THE NATURE OF INSTRUCTIONAL SUPPORT HODS PROVIDE TO MATHEMATICS AND SCIENCE TEACHERS IN CAPE TOWN PRIMARY SCHOOLS

by

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DECLARATION

I, Frederick Ngmenkpieo, declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

Signed: .....

Frederick Ngmenkpieo

Date: 25/09/10

ABSTRACT

The thesis examined the instructional support that Heads of Departments (HoDs) in four Cape Town primary schools provided for mathematics and science teachers. The main research focus was: To investigate the activities and strategies that HoDs in Cape Town primary schools use to provide support to mathematics and science teachers in their departments. A qualitative interpretative approach was used for the study. Face-to-face, semi-structured individual interviews were used to enable the researcher to obtain in-depth responses to the questions and probe the participants' responses. The sample for the study consisted of four HoDs and four Grade 6 mathematics and science teachers. The results indicated that among other things, the HoDs used mentoring or coaching and motivation to support mathematics and science teachers. It was also found that, in the course of mentoring the teachers, the HoDs encountered several challenges. In the light of the findings, the researcher recommends that HoDs be provided with formal leadership and management programmes to ensure efficacy in their practices.

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DEDICATION

This thesis is dedicated to my sister, Yelebapuono, and her late husband, Vincent Tindana, for their contribution to my education.

KEY TERMS

Acronyms	Definition/explanation
CTLI	Centre for Training and Learning Institute
DoE	Department of Education
EFA	Education for All Goals
ELRC	Education Labour Relation Council
HoD	Head of Department
IQMS	Integrated Quality Management System
MDGs	Millennium Development Goals
M Ed	Master of Education
REQV	Relative Educationa Qualification Value
SGB	School Governing Body
UN	United Nations
UIS	UNISCO Institute for Statistics
UNESCO	United Nation Education Scientific and Cultural Organisation
WCED	Western Cape Education Department

GLOSSARY

Head of Department

A Head of Department is a senior teacher with certain specific knowledge and skills in terms of the methodology and procedure required to manage a learning or subject area.

Professional development

Professional development is the provision of assistance, support and advice to teachers in order to promote their professional confidence and efficacy in teaching and learning. Smith and Kritsonis (2006:2) state that professional development requires activities designed to build the personal strengths and creative talents of individuals and thus create human resources necessary for organisational productivity.

Management

Management involves administration and implementation of organisational policies, making decisions about what goals to pursue and how to attain them in an organisation. Hence, management is the effective use of organisation's resources to achieve its set goals.

Leader

A leader is a person who leads, rules, guides or inspires others to work.

Leadership

Leadership is the ability to influence others towards the achievement of common goals that contribute to a worthwhile purpose, such as professional, organisational, leadership development and improvement of practice in an educational organisation (Zuber-Skerritt, 2007:994)

Instructional leadership

Instructional leadership focuses on the teaching and learning and the behaviour of teachers in working with students (Bush, 2007:401)

Instructional support

Instructional support is the provision of resources, guidance, advice, and professional development to teachers to improve teaching and learning in the classroom.

Principal

The principal is an educator, the head of a school or other educational institution who ensures that the school is managed satisfactorily and complies with applicable legislation, regulations and personnel administrative measures as prescribed (ELRC, 2003:64).

Intermediate Phase

According to the policy document, Intermediate Phase consist of Grade 4, 5 and 6 (ELRC, 2003:32)

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CHAPTER ONE: BACKGROUND OF THE STUDY

1.1 Introduction

The United Nations Education Scientific Cooperation Organisation-UNESCO Information Statistics (UNESCO-UIS) (2008:5) recognises that primary education is one of the basic human rights which is vital both to the development of individuals and societies. As a result, primary education has been made a major global concern by the United Nations Millennium Development Goals (MDGs) and Education for All Goals (UNESCO-UIS, 2008:15). Mposa and Ndaruhutse (2008:15) argue that "in order to accomplish the MDGs for education and the wider Education for All Goals, one of the critical inputs to the education system is the school teacher." Mposa *et al.* believe that effective teachers are a means to delivering the education MDGs, but good teaching is only able to succeed within a favourable environment. Daily practices that foster an environment which is supportive of effective teaching are classified in themes such as developing teachers and facilitating leadership, communicating and rapport, and managing change and supporting instruction (Crum & Sherman, 2008:81).

1.2 Background

The increasing responsibilities of principals in South African schools have given rise to initiatives for institutional leadership (Naidu, Joubert, Mestry, Mosoge, & Ngcobo, 2008:183). According to UNESCO-UIS (2008:15), school principals are more often engaged in managing school facilities, resources, administrative and office duties and labour related issues. In view of this, principals are relatively less engaged in coordinating special measures for teaching and learning problems, coordinating lesson programmes and organising extracurricular activities. Naidu *et al.* (2008:104) state that in the past, most principals managed their schools single-handedly, but nowadays the organisational complexity of schools makes it difficult for one person to manage a school. This situation has brought about members of senior management teams such as HoDs, who are subject or learning area heads, and instructional leaders to be involved in providing instructional support to teachers. Dinham (2004:339) claims that subject departments or other groupings of teachers appear influential in the

achievement of outstanding educational outcomes because they, as departments, provide organisational support for school subject knowledge.

While support for teachers is important in all learning areas, the need becomes more pronounced in subjects such as mathematics and science as these subjects are generally considered to be more difficult than the others. Mathematics and science literacy are central to all further learning and also to most jobs in the information economy (Mji & Makgato, 2006:254). Yet the poor performance of South African primary and secondary school learners in mathematics and science constitutes one of the country's most critical problems (Bernstein 2005:230; Taylor, Fleich & Shindle, 2007:86). As an effort to increase participation and success rates in mathematics and science, the Western Cape Education Department (WCED) decided to enhance the teaching and learning of mathematics and science in schools by initiating support programmes (Department of Education (DoE) (2002).

A further effort by the WCED in collaboration with the Cape Town Department of Education was to provide instructional support to mathematics and science teachers by developing a number of initiatives and support programmes at the Western Cape provincial level (Mji & Makgato, 2006:255). These programmes were meant to enhance the teaching and learning of mathematics and science learning areas. Some of these support strategies and programmes are illustrated in Table 1.1.

Table 1. 1: Mathematics, science and technology instructional support strategy, the role of the CTLI as the official training arm of the WCED

Project	Aim
Centre for Science and Technology	To encourage learners in disadvantaged areas to perform well in mathematics and science To offer special tuition to mathematics and science learners
The Mathematics and Science Academy	Set up to identify and recruit learners with high potential To recruit competent teachers
Cape Town Institute	To offer six weeks full time course for mathematics and science teachers at the Intermediate Phase level
The Multigrade Rural school intervention	To train teachers in multigrade classroom management To train teachers to use ICT in teaching
The Thintana MST Project	To offer courses to teachers in mathematics and science To train assessors in mathematics and science and technology in education
Advanced Certificate of Education	To offer courses to teachers in mathematics and science To train assessors in mathematics and science and technology in education
The Khanya Project	To offer training to teachers in mathematics and science To offer resource materials To offer computer-based training in mathematics and science
The E-Curriculum Project	To provide learners with ICT to be used in tertiary institutions To support mathematics and science learners in high Grade 10 and 12 To provide computers and related technology to schools

Source: DoE (2002-2008)

Table 1 shows the enormous move by the Cape Town Department of Education and WCED officials to improve mathematics and science instruction. What is, however, lacking is

effective leadership in the schools to support these two learning areas (Bernstein, 2005:232). In the 21st century, schools require effective leaders and managers if they are to provide the best education for their learners (Bush, 2007). Colitz, Fuglestad and Lillejord (2002:196) argue that the failure rate in mathematics and science is unacceptably high and requires efficient leadership in the field.

Research done by Murphy, Brown, Herman and Ozturgut (2006:102) shows that certification is not necessary for a teacher to move into an administrative position in a school in South Africa. Their finding indicates that the normal route is to be a teacher, head of a department, a deputy principal, and then a principal. Hence, HoDs are not given formal training on leadership skills about teacher supervision and support.

The minimum basic qualifications for HoDs includes a matriculation certificate, a three-year diploma (the required Relative Educational Qualification Value, REQV 13) and two years minimum teaching experience (Employment of Education Act 76 of 1998). Other requirements involve medical fitness, sound character (not guilty of any misconduct during two years preceding the application) and language proficiency (DoE, 1996).

According to DoE (1996), the prospective candidate must also meet the criteria for the appointment which include the sifting process that takes place at the Education Department to ensure that a candidate has complied with the basic requirement, including the prescribed format of application forms, the interview process and passing the School Governing Body (SGB) profile of their ideal candidate test (Employment of Education Act 76 of 1998).

1.3 Statement of the problem

The minimum qualifications required for promotion to HoD as discussed, coupled with the selection criteria used for these candidates, suggest that HoDs might not possess the key leadership skills necessary for supporting mathematics and science teachers. The fact that they are selected purely on the basis of their long service experience in the teaching arena, rather than their subject expertise, might be interpreted as an indication that they are not

adequately equipped for the HoD positions they hold. In this study, it is argued that by virtue of the perceived complexity of the learning areas of mathematics and science, leaders with expertise and a wide repertoire of knowledge in the subject content, rather than mere teaching experience, are required. Without the essential expertise, knowledge and skills, it would be difficult to understand the methods that mathematics and science HoDs use to make their instructional support for teachers of these two learning areas effective. Of even more serious concern is to note that not much research has been conducted to investigate the strategies and activities HoDs in Cape Town primary schools use to support mathematics and science teachers.

1.4 Purpose of the study

The purpose of the study was to investigate the activities and strategies that HoDs in Cape Town primary schools use to provide support to mathematics and science teachers in their departments.

1.5 Research question

The main research question which guided the study was: In what ways do HoDs support mathematics and science teachers in Cape Town primary schools? The sub-question was: What activities and strategies do HoDs use to enhance their support for mathematics and science teachers?

1.6 Significance of the study

The findings of this study serve as reference points for HoDs of mathematics and science in schools, particularly on management skills that will lead to improvement of HoD and teacher performance in the area of mathematics and science. The findings of the study will also benefit the policy-makers in terms of revisiting and reviewing policy formulation as it relates to the performance of HoDs, particularly those of mathematics and science. As a teacher, the study will also enhance my administrative skills in education management.

1.7 Scope of the Study

This study is focused on HoDs in four primary schools in Cape Town. Four HoDs and four mathematics and science teachers of the sampled schools were the respondents. They provided the information on the instructional support of HoDs in relation to the teachers' professional growth and performance. The research focus is on the nature of instructional support HoDs provide to support mathematics and science teachers.

1.8 Overview of the thesis

Chapter 1 provides the background, which constitutes a synopsis of the role of school principals and HoDs. The background also highlights the poor performance of learners in mathematics and science, and the efforts made in improving learner performance. Emphasis is given to the importance of HoDs instructional support to teachers in the two learning areas, and on the career paths followed in becoming an HoD. The issue of the career path for HoDs leads to the main question on the ways in which they support teachers, when considering their own upward mobility to becoming HoDs which is not based on expertise in mathematics and science. The chapter concludes with the significance of the study.

Chapter 2 reviews literature that was pertinent to the study. Literature was obtained from journal articles, thesis, books, and the internet. The main area of focus was instructional support, but other concepts of interest were leadership, management, and instructional resources.

Chapter 3 presents the research design and methodology. In this chapter the research design, data collection procedure, data analysis and ethical considerations are described.

In Chapter 4, the findings on how HoDs support mathematics and science teachers in primary schools, drawn from the interviews and document analysis, are presented.

Chapter 5 consists of the analytical discussion of the findings. In this chapter, interpretations of the findings in Chapter 4 are put into perspective, using literature to support some of the arguments raised.

Chapter 6 provides the conclusion of the study. It also highlights the recommendations made by the researcher based on the findings, and makes suggestions for further research. The next chapter highlights the literature review in relation to the study.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The literature review presented the conceptual framework of the study and reflects on recent research that highlights important aspects concerning the role of the HoD. This study was informed by the leadership theories. The following issues were discussed under leadership theory: definition, leadership paradigms in South Africa and the roles and characteristics of HoDs. Further literature looked at the support of HoDs for teachers. Specifically, this section highlighted the role of induction for teachers, provision of resources, and coaching and mentoring. The value of monitoring teachers' work, teacher professional development and teacher motivation were also discussed in the review of the literature. The chapter concludes by discussing strategies for improving the support for mathematics and science. Of central importance in this section is training for HoDs, availability of resources and shared leadership. A summary of the issues highlighted in the literature review is provided at the end of this chapter.

2.2 Conceptual framework for the study

Conceptual framework is a map of theories and issues relating to the research topic (Leshem & Trafford, 2007:99). Wilson (2001:472) argues that the conceptual framework includes beliefs about the nature of knowledge as well as conscious and unconscious values and assumptions, and feelings, experience and knowledge portrayed by literature about the study. According to Maxwell (2005:33) it is important for one's research study to be linked to theories, beliefs and prior research findings so as to inform or guide the research study. A conceptual framework also helps to focus the study (Anfara & Mertz, 2006:51). In this case, the conceptual framework enabled the research to be more focus in terms of assessing and refining the research goal, choosing the appropriate method and linking to the relevant theories that inform the study.

