, 1) Developing schools' data leadership team, 2) Employing a vision for data use and 3) Providing accessibility to data. To provide clarity and meaning to these dimensions, further explanations by breaking them down into three sub-categories were done which in turn, formed part of the questions to which participants were required to respond, *inter alia*, 1) reflecting on schools' data vision and goals and aligning that with student achievement and accountability, 2) school leaders' understanding and knowledge of meaningful data use to impact instruction (taken from Light et al., 2004) Framework for Data Driven Instruction), and 3) staff access to multiple data sets and sources to gain broader perspectives and deeper insights into student learning.

Research data from participants' interview and questionnaire responses indicated that principals and SMTs in both schools adopted systematic ways of leading data processes. Furthermore, they worked closely together in scheduling, co-ordinating and facilitating schools within purposed, focused, and collaborative data inquiry meetings. In these contexts, school leaders oversaw data inquiry processes at various levels of the schools' instructional systems, for instance HODs simultaneously led and supervised departmental data meetings while principals or deputy principals monitored and led staff at school-wide data inquiry meetings. In demonstrating their data driven instructional leadership capabilities, principals in both researched schools took into consideration these schools' contexts when adopting ways of managing and leading data analysis meetings, for example, Principal S of Seal Secondary School preferred leading data discussion meetings personally, whereas Principal T of Turtle Secondary School assigned that responsibility to Deputy Principals. In both schools, principals consulted broadly with the SMTs on decision making as it pertained to schools' data processes.

Collaboration between SMTs and teachers was most evident in departmental data inquiry meetings in the sharing of ideas and development of strategies for improving instruction. However, Principal T expressed the need to expand data inquiry meetings to involve all other teachers in the school beyond subjects such as Mathematics, Physics, Life Orientation and English as they were given more attention over others.

In demonstrating their understanding and knowledge of the data inquiry process, school leaders (principals and SMTs) were mostly knowledgeable and understanding to how various data sources and multiple data sets could be best leveraged towards enhanced student success. Nevertheless, Principal S was left frustrated with the low level of understanding of the SA-SAMS by some HODs, which in turn, constrained their data leadership capacities.

Furthermore, schools were confronted with a systematic challenge in which various data sources were inaccessible to most of the teaching staff, primarily due to having no login credentials and inadequate resources. I argue that for school leaders to directly influence student outcomes through meaningful data use, not only must they exhibit understanding and knowledge of data sources but show competency of using such data sources in ways that enable, guide and support teachers' data analysis and interpretation capabilities. Additionally, it may be suggested that policy makers' and school leaders' challenge of providing sufficient resources as well as broadening data access to many teachers accompanied by continuous data literacy training and support remains a significant limitation to both schools' efforts of raising student outcomes.

5.3.2 School Culture

The school culture or climate was explored from a vantage point of Reeves' (2004) *Antecedents of Effective Data Use Conceptual Framework* with particular focus on the ability of school leaders in both researched schools to; a) establish trust, b) cultivate collaboration and d) embed time and structure into schools' data inquiry programmes. The overall finding was that both schools operated within a trust-based climate, for example, Principal T's delegation of data leadership roles to Deputy Principals showed that it was based on her trusting them to carry out the task responsibly.

At the same time, both Principals stated that they trusted the HODs with departmental data analysis meetings in collaboration with teachers. In terms of the existence and functioning of data structures in both schools, it was apparent that schools relied on existing leadership structures or teams for co-ordinating schools' data activities instead of establishing new ones to avoid unnecessary overlaps (O'Neal, 2012). That ensured that schools' data processes went about seamlessly without interrupting schools' curriculum programmes. Furthermore, it was evident from the findings that both schools adopted a systematic approach to data inquiry processes in terms of planning and co-ordinating data meetings using existing data structures. Based on the participants' interviews and questionnaire responses, it may be concluded that

data inquiry processes in both schools occurred within school climates that were based on trust and centred on collaboration between various staff members.

It must be noted that in line with the thinking of Reeves (2004) and O'Neal (2012), school leaders' ability to establish a conducive school climate for meaningful data use goes a long way in enabling schools' data efforts towards student success. As such, data inquiry processes in both schools happened within that same context and proved to be yielding the desired outcome when it came to efficacy of data use.

5.3.3 Development and support

In conducting this part of the research inquiry, I sought to investigate the data literacy of teachers in terms of their attitude, skills, purposive use of data and the extent of development and support in data use, essentially, exploring their ability to analyse data with little assistance and guidance, meaningfully and passionately. By referring to teachers as being data literate, that means they are able to set a purpose, collect, analyse and interpret data to make instructional decisions (Kippers et al., 2017; Mandinach & Gummer, 2016) in ways that enhance pedagogic practices while enriching student learning. In this context, teachers should be able to provide clear reasons for using data, verify the accuracy of data, organise, prioritise and interpret statistical data to solve identified student learning gaps through intervention while meeting their educational needs (Kippers et al., 2017).

However, it became clear throughout the data collection process, according to school leaders, that schools in general analysed data for accountability and reporting purpose to comply with departmental directives rather than using data as important information to guide instructional decisions.

Evidently, school leaders in both schools solidly led and managed internal professional development initiatives, thereby culminating into departmental and school-wide data evaluation meetings. Collaborative efforts happening at these schools included departmental data analysis meetings between HODs and subject teachers, aimed at sharing information on subject performances and ideas for improving subject performances. At the same time, the district officials wherein district academic performance data are shared normally provided some form of "teacher focused development" at quarterly district-wide data meetings. Participants cited that on-site data support sessions from the district were also available on request. Evidently, the level of capacity building and support to schools were unstructured and

inadequate, hence these were cited as barriers to teachers' data use for teaching and learning. Many of the teaching staff lacked the necessary skills for analysing statistical and diagnostic data because it required mathematical or statistics background which some did not have (Earl & Katz, 2006). To this end, teachers developed negative feelings and attitudes towards data use, particularly because they thought of data analysis as an added responsibility which diverted their attention and time away from teaching.

Additionally, principals indicated that some HODs were struggling in the use of the SA-SAMS and the Data Driven District data tools. Access to multiple data sets from Departmental data sources also proved to be a limitation to many teachers because they lacked necessary login credentials and resources. Essentially, it may be concluded that there were no well-communicated plans or programmes in schools and the district to assist school leaders and teachers in data capacity building. So far, there was no evidence of a clear policy direction in terms of empowering schools on improving their data capacity in ways that will benefit schools towards increased student success. At the moment, data analysis in schools seems to be driven from a point of satisfying accountability mandates and for reporting purposes rather than for improving teaching and learning.

5.4 Recommendations

Recommendation for this study developed from the findings and conclusions of this study. Recommendations are presented as follows;

5.4.1 Recommendation One

It was found that principals and SMTs in both schools exhibited strong leadership and management capabilities which manifested in their ability to define these schools' data visions, measure district's and schools' performance data against set targets and student achievement goals, as well as aligning student performance with accountability. Furthermore, data inquiry activities of the school were basically focused on improving instruction within a collaborative data inquiry framework between various role players within the school. Despite all of these intentions and actions, nevertheless school leaders experienced serious limitations of data use such as the inability of some HODs to use the SA-SAMS and the DDD dashboard data tools. In cases where school leaders were unable to guide and mentor their subordinates to use data meaningfully, the impact on teaching and learning through data became limited (Blink, 2007). In a way, this constrained their data-informed leadership capabilities in ways that are less

guiding and supportive to the teachers in these departments. Moreover, teachers' lack of access to multiple data sets meant that their instructional decisions are based on inadequate data. In turn, this led to student learning being viewed from a narrow perspective, thus implying misdiagnosis of student learning difficulties (Mertler, 2014). It was pointed out also that data analysis processes in schools was focused mainly on the so-called gateway subjects, such as Mathematics and Physical Science.

It is therefore recommended that principals and district leaders need to open data access to all teachers within schools. By so doing, this will enable teachers' access to multiple data sets from which to reflect deeply about teaching and learning. Furthermore, HODs lack of adequate knowledge of using the SA-SAMS and the DDD dashboard needs to be attended to by principals and the district officials. At the national level, policy makers need to develop a nationwide data use policy for schools if this is not yet available.

If available, a clear policy direction on data use for teaching and learning has to be communicated throughout all the schools, including the researched schools, which seemed unaware of the existence of such a policy. At school level, principals and SMTs need to provide teachers with additional resources for accessing and analysing data as well as broadening data analysis to include all other subjects offered at the schools beyond gateway subjects. When all the HODs and teachers have been capacitated on data analysis and have access to multiple data sets from a variety of data sources, with the leadership, guidance and continuous support from the SMTs and the district, their ability to raise student outcomes through data driven decisions will be enhanced.

5.4.2 Recommendation Two

A conducive school climate or culture is essential for school effectiveness when it comes to leveraging data for the betterment of student learning (Bambrick-Santoyo, 2010). In both schools' contexts, school climates or cultures responded positively to the requirements of the *Antecedents of Effective Data Use* in terms of demonstrating certain practices and routines essential for raising student outcomes, such as establishing trust based environments, collaboration between different levels in the data management processes, reliance on SMTs as data leadership structures and setting aside time for data analysis inquiry meetings.

While taking all of that into account, it is recommended that schools should conduct data discussions within schools' climate that provide necessary conditions for the establishment of

trust and that foster collaboration. Collaborative data inquiry meetings taking place quite regularly would potentially increase their efforts to interrogate formative assessment data to improve student achievement. Currently, schools' data inquiry meeting focused mostly on summative assessment data at the end of the first three terms or quarters of the academic year. This suggested that except for fewer subjects where regular unstructured data analysis took place, largely this did not apply. This is partly because school leaders and teachers either complained about lack of time to do that or were not compelled by external mandates. However, if school leaders were to bring about meaningful change in the classroom, this would require their development of a clear data strategy that incorporates data into teachers' professional practices.

5.4.3 Recommendation Three

In examining teachers' data literacy, I used the *Framework for Data Instruction* from which to explore how rigorous their data inquiry process for aggregating and analysing data were, and how the process informed future action for improving outcomes at different levels of the educational system. Data reflected on school leaders' inability to cultivate an environment that enabled positivity in teachers' experiences and attitude towards data use, purpose for using data as well as professional development and support in data literacy. Invariably, according to the findings, teachers' development of negativity towards data suggested that they could not see the value of data thereby rendering their ability to use data less meaningful.

The recommendation to school leaders and policy makers is for them to engender daily data practices through sufficient teacher data literacy training and support. The current status in both researched schools in terms of data analysis to guide instructional decisions for impacting student learning, suggested that most teachers were not data literate and lacked much needed support. To that end, the Department of Education needs to develop a national data literacy framework aimed at data literacy capacity building for teachers at teacher preparation and professional levels in ways that enable purposive use of data. In so doing, this will ensure that school leaders and teachers are able to align data inquiry to student support interventions. In addition, this will sharpen teachers' data knowledge and understanding that requires resources and access to data sources.

5.4.4 Recommendations for future studies

It is recommended that future studies focus on widening the scope of this study to research a wide variety of schools from different contexts (township, farm or rural and town schools) and school levels (primary and secondary schools). Additionally, different types of research participants (principals, HODs, teachers, policy makers, national, provincials, district officials, students, and parents) must be considered as the people who are expected to lead schools' efforts to increase student performance. Based on the diversity of the proposed research sample, the research study may be further enriched.

Increasing the scope of this study has the potential to allow me to gain better understanding of the participants' experiences with the research topic, identifying patterns and trends in the generated data to use as a point of reference from which to draw conclusions valuable in advancing teaching and learning.

5.5 The implications for further study

Implications of this study reflected the roles of principals, school management teams (SMTs) and policy makers and officials who are pivotal towards continuous school improvement through Data-driven decision making. These roles include principals' instructional leadership practices, schools' data culture, data literacy for teachers as well as capacity building and support.

5.6 Implications for principals

The effectiveness of principals' data practices towards school improvement is primarily dependent on principals' ability to create conditions that enable teachers to use data for teaching and learning. These range from the establishment of schools' data culture that promotes student learning, leaderships' ability to communicate and align goals and performance targets with accountability, providing teachers with access to data, fostering collaborative data inquiry activities' capacity building and support to teachers on data use to improve teaching and learning.

Although findings in this study showed that principals and management teams were able to create a climate for enabling effective data use for teaching and learning, however granting most teachers access to data and resources, teachers' capacity building on data literacy and continuous support towards continuous school improvement seemed less evident. A consensus

emerging from school leaders' interview transcripts and questionnaires was that teachers' lack of necessary resources and access to data sources such as SA-SAMS, District dashboard, lack of teachers' capacity building and support rendered schools' data efforts to raise student outcomes less productive.

As such, there is a need for school leaders to prioritise teachers' needs for meaningful data use by providing the necessary conditions, development, and support. Additionally, school leaders need to reorganise their collaborative approach to data discussions in ways that comply with requirements for established and functioning Professional Learning Communities in which data discussions form part of teachers' daily interactions guiding their professional practice.

5.7 Implications for policy makers and officials

The implications of this study to policymakers and officials pertains largely to providing a clear policy direction in terms of data literacy of teachers in schools nationally. Given that the study found school leaders and administrative staff to be the main role players in data management and analysis with permission to access data from data rich data sources such as the SA-SAMS and the Data Driven District (DDD) dashboard while the majority of teachers had little or no access to these data sources at all means that multiple data sets available from the data tools are meant for other purposes than for improving teaching and learning. This proved disempowering to a greater proportion of the teaching staff if the intention of the department was to enable teachers to use multiple data sets to base their instructional decisions on improving student learning.

That in itself, deprived teachers of access to crucial data sets such as attendance data, learner over-age data and early drop-out data, all essential in understanding factors that influence student learning. The study also determined that support from the district office to improve teaching through data use to schools was only available when requested which suggested that there was lack of a coherent district wide data strategy for guiding districts in the implementation of data training programmes to all the schools. Also, because such support is focused on the technical aspects of the data manipulation while at the same time is sufficiently lacking in relation to data use for teaching and learning.

This is in contrast to how much emphasis had been placed on principals' use of data use for accountability and for improving teaching and learning as expressed in the National Development Plan (NDP) and the Policy on the South African Standard for Principalship, just

to mention two. Interestingly, the Department of Education, through these guideline documents, seemed to be confirming the need for teachers in a technologically driven, assessment based, accountability embedded educational context to become data literate in their daily teaching practice within the data rich learning environments.

However, it appeared as if the district official interviewed and school leaders in the researched schools where data from the SA-SAMS and DDD dashboard are frequently accessed, analysed and used were not aware of any departmental data policy or planned data literacy programmes for schools. Moreover, districts' efforts towards capacity building in schools were found to be haphazard, unstructured and unplanned. Pertaining to school leaders' data literacy development, the district and head office data management teams seemed somewhat developmental and supportive.