The conceptual framework for this study is linked to instructional leadership. Quinn (2002:447) points out that instructional leadership includes goal setting, school-community relation, supervision and evaluation, school climate, instructional coordination and teacher professional development. The concept of instructional leadership is aimed at ensuring the enhancement of school's central activities which are teaching and learning (Bush, 2007:407). The instructional support HoDs provide to mathematics and science teachers is linked to instructional leadership theory in that the concept strongly concerns teaching and learning, including the professional learning of teachers (Southworth, 2002:79). Gignant and Firestone (2007:303) also state that the support functions HoDs as teacher leaders provide to mathematics and science teachers include work related tasks such as providing the necessary resources, space and ensuring adequate time and professional development issues.

2.3 Leadership paradigms in South Africa

In the South African context and thinking about leadership, Moyo (2004:36) gathered the following leadership paradigms: Scientific Education Management approach, Education Management approach and Education Governance and Management, as shown in the Table 2.1.

Table 2. 1: Leadership paradigms in South Africa

1 Scientific Education Management (Control)	**2 Education Management (Leadership)**	**3 Governance and Management (Facilitation)**
Professionalism Hierarchy and regulation Rule compliance Planning Organising Guiding Control Works study Personnel classification	Decentralisation Devolution of power Performance Strategic planning Mission driven School effectiveness Human resource management Total Quality Management Customer focus	Relationship building Recognition of diversity Participation and communication Responsiveness Balance and reconciliation Collaboration Change management Support Negotiation

Source: Moyo (2004:34)

Considering Table 2.1, Moyo (2004) argues that in the current South African educational and political dispensation, and in line with global trends, educational leadership is moving away from paradigm 1 towards paradigms 2 and 3, where the notion of leadership takes centre stage rather than just management issues as being the central focus in schools.

In defining management and leadership, Darling and Nurmi (2008:202) describe management as a position in an organisation, encompassing the responsibilities that come with that organisational position. On the other hand, they argue that leadership is a personal skill encompassing the abilities to envisage, act, communicate and influence people with whom one is involved in the organization.

Darling and Nurmi (2008) further advance their argument that management is based on a status in a hierarchy, while leadership is on personal recognition and acceptance of other people. They conclude that management works on strategic matters such as planning and designing organisational structure, during which one delegates the implementation of the strategies to lower level ranks to get the delegated strategy implemented successfully. This was confirmed by Zuber-Skirritt (2007:992) who argued that leadership refers to a process of guiding people and influencing decisions; while management involves administration and implementation of organisational policies and decisions. Middle management like HoDs and supervisors need leadership skills in order to become operational people to work for the wisdom invented by the top management.

Most often, instructional leadership and management styles are juxtaposed at the ends of a scale, usually positioned in tension with each other (Scott & Webber, 2008:768). Moyo (2004) finds the list of words associated with leadership and management styles to include the following in Table 2.2:

Table 2. 2: Differences between leadership and management

Leadership	Management
Guide	Co ordinates
Motivation	Organise
Initiation	Maintains
Anticipate	Stabilises
Build vision	Realises
Create	Structure
Moves forward	Establishes
Inspires	Handle
Background boundaries	Set boundaries

Source: Moyo (2004:36)

Instructional leadership and management are interrelated components of school leaders' professional practice. Crowther, Kaagan, Ferguson, and Hann (2002) noted that the optimal approach to school leadership is to integrate management and instructional leadership so that good management practices support teaching and learning.

Bush (2007:392) is of a similar view that leadership and management need to be given equal prominence in schools if they are to operate effectively and achieve their objectives. Leithwood, Jantzi and Teinbach (1999) also point out that in practice, HoDs in their day-to-day work are rarely aware of whether they are leading or managing; they are simply carrying out their work on behalf of the school and the department. The concept of management overlaps with that of leadership, a notion of great contemporary interest in most countries in the developed world which is also reflected in contemporary South African discourse (Bush, 2007:392). Thus leadership role of the school HoD can never be over emphasised.

2.4 The roles and characteristics of HoDs

The HoD is an educator in a school in charge of a subject, learning area or phase (Education Labour Relation Council (ELRC) (2003:66). According to the (ELRC 2003:66), HoDs are classroom teachers, but responsible for the effective functioning of the department. Part of their duties, as stated in the ELRC (2003), is to organise extra-curricular activities so as to ensure that the subject, learning area or phase and the education of the learners is promoted in a proper manner. Other roles included in the ELRC are:

- to protect and maintain the quality and integrity of the teaching and learning programmes within the Department;
- to conduct regular reviews of teaching and learning within the Department in order to optimise the use of resources available;
- to organise the Department's teaching programmes, especially in timetabling and the use of space resources; and
- to oversee the conduct of examinations and arrangements of the assessment of student performance and progress; monitor the academic and service activities of the department.

These roles are better performed based on the individual HoD's leadership characteristics as discussed in the sections that follow. Naidu *et al.* (2008:190) also noted that HoDs' instructional support roles performance depends on their individual skills/practice and their job description.

2.5 Leadership theory

Leadership theory seeks to identify and predict which leadership characteristics are most effective and why (Mankoe, 2002:41). Dambe and Moorad (2008:575) identify three main views that influence leadership theory: trait, behavioural and situational or contingency perspectives.

2.5.1 Trait leadership theory

The trait theories assume that leaders are born not made. Jain and Mukherji (2008:439) stipulate that theories of leadership assume that people naturally have certain traits which make them better suited for leadership. These traits refer to distinguishing characteristics which include personality, social, and physical (Juli & Atmadja, 2005:102). Liu and Liu (2006:2) also identified a group of traits that were positively associated with leadership including: intelligence, self-confidence, initiative, and persistence. Leithwood (2005:622)

identifies instructional leadership qualities that support instruction: professional knowledge, and skills/practices.

Dinham (2006:69); McNulty, Water, Robert and Marzono (2003) and Scott and Webber (2008:771) emphasise that instructional leaders must have in-depth knowledge and sound understanding of curriculum, assessment, and instructional methods. As instructional leaders, HoDs need to have knowledge about instructional practices, knowledge about assessment practices, and good background knowledge on areas of educational issues. Similarly, learning communities require leaders who are very competent in the area of instructional design and have sound assessment evaluation literacy (Scott & Webber, 2008:772). The extent to which HoDs are knowledgeable about the current curriculum instruction and assessment is important for their leadership roles (McNulty, *et al.,* 2003).

With regard to curriculum, Naidu *et al.* (2008:191) assert that in order for HoDs to help teachers improve the quality of teaching and learning, they need to understand the curriculum in terms of:

- The relationships of the subjects or learning areas to revise curriculum as a whole;
- The statutory curriculum requirement for assessment, recording and reporting learners' achievement;
- The characteristics of high quality teaching and the strategic requirement for improving and sustaining high standard of learning and teaching;
- How to utilize their subject or learning area to develop their literacy, numeracy and comprehension skills; and
- How teaching can promote learners' morale, spiritual, social, cultural and mental development.

Pertaining to instruction, HoDs need to know about different models of teaching, the theoretical reasons for adopting a particular teaching model and pedagogy.

HoDs also need to know about the principles of teacher and student assessment, assessment procedures with emphasis on formative assessment methods, and assessment that aim to improve learner learning. Sieborger and Macintosh (2004:29) and Bialobrzeska (2006:53) suggest that:

> 'If the curriculum has moved away from content heavy syllabuses into a syllabus which [put emphasis on] knowledge, skills and values as outcomes, then surely we must assess how our students have progressed in their development of knowledge, skills and values. We have to move away from assessing facts and content only'.

HoDs need to understand the philosophies of assessment and evaluation as well as an appreciation of the importance of creating an alignment among curriculum, learning experiences, and assessment practices (Scott & Webber 2008).

2.5.2 Behavioural leadership theory

Though both trait and behaviour theories have the same perspective that leadership is central to organisational performance, the behavioural approach to leadership is based on what leaders actually do to achieve leadership effectiveness (Tabbodi & Prahallada, 2009:169).

Good leadership ultimately depends primarily on what leaders do, and not merely their qualities or traits alone (Allio, 2006:173). Therefore, to develop potentially effective mathematics and science teachers in their departments', HoDs must model leadership behaviour themselves so that teachers can actually observe leadership in action. Zuber-Skirritt (2007:992) indicates that HoDs need to practice what they preach by living and modelling the approaches they wish teachers to adopt. HoDs are role models and teachers observe them virtually every hour of the day, during and after work. Teachers quote, imitate, pursue, watch, study, and analyse HoDs' actions and inactions. Because of the factor of emulation, HoDs must demonstrate emotional intelligence, which is the ability to assess and manage one's emotions, as well as the capacity to understand the emotions of others, thereby utilising the information to improve relationships with other teachers (Cangemi, Burga, Lazarus, Miller & Fitzgerald, 2008:1028).

Interpersonal relations skills are also necessary for HoDs to succeed in their job as it allows them and their teachers to talk about their practice, share their knowledge, observe one another's lesson and offer suggestions (Naidu *et al.*, 2008). Sias (2005:377) asserts that relationships between individuals in the school can be described as being unique and interpersonal as a result of working together in close proximity and sharing the same goals. Dinham (2004:340) argues that effective school leadership involves intense interpersonal relationships, and working with individuals and teams to improve teaching and learning.

Edgerson and Kritsonis (2006:3) believe the concept of trust is important in the leadership of HoDs. Trust contributes to a positive working environment (Moye, Henkin & Egley, 2004:261). No matter what the leadership skills or professional competence of the HoDs are, daily interpersonal interactions of HoDs are necessary to gain trust and support from teachers. Edgerson and Kritsonis (2006) further contend that it is essential that school leaders develop trust factors necessary for teachers to follow and support their efforts. Wing (2006:8) also postulates that HoDs, as leaders, must set a climate of trust and allow their teachers to lead and manage the day-to-day activities to the best of their ability while they monitor and provide support.

In dealing with relationships in schools, Green (2005:74) and Naidu *et al.* (2008:11) argue that those relationships that are professional and collegial lead to exchange of value and attitude. They also enhance cohesion and develop positive and unique school culture which is very important in multicultural school settings. Naidu *et al.*, (2008) further postulate that there are three important basic characteristic or attributes of relationship namely: attitudinal, affective and behavioural.

Attitudinal attributes: this kind of relationship is composed of both negative and positive attitudes between or among parties. The positive attitude is characterised by trust, respect, administration and great regard for one another, having understanding and believing in each other. The negative is characterised by disrespect and biases.

Affective attributes: the attributes of this relationship include emotional feelings such as warmth and comfort or hate between or among parties in an organisation. There is empathy in this relationship that fosters good feelings and intention among members. Hate, which is the negative, fosters bad feelings and despair.

Behavioural attributes: the attributes in this relationship are observable, and also comprise both positives and negatives. In the case of positive relationships, the manifestation includes spending quality time together, sharing tasks, frequent and sustainable communication and support for one another. The negative attributes brings despondency.

It is important for HoDs to understand how morals reflect underlying human motivations and shape the subsequent attitudes, speech, and actions of teachers. HoDs should know their own values and ethical predispositions, as well as being more sensitive to the value orientations of others (Begley & Stefkovich, 2007). This is because HoDs literally use moral principles as leadership tools to support actions taken, model ideal practice and promote particular kinds of departmental activity (Begley & Stefkovich, 2007). The moral aspect of leadership therefore holds much promise in a manner that can best help teachers develop and empower them to teach (Greenfield, 2004:174).

The practices of leaders may be common, but the specific structures and strategies used to implement them are worthy of attention (Paek, 2008:13). Nowadays, people and school systems depend increasingly on leaders with skills and ability to master and develop knowledge resources for instructional development (Lerro & Suhiuma, 2009:114). HoDs must define and unpack clear and specific academic objectives by grade and subjects that they want their department to achieve through planning (Rutherford 2004). Furthermore, HoDs must observe instruction with the aim of providing teachers with feedback and of reflecting upon their own practices in order to improve (James, Dunning, Connolly & Elliott, 2007). The feedback and reflections helps teachers to make their own judgment and reach conscious decisions.

Assessment and/or evaluation skills are needed to critically question the success of instructional programmes, as well as support certain communication with teachers (Scott & Webber, 2008:772). HoDs must have a working knowledge of assessment and evaluation and the ability to use assessment information to inform decision making, ranging from the macro level of departmental evaluation to the micro level of classroom assessment (Scott & Webber, 2008:767). Teachers count on their HoDs as sources of information on current trends and effective instructional practices, for support and encouragement (Naidu *et al.*, 2008). HoDs must be responsible for informing teachers about new educational strategies, technologies and tools that apply to effective instruction (Quinn, 2002). As instructional leaders, HoDs need to communicate effectively and work collaboratively with their teachers to define and use data-driven, shared goals of the department (Alig-Mielcarek, 2003; Leithwood, 2005). Anusha *et al.*, (2008) argue that collaboration within schools which are working jointly on an activity, (as in team or group activity in a school, department or class) is essential for teachers to learn continuously from each other and from the HoDs.