As for teachers' development and support on data use, it was established that district officials made some attempts to share and discuss data on schools' data performance patterns and trends at district meetings without necessarily scheduling proper professional teacher development programmes nor preparing entrant teachers with the necessary data literacy skills. To this end, this research study, in support of other studies, showed that a greater portion of officials from the district offices lack requisite data literacy skills to impart to schools. In fact, many schools which form part of the SA-SAMS and DDD dashboard programmes, lack the necessary skills and interest in using these data to improve classroom teaching.

From a policy development perspective, it is almost a requirement for the National Department of Education to District level that policymakers need to develop a national data literacy policy and framework or strategy on which officials will be trained first before being advocated, mediated, and implemented through properly planned and scheduled data training programmes across all schools. Having noted teachers' negative attitude towards data owing mostly to inaccessibility to data sources and an added burden while taking time away from teaching, these implied that policy makers and officials need to consider teachers' needs and conditions under which data use could thrive when developing policies and strategies for improving schools' data literacy.

5.8 Implications of the study

This study was a snapshot of data instructional leadership practices of principals in the two researched schools in Gauteng province. As such, this was a small-scale study involving only

five participants namely, one district official, two principals and two HODs from the two researched schools. The findings from this study cannot be generalised further than the researched schools and participants. Nevertheless, from conducting this study, I provided some valuable insights generated from real life experiences, perspectives and attitudes of participants towards harnessing the power of data to enrich student learning and pedagogic practices.

These pertained to school leaders' ability to model the use of data, the creation of a climate and conditions for enabling effective data use among teachers, inspiring and motivating the management team and teachers to use data inquiry approaches to adapt their teaching methods and strategies, fostering capacity building and support to teachers, communicating the schools' visions, academic targets and student achievement goals with all the stakeholders within the schools while aligning student achievement with accountability, providing resources and data access to teachers and cultivating a culture of collaborative data inquiry and establishing functional and sustainable data structures in the mould of Professional Learning Communities. Researchers in the area of data-informed instructional leadership have proven that a combination of all of these factors were important towards schools' efforts of raising student outcomes, as has been the case in many high achieving schools.

5.9 Overall summary of the study

This research inquiry sought to establish principals' instructional leadership capabilities in leading, co-ordinating and facilitating collaborative data inquiry systems and protocols while creating conditions for effective data use for teaching and learning. Additionally, individual school's culture was examined in terms of the extent to which instructional leadership were able to provide enabling and supportive conditions towards purposive data use. The study explored the school leaders' ability to foster a culture of continuous data inquiry linked with accountability on student academic achievements in both schools. Furthermore, it established if school-wide data discussions were based on trust, collective leadership and focused towards the achievement of school and district performance goals.

In investigating the leadership roles of principals and management teams in leading learning through innovative school improvement approaches using data to inform decision making within the schools, the following were brought into sharp focus, *inter alia*, instructional leadership qualities of principals and SMTs in modelling data use within the school, inspiring and building confidence of SMTs and teachers to do the same while leading school wide data inquiry discussions driven from a collaborative data inquiry base, building trust and collegiality

among teachers, cultivating an enabling and supportive data use culture within the school, prioritising staff development in mastering data analysis, interpretation and data-based instructional decision making. The study was approached using Hallinger's (2003), *Principal Instrument Measurement Rating Scale* (PIMRS).

The thematic areas of focus, on which the study focused, entailed three fundamental aspects of the Data-Driven Decision Making (DDDM) strategy to impact teaching and learning: firstly, the principals' data-informed instructional leadership practices in reference to their ability to stimulate data use for teaching and learning through collaborative and sustained schools' data inquiry procedures, routines and structures. These leadership attributes were viewed from the lenses of the PIMRS in identifying the leadership traits most evident in highly impactful principals in successful schools (Defining the School Mission, Managing Instructional Programme and Developing the School Learning Climate). It was found that principals and SMTs in both the researched schools exhibited strong leadership qualities in the way in which they systematically approached data discussions within these schools. Their high levels of planning and co-ordination were evident. Their ability to systematically manage school wide data discussions collaboratively with SMTs and teachers was impressive.

Again, I factored the *Antecedents of Effective Data Use Conceptual Framework* into the study as a way of examining data or evidence-based leadership attributes of principals manifesting through daily practices, habits and culture that give rise to organisational excellence, effectiveness and increase productivity. In the context of a school, the three dimensions encapsulating these leadership attributes entailed, first, their ability to model data focused Leadership; second, Professional Development in building capacity of teachers' data literacy skills, both internally and externally, because there is a greater need for teachers to sharpen data literacy skills in ways that enable them to become capable of transforming raw data into useful information to guide instructional decisions, choices and actions. Empirical data revealed that there were weaknesses in the level of professional development from district officials and school leaders.

This was partly due to lack of a clear data literacy policy from the Department of Education, teacher focused training workshops on data analysis were more information sharing sessions and lacked a hands-on approach, most school managers lack the necessary data inquiry skills, data tools' inaccessibility and lack of resources impeded teacher's growth in data analysis. Regrettably, not all staff members, but certain SMT members and administrative staff, were

accredited to gain access to the Department of Education data sources or tools (SA-SAMS and DDD dashboard) which meant lack of exposure to multiple schools' data sets from which to make informed decisions, lack of planned and sustained district support because support provided to schools was obtainable when required and was offered generally on a small scale as district school performance data sharing sessions or assessment meetings; third, School Culture, fostering and engendering data-based instructional decisions within the schools is another fundamental leadership dimension that was explored.

Findings suggested that in the researched schools, school leaders set the tone for data use through modelling data focused leadership traits, they seemed to inspire and encourage others to do the same, they have been able to create a culture of data inquiry within the school and showed some level of development and support to teachers to understand the data analysis process and how it affects student learning.

The second thematic area of focus put school leaders' and teachers' data skills at the centre of data-based decision making as catalysts for self-inquiry and for enriching student learning. Particular emphasis was placed on teachers' data literacy and possible barriers towards using data to enhance teaching and learning. For examining these schools' ability to adopt and apply data-oriented models to bring about significant change to student learning, the *Framework for Data-Driven Instruction* became a useful evaluation tool to use.

To this end, schools' data inquiry processes were evaluated from a systematic planning point of view up to execution in following an input-output cyclical data inquiry framework. In determining whether the researched schools were following processes similar to those proposed in the *Framework for Data-Driven Instruction,* I paid attention to how they used raw data and transformed it into useful knowledge not only in understanding many of the factors that contribute towards student success or failure, but also from which to base remediation.

To this end, findings revealed that these schools' data inquiry processes lacked the necessary data framework and support to guide them, in defining their school's data analysis meetings, one could say they were thin in rigour and intensity that characterises typical data inquiry cycles for transforming data into meaningful information for understanding student learning with a view of taking a course of action to remediate and support student learning. Moreover, evidence proved that many teachers lacked the requisite data literacy skills in ways that enrich classroom practice. The final thematic area of focus for the study involved exploring teachers' data professional development from both the institutional and departmental levels.

5.10 Chapter summary

In this chapter, the overall study summary, conclusions, recommendations and implications for the study and for further research were presented. The recommendations outlined in this chapter stemmed from the conclusions and the implications of the study. The recommendations presented relate to action that needs to be taken by policy makers, officials and school leaders from a policy point of view to implementation in respect of the development of a national data literacy policy framework for application across wide ranging school contexts in order to strengthen the attainment of student outcomes through data-based decision making approaches. The implications thereof are aimed at informing future practice and research about instructional leadership practices of principals through data-based instructional decision making to increase student academic achievements.

REFERENCES

Abrevaya, S., & White, J. (2009). Obama administration announces historic opportunity to turn around nation's lowest-achieving public schools. *US Department of Education*, 1.

Acharya, D., & Vista, A. (2019, January 25). *How educators use assessment data to improve student learning in Nepal: Challenges and solutions*. Brookings blog. Retrieved from https://www.brookings.edu/blog/education-plus-development/2019/01/25/how-educators-use-assessment-data-to-improve-student-learning-in-nepal-challenges-and-solutions/amp/

Ackoff, R. L. (1989). From data to wisdom. *Journal of applied systems analysis, 16*(1), 3-9.

Amakyi, M. (2013). Readiness for Data-Driven Decision Making in Education in Ghana. *Journal of Education and Practice, 4*(8), 134-139.

Anderson, S., Leithwood, K., & Strauss, T. (2010). Leading data use in schools: Organizational conditions and practices at the school and district levels. *Leadership and Policy in Schools*, *9*(3), 292-327.

Archer, E., Scherman, V., & Howie, S. (2013). Approaches to effective data use: Does one size fits all? In *Data-based decision making in education* (pp. 91-112). Dordrecht: Springer.

Babbie, E., Mouton, J., & Strydom, H. (2011). The research process with reference to the research method section Social work theories and methodologies*:* Dubrovnik. *Croatia:* North West University, *Potchefstroom, South Africa Herman:*

Bambrick-Santoyo, P. (2010). *Driven by data: A practical guide to improve instruction*. John Wiley & Sons.

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The qualitative report, 13*(4), 544-559.

Bernhardt, V. L. (1998). *Multiple measures* (p. 6). California Association for Supervision and Curriculum Development.

Bernhardt, V. L. (2005). *Using data to improve student learning in high schools*. London: Eye on Education, Inc.

Bianco, S. D. (2010). Improving Student Outcomes: Data-Driven Instruction and Fidelity of Implementation in a Response to Intervention (RTI) Model. *Teaching Exceptional Children Plus*, *6*(5), n5.

Blasé, J., & Blasé, J. (2004). *Handbook of instructional leadership: How successful principals promote teaching and learning*. Thousand Oaks, CA.: Corwin Press.

Blink, R. (2007). *Data-driven instructional leadership.* New York: Eye on Education.

Blink, R. J. (2014). *Data-driven instructional leadership.* London: Routledge.

Botha, E. M. (2015). *Effective use of assessment data to improve teaching and learning in primary schools in South Africa: four case studies South of Johannesburg* (Doctoral dissertation, Wits University).

Boudett, K. P., City, E. A., & Murnane, R. J. (2006). The 'data wise' improvement process. *Harvard Education Letter, 11*(4), 1-3.

Boudett, K. P., City, E. A., & Murnane, R. J. (2013). *Data wise: A step by step guide to using assessment results to improve teaching and learning.* Cambridge, MA.: Harvard Education Press.

Brill, F., Grayston, H., Kuhn, L., & O'Donell, S. (2018). *What impact Does Accountability Have on Curriculum, Standards and Engagement in Education? A Literature Review*. Slough: National Foundation for Educational Research.

Burton, N., Brundrett, M., & Jones, M. (2008). *Doing your education research project*. London: Sage.

Bush, T. (2013). Instructional leadership and leadership for learning: Global and South African perspectives. *Education as Change*, 17(sup1), S5-S20.

Coburn, C. E., & Turner, E. O. (2011). The practice of data use: An introduction. *American Journal of Education*, 118(2), 99-111.

Crawfurd, L. (2016). School management in Uganda. *Journal of African Economies 26*(5) 539-560.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches.* Thousand Oaks, CA. Sage.

Creswell, J. W. (2007). *Qualitative inquiry & research design: Choosing among five approaches.* Thousand Oaks, CA. Sage.

Datnow, A., Park, V., & Kennedy-Lewis, B. (2012). High school teachers' use of data to inform instruction. *Journal of Education for Students Placed at Risk (JESPAR), 17*(4), 247-265.

De Vos, A. S., Delport, C. S. L., Fouché, C. B., & Strydom, H. (2011). *Research at grass roots: A primer for the social science and human professions*. Pretoria: Van Schaik Publishers.

Department of Basic Education (2013). *National Curriculum Statement. Curriculum Assessment and Policy Statement: Further Education and Training Phase Grade 10-12.* Retrieved from https://www.education.gov.za/Curriculum/NationalCurriculumStatementsGradeR-12.aspx

Department of Basic Education (2015). *Policy on South African Standards for Principalship*: Retrieved from https://www.sapanational.com/files/POLICY-ON-THE-SASP--2-.pdf

Department of Basic Education. (2012). *Data driven district dashboard*

Retrieved from https://dbedashboard.co.za/Home/

Du Plessis, P. (2013). The principal as instructional leader: Guiding schools to improve instruction. *Education as Change*, 17 (sup1), S79-S92.

Dunlap, K., & Piro, J. S. (2016). Diving into data: Developing the capacity for data literacy in teacher education. *Cogent Education, 3*(1). 1132526.

Earl, L.M., & Katz, S. (Eds.). (2006). *Leading schools in data-rich world: Harnessing data for school improvement.* Thousand Oaks, CA: Corwin Press.

Education: Why data-driven instruction does not work. (2013). Retrieved from https://www.dailykos.com/stories/2013/4/27/1205236/-Education-Why-data-driven-instruction-does-not-work

Feagin, J. R., Orum, A. M., & Sjoberg, G. (Eds.). (1991). *A case for case study*. London: UNC Press Books.

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). In Burvikovs AE. *Educational research: An Introduction* (8th ed.). Boston, Massachusetts: Pearson Publishing.

Gasson, S. (2004). Rigor in grounded theory research: An interpretive perspective on generating theory from qualitative field studies. *In The handbook of information systems research* (pp.79- 102). New York: IGI Global.

Gauteng Department of Education (2016, October 17). *Circular 9 of 2016. Planning, Reporting and Accountability Framework for Public Schools*. Retrieved from http://www.gauteng.gov.za/government/departments/education/Documents1/SIP

Green, R. L. (2010). *The four dimensions of principal leadership: A framework for leading 21st century schools.* Boston. MA. Allyn & Bacon.

Guba, E. G. (Ed.). (1990). *The paradigm dialog*. Thousand Oaks, CA. Sage.

Hallinger, P. (2003). Leading educational change: Reflections on the practice of instructional and transformational leadership. *Cambridge Journal of education, 33*(3), 329-352.

Hallinger, P., & Heck, R.H. (2010). Collaborative leadership and school improvement: Understanding the impact on school capacity and student learning. *Instructional leadership and management, 30*(2), 95-110.

Hallinger, P., & Wang, W.C. (2015). *Assessing instructional leadership with the principal instructional management rating scale.* Dordrecht. Springer.

Halverson, R., Grigg, J., Prichett, R., & Thomas, C. (2007). The new instructional leadership: Creating data-driven instructional systems in school. *Journal of Instructional leadership, 17*(2), 159-194.

Iyengar, R., Mahal, A. R., Felicia, U. N. I., Aliyu, B., & Karim, A. (2015). Federal policy to local level decision-making: Data driven education planning in Nigeria. *International Education Journal: Comparative Perspectives*, *14*(3), 76-93.

Jones, L., & Kennedy, E. (2015). *A Guide to data driven leadership in modern schools*. Charlotte, NC. IAP.

Kamenetz, A. (2016). *5 Doubts About Data-Driven Schools* [Blog]. Retrieved from http://npr.org/sections/ed/2016/06/03/480029234/5-doubts-about-data-driven-schools

Kanjee, A., & Moloi, Q. (2014). South African teachers' use of national assessment data. *South African Journal of Childhood Education, 4*(2), 90-113.