2.5.3 Situational leadership theory

Bolden, Gosling, Marturano and Dennison (2003:8) argue that while behavioural theories may help managers develop particular leadership behaviours they give little clue as to what constitutes effective leadership in different situations. The situational leadership theory approach assumes that there is no one best way that is transcendent across all situations (Liu & Liu, 2006:4). The situational or contingency theory holds that what works for a leader in one situation may not necessarily work in another (Bradly, 2006:19). Hence, holders of the situational theory believe that a leader's most appropriate action or behaviour depends on both the situation and on the followers.

In other words, HoDs may need to concern themselves less with the actual behaviours they exhibit and give more attention to the situation within which they work, and create the right environment, one in which the teachers want to be involved and feel committed to their work. The work of HoDs, as leaders, is to influence and direct the activities of the teachers towards the achievement of desired goals.

In conclusion, leadership is not only about traits, behaviours, processes and activities of the person who is in a leadership position, but also encompasses the environment/situation and how the leader responds, as well as the particular skills and activities of the people being led (Horner, 1997:274).

2.6 Support provided by HoDs for teachers

According to Spink (2005:1) teacher instructional support is geared towards more teacher-driven method of problem solving and instructional improvement. Instructional support for teachers is meant to motivate teachers, monitor instruction and promote teacher developmental growth and learning through collaborative approaches (Weston & Brain, 2008). Gigante *et al.* (2008:311) also posit that HoDs' support to teachers includes being a consultant to individual teachers, managing the curriculum, developing curriculum materials, mentoring teachers' performance, coordinating professional development, managing the distribution of materials needed for teaching and participating in decision making. Frazier, Sterling, Logerwell and Kitsantas (2008:5) indicate that instructional support that HoDs provide for teachers in mathematics and science can be categorised under the following basic captions: creating conducive work environment, induction or orientation, resource and teaching support, coaching and mentoring, monitoring teachers' work and teachers' professional development.

2.6.1 Creating a conducive working environment

School leadership roles include creating an environment that is characterised by higher-level learning, values of creativity, innovation, expertise, self-development, knowledge sharing, mutual trust and appreciation of diversity (Zdunczyk & Blenkinsopp, 2007:28). Zdunczyk *et al.* (2007) observe that creating a working environment that is conducive for mathematics and science teachers would include communication procedures and policies, technology, training schemes and other resources. The importance of such an environment is that it develops and enhances the professional growth and performance of the teachers.

Begley and Zarestsky (2004:642) note that any school leader who attempts to lead and manage without reference to the broader environmental context is bound to encounter difficulties. Horner (1997:273) also argues that leadership is less a set of behaviours than it is the creation of an environment in which people are motivated to produce and move in the direction of the leader. Collinson (2007:447) adds that schools' leadership works at developing their schools' capacity by establishing an environment in which members, and thereby the school as an organization, can continuously learn and improve. Collinson (2007) further envisage four factors that impact on favourable environments for teaching and learning.

Social factor

Collinson (2007:450) observes that schools are established within community and societal cultures, and the norms and values of those larger social spheres mediate and shape what transpires among people within the school. Therefore, knowledge of the school community and the societal culture is paramount in setting a peaceful coexisting environment for mathematics and science teachers. Those social knowledge and skills are learned through interactions with others over time, so leaders have to structure various possibilities for interactions such as dialogue, decision making, and dissemination of information (Collinson, 2007:451).

Ethical factor

School leadership mostly depends on ethically factors that deserve study and attention as professional principles. Such professional principles include: caring, respect, and participation associated with inclusion; equity and knowledge associated with efficient reliability; and conditions that foster organisational learning (Leithwood *et al.*, 1999:45). Collinson asserts that people by nature seek organisations with which they share values or understandings and in which they find a sense of meaning and belonging. The issue of ethics cannot be over emphasised when creating a conducive environment for mathematics and science teachers.

Democratic/political factor

School leaders work to establish and sustain democratic values in the daily lives of everyone in the schools community. They are basically responsible for creating just, fair, humane and caring conditions, processes, and structures that provide equitable opportunity, access, and experiences for everyone in the schools community. At the same time, they challenge inequality and disrupt the sources and systems that contribute to those injustices (Bredeson, 2004:712). Democratic processes are a desirable and necessary approach to leading schools effectively in increasingly culturally diverse communities such as South Africa.

Intellectual factor

In the school system, individual teachers' knowledge in the subject matter and pedagogical skills is necessary and important (Collinson, 2007:448). Collinson (2007), for that reason, suggests that all members, particularly the teachers, must learn togetherness', share their learning and collectively make sense of their environment. Leaders, in this case, are critical in tapping the talents and knowledge of all members, encouraging innovation, and then providing opportunities for dissemination and discussion of innovative ideas at the school level and beyond. Furthermore, school leadership is required to create the internal conditions necessary for the continuous development and increasing professionalism of the teachers (Huber, 2004:670).

In the light of this, it is clear that school leadership needs to have a school culture. According to Dambe and Moorad (2008:583), successful organisations like schools must develop a shared culture to which all members are committed. Such a school culture should be characterised by stated missions, goals, values and standards of performance (Ninan, 2006:3). Ninan (2006) concludes that this kind of culture should allow the teachers to participate in decisions that affect their work, have reasonable autonomy to carry out their work, share a sense of purpose and receive recognition, respect and dignity.

2.6.2 Teacher induction

Teacher induction as an educational process entails the extension of teacher preparation that aims at sustaining and supporting teachers who have already completed an initial teacher training and are now at school to teach (Dube, 2008:20). It is a way of introducing beginning and new teachers into the practice of teaching and providing them with knowledge, skills and information that they will need for their job performance. Developing a clear job description and linking teachers' experience to these requirements provides a useful starting point for them (Bush & Oduro, 2006:373). Induction is seen as the process of learning about a work setting, the key people and places, the traditions and the organisational culture, the district's expectations of its professional staff and the curriculum and other programmes thereof. Bartell (2005) asserts that teacher induction is aimed at acquainting teachers with the information included in Table 2.3.

Table 2. 3: Importance of induction to teachers

Category	Example
Procedural	Familiarity with schools and district procedures and expectations for personnel
Managerial	Classroom management strategy; time management; setting up the classroom; getting materials and supplies; scheduling; taking attention; grading practices; keeping records
Psychological	Managing stress; gaining self-confidence; handling challenges and disappointments; teacher role; attending to physical and emotional well-being
Instructional	Grade level curriculum standards and expectations; lesson planning; instructional resources; assessing students progress and using results to shape instruction; using a variety of instructional practice; adopting instruction to meet individual student needs
Professional	Teaching norms and practices; appropriate boundaries and relationship between department and students; legal issues; the role of professional organisations; professional development opportunities
Cultural	Developing rapport with students and parents; understanding and appreciating environment; using community resources; valuing diversity; developing cultural proficiency
Political	Getting to know colleagues; contribution to extra-curricular programmes; building relationships with colleagues, staff and administrators; understanding the broader context of teaching and reform efforts

Source: Bartell (2005:17)

Induction or orientation is meant to create a motivational environment, to ensure effective control and performance of the new teacher (Wanzare & Ward, 2000:265). Furthermore, induction helps novice and new teachers to manage uncertainties that may arise during the duty of the new teacher. While induction courses are mostly meant for new or beginning teachers, staff or professional development or in-service training is for teachers already on the post.

2.6.3 Provision of instructional resources

Another form of support to mathematics and science teachers by HoDs is providing teaching materials to enable them to teach effectively. This goes way beyond informing teachers how to obtain textbooks, paper and pencils. Depending on the kind of school and the technology available, resources range from overhead projectors, transparency pens and transparencies and laboratory to computers with projection systems (Sterling & Frazier, 2008:4). Science equipments are needed to conduct science experiments. In order for students and teachers to conduct experiment, teachers need to know what science equipment should be found in all science classrooms and the location of shared science equipment. The same is expected of mathematics teachers. The reason is that having easy access to resource materials needed for teaching and learning enhances the effectiveness and likelihood of teachers guiding students on more practical work.

In this case, HoDs act as intermediaries between their subordinates and their own superiors (Tierney, Farmer, and Graen, 1999; Stoker, Looise, Fisscher, and de Jong, 2001). HoDs ascertain what resources teachers need to support their work, and then secure these resources from the higher organisational levels such as the school principal or the DoE (Hjorth, 2005; Tierney *et al.*, 1999). Such resources can include computers, software, tools or even funds and training.

2.6.4 Coaching and mentoring

In addition to having the equipment or resources available, mathematics and science teachers sometimes need someone to model effective use of the equipment. This is the task of a coach or guide, a person who motivates, educates and leads by example (Allio, 2006:1075). HoDs should act as mentors and coaches, engaging in both roles as appropriate for a given teacher and for a given situation. Sheard, Kakabadse, Kakabadse (2009:542) note that an essential form of support for mathematics and science teachers is providing them with coaching and mentoring in order for them to perfect their teaching and enhance student learning. Mentoring is when a subject-matter expert, like the HoD, provides psycho-social support and helps teachers increase their skills and knowledge in that subject area. Coaching, on the other hand, is helping the individual teacher to develop a sense of competence, confidence and effectiveness to meet their teaching goals (Ehrich, 2008:470). Mentoring and coaching are very effective ways of ensuring professional development based on the expertise and experience of a professional already in the system (Naidu *et al*, 2008:97).

HoDs perform both roles of mentoring and coaching because their job functions include supporting, coaching, protecting, exposure, visibility and challenging work assignments. Psycho-social functions include encouragement, friendship, advice and feedback, as well as helping individual teachers to develop a sense of competence, confidence and effectiveness in their teaching (Ehrich, 2008:470). According to Ehrich (2008), mentoring or coaching helps teachers gain more confidence in their professional capability, translate educational theory into practice more effectively and develop improved communication skills. They also enhance the mentor's professional growth through increased recognition from peers, and provide further opportunities for personal career advancement. Morrison (2007:8) identifies the following tasks as what HoDs do as coaches and mentors:

- identifying appropriate instructional strategies and interventions to address diverse teaching needs and to improve the teacher performance;

- Conduct demonstration lessons using research-based instructional strategies. Collaborate with grade-level teachers to set goals for improving instruction. In this way they assists teachers in designing and delivering effective instruction;

- Observe instruction during mathematics and science sessions and provide support for teacher(s) in terms of suggestions or motivation. Provides professional development instruction on a variety of topics related to mathematics and science instruction; and

- Ensure that district standards/benchmarks are the instructional focus for planning and delivering of the instruction. Coordinate the implementation of the assessment system, including data management/reporting system and analysis/interpretation of data to inform decision-making at the school and department level.

2.6.5 Monitoring teachers' work

Monitoring teachers' work is another responsibility of HoDs. Fouries and Myer (2004:2) define monitoring as a dynamic and reciprocal relationship in a work environment whereby a more advanced and wiser career incumbent (mentor) helps a less experienced person. Monitoring and providing feedback to teachers on their performance are regarded as crucial skills and practices of HoDs (Blasé & Blasé, 1999; Alig-Mielcarek, 2003). Monitoring in this sense involves HoDs observing and looking at teachers' weekly focus, visiting classrooms, examining samples of work and observing the implementation of departmental policies (Southworth, 2002:76). This dimension describes the activities of the HoD as an instructional leader around the academic curriculum. Alig-Mielcarek (2003) also identifies such activities as being visible throughout the school, talking with teachers, providing encouragement and feedback to teachers on academic performance and ensuring that the instructional time of the school is not interrupted.

The work of the mathematics and science HoDs involves supporting colleagues or teachers in the teaching of the subject area, being informants about current developments in the subject,

and providing a strategic lead and direction for the learning area in the department (Goos, Dole & Makar, 2007). Blasé and Blasé (1999:133) also state that the feedback focuses on observed classroom behaviour, expressing caring and interest, providing praise, establishing a problem-solving orientation and response to concerns about teachers and students. They further observe that the effects of this feedback increase teacher reflection, innovation/creativity, instructional variety, risk taking, better planning for instruction and improve teacher motivation, efficacy, sense of security and self-esteem.

2.6.6 Supporting teacher professional development

Teacher professional development is another form of assistance HoDs offer to teachers. Professional development of teachers is an ongoing process of developing the knowledge, skills, and dispositions needed to provide the necessary and essential professional services to assist all teachers to achieve their educational potential (Raihani, 2008). Professional development activities may be provided through school priorities and are available for all teachers. Teachers, both new and old, are provided with similar professional development opportunities in their various departments, which address specific needs identified in the department's development plan.

Some of the activities through which teachers develop professionally include the use of monitoring or supervision, coaching or mentoring, demonstrating lessons, and workshops organised by experienced teachers such as HoDs (Wong, 2005:559). Naidu *et al.* (2008) state that HoDs use mentoring and coaching to guide teachers' continuous professional development.