Kivunja, C., & Kuyini, A. B. (2017). Understanding and Applying Research Paradigms in Educational Contexts. *International Journal of Higher Education, 6*(5), 26-41.

Kohn, A. (2010). Turning children into data. *Education Week, 30*(1), 29-32.

Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Dehli: New Age International.

Krauss, S.E. (2005). Research paradigms and meaning making. A primer. *The qualitative report, 10*(4), 758-770.

Kruger, D., De Vos, A., Fouche', C., & Venter, L. (2005). Quantitative data analysis and interpretation. In A. S. De Vos, H. Strydom, C. B Fouche & C. S Delport, Research at grassroots: An empirical study. *European Journal of Scientific Research, 21*(4), 603-616.

Kuhn, T. (1962). *The structure of scientific revolutions*. Chicago: Chicago Univ. Press.

Lange, C., Range, B., & Welsh, K. (2012). Conditions for effective data use to improve schools: Recommendations for school leaders. *International Journal of Educational Leadership Preparation, 7*(3), n3.

Lavrakas, P. J. (2008). *Encyclopaedia of survey research methods*. Thousand Oaks, CASage.

Lee, M., Walker, A., & Ling Chui, Y. (2012). Contrasting effects of instructional leadership practices on student learning in a high accountability context, *Journal of Educational Administration, 50*(5), 586-611.

Leithwood, K., Harris, A., & Hopkins, D. (2008). Seven strong claims about successful instructional leadership and management. *School leadership and management, 28*(1), 27- 42.

Leithwood, K., Louis, K. S., Anderson, S., & Wahlstrom, K. (2004). *How Leadership Influences Student Learning. Review of Research.* New York. Wallace Foundation.

Levin, J. A., & Datnow, A. (2012). The principal role in data-driven decision making: Using case-study data to develop multi-mediator models of educational reform. *School Effectiveness and School Improvement, 23*(2), 179-201.

Lichtman, M. (2006). Qualitative Research in Education: A User's Guide. *SAGE Publications (CA).*

Light, D., Wexler, D., & Heinze, J. (2004*). How practitioners interpret and link data to instruction: Research findings on New York City Schools' implementation of the Growth Network.* In annual meeting of the American Educational Research Association, San Diego, CA.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. London. Sage.

Scott, C.L (2015). The Futures of Learning 2: What kind of Learning for the 21st century? UNESCO Education Research Foresight, Paris.

Lynch, K. (2017). New managerialism in education: In Abraham-Hamanoiel, A., Freedman, D., Khiabany, G., Nash, K. (eds.). *Liberalism in Neoliberal Times: Dimensions, Contradictions, Limits.* London: Goldsmiths.

Mandinach, E. B., & Gummer, E. S. (2013). Building educators' data literacy: Differing perspectives. *The Journal of Educational Research & Policy Studies, 13*(2), 1-5.

Mandinach, E. B., & Gummer, E. S. (2016). What does it mean for teachers to be data literate? Laying out the skills, knowledge and dispositions. *Teaching and Teacher Education, 60*, 366-376.

Mandinach, E. B., Honey, M., & Light, D. (2006, April). A Theoretical Framework for Data-Driven Decision Making. *In annual meeting of the American Educational Research Association, San Francisco, CA.*

Marishane, R. N. (2015). Data-informed Instructional Leadership: Improving the Instructional Program in South African Primary Schools. *International Journal of Educational Sciences, 10*(2), 192-200.

McLeod, S. (2005). *Data-driven teachers*. Retrieved from https://www.hved.org/documents/DataManagement/Data_Driven_Teachers.pdf

Means, B., Padilla, C., DeBarger, A., & Bakia, M. (2009). Implementing Data-Informed Decision Making in Schools: Teacher Access, Supports and Use. Washington, DC.: *US Department of Education.*

Mertler, C. A. (2014). *The Data-Driven Classroom*: *How do I use student data to improve my instruction? (ASCD Arias).* New York, ASCD.

Mills, J., Bonner, A., & Francis, K. (2006). The development of constructivist grounded theory. *International journal of qualitative methods*, *5*(1), 25-35.

Morrow, S. L. (2005). Quality and trustworthiness in qualitative research in counselling psychology. *Journal of counselling psychology, 52(2),* 250.

National Planning Commission (2012). *National Development Plan 2030: Our future-make it work.* Pretoria: Presidency of South Africa.

Neuman, S. (2016). *Code Red: The Danger of Data-Driven Instruction*.

Retrieved 15 July 2019, from http://www.ascd.org/publications/educational_leadership/now16/vol74/num03/abstract.aspx#Code_Red@_The_Danger_of_Data-Driven_Instruction

Ng, P.T., & Chan, D. (2008). A comparative study of Singapore's school excellence model with Hong Kong's school-based management. *International Journal of Educational Management, 22*(6). 488-505.

O'Neal, C. (2012). *Data-Driven Decision Making*. New York: International Society for Technology in Education.

Organization For Enonomic Co-Operation And Development. (2017). *Education at a glance*: 2017. *OECD indicators*. Paris: OECD.

Patton, M. Q. (2002). Two decades of development inquiry: A personal, experiential perspective. *Qualitative social work, 1*(3), 261-283.

Prew, M., & Quaigrain, K. (2010). Using school performance data to drive school and education and improvement: The case of Ghana. *Educational Management Administration & Leadership, 38*(6), 728-744.

Rabovsky, T. M. (2012). Accountability in higher education: Exploring impacts on state budgets and institutional spending budgets. *Journal of Public Administration Research and Theory, 22*(4), 675-700.

Reeves, D. B. (2004). *Accountability in action: A blueprint for learning organizations*. Englewood, CO. Lead + Learn Press.

Reeves, D. B. (2004). *Accountability for learning: How teachers and school leaders can take charge*. New York: ASCD.

Saldaña, J. (2009). *The coding manual for qualitative researchers*. Sage.

Schurink, W., Fouché, C. B., De Vos, A. S., Strydom, H., & Delport, C.S.L. (2011). *Research at Grass Roots: For the Social Sciences and Human Service Professions.* Pretoria: Van Schaik.

Schwandt, T. A. (2000). Three epistemological stances for qualitative inquiry: Interpretivism, hermeneutics, and social constructivism, *Handbook of qualitative research, 2*, 189-213.

Schwandt, T. A. (2007). Expanding the conversation on evaluation ethics. *Evaluation and Program Planning, 30*(4), 400-403.

Scott, D., & Morrison, M. (2006). *Key ideas in educational research*. Edinburgh: A&C Black.

Seashore Louis, K., & Robinson, V., M. (2012). External mandates and instructional leadership: school leaders as meditating agents. *Journal of Educational Administration*, 50(5), 629-665.

Sebastian, J., & Allensworth, E. (2012). The influence of principal leadership on classroom instruction and student learning: A study of mediated pathways to learning. *Educational administration quarterly*, *48*(4), 626-633.

Senge, P. (1990). The art and practice of the learning organisation. *The new paradigm in business: Emerging strategies for leadership and organisational change*, 126-138. New York: Currency.

Sharma, G. (2017). Pros and cons of different sampling techniques. *International journal of applied research*, *3*(7), 749-752.

Spaull, N. (2013). South Africa's education crisis: The quality of education in South Africa 1994-2001. *Johannesburg: Centre for Development and Enterprise*, 1-65.

Spillane, J. P. (2012). Data in practice: Conceptualising the data based-decision making phenomena. *American Journal of Education*, *118*(2), 113-141.

Terbish, K., Baljinnyam, M. & Care, E. (2018). *Using assessment data to help students thrive: Classroom perspectives from Mongolia*. Retrieved from https://www.brookings.edu/blog/education-plus-development/2018/12/20/using-assessment-data-to-help-students-thrive-classroom-perspectives-from-mongolia/

Thompson, L. (2010). *Principles of data-driven instruction*. Retrieved from http://epdmh.com/leadership/pdfs/Principles_of_Data_Driven_Instruction.pdf&ved

Turner, R., Scoular, C., Vista. A. (2018). *The use of 21st century skills assessment data: National and global perspectives*. Retrieved from https://www.google.com/amp/s/www.brookings.edu/blog/education-plus-developmen/2018/12/13/the-use-of-21st-century-skills-assessment-data-national-and-global-perspectives/amp/

UNESCO Global Education Monitoring Report, 2017/ 18. (2017). *Accountability in the Education Sector of South Africa.* Geneva: UNESCO

Van Geel, M., Keuning, T., Visscher, A., & Fox, J. P. (2017). Changes in educators' data literacy during a data-based decision making intervention. *Teaching and teacher education, 64*, 187-198.

Waters, T., Marzano, R. J., & McNulty, B. (2003). *Balanced Leadership: what 30 years of research tells us about the effect of leadership on student achievement. (Working Paper)* Denver. CO. *Mid-Continent Regional Education Laboratory*.

Wayman, J.C., & Jimerson, J. B. (2014). Teacher needs for data-related professional learning. *Studies in Educational Evaluation*, 42, 25-34.

Wayman, J.C., Jimerson, J.B., & Cho, V. (2012). Organizational considerations in establishing the data-informed district. *School Effectiveness and School Improvement, 23*(2), 159-178.

Weber, E. (2005). New controls and accountability for South African teachers and schools. The Integrated Quality Management System, *Perspectives in Education, 23*(2), 63-72.

Yin, R. K. (2003). *Case study research: design and methods*. Thousand Oaks, CA.: Sage.

Young, V. M., & Kim, D. H (2010). Using assessments for instructional improvement: A literature review, *Education policy analysis archives, 18*, 19.

APPENDIX A: QUESTIONNAIRE

The main objective of accountability regimes in education is to ensure system's effectiveness within a context driven by system-wide assessments, national standards and student performance. Within this domain, school principals are held accountable for both school and student performance. As a result, school leaders look for ways to enhance continuous school improvement through data use for teaching and learning. With advances in technology allowing schools easy and rapid access to varied data sets, schools increasingly leverage data to support instruction while positively influencing students' achievement. A framework for guiding schools' instructional decisions based on insights gained about student learning is known as the Data-driven decision making (DDDM), an approach adopted by schools to improve teaching and learning.

Instructions for completing the questionnaire

The questionnaire must be answered by entering text or numerical data on several data fields. You will be required to click and manually add information, select information from a drop down list in the data field titled "choose an item". You may also be required to select options in check boxes by ticking inside the box. A selected check box would look like this: ☒. An unselected check box will look like this: ☐

Thank you for taking time to complete the questionnaire. Your sincere responses are highly valued appreciated. Your responses will be kept completely confidential. Please save the file and email to tshepom37@gmail.com or 216116@students.wits.ac.za

Section 1: Biographical data	
What is your gender?	**Male☐ Female☐**
What is your race?	**African☐ White ☐ Indian☐ Coloured☐**
What is your age range?	Choose an item.
What is your institution type?	Choose an item.
What is your designation?	Choose an item.
What is your post level?	Choose an item.

What is your teaching experience in years?	Click here to enter text.
What is your highest qualification?	Choose an item.

Section 2: The schools' use of student assessment data

Does the principal or the School Management Team (SMT) access student assessment data from the SA-SAMS?	Choose an item.
Does the principal or the School Management Team (SMT) access student assessment data from the SA-SAMS?	Choose an item.
Does the school log on to the District Driven District Dashboard to access data?	Choose an item.
Which data sets from these data management systems are useful for informing decisions about student learning?	Choose an item.
Are students' performance statistics analysed and discussed collaboratively by all teachers?	Choose an item.
Do teachers base their decisions about improving their teaching strategies on analysed assessment data?	Choose an item.
How is analysed assessment data used to enrich student learning?	Click here to enter text.
How do teachers use assessment data to identify students' learning gaps?	Click here to enter text.
Do you compare your school's performance data with the district target?	Choose an item.
How does the comparison between the performances of the school and the district enable the school to improve its results?	Click here to enter text.

Does your school have a team assigned for managing data use for learning?	Choose an item
Who constitutes the data management team of your school?	Click here to enter text.

In this section of the questionnaire you will be required to give information relating to how student performance data are accessed and used to improve teaching and learning. Complete the data fields with the correct response by checking a box☒, choosing an item or typing in a text.

Section 3: Staff Development

Does the school offer staff development programmes on data analysis to improve teaching and learning?	Choose an item.
What is the role of the district in assisting schools to analyse assessment data in ways that raise student outcomes?	Click here to enter text.
How often are teachers offered staff development programmes on data analysis, if any?	Click here to enter text.
Who is supportive towards teachers' efforts of using data to improve student outcomes?	Choose an item.
Do teachers collaboratively meet and analyse data together?	Choose an item.

Section 4: Teachers' opinions

Do you believe that analysed assessment data can improve teaching and learning if used meaningfully?	Choose an item.
Do you think that when the principal and the management team foster a data culture in a school it will motivate teaches to use data effectively?	Choose an item.
Do you think that by sharing analysed performance data with students will lead to high academic achievement?	Choose an item.
What is your opinion about the role parents could play in using analysed data to improve student outcomes?	Click here to enter text.

Thank you for taking your time to complete this questionnaire. Your participation is greatly appreciated.

APPENDIX B: HEAD OF DEPARTMENT INTERVIEW SCHEDULE

General information

1. What is your highest professional qualification?

2. Which grade (s) are you teaching?

3. How many years of teaching experience do you have?

4. How many years do you have as a school principal?

Management and use of data for teaching and learning

5. What is your understanding of the concept "data driven district or DDD"?

6. Do you think data management tools or systems of the Department of Education allow for easy access to schools' various data sets?

7. Describe your school's data analysis process.

8. Do you involve teachers in the data analysis process outlined above?

9. Who is leading discussions around school's data analysis process?

10. What is the role of the principal in fostering a data culture within the school?

11. How do members of the School Management Team provide teachers with necessary skills and knowledge in the use of data to enrich student learning?

Teachers' experience with data

12. What are teachers' perceptions around analysis of student assessment data?

13. Are teachers capable of using analysed data effectively to improve students' performance?

14. How is the school approaching teacher professional development on using data to enhance teaching and learning?

15. Describe the role of the principal and the SMT in supporting teachers' use of data to support instruction.

16. Do you think that staff development in data analysis is adequate?

17. On which areas of data analysis do you think teachers need development?

18. Do you think discussing analysed data with students has a potential to raise achievement standards?

19. What effect does analysed data have on student achievement? Why?

20. In what way would you say you have been supportive of teachers in their use of data to improve classroom teaching?

APPENDIX C: PRINCIPAL INTERVIEW SCHEDULE

General information

1. What is your age?

2. What is your highest professional qualification?

3. Which grade (s) are you teaching?

4. How many years of teaching experience do you have?

5. How many years of management experience do you have?

Management and use of data for teaching and learning

6. What is your understanding of the concept "data driven district or DDD"?

7. Do you think data management tools or systems of the Department of Education allow for easy access to schools' various data sets?