Jacobs and Kristsonis (2006:5) recommend that during teacher development programmes, school administrators and leadership (HoDs) must take teachers through new methodologies to address classroom problems that are non-curricular issues, such as students who have mental or physical illnesses, are homeless, have a history of drug abuse or teenage pregnancy issues. The authors indicated that the teacher development programme being offered as training on non-curricular issues must empower teachers' pedagogy to actually

reside around students who lack focus in their education because of external problems and issues they are dealing with prior to coming to the classroom. Safer and Fleichman (2005:n.p) note that in today's school, success is identified as ensuring achievement for every student. To ensure success for all, educators need tools to help them identify students who are at risk academically and adjust instructional strategies to meet these students' needs.

Jacobs and Kristsonis (2006) further add on that school leadership (HoDs) have to be resourced to send teachers to conferences that address teaching to students who advance at a rapid pace in their studies. The "No Child Left Behind Act" (NCLB), which calls for all students to be taught a particular concept until the last child in the classroom understands, however, has not considered the child who quickly gains an understanding of the ideas presented in the classroom. Such a child, Jacobs and Kristsonis (2006) note, is often left frustrated and unmotivated to access higher levels of knowledge. If teaching and learning is the key to having a successful future, then instructional leaders and teachers need to be adequately resourced.

Scholarly work suggests that the most effective leadership programmes focus on building professional knowledge, competence, skills and critical thinking (Allio, 2005:1071). Allio (2005) argues that the professional development of teachers as an educational strategy intends to help them develop proficiencies such as:

- helping teachers master the standards, using State Board of Education-adopted instructional materials that have been selected locally for students in kindergarten through grade eight or are aligned with the standards (grades nine through twelve);
- deepening their knowledge of the subject(s) they are teaching;
- sharpen their teaching skills in the classroom;
- keeping up with the trend of developments in their fields; and
- increase their ability to monitor students' work, so they can provide constructive feedback to students and appropriately redirect their own teaching.

2.6.7 Teacher motivation

Pre-eminent in the role of HoDs as instructional leaders is the ability to motivate and inspire teachers with the ultimate goal of imparting good instructional practices (Quinn, 2002:451). HoDs employ many methods to motivate teachers, including the provision of rewards and individualised support, emphasis on school performance at meetings and an ongoing monitoring and evaluation of staff performance (Raihani, 2008).

Teachers, like all other professionals, need regular motivational support in order to enjoy their job and to do it effectively. Bennell (2004:8) explains 'motivation' as the psychological processes that influence individual behaviour with respect to the accomplishment of one's needs and tasks. Motivation is also explained as the willingness to put forth high levels of effort toward organisational goals, conditioned by the efforts and ability to satisfy some individual need (Hijazi, 1999:907).

HoDs could establish a system of performance-based incentives for teachers. The incentives could be both financial and non-financial, small financial increments, selection for special training programmes, or award professional credits that count for promotion purposes (Newsletter, 2001:6). Such motivation could also mean enabling working conditions, productive interactions with the HoDs, praises, involving the teacher in decision-making depending on the needs and goals of the teachers (Newsletter, 2001:7). It is worth noting that to create motivating environments for teachers, it is necessary to ascertain what their goals are (Rouse, 2004:31).

Motivation is founded on needs, and needs are met in order of importance (Dion, 2008:1). Needs theory was propounded by Abraham Maslow. According to Hijazi (1999:907) and Ugah, Okpara and Umuahia (2008:3), Maslow's needs theory is well known for explaining motivation and has had widespread acceptance since it was introduced. The theory posits that behaviour at a particular moment is determined by the strongest need. Hence, Maslow hypothesised five levels of needs as shown in the in figure 2.1 below.

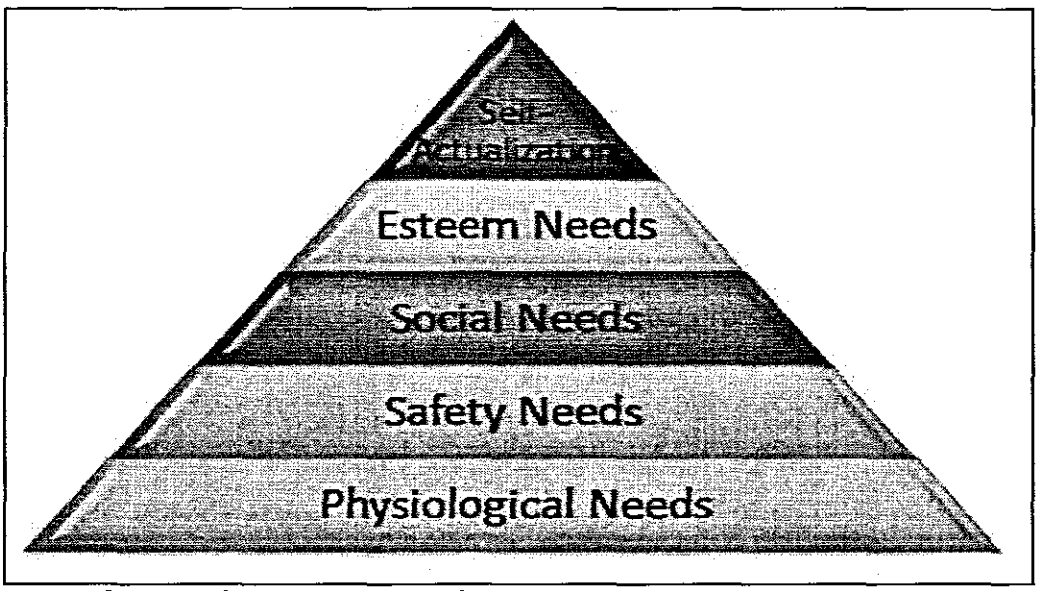

Figure 2. 1: Maslow's hierarchy of needs

Source: Rouse (2004:3)

Abraham Maslow put forward the hierarchy of needs consisting of self-actualisation (full potential), self-esteem (self respect, personal worth, autonomy), belongingness needs (love, friendship, comradeship), safety needs (security; protection from harm) and physiological needs (food, sleep, stimulation, activity) (Rouse, 2004:27).

Maslow's model of needs theory can be applied in educational context to understand the motivation of teaching and learning, especially with regard to HoDs. The educational implications of Maslow's needs theory in school departments are summarised in the Table 2.5.

Table 2. 4: Pedagogical implication of Maslow's hierarchy of needs

Stage	Needs	Pedagogical Implication
Stage-1	Physiological needs	Teachers will lose attention and not be able to teach well if their physical conditions are not well attended to. Leaders should be sensitive to the physiological needs of their teachers at work who may be in need of rest, break for lunch or medical care
Stage-2	Safety	The teaching environment must be safe and sound for all teachers from any background and at any age. Leaders should be mindful of the safety needs of their staff and never to take for granted that all is well with the teacher
Stage-3	Love and sense of belonging – Social	The individual teacher needs to be cared and loved by the HoD and colleagues. Leaders should promote and encourage conditions that will enhance teacher recognition and acceptance
Stage-4	Self-esteem	Leaders should institute measures that recognise status, achievement, and efforts of all teachers. This will encourage teacher to work hard to maintain their dignity and self-respect
Stage-5	Self-actualisation	Leaders should provide challenging and meaningful workload/task to enable innovation, creativity in accordance with department long term goals for teacher to develop their full potential

Adopted from: Chew, Jones, and Turner (2008:17)

Leaders need a sound understanding of human nature if they are to lead effectively (Dinham, 2004:340). This is because most of what happens in education depends on collaboration, commitment, trust and common purpose. Maslow's needs theory is a benchmark study that underlines the call to motivate personnel in organisations (Afful-Broni, 2004:99). For HoDs to be more relevant, contemporary and use effective leadership style, they would have to be very sensitive to the varied needs of the different teachers working for the department as indicated in Table 2.5.

2.7 Strategies for improving support for mathematics and science teachers

Improvement is a stage-wise process which requires technical, social and emotional skills and a well-developed explicit set of practices that need to be well distributed in the organisation (Robert, 2007). Martins (2007:616) asserts that the instructional and improvement support of HoDs to mathematics and science teachers is crucial for various reasons: first, there is a growing importance attached to the roles they play in schools; second, to manage the uncertainties that tend to arise about the roles of HoDs; and third, in order to effectively manage the problems associated with their performance. Therefore, all efforts should be made to ensure that operations and internal processes are directed to supporting and improving HoDs' leadership skills and instructional support to mathematics and science teachers.

2.7.1 Training for HoDs

James, Naidoo and Benson, (2008) suggest that when HoDs undergo in-service training and have provision of resources and school-based support, instruction of mathematics and science by teachers improves. This is illustrated in figure 2.1.

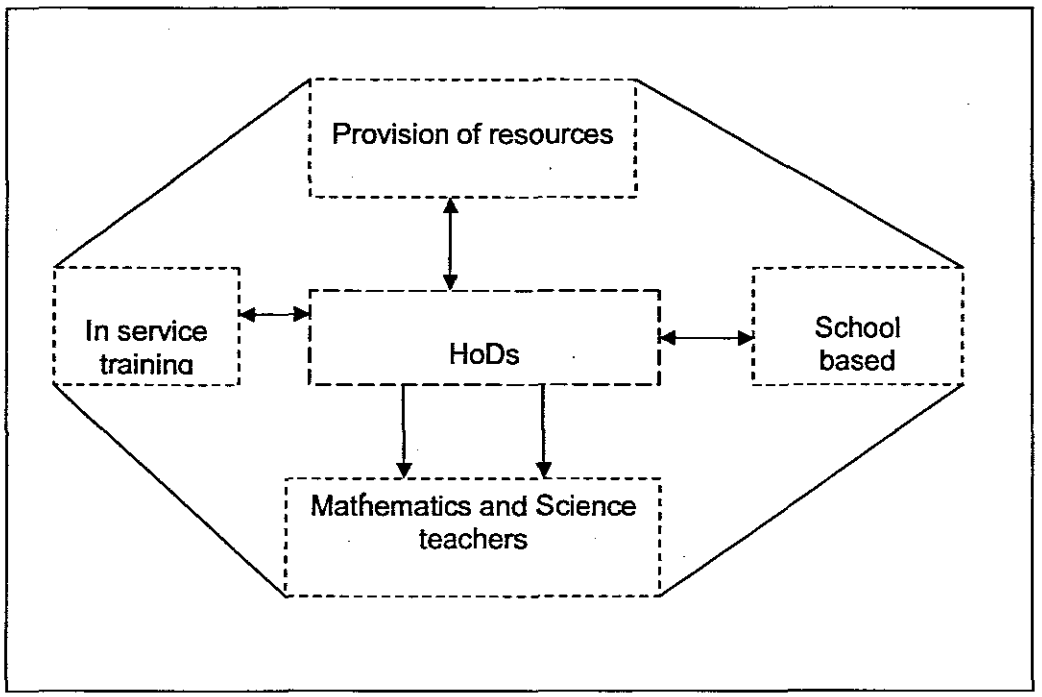

Figure 2. 2: Factors that improves HoDs instructional support to mathematics and science teachers

In the case of improving leadership performance, Martins (2007) observes that the extent to which leaders such as HoDs receive appropriate training and the overall development opportunities made available is important. This is because school leadership is literally based on the quality of management training, personal commitment, profound knowledge of the subject matter and the local terrain and good judgment (Onguko, Abdalla & Webber, 2008). This, the authors say, calls for quality management training programmes to optimise positive impact on teaching and learning. In the USA for example, most school leaders are trained in formal preparation programmes housed at four-year colleges and universities (Nelson, de la Colina & Boone, 2008).

Blasé and Blasé (1999) and Onguko, Abdalla and Webber (2008) also note that England, Europe, Australia, North America, Asia, Netherlands and the Scandinavian countries have a multitude of professional development programmes (usually in-service training) offered to HoDs to improve their managerial and leadership skills, attitudes and knowledge. The content offered in the preparation of such programmes includes topics such as leadership and management, change, motivation, communication, team building, financial management, and

staff appraisal, among others (Onguko, Abdalla & Webber, 2008). Blasé and Blasé (1999) reiterate that improvement of leadership programmes should teach practising and aspiring HoDs how to develop professional dialogue, collegiality among teachers, group development, theories of teaching and learning and reflective practice. This has become necessary because school leadership nowadays is a profession requiring special preparation for the job (Karstanje & Webber 2008:741). Improvement strategy for HoDs support to teachers requires focus on content, knowledge and instructional practice coupled with the allocation of resources.

2.7.2 Availability of resources for HoDs

Naidu *et al.* (2008:163) argue that resources are the means of supply and support that assist school managers such as HoDs in the achievement of goals. These resources include money, time, material resources and human skills. Karstanje and Webber (2008:741) observe that resources such as finances, facilities, information and information systems, and buildings are well known as elements of management and leadership improvement. Resources serve the primary processes of teaching and learning. The effective allocation of these resources to HoDs is critical for the support of mathematics and science teachers' instruction in schools. Based on the South African School Act (SASA, 2007), the DoE and the School Governing Body (SGB) should ensure that the necessary resources in terms of infrastructure, equipment and material are in place for the schools and their department as this will enable the HoDs to work effectively with their teachers. With the right expertise and the resources available, HoDs will still need the school-based support, as discussed in the next section.