8. Are data from the "data driven district dashboard" useful for informing teachers about student progress?

8. Describe your school's data analysis process.

9. Do you involve teachers in the data analysis process outlined above?

10. Who is leading discussions around school's data analysis process?

11. What is the role of the principal in fostering a data culture within the school?

12. How do members of the School Management Team provide teachers with necessary skills and knowledge in the use of data to enrich student learning?

Teachers' experience with data

13. What are teachers' perceptions around analysis of student assessment data?

14. Are teachers capable of using analysed data effectively to improve students' performance?

15. How is the school approaching teacher professional development on using data to enhance teaching and learning?

16. Describe the role of the principal and the SMT in supporting teachers' use of data to support instruction.

17. Do you think that staff development in data analysis is adequate?

18. On which areas of data analysis do you think teachers need development?

19. Do you think discussing analysed data with students has a potential to raise achievement standards?

20. What effect does analysed data have on student achievement? Why?

21. In what way would you say you have been supportive of teachers in their use of data to improve classroom teaching?

APPENDIX D: DISTRICT OFFICIAL INTERVIEW SCHEDULE

General information

1. What is your highest professional qualification?

2. What is your age?

3. Describe your role in the district office.

4. How many years of experience do you have in your current role?

Management and use of data for teaching and learning

5. Do you think data management tools or systems of the Department of Education allow for easy access to schools' various data sets?

6. How best can various data sets accessible from the "data driven district or DDD" dashboard be used to improve student achievement?

7. Describe your school's data analysis process as it pertains to analysis of termly assessment marks.

8. Do you involve teachers in the data analysis process described above?

9. Who is leading discussions around school's data analysis process?

10. What is the role of district officials in fostering a data culture within the schools?

11. How does the district provide teachers with necessary skills and knowledge in the use of data to enrich student learning?

12. Is your staff development programme in data analysis effective in improving student outcomes? If so, how?

Teachers' experience with data

13. What are teachers' perceptions around analysis of student assessment data?

14. Are teachers capable of using analysed data effectively to improve students' performance?

15. Describe the role of the district official in supporting teachers' use of data to support instruction.

16. In what way would you say you have been successful in supporting teachers in the use of data to improve classroom teaching?

17. Do you think that schools require more staff development in data analysis?

18. On which areas of data analysis do you think teachers still need development?

19. Do you think discussing analysed data with teachers has a potential to raise achievement standards?

20. What effect does analysed data have on student achievement? Why do you think analysed data has an effect on student achievement?

21. Do you think principals and SMT members are doing enough to motivate and support teachers in the use of data for teaching and learning?

22. What are school leaders' perceptions around the use of data to improve student outcomes?

23. Do you believe principals and SMTs should be the ones leading discussions around data analysis? Why?

24. Describe conditions under which schools thrive in their use of data to enhance teaching and learning.

APPENDIX E: UNIVERSITY OF WITWATERSRAND ETHICAL CLEARANCE

WITS SCHOOL OF EDUCATION

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

SCHOOL OF EDUCATION ETHICS COMMITTEE

CONSTITUTED UNDER THE UNIVERSITY HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: 2019ECE008M**
PROJECT TITLE	An Exploratory Study of Instructional Leadership Practices within Data Driven Schools: A Case Study of Two Gauteng Schools.
INVESTIGATOR	Charles Tshepo Motshaisa
SCHOOL/DEPARTMENT OF INVESTIGATOR	WITS SCHOOL OF EDUCATION
DATE CONSIDERED	18 June 2019
DECISION OF THE COMMITTEE	Approved unconditionally
EXPIRY DATE	Date of submission of the project report

ISSUE DATE OF CERTIFICATE 24 June 2019 **CHAIRPERSON** (Dr. Paul Goldschagg)

cc: Supervisor: Dr. Geeta Motilal

DECLARATION OF INVESTIGATOR

To be completed in duplicate and **ONE COPY** to be emailed to the Ethics Office.

I fully understand the conditions under which I am authorized to carry out the abovementioned research and I guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee.

Motshaisa
Signature

25 / 06 / 2019
Date

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

APPENDIX F: GAUTENG DEPARTMENT OF EDUCATION APPROVAL LETTER



GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

8/4/4/1/2

GDE RESEARCH APPROVAL LETTER

Date:	**26 June 2019**
Validity of Research Approval:	**04 February 2019 – 30 September 2019** **2019/118**
Name of Researcher:	**Motshaisa C.T**
Address of Researcher:	**4 Kite Street**
	Crystal Park
	Benoni, 1501
Telephone Number:	**011 746 8132/ 082 690 2345**
Email address:	**tshepom37@gmail.com**
Research Topic:	**An Exploratory Study of Instructional Leadership Practices within Data Driven Schools: A Case Study of Two Gauteng Schools.**
Type of qualification	**Master of Education**
Number and type of schools:	**Two Secondary Schools and One District/ Head Office**
District/s/HO	**Ekurhuleni North**

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

28/06/2019

The following conditions apply to GDE research. The researcher may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

1. *The District/Head Office Senior Manager/s concerned must be presented with a copy of this letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.*
2. *The District/Head Office Senior Manager/s must be approached separately, and in writing, for permission to involve District/Head Office Officials in the project.*
3. *A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB) that would indicate that the researcher/s have been granted permission from the Gauteng Department of Education to conduct the research study.*
4. *A letter / document that outline the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.*
5. *The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, and chairpersons of the SGBs, teachers and learners involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in any way.*
6. *Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Director (if at a district/head office) must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.*
7. *Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year. If incomplete, an amended Research Approval letter may be requested to conduct research in the following year.*
8. *Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.*
9. *It is the researcher's responsibility to obtain written parental consent of all learners that are expected to participate in the study.*
10. *The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.*
11. *The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.*
12. *On completion of the study the researcher/s must supply the Director: Knowledge Management & Research with one Hard Cover bound and an electronic copy of the research.*
13. *The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned.*
14. *Should the researcher have been involved with research at a school and/or a district/head office level, the Director concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.*

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

.....

Mrs Faith Tshabalala
Acting Director: Education Research and Knowledge Management

DATE: 28/06/2019

Making education a societal priority

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

APPENDIX G: INFORMATION SHEET AND LETTER FOR PERMISSION FROM THE PRINCIPALS

Date: 21 March 2019

Dear Sir/ Madam

My name is Charles Tshepo Motshaisa I am a student in the School of Education at the University of the Witwatersrand.

I am doing research on instructional leadership practices of principals and School Management Teams (SMTs) in fostering a data culture within the school while supporting teachers towards effective data use to improve teaching and learning.

My research involves a data gathering process that will take approximately 60 minutes. It will encompass the completion of a questionnaire and individual interviews. These will be done for purposes of gaining insight into the school's approach to analysed learner assessment data and how data are used in ways that lead to improved teaching and learning.

The reason I have chosen your school is that, it counts amongst data driven schools in the Ekurhuleni North District as evidenced by the high rate of log-ins the school has registered in the Data Driven District (DDD) dashboard. Furthermore, your school complies with submissions of analysed learner performance statistics to the District Assessment officials on a termly basis.

I am inviting your school to participate in this research because your school's participation will significantly enrich the study and help to improve the quality of teaching and learning.

The research participants will not be advantaged or disadvantaged in any way. They will be reassured that they can withdraw their permission at any time during this project without any penalty. There are no foreseeable risks in participating in this study. The participants will not be paid for this study.

The names of the research participants and identity of the school will be kept confidential at all times and in all academic writing about the study. Your individual privacy will be maintained in all published and written data resulting from the study.