2.7.3 Shared goals

Martins (2007) shared a concern about how far broader organisations like school systems and structures serve to facilitate leadership improvement. If HoDs are to carry out their instructional responsibilities effectively, attention needs to be paid by the school to a number of inevitable inter-related factors. The structural conditions that enhance school-based support to HoDs include: time to meet and talk, the use of space, resources, communication mechanisms, coordinating and planning professional development. Mercer (2009) further

notes that across organisations like schools, people want to participate in shared decision-making and prefer to be intensely involved in any form of support. A shared sense of purpose, accommodation and celebration of diverse ideas, and meaningful participation in decisions will enhance the course of HoDs instructional support to teachers.

Furthermore, the school leadership needs to make sure that the HoDs can and do meet on a regular basis to discuss common problems and approaches to managing their departments (Clarke, 2007:143). Clarke also asserts that the school principals need to encourage and motivate the HoDs to form informal working groups with other subject heads of neighbouring schools to share expertise and problems associated with their roles as HoDs.

2.7.4 Summary

This chapter reviewed pertinent literature relevant to this study. The literature revealed that the quality of an instructional leader (HoD) makes a big difference in teacher instructional support. These qualities include personal traits and behaviours of the HoD who provides instructional support to teachers. The literature also revealed that depending on the situation and calibre of the teachers, HoDs' support to teachers varies from school to school and from department to department.

The literature further revealed the kind of instructional support HoDs provide to teachers including goal setting, planning, mentoring and coaching, motivation, monitoring, and securing needed resources. However, in the literature, there appears to be a gap of instructional leadership skills to support mathematics and science teachers in the schools which is the focus for this study. Finally, the literature suggests strategies for improving HoDs instructional support. The next chapter focuses on the approach to the research which includes data collection and analysis, and the ethical consideration.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

In the previous chapter, literature that was pertinent to the study on the instructional support that HoDs provide to mathematics and science teachers was discussed. This chapter focuses on the methodological approaches that were used for this study and the research paradigm that guided the study. According to Hitchcock and Hughes (1995:20) research methodology refers to the whole range of questions about the assumed appropriate ways of going about social research. In the view of Richard and Morse (2008:28), research methodology is the consistent and coherent way of thinking about and collecting data, of interpreting and analysing the data and of judging the resulting theoretical outcome. This chapter explains how the empirical investigation was conducted and also discusses the methods used in data collection and analysis. The chapter ends by outlining the processes involved with clearing the ethical issues observed during the data collection as well as the potential limitations posed by the methodological approach used in the study.

3.2 Research method

Yin (2003:13) describes 'case study' as an empirical inquiry that investigates a contemporary phenomenon within real life context, especially when the boundaries between the phenomenon and content are not clearly evident. Jackson (2008:17) adds that case study is an in-depth study of one or more individual. The case study method was used to explore the nature of the instructional support HoDs provided to mathematics and science teachers in Cape Town schools. This method was used to allow an in-depth investigation of the strategies HoDs used to support mathematics and science teachers in four Cape Town primary schools.

3.3 Research design

The design of this study was qualitative in nature. Qualitative research approach was used to make sense of the complex nature of instructional support HoDs provide to mathematics and

science teachers, the meaning they put on it and how they interpret what they experience (Richard & Morse, 2007:30). The qualitative research approach was also used for the purpose of understanding deeply and in detail the phenomenon of instructional support HoDs provided to mathematics and science teachers (Holliday, 2007:9). Qualitative research uses the interpretive framework, positivist framework, and critical framework (Chetty, 2009). The attributes of these three main paradigms are shown diagrammatically in the Table 3.1.

Table 3. 1: Characteristics of qualitative research paradigms

Positivist framework	Interpretive framework	Critical frame work
Finding the truth through science What we can observe and measure Emotional, thoughts, personal insights excluded Experiments Empirical research Surveys, statistics Hypotheses	Understanding lives of participants Interpret meaning Researcher as co-creator of meaning Everyday common sense reasoning verses scientific reasoning Uncertainty Measurement is fallible Validity through triangulation	Deconstruct the world Question political nature and power Critical consciousness Aim: political emancipation Address social issues Participation, involvement, collaboration between searcher and subject

Source: Chetty (2009: np)

The interpretive paradigm was identified as the most appropriate for this study as it dealt with the understanding of the lives of the HoDs and teachers. The interpretive paradigm was also used in order to get a better understanding of the nature of the instructional support that HoDs provided to the mathematics and science teachers and the meaning they assigned to it (Meyer, 2003).

3.4 The research sample

Based on my initial site visits and preliminary discussion with participants, in deciding which schools to select, which and how many participants to interview, I considered those schools that were interested in my research and were accessible in terms of distance and willingness to participate in the study. This was in tune with Holliday (2007:10) who believes the

researcher must consider the interest and accessibility to the research site and the respondents.

The sample was purposeful in the sense that it included HoDs, mathematics and science teachers who were selected on the basis that they possessed the relevant information related to the research which could help provide an answer to the research question (Holliday, 2007). The sample comprised four HoDs and four mathematics and science teachers, with one HoD and teacher from each of the four selected schools.

The following section discusses the mode of data collection, which included interviews and document analysis.

3.5 Data collection

In order to obtain relevant information for the study, I used face-to-face, open ended and semi-structured interviews with HoDs and teachers, as well as document analysis. The interviews and document analysis were intended to ensure an in-depth study of the phenomenon and to strengthen the data.

3.5.1 Interviews

Semi-structured, open-ended interviews were used in order to solicit primary data for this study. They were considered more flexible than structured interviews as they helped me to expand on the participants' responses and to probe in-depth into the research problem (de vos, Strydom, Fauche & Delport, 2002). On the other hand the information provided by the HoDs gave a better understanding of the nature of instructional support they provided to both mathematics and science teachers. On the other hand, the information provided by the teachers also provided an understanding of the kind of instructional support they received from their HoDs.

The interviews were also meant to gather descriptive data in the participants' own words, which, according to Bogdan and Biklen (1982:86), would enable the researcher to develop insight into how the teachers and HoDs interpreted and made meaning of the nature of the instructional support HoDs provided to mathematics and science teachers in the primary schools.

With permission from the participants, the interviews were tape recorded to enable me to get direct responses from the participants. Flick (2007:39) argues that tape recordings of interviews make it possible to get detail and the most accurate record than the amount of note taking or reflection could offer, and also to maintain a good rapport between the researcher and the participants. The good rapport I developed with the HoDs gave me the chance to get access to other sources of information in the form of documents in the school.

3.5.2 Document analysis

Documents are available materials or data which are in existence prior to the research at hand (Merriam, 2001:113). Document analysis involves the collection of facts from written texts that are available within an organisation, such as existing files, reports or records (Hitchcock & Hughes, 1995:212). Richard and Morse (2007:117) state that institutional records such as school management records, policy statements or home records are all secondary data. I used document analysis as a secondary data-generating instrument for this study. One reason for using document analysis was that this technique reveals hidden secrets which are difficult to uncover through the account of people in the research setting (Holliday, 2007). They can also reveal deeper and more tacit aspects of the nature of the instructional support HoDs provide to the teachers. The documents I found relevant to this study at the schools included the educators' handbooks which the HoDs obtained for me from their principals' offices. For this study, these documents provided me with additional information regarding criteria for appointing HoDs and the role of HoDs in school departments.

After gathering the data from both the participants and the documents, they were analysed as shown in the data-analysis section.

3.5.3 Field notes

I recorded field notes during and after my research interviews. I kept records of the whole research data collection process which I could always refer to (Mouton, 2005:107). The field notes gave the description of the context of the research in which the data were collected. I also kept the list of names, dates, places and events for easy reference (Roberts, 2007:69). In the field notes, I described each HoD's and teacher's profile and body language. This is in line with Fraenkel & Wallen (1990) who claim that field notes assist researchers with a detailed account of what they have heard, seen, experienced and thought in the process of collecting and reflecting on the information.

3.6 Data analysis

Data analysis is a systematic process of making sense of the data and discovering what it entails (Holliday 2007:89). Hitchcock and Hughes (1995:295) also argue that data analysis refers to the way of discovering and deriving patterns in the data, thus trying to sort out what the data are about, as well as why and what kind of things might be said about them. I analysed the data to discover the themes that described the nature of the instructional support HoDs provided to mathematics and science teachers in four Cape Town schools.

The data-analysis approach adopted in this study was content analysis. According to Brantlinger *et al.* (2005:197), content analysis is a close inspection of text(s) to understand themes or perspectives. This approach was guided by the research question which intended to find out about the nature of the instructional support HoDs provided to mathematics and science teachers in Cape Town primary schools.

The analysis procedure for this study took two forms: First, I transcribed the interview recordings (See Appendix H), read through them thoroughly and highlighted the themes

(Cohen & Manion, 1994:293). I also identified and colour-coded the recurring themes within the data from each of the participants. By colour-coding the data set, it was then possible to determine the emerging themes from the data (Hramiak, 2005).

The second stage involved identifying common themes and areas of variations among the participants and those themes that emerged (Wiersma & Jurs, 2005:217). The themes were later used to structure the presentation of the discussion.

3.7 Ethical concerns

I started to collect my data by taking research ethics into account. According to Maree (2007:298), students must obtain permission from education departments, etc., before conducting any research whatsoever. Before visiting the schools, I sought permission from the WCED for access to the various schools to conduct the research interviews. I first wrote a consent letter to the WCED director who is responsible for the schools in the Western Cape Province (Cape Town in particular) to seek permission to conduct the research in the schools (see Appendix A). The WCED granted me permission on condition that my research interviews were not to interfere with the school curriculum (see Appendix B).

I then went to the schools in Cape Town with the consent letter from the WCED directorate. The aim of the visit was to explain the purpose of the research study and to submit to them a request to conduct the study in the selected schools. Later, copies of the letters to the schools asking for permission to conduct interviews were given by hand to the school principals (see Appendix D). Some of the schools verbally granted me permission to conduct the interviews in their schools while others gave written permission (see Appendix E).

Another letter was sent to each of the participants introducing me and briefly explaining the need for them to participate in the project. The participants were assured that their responses would remain confidential and anonymous (see Appendix F). Attached to the letter was a copy of the interview schedule (see Appendix G) for each participant. Thereafter, I went to the

schools to conduct the interviews after school hours in order to ensure that schoolwork was not interfered with.

I indicated to the participants that their participation in the study was voluntary. They were free to withdraw from the study if they wished to (Maree, 2007:297). Those who agreed to be interviewed were asked to sign an informed consent form which described the purpose of the research and the procedures. This was to clarify the situation for the participants and also to provide proof that participants had agreed to take part in the study in their own free will. Responses to questions were kept confidential and anonymous so that readers of the research would be unable to know the identity of the participants (Maree, 2007:290). In order to ensure anonymity of the subjects, identification codes were given to the research participants. The interview scripts will be kept for five years for anyone who may want to verify the authenticity of the information, after which they will be destroyed.

3.8 Validity

Validity is the extent to which a research fact or finding is what it claims to measure (Cohen & Manion, 1994). To ensure validity, I returned to each of the four HoDs and the teachers to show them the transcribed interviews and written field notes. This member checking of the interview findings was to confirm the accuracy or inaccuracy of interview transcriptions and the field notes (Brantlinger *et al.*, 2005:1). I also used data triangulation, which is the use of different sources of data, like the interviews, document analyses and the field notes in the study to cross check and ensure trustworthiness (Brantlinger *et al.*, 2005:1).

3.9 Limitation

This case study was limited to a small sample of only four Intermediate Phase Grade 6 HoDs and four mathematics and science teachers in four Cape Town primary schools. As a result, my findings cannot be statistically generalised in the traditional sense (Neil, 2006:n.p). However, Stake (1995:85), and Patton and Appelbaum (2003:66) postulate that although

small samples are not a strong base for generalisation, people can learn much from them to strengthen, modify or reject old generalisations.

In spite of these limitations, the research findings were valid based on the fact that I proceeded through the research process thoroughly in terms of commitment, time and dedication with rigour. I followed the research methods carefully in order to avoid negative influences such as bias that might occur during the research study.

3.10 Summary

In this chapter, I outlined the research method and the process of data gathering, analysis and the research ethics. The research method was qualitative, which was interpretive in nature. The instruments for data collection were interviews and document analysis. The content analysis approach was used for analysing the data.

The next chapter presents the findings of the study from data collected through interviews and document analysis.

CHAPTER FOUR: RESEARCH FINDINGS

4.1 Introduction

This chapter reports the findings on the instructional support HoDs provide to mathematics and science teachers in four Cape Town primary schools. Data were collected from both HoDs and mathematics and science teachers. While the main focus of the study was on HoDs, data collected from the mathematics and science teachers in the same schools with the HoDs served to confirm the statements of the HoDs. For the purposes of clarity and to avoid confusion, HoDs and teachers interviewed will be referred to as A, B, C, D and teachers 1, 2, 3, and 4 respectively throughout the study. The presentation of the findings will begin with the profile of the participants and ended with a summary.

4.2 Gender of the participants

It was observed that all the HoDs and teachers interviewed were females. This could be attributed to the dominance of female teachers at the Intermediate Phase level in schools. In contrast, all the four schools involved in the study, except for one, were headed by male teachers, which could explain the gender disparity in higher positions in schools. Equally significant was that with the exception of one HoD, who had a Bachelor of Education honours degree in management and was even acting as HoD, all the other HoDs were appointed on a full-time basis due to their long service experience in the teaching profession. The most highly experienced HoD had 34 years of teaching experience and the least experienced had seven years of teaching experience.

4.3.1 Activities of HoDs on instructional support for mathematics and science teachers

Responses from the four HoDs suggested that they all had an understanding of the instructional support and its importance to the teachers. They defined instructional support as the act of guiding teachers to plan, helping them with the needed resources and giving the

necessary information materials and support in order to enhance the teachers' skills in solving problems related to mathematics and science in the classroom. One HoD D expressed her understanding of instructional support for mathematics and science teachers as follows:

> I believe that [mathematics and science] teachers need to be supported, em they need to have resources, such as text books obviously, [em] that is needed to be supported with experience, I feel as an HoD you have certain experience that you can pass on to em your teachers. I also believe that you need to keep up to date to what is going on and as HoD. I feel and as a ... you pass on information that could be relevant to whomever it might be relevant to. And also not challenge but to listen to [their] problems and come out with suggestions em of how to do things.

This view was supported by one of the HoDs who felt that instructional support was more about helping or supporting mathematics and science teachers with resources, best models and good opportunities for teachers to do the best that they can to teach the children. This participant, HoD A, was quoted as saying:

> Instructional support is more of supporting the way the teacher teaches in the classroom, so that you [the HoD] provide the best em, possible scenarios or em, opportunity for the teacher to do the best that they can to teach the child or get the child to learn as much as possible. Instructional support is making sure that everything that is necessary for teaching to take place is in place.

The integral part of support which HoDs provide to mathematics and science teachers was instructional resources. It would appear that the issue of resources was more critical in mathematics and science education than in other learning areas. Over and above the instructional resources, there were other types of support which HoDs mentioned they provided to the teachers, including the provision of information to the teachers, motivational support, and teacher professional support. In addition, HoDs highlighted mentoring and coaching, and monitoring of teachers' work as other forms of support they provided for mathematics and science teachers. The next section looks at the kinds of support HoDs said they provided to the teachers.

4.3.2 Instructional resources

It was evident from the responses of the four HoDs that there were lots of instructional resources in the schools for mathematics and science teaching. According to the HoDs, the resources ranged from computers, televisions, projectors, pencils and papers. HoDs (D) remarked that:

> Where teachers don't know how to use the resources we give them the necessary guidance.

One of the teachers gave a similar response to the kind of resources they were supported with. According to her, HoDs provided most of the basic equipments to their mathematics and science teachers for instruction. The following quotation reflects teacher 1 responses on the kind of instructional resources teachers were supported with at the schools:

> We have text books that we can use, we have different resources, and different operators that are in the old lab ... some company sponsored the mathematics and science equipment and technology equipment in there. All teachers know about it ... there are available to them.

Another teacher, thus Teacher 1 stated as follows:

> Ok, we have textbooks, we have an initiative kit supplied by the department, we have mathematics kit supplied by the department, so we use it in natural science, mathematics and technology. We have got a resource room where we can make our photo copies, we've got a science lab, and we are well resourced.

Yet, teacher 3 was emphatic and said:

> Well, we are well supported with mathematics equipment. We can do mathematics in any form, and we got all the basic equipment. The measuring stick ... we got the meter, we got [materials for] mathematics games, we got flash cards for fractions ... we are very well equipped. Science also, it all there, but is not handy, as I explained to you. ... but we have got the science equipment.

These statements outlined the kind of instructional resources available in the different schools studied. The next issue deals with the nature of instructional support HoDs provided for teachers.

4.3.3 Information, communication and motivational support

It was evident from the responses of the participants that part of the daily practices of the HoD was to communicate pertinent information pertaining to the teaching of learners. HoDs C put it thus:

> As HoD I feel [we] pass on information that [is] relevant to [teachers].

One of the respondents, Teacher 4 confirmed this response by stating that:

> ... If there is any change in policy document or something like that em, the HoD get the ... horrible job of reading it and trying to unpack it and figure it out and it is passed on [the information] during staff development to us.

For the most part, HoDs reported that they were also expected to provide motivational support for mathematics and science teachers. They mentioned different forms of motivational support that they used in boosting the teachers' morale. Some forms of motivational support, also referred to by the HoDs as supportive strategies, included the following:

- having regular meetings with teachers where they air their concerns;
- planning and working together with teachers as a team;
- showing or living exemplary life for teachers to emulate;
- operating open door policy, where teachers freely bring their grievances and concern to the fore for discussion or redress; and
- encouraging teachers to take Mathematics and Science teaching seriously.

HoDs (A) reported that she went an extra mile in motivating her teachers by taking them for lunch at least once a term, and also by honouring them during birthdays.

The issue of motivational support for mathematics and science teachers became more authentic when the teachers affirmed that they were motivated in numerous ways, such as

getting opportunities to attend workshops and honouring their birth days. Teachers 2 contributed thus:

> I think we are encouraged to go to centre for training and learning institute (CTLI) for two weeks course, sometimes just to refresh, and also have meetings, best practices meetings and ... we share knowledge like different terminologies.

Other teachers mentioned that they received the motivation in the form of mental support. In this regard Teacher (4) said:

> So I think the most important thing is her [HoD's] encouragement, her mental support. ... She's tactful about telling me how to make it right...

4.3.4 Support for teacher professionalism

The feedback from the HoDs also revealed that they had the added responsibility of encouraging teachers to be professionally responsible; that is, being able to teach well. The HoDs reported that they did this by encouraging the teachers to participate in training sessions and workshops which are provided by the WCED. They also stated that they made time for teachers who were interested in furthering their education and/or had examinations or assignments to do. This was captured in the following response made by HoDs (B):

> If the teacher needs to write exams then we make sure that we have somebody in his place to see to his classes, if he needs study time, we make sure that he gets the study time.

This comment indicates the instructional support that HoDs provide to mathematics and science teachers includes giving them time off to study and to improve their professionalism.

According to the HoDs, professional support includes helping teachers to understand and effectively prepare lessons, and to deliver the curriculum content to learners. Most of the assistance HoDs said they provided to the teachers as a support mechanism in their daily activities and practices were based on the school vision and mission statement, which also comes from the national curriculum statement. Some of the support activities the HoDs

provided the teachers with in order to enhance their understanding and competencies included phase planning, learning programmes and weekly planning.

4.3.5 Mentoring and Coaching

One of the support strategies the HoDs stated they provided for the teachers was in the form of mentoring and coaching. In response to why, how and on what HoDs mentored or coached teachers, it became clear from their statements that they mentored and coached teachers to have a sense of purpose and direction towards the set goals, school standards, planning, teaching and assessment. The following statements were made by HoDs D to explain the purpose of mentoring and coaching:

> We have a performance standard to the school and when new teachers come in we make sure they know what our school requires, how the work is to be set out, what level we require from them.
>
> ... we also [observe] teachers teach particularly test, we em, look at the test and we help; mentor through the sociology test. If we feel that there is no balance in the test that are set, then we look at the [teaching] that they do and we see how we can improve it.
>
> ... we have observation lesson where she [HoD] comes in and she observes and gives us tips. She comes in ... assists ... and suggests how things should be done differently ...

With regard to monitoring, HoD B to talked about how she monitored the teachers' work saying she used the Integrated Quality Management System (IQMS) as a means of monitoring her teachers. She described the IQMS as follows:

> IQMS is a gauge for teachers to see how they are faring in their teaching, in the lesson preparation, in the control of the classroom, and also the way they teach the lesson. How they interact with children, parents, human relation ...

HoD C also described the IQMS as a tool for monitoring and supporting teachers' instruction to learners. Another one, HoD (A), further stated that she monitored the teachers' work through what she called the teachers' portfolio and moderation. According to her explanation, the teachers' portfolio contained lessons and assessment plans which were submitted during the second Thursday of the term. She explained the process as follows:

> Teachers are supposed to hand in weekly preparation every Thursday that is the cut off day and they need to correlate with what is in the child's book, it need to correlate with the phase planning what big planning for the phase in the school or for the grade. So there must be a connection that is one thing. The second is we have moderation section of the learner book once a term where we have got different level. It can be any learners book may be five or so different level to see where the children are, what the struggling learners are busy with or the achiever [in otherwise] where the hardworking learner are. Then we also have office test that we set up in mathematics for the different class also to see the level the children are at, a lot of tools that we use. The same for science, it includes mathematics, science everything.

The use of the portfolio was confirmed by HoD C who revealed that it was used as an internal moderation system to monitor her teachers' work. She described it thus:

> ... we have internal moderation whereby we check teacher portfolios; we call it support and guidance. Em we call in learners books to see what is been done in the class and how teacher controls the learners work and once have done all that moderation assessment documents how often the teacher assessing where he is been following the planning whether everything is been followed the work schedule and learning program. I write out report but I make it very clear to the individual that it is only for support ... and I will give them a little report so that they can refer to and after that the following term will call in the teachers that followed those guidelines.

Another HoD D reiterated the ways of monitoring the teachers' work following the same trends as the other respondents. She explained as follows:

> ... we have what we call an educators' portfolio, where all the lesson plans are put in there and the assessment plans the teacher are require[d] to submit an assessment plan in the second Friday of each term exactly what there are going to be assessing and when they are going to be assessing.

4.4 Challenges HoDs encounter in providing teacher support

It became evident from the responses of the HoDs that the task of providing support for the teachers was fraught with challenges. Some of the challenges HoDs said they encountered included work overload, lack of science space, lack of capacity to effectively support mathematics and science teachers, and frequent curriculum changes. The challenges identified are discussed in detail in the section that follows.

4.4.1 Work overload and time constraints

The data from the HoDs and teachers revealed that in the course of providing instructional support to mathematics and science teachers, work overload was one of the biggest obstacles HoDs were faced with. They reported that apart from the responsibility that was bestowed upon them as HoDs, they also had classes to teach and had to assess their learners. Teachers 3 remarked that

> ... the HoD doesn't have much time to help me, because she herself has a class.

This situation was acknowledged by HoDs (A) who said there was insufficient time because they had different stages of learning happening in the classroom and other events that happened in the school which interrupted their work.

Closely related to the heavy workload the HoDs were experiencing was time constraint. Almost all the HoDs reported difficulties in finding time to support staff; in being effective in their roles as teachers and in balancing work and family life issues. They expressed a need for time to adequately perform multiple tasks as well as to maintain a balance between their professional and private lives. This feeling was expressed by HoDs A as follows:

> ... you know, there are always other things to do like events that needs to take place at the school and so on. So you find it a bit challenging having to complete your syllabus or your plan your phase plan that you have plan for the team or for the week. You need to think on your feet, you need to be able to change with plan because nothing is constant; things are changing all the time.

In line with this, HoD C articulated her feelings that:

> For the sake of lack of time and the amount of work we have, I'm sometime forced to act promptly without thinking critically over the issue. Look, I have my class to teach, teachers' weekly plans to look at, and many other administrative work.

4.4.2 Lack of space for science practical lessons

Though mathematics and science are priority areas, three of the four HoDs expressed a concern that adequate attention had not been given to these subjects at the Intermediate Phase level. One of the concerns they raised was the lack of science space for children to interact and manipulate things during the science lessons. HoD D remarked that:

> ..we do have a problem because we don't have a dedicated science room, so that is a problem, we have used the science room for a class, so that is so that is a problem .

The responses of the mathematics and science teachers affirmed the HoDs' earlier concerns that there was lack of a laboratory for learners to interact appropriately and adequately with the teaching and learning of the subject. Teacher 2 reiterated similar feelings:

> We don't have a science lab where we can go; the children [could] work with the different operator in the lab... Children ... bring things from... the storeroom... to the class [and] they have to carry it to four different classes and the desks are slanted in most classes learners can't work with the operator, they have to see you do things. So I think that is a real challenge.

Teacher 4 shared the same view about the lack of laboratory and expressed her sentiment thus:

> We don't have science room, science laboratory, we did have one, but we have to sacrifice it for a classroom. So, our science equipments will not be as handy as will be in the science laboratory

4.4.3 Lack of capacity and frequent curriculum changes

During the interviews with the HoDs, it became apparent that they lacked capacity in terms of knowledge and innovative skills to effectively function in their roles as HoDs. The HoDs overly relied on the WCED and area managers for workshops and in-service training for the teachers. This was noted in my field notes during the data collection. As indicated in the profiles of the participants, only one of the HoDs had an honours degree in Educational Management; the rest were made HoDs on the basis of their long service in the teaching

profession. Furthermore, none of the HoDs interviewed had a strategic work plan to show as an innovation for supporting mathematics and science teachers. This gap was noticed and captured in my field notes when HoDs were asked to produce work plans for mathematics and science teaching in the school.