All research data will be destroyed between 3-5 years after completion of the project.

Please let me know if you require any further information. I look forward to your response as soon as it is convenient.

Yours sincerely,



Charles Tshepo Motshaisa

4 Kite Street

Crystal Park

Benoni

1501

tshepom37@gmail.com/ 082690245

Principal Consent Form

Please fill in and return the reply slip below indicating your willingness to be a participant in my voluntary research project called: **An Exploratory Study of Instructional Leadership Practices within Data Driven Schools: A Case Study of Two Gauteng Schools.**

I, _____ give my consent for the following:

Permission to review/collect documents/artifacts Circle one

I agree that learners' assessment mark sheets can be used for this study only YES/NO

Permission to be audiotaped

I agree to be audiotaped during the interview or observation lesson YES/NO

I know that the audiotapes will be used for this project only YES/NO

Permission to be interviewed

I would like to be interviewed for this study YES/NO

I know that I can stop the interview at any time and don't have to

answer all the questions asked. YES/NO

Permission for questionnaire/test

I agree to fill in a question and answer sheet or write a test for this study YES/NO

Informed Consent

I understand that:

- my name and information will be kept confidential and safe and that my name and the name of my school will not be revealed.
- I do not have to answer every question and can withdraw from the study at any time.
- I can ask not to be audiotaped, photographed and/or videotaped
- all the data collected during this study will be destroyed within 3-5 years after completion of my project.

Sign_____ Date _____

APPENDIX H: INFORMATION SHEET AND LETTER FOR PERMISSION FROM HEADS OF DEPARTMENT

Date: 21 March 2019

Dear Sir/ Madam

My name is Charles Tshepo Motshaisa and I am a student in the School of Education at the University of the Witwatersrand.

I am doing research on instructional leadership practices of school leadership and management in the use of data for making decisions that improve teaching and learning.

My research involves a data gathering process that will take approximately 60 minutes. It will encompass the completion of a questionnaire and individual interviews. These will be done for purposes of gaining insight into the school's approach to analysed learner assessment data and how data are used in ways that lead to improved teaching and learning.

The reason I have chosen your school is that, it counts amongst data driven schools in the Ekurhuleni North District as evidenced by the high rate of log-ins the school has registered in the Data Driven District (DDD) dashboard. Furthermore, your school complies with submissions of analysed learner performance statistics to the District Assessment officials on a termly basis.

I am inviting your school to participate in this research because your school's participation will significantly enrich the study and help to improve the quality of teaching and learning.

Your name and identity will be kept confidential at all times and in all academic writing about the study. Your individual privacy will be maintained in all published and written data resulting from the study.

All research data will be destroyed between 3-5 years after completion of the project.

You will not be advantaged or disadvantaged in any way. Your participation is voluntary, so you can withdraw your permission at any time during this project without any penalty. There are no foreseeable risks in participating and you will not be paid for this study.

Please let me know if you require any further information.

Thank you very much for your help.

Yours sincerely,



Charles Tshepo Motshaisa

4 Kite Street

Crystal Park

Benoni

1501

tshepom37@gmail.com

0826902345

Head of Department Consent Form

Please fill in and return the reply slip below indicating your willingness to be a participant in my voluntary research project called: **An Exploratory Study of Instructional Leadership Practices within Data Driven Schools: A Case Study of Two Gauteng Schools.**

I, _____ give my consent for the following:

Permission to review/collect documents/artifacts Circle one

I agree that learners' assessment mark sheets can be used for this study only YES/NO

Permission to be audiotaped

I agree to be audiotaped during the interview or observation lesson YES/NO

I know that the audiotapes will be used for this project only YES/NO

Permission to be interviewed

I would like to be interviewed for this study YES/NO

I know that I can stop the interview at any time and don't have to answer all the questions asked. YES/NO

Permission for questionnaire/test

I agree to fill in a question and answer sheet or write a test for this study YES/NO

Informed Consent

I understand that:

- my name and information will be kept confidential and safe and that my name and the name of my school will not be revealed.
- I do not have to answer every question and can withdraw from the study at any time.
- I can ask not to be audiotaped, photographed and/or videotaped
- all the data collected during this study will be destroyed within 3-5 years after completion of my project.

Sign_____ Date _____

APPENDIX I: INFORMATION SHEET AND LETTER FOR PERMISSION FROM THE DISTRICT OFFICIAL

Date: 21 March 2019

Dear Sir/ Madam

My name is Charles Tshepo Motshaisa and I am a student in the School of Education at the University of the Witwatersrand.

I am doing research on the role of the district office in building capacity to teachers and providing support to schools in the effective use of analysed student assessment data for making decisions that improve teaching and learning.

My research involves a data gathering process that will take approximately 60 minutes. It will encompass the completion of a questionnaire as well as an interview. These will be done for purposes of gaining insight into the district's approach to teachers' professional development in data literacy. Furthermore, in understanding as to how schools are supported in the use of analysed student assessment data to enhance teaching practice while enriching student learning.

The reason for selecting you to participate in this study is that you play a key role in monitoring and supporting schools in the implementation of national assessment policy, which requires schools to analyse student assessment data for accountability and for improving student academic performance.

I am inviting you to participate in this research because your leadership role and experience will significantly enrich the study and enhance schools' efficiency in data use to improve teaching and learning.

Your name and identity will be kept confidential at all times and in all academic writing about the study. Your individual privacy will be maintained in all published and written data resulting from the study.

All research data will be destroyed between 3-5 years after completion of the project.

You will not be advantaged or disadvantaged in any way. Your participation is voluntary, so you can withdraw your permission at any time during this project without any penalty. There are no foreseeable risks in participating and you will not be paid for this study.

Please let me know if you require any further information.

Thank you very much for your help.

Yours sincerely,



Charles Tshepo Motshaisa

4 Kite Street

Crystal Park

Benoni

1501

tshepom37@gmail.com

0826902345

District Official Consent Form

Please fill in and return the reply slip below indicating your willingness to be a participant in my voluntary research project called: **An Exploratory Study of Instructional Leadership Practices within Data Driven Schools: A Case Study of Two Gauteng Schools.**

I, _____ give my consent for the following:

Permission to review/collect documents/artifacts Circle one

I agree that district performance data can be used for this study only YES/NO

Permission to be audiotaped

I agree to be audiotaped during the interview or observation lesson YES/NO

I know that the audiotapes will be used for this project only YES/NO

Permission to be interviewed

I would like to be interviewed for this study YES/NO

I know that I can stop the interview at any time and don't have to answer all the questions asked. YES/NO

Permission for questionnaire/test

I agree to fill in a question and answer sheet or write a test for this study YES/NO

Informed Consent

I understand that:

- my name and information will be kept confidential and safe and that my name and the name of my school will not be revealed.
- I do not have to answer every question and can withdraw from the study at any time.
- I can ask not to be audiotaped, photographed and/or videotaped
- all the data collected during this study will be destroyed within 3-5 years after completion of my project.

Sign _____ Date _____

APPENDIX J: TURNITIN PLAGIARISM REPORT

00658018:Charles216116_CT_Motshaisa_TURNITIN_January_2020.docx

by Denise Nicholson

Submission date: 27-Jan-2020 02:35PM (UTC+0200)
Submission ID: 1247080703
File name: f7234435ff_Charles216116_CT_Motshaisa_TURNITIN_January_2020.docx (313.55K)
Word count: 30639
Character count: 179582

00658018:Charles216116_CT_Motshaisa_TURNITIN_January_2

ORIGINALITY REPORT

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