Besides the lack of capacity, frequent curriculum changes were highlighted by HoDs as being of considerable concern. The HoDs expressed worry that there were frequent curriculum changes by the Department of Education. According to the HoDs and some of the teachers', as soon as they struggled to settle on a new curriculum, the Department brought another new one. In this case, it means all the efforts and time put in trying to understand a particular curriculum is a waste. It then becomes discouraging and stressful to study the new curriculum.

4.5 Summary

This chapter has outlined the nature of the instructional support both HoDs and teachers said were provided to mathematics and science teachers. Some of the forms of support included the provision of teaching resources, professional development, motivation and communication. Furthermore, the HoDs and teachers highlighted a number of challenges they believed the HoDs encountered in the process of supporting the teachers. These involved work overloads, time constraints, lack of science space and frequent curriculum changes. The next chapter will provide an analytical discussion of the findings.

CHAPTER FIVE: DISCUSSION OF FINDINGS

5.1 Introduction

In Chapter 4, I presented the research findings about the nature of instructional support HoDs provide to mathematics and science teachers. In Chapter 5, the findings are discussed in relation with relevant literature in a bid to answer the research question; how do HoDs support mathematics and science teachers in Cape Town primary schools? This section will present an analytical discussion of the issues raised in the findings to this study.

The discussion is on the main themes which were derived from the data analysis in relation to the research question. The study investigated the instructional support that was provided to mathematics and science teachers. The main themes discussed in this chapter are shown below:

Understanding instructional support
Professional support
Monitoring support
Mentoring/coaching support
Information support
Motivational support
Challenges in instructional support

In this study, the HoDs defined instructional support as supporting the way teachers teach; providing material resource and the best possible models or training opportunities such as workshops for the teachers and making sure that everything that is necessary for teaching is in place. This perception correlated with the Dinaledi Instructional Support Programme that was instituted by the DoE in 2001 to support schools in mathematics and physical science in South Africa, which, according to Mosuwe (2008:n.p), stipulated the following types of instructional support to be provided for mathematics and science teachers in the schools:

- Provision of materials resources such as textbooks and calculators.
- Teacher-training programme focusing on content knowledge of mathematics and science and enhancing learner performance.
- A mentor teacher assistance programme and school visits

Based on the definitions of instructional support from the HoDs, it would seem as though their own views on instructional support are appropriate and relevant, especially when considering the fact that they correlate with those of the Dinaleldi project which is a national project of high standard in the area of mathematics and science.

With regards to professional support for mathematics and science teachers, Crum and Sherman (2008:567) point out that leadership responsibility of HoDs include developing the teachers within departments to be effective at their respective jobs. However, the findings of this study showed that most of the HoDs were appointed on the basis of their long experience in the teaching profession.

The problem, as indicated in the background of the study, is that HoDs lack leadership skills and content knowledge in mathematics and science to be able to enhance the teachers' professional development. The profile of the HoDs showed that most of them HoDs do not have the honours degree but were appointed on the basis of long experience in the teaching profession.

In the final analysis, Quin (2002) warns that leadership development that lies totally on experiential teaching and learning, and peer mentorship without the inclusion of a range of expertise runs the risk of pooling ignorance and accepting outdated practices. This could be interpreted to mean that leaders should be formally equipped with leadership skills so that they would be able to carry out their leadership duties effectively. One needs to be reminded that the overall professional development of teachers is meant to properly equip them to undertake their demanding tasks and to continually enhance their professional competence and performance (Robinson & Carrington, 2002). Under the circumstances, it would appear as a tall order to expect the HoDs to develop the professional skills of their subordinates.

In the study it was found that some HoDs used the Integrated Quality Management System to monitor the teachers. According to the UNESCO-UIS report (2008), monitoring and evaluation are essential to all the teachers, the individual learner as well as the classroom levels in order to consolidate achievement and identify areas of weakness for corrective measures, in this case for instructional support. It could thus be concluded that the HoDs in this study are helpful as they include monitoring of teachers' work in order to enhance their (teachers') performance.

Another issue that came up was motivational support for teachers by HoDs. The description of motivational support provided by the HoDs indicated that motivation was meant for providing support and involving teachers in the planning of the daily activities of school work. These definitions give a clear indication that the HoDs knew the impact that motivation has on the teaching and learning of mathematics and science. According to Wong (2006), if individual teachers are not motivated to teach, no amount of investment, infrastructure and technological intervention would make teaching of mathematics and science effective. To emphasize the importance of motivational support, Wong (2006) highlights it as one of the important factors in the establishment of the right incentives and rewards or motivational aids to encourage people to share and apply knowledge. Wong (2006) further holds that the motivational support HoDs provide to mathematics and science teachers helps to stimulate and reinforce the positive behaviours and culture needed for effective teaching and learning.

It was also clear from the findings of the study that part of the daily practices of the HoDs was to communicate pertinent information pertaining to the teachers' daily practices and instructions that dealt with teaching and learning of the learners. This practice correlates with the views of Alexandra (2004:56), who claims that it is expected of HoDs to create an atmosphere of good communication systems through which teachers are informed of what is expected of them, what the program is all about and how the program should be implemented. In other words those systems should keep teachers informed about the latest developments to ensure that they are abreast with time. The data also indicated that information and communication at the department level took place during staff or staff

development meetings. What is to be made clear is the procedure for communication of information to the teachers. Quinn (2002) is of the view that teachers need shared agreement that supports directness, facts and authenticity and open communication procedures. On the other hand, HoDs need to be tactical in information communication; this means getting the right information through the right sources to the teachers at the right time and with the right effect.

The other support strategy that was mentioned in the findings was mentoring and coaching. Naidu *et al.* (2008:97) also emphasise this strategy, and define mentoring as the process whereby an experienced person assists and guides a less experienced person. In the case of this study, the HoD (mentor) assists and guides the teacher as the mentee. Naidu *et al.* (2008) reiterated that mentoring and coaching are powerful tools of ensuring continued professional development depending on the availability of the expertise and experience of the professional already in the school or department. They emphasise that mentorship and coaching is necessary in order to provide development support to teachers in school departments.

It is acknowledged that one of the most important forms of support HoDs provide to mathematics and science is coaching and mentoring. The reasons are that the work environment is often challenged by inherent difficulties such as practical knowledge and experiences when it comes to skills application (Jain & Mukherji, 2008). HoDs in the study were therefore right when they stated that they mentored and coached teachers for them to have skills and a sense of purpose and direction towards the set goals, the school standards, planning, teaching and assessment. Mayfield and Mayfield (2007) argue that HoDs use mentoring and coaching support to bring out the best of their teachers' creativity. Hence, both mentoring and coaching cannot be underestimated. HoDs as senior colleagues with valuable experience in a similar type of work with teachers give advice and act like role models to them (Goodman, 2009).

Having discussed some of the instructional support HoDs provide to mathematics and science teachers in the primary school as revealed by the data, it became imperative to

highlight the challenges that emerged in the data. According to the data the challenges were: work overload, time constraint, lack of science space and frequent curriculum change. Naidu *et al.* (2008:51) also observed the challenges encountered by HoDs, arguing that IQMS had increased HoDs and teachers' workload and involved a lot of paperwork that is seen as unnecessary by teachers in schools. They however, suggested that workload should be fairly shared or where possible, engage the services of additional staff in the form of SGBs' paid teachers.

Obviously, work overload and all the additional tasks of the HoDs led to time constraints which impacted on the efforts of the HoDs in providing instructional support to mathematics and science teachers. Mercer (2009) is of the same view, arguing that it is not easy for HoD in the primary school to balance their teaching demands and their departmental management tasks due to time constraints. He further contends that HoDs experience considerable conflict in trying to act as both managers and teachers, mainly because the management is seen as taking time away from their teaching.

Bartell, (2005:85) concurs that it is difficult for HoDs to find enough time in the work day to plan with teachers, observe in their classrooms and to have the kind of in-depth conversation that make for rich mentoring. It could be argued therefore that HoDs need time in order to function properly because managing the activities across the different phases and among different subject areas in the primary school not only stresses them but also takes off their time. Because time is a finite resource which cannot be increased or decreased, HoDs may have to make judicious use of their time either by paying attention to the most important tasks or avoiding time wastage on trivial tasks.

The findings also revealed that there is lack of science space in schools. Three out of the four schools interviewed lacked science space for children to interact and manipulate the tools during the science lessons. Towards this end, Frazier Sterling, Logerwell and Kitsantas (2008:3) points out those science teachers need to be assigned rooms that are purposely designed for science instruction. They need to be able to teach in one room so that they are not spending their time providing for the same science activity in different rooms. Depending

on the type of school, the HoD in conjunction with the school principal and the sub-committee of the SGB called the "Asset Management Committee" can come together and procure laboratories for departments (Clarke, 2008). After all, the benefit goes to the school and the learners. It is possible for the SGB to procure a laboratory for the school because asset *management is school based depending on the school or institution capacity of schools* (Weber, 2005:69)

The concern was raised in the findings about frequent curriculum changes. This concern was reiterated by the current Minister of Basic Education, Motshekga, who said:

> Teachers are frustrated because they cannot find their way through the apparently never ending demands of new policy, new initiatives, new regulations and new forms to fill in. They find it difficult to find the most effective route towards their own professional growth and fulfillment" (Cameron, 2009:n.p).

Measures need to be put in place to curb this trend of frequent curriculum changes that impact negatively on teachers.

Pertaining to how the support of HoDs to mathematics and science teachers could be improved, the findings indicated that HoDs are challenged by time constraints. They therefore need more time to enable them to prepare adequately for both their administrative and professional duties. Time resources are very important, in view of the fact that HoDs need to prioritise their use of time. Better still, the Education Department and the school principal can organise time management workshops or in-service training for both the HoDs and the teachers.

Time management is very important to all managers, especially HoDs who seem to have a lot of responsibilities. Lansang (2003:3) states that time is finite and no one can actually do anything about it. Lansang further argues that we can only set our priorities and plan our lives and time according to these priorities. If HoDs choose to set their priorities wisely and plan the use of their time they will achieve the goals and tasks more efficiently. Staying focused on *your goals, putting them in priority, and achieving them while balancing work and family life* can be a rewarding experience that can never be over emphasised.

In the findings it was clear that HoDs have cordial relationships with their principals and with the Education Department which can turn into collaborative relationships. This collaborative relationship must be purposed to cooperate with principal and the Education Department in order to achieve a goal. In this relationship, the role of the HoDs is important in building and maintaining working relations that lead to success. The HoDs must therefore act like collaborative leaders who build bridges that people are willing to cross in order to work together to achieve the same goal (Dambe & Moorad, 2008:584).

It was further revealed in the findings that workshops and in-service training were ideal ways of improving the support that HoDs provided to mathematics and science teachers. The fact that HoDs in the primary schools are in charge of many subject areas, which they may not necessarily have the capability to supervise effectively, is enough for them to suggest regular workshops and in-service training. It is even more necessary when the HoDs are not appointed based on their subject expertise but rather their long experience in the teaching service. Leithwood (2005:622) states that the factors stimulating successful leadership practices include on-the-job learning, professional development experiences, socialization processes and individual traits which are developed during workshops and in-service training sessions.

5.2 Summary

It is clear from the discussions of the research findings what the nature of instructional support in the schools currently look like. At the schools it is apparent that materials, collaboration or knowledge based support to HoDs could enhance them to carry out their mandatory duties diligently. The next chapter draws a conclusion to the thesis.

CHAPTER SIX: RECOMMENDATIONS AND CONCLUSION

6.1 Introduction

This study investigated the nature of instructional support HoDs provide to mathematics and science teachers. The qualitative research approach was used. In this chapter the concluding summary of the study is provided. Further, recommendations are made on the way in which HoDs could provide support for mathematics and science teachers are made.

6.2 Recommendations

In order for the HoDs to be effective in their supportive roles, the researcher recommends that they be provided with interventions such as formal training and education, leadership programmes and nurturing. These interventions might increase their knowledge and skills and help to boost their self-esteem and self-confidence, all of which have the potential to result in the enhancement of their self-efficacy to be creative and supportive (Mayfield & Mayfield, 2007).

To ensure that all HoDs already in their posts have the formal basic leadership training, the Cape Town DoE in conjunction with the WCED should establish a partnership relationship with Institutions of Higher Education which offer teacher professional development in order for them to provide refresher courses and advanced training. Further training might assist and equip the HoDs with skills on supporting mathematics and science teachers at the primary school level effectively.

The other recommendation, which is closely linked to the one above, is that the bar should be raised so that the entry point to the HoD status becomes at least a bachelor's degree. In other words, promotion of teachers to HoD should be linked to the upgrading of academic programmes. The assumption is that the higher the education qualification the teacher obtains, the more knowledgeable they would be, especially if the degree of study includes educational management. For those teachers who already hold the HoD position without the

proper academic qualification, further programmes should be in place for them to undergo staff development. Such programmes might enable them to hone their supportive skills and to have more insight into their leadership and management roles.

Managing the activities across the different phases and among different subject areas in the primary school not only stresses HoDs, but also takes up their time. This implies that HoDs should prioritise their time in order to function effectively and efficiently.
For the workload of mathematics and science teachers to be reduced, it should be fairly distributed and/or, where possible, the services of additional staff in the form of SGB-paid teachers should be solicited.

The study did not reveal a direct link between the role of the School Governing Body and the support HoDs provide for mathematics and science teachers. The researcher recommends that all stakeholders, including the school district office and the SGB intensify their efforts and direct their energies towards supporting the HoDs, as the tasks of the latter form the core of teaching and learning.

6.3 Suggestions for further research

Studies on the nature of instructional support HoDs provide to mathematics and science teachers are not common. It is, therefore, necessary for further studies to be conducted on the nature of instructional support that HoDs provide to mathematics and science teachers in order to further enhance an understanding of this phenomenon. The following proposed areas of research should be considered in the future:

- A broader study on the nature of instructional support HoDs provide to mathematics and science teachers, focusing on how to support that HoDs in charge of mathematics and science in the primary schools; and

- Assessing the impact of HoDs' instructional support to mathematics and science teachers in primary schools.

6.4 Conclusion

This study has made clear the nature of instructional support HoDs provide to mathematics and science teachers in Cape Town primary schools. It has also showed that the efforts HoDs' in providing support for mathematics and science teachers were met with a number of challenges. The most serious challenges facing the HoDs were work load and time constraints.

The career path for teachers to become HoDs is not neatly carved out as promotion depends on experience in the teaching field but not so much on the educational level or leadership skills of the appointee.

Finally, the instructional support HoDs provide to mathematics and science teachers forms part of their professional development process. How HoDs are supported will determine the impact this process might have on mathematics and science teachers and the quality of service they provide to other teachers. This study, though not conclusive, will help to identify a number of issues that enhance educational policy makers and other stake holders in their discourse. It will also reinforce other researchers concerns and proposals which were made over the past few years with regards to HoDs instructional support to teachers

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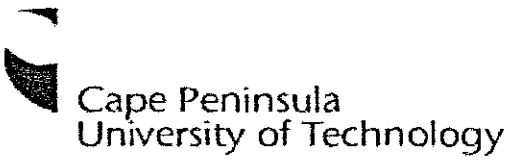
APPENDICES

APPENDIX A APPLICATION LETTER TO WCED TO CONDUCT RESEARCH INTERVIEWS IN SCHOOLS



The Western Cape Education Department

Dear Sir

PERMISSION TO CONDUCT RESEARCH IN CAPE TOWN PRIMARY SCHOOLS

I am a master's student at the Cape Peninsula University of Technology with student number 208088741. My supervisor is Dr Lungi Sosibo, telephone number 0216801539.

I will be grateful if you could allow me to conduct a research in Cape Town primary schools. The research topic is Exploring the nature of Heads of Departments (HoD) support to teachers in Cape Town primary schools. Research question: How do HoDs support teachers in Cape Town primary schools? Respondents: HoDs and teachers in primary schools.

The intended research in the schools will last for one month (21 July 2009-21 August 2009).

I hope my application will be considered.

Thank you.

Frederick Ngmenkpieo

(208088741)

APPENDIX B A LETTER OF PERMISSION FROM WCED

Navrae / Enquiries / IMibuzo: Dr RS Cornelissen
Telefoon / Telephone / IFoni: (021) 467-2286
Faks / Fax / IFeksi: (021) 425-7445
Verwysing / Reference / Isalathiso: 20090629-0023

Wes-Kaap Onderwysdepartement
Western Cape Education Department
ISebe leMfundo leNtshona Koloni

Mr Frederick Ngmenkpieo
4 La Casa Mathew Road
CLAREMONT
7708

Dear Mr F. Ngmenkpieo

RESEARCH PROPOSAL: EXPLORING THE NATURE OF HEADS OF DEPARTMENT SUPPORT TO TEACHERS IN PRIMARY SCHOOLS IN THE CAPE TOWN METROPOLE.

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from 21st July 2009 to 30th August 2009.
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
7. Should you wish to extend the period of your survey, please contact Dr R. Cornelissen at the contact numbers above quoting the reference number.
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:

    The Director: Research Services
    Western Cape Education Department
    Private Bag X9114
    CAPE TOWN
    8000

We wish you success in your research.

Kind regards.

Signed: Ronald S. Cornelissen
for: HEAD: EDUCATION
DATE: 2nd July 2009

[illegible]

GRAND CENTRAL TOWERS, LAER-PARLEMENTSTRAAT, PRIVAATSAK X9114, KAAPSTAD 8000
GRAND CENTRAL TOWERS, LOWER PARLIAMENT STREET, PRIVATE BAG X9114, CAPE TOWN 8000

WEB: http://wced.wcape.gov.za

INBELSENTRUM /CALL CENTRE

[illegible] 97 33 22

VEILIGE SKOLE/SAFE SCHOOLS (0800 45 46 47

APPENDIX C A LETTER TO SCHEDULE AN APPOINTMENT WITH SCHOOL PRINCIPALS

Cape Peninsula
University of Technology

Dear Principal,

My name is Frederick Ngmenkpieo a student at CPUT. I am currently working towards the completion of my Master's Degree in Educational Leadership. My area of study is Teacher Support. The study is titled "Exploring HoDs support to Mathematics and Science teachers' in primary schools in Cape Town". The purpose of the study is to investigate the nature of support HoDs provide to Mathematics and Science teachers and how it can be improved.

Your director in the WCED has been informed about the intent of the study. Your teachers have been chosen as part of a sample that includes 4 primary schools, 8 HoDs and 8 teachers in Cape Town. HoDs and teachers will be interviewed once (approximately 35 minutes for HoD and 30 minutes for a teacher) and the interview will be audio-taped. The interview participation is voluntary and all respondents are assured of anonymity and confidentiality. This research has been approved on ethical grounds by the Cape Peninsula University of Technology and the Western Cape Education Department on Ethics in Educational Research

Thank you for your assistance and participation in this study. Hopefully the results will contribute to better HoDs support for all Mathematics and Science teachers. If you are interested, I will gladly give you a summary of the results of the completed study.

If you have any questions, please are you are welcome. You can contact me at 0711176234 or ngmenkpieo@yahoo.com . My supervisor is Dr Sosibo Lungi a lecturer in the education department, Cape Peninsula University of Technology.

.Yours in Education, Frederick Ngmenkpieo

APPENDIX D ACCEPTANCE LETTER TO INTERVIEW PARTICIPANT

From: Gill. <gll@rrgjs.org.za>
To: ngmenkpieo@yahoo.com
Cc:
Sent: Thu, August 27, 2009 10:44:20 AM
Subject: RESEARCH POJECT

Hello Frederick

You asked for two separate meetings and I advise the following, which I hope will be convenient to you:-

GROUP 1 = HOD
Monday 14th September: 35minutes between 13h30 – 14h30

GROUP 2 = TEACHERS
Monday 14th September: 35minutes between 12h00 – 14h00

I would suggest the following times which may assist a flow between both meetings:-
14.9 Group 2 – 12h45
14.9 Group 1 – 13h30

Please revert accordingly
Kind regards

APPENDIX D ACCEPTANCE LETTER TO INTERVIEW PARTICIPANT

From: Gill. <gll@rrgjs.org.za>
To: ngmenkpieo@yahoo.com
Cc:
Sent: Thu, August 27, 2009 10:44:20 AM
Subject: RESEARCH POJECT

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14.9 Group 2 – 12h45
14.9 Group 1 – 13h30

Please revert accordingly
Kind regards

APPENDIX E INTRODUCTORY LETTER TO INTERVIEW PARTICIPANT

Cape Peninsula
University of Technology

Dear Teacher

I am a Masters student at CPUT, and my research area is Educational Leadership. Currently, I am conducting a study to examine HoDs instructional support to Mathematics and Science teachers' in primary schools in Cape Town. A semi-structured interview is designed to elicit information regarding HoDs instructional support to Mathematics and Science teachers and how it can be improved.

The director in the WCED has been informed about the purpose of the study. You have been chosen as part of a sample that includes teachers from other 4 primary schools in Cape Town. The interview lasts approximately 35 minutes. For ease of data capture the interview will be audio-taped. The interview participation is voluntary and all respondents are assured of anonymity and confidentiality. The interview questions intend to find out HoDs instructional support to teacher in the two departments.

The information gained through this interview, coupled with information gained from document analysis is to create understanding of HoDs instructional support, experienced by Mathematics and Science teachers in primary schools in Cape Town.

If you choose to participate, please complete the attached consent form.

Thank you for your cooperation.
Sincerely yours
Frederick Ngmenkpieo

APPENDIX F A CONSENT FORM FOR INTERVIEW PARTICIPANTS

Cape Peninsula
University of Technology

Dear, _____,

I appreciate your participation in the research study, HoDs support to mathematics and science teachers in some primary schools in Cape Town. The study will explore HoDs support to teachers' in the primary school in Cape Town. In order to protect the interests of the participants I the researcher will adhere to the following guidelines.

1. The researcher will interview me to discuss my experiences and preferences in instructional support to teachers in the department
2. I will be interviewed once (approximately 35 minutes) and the interview will be audio-taped. I have the right to answer or not answer all the questions if I so wish.
3. Participation is completely voluntary, and I may withdraw from this study at any time without fear of penalty or punishment by the school or school division. If I choose to withdraw, my part of the audio tape recordings, transcripts and interview data will be destroyed.
4. Tape recordings and the results of this study will be securely stored with Dr. Lungi Sosibo, within the department protected and from the public.
5. The results of the study will be disseminated in the researcher's Masters Thesis. Later, the study may be published as an article in a scholarly journal or presented at a conference. My confidentiality and anonymity will be protected through the use of assumed name.

This research has been approved on ethical grounds by the Cape Penninsula University of Technology and the Western Cape Education Department on Ethics in Educational Research.

Consent form interview participant

I, _____, understand the guidelines above, agree to participate in the study and have received a copy of the consent form for my records.

Date: _____

Participant's signature: _____ Researcher's signature: _____

APPENDIX G INTERVIEW INSTRUMENTS FOR HEADS OF DEPARTMENTS (HODS)

1. What is your understanding of instructional support?

2. How do you motivate your teachers?

4. What instructional resources do you provide your teachers with as a support?
coach on?

3. As HoD, invariably a coach/mentor to your teachers, what do you basically mentor or

5. How do you conduction induction or orientation for your teachers in the department?

7. How do you monitor your teachers' in terms of lesson preparation, teaching and learners' assessment?

8. How do support the enhancement of your teachers' professional development?

9. How do you manage to create a good learning environment for your teachers?

10. How do you ensure effective teaching of Mathematics and Science in the classrooms?

11. What teacher support program do you have in place?

12. a. How are you supported to enable you to provide effective instructional support to your teachers?
b. What support both internal and external do you think could enhance you to be more effective in assisting your teachers' instruction?

APPENDIX H INTERVIEW INSTRUMENTS FOR SCIENCE AND MATHEMATICS TEACHERS

1. What are the challenges you face in teaching mathematics/science?

2. How does the HoD support you?

3. What kinds of resources are you supported with?

4. What motivational support does your HoD gives you?

5. How do you personally like to be motivated?

6. Can you please describe briefly the induction or orientation program in the department?

7. What support does your HoD offers you when preparing lessons notes?

8. In what ways can you say your HoD is a mentor and coach to you?

9. What teacher development programs have you been taken through since at post?

10. How does your HoD support you in your classroom?

APPENDIX I TRANSCRIBED INTERVIEWS

Primary School 1

Head of Department

Tell me your understanding of teacher instructional support.

Instructional support is more of supporting the way the teacher teaches in the classroom, so that you provide the best em, possible scenarios or em, opportunity for the teacher to do the best that they can to teach the child or get the child to learn as much as possible. Instructional support is making sure that everything that is necessary for teaching to take place is in place.

What instructional resources do you provide your teachers?

Well, we've got a lot of resource; I will start with text books, every learner has a text books, teacher has a verity of text books, (you can look over there) they can work from, we don't conform to one book we use different text book, we have things available for the teacher to use like a television, computer, the over head projector, projector where you work on a laptop and put thing on the screen and so on. We teachers do not expect teachers to purchase for the own files, paper and pens and so on the school provide for that because ultimately we want the teachers to do the best that they can. The school provide for that

How do you motivate your teachers?

We have weekly staff day meetings, we have weekly, we have staff developmental meeting and session. We go for lunch once a term, at the end of the year we go to a fancy restaurant and then the school actually pays for it. We make big fast on teachers' birthday. so we make them feel special, we have one on one session and my most important thing is that I have an open door policy the people can come to me when they feel they have a problem and I give them my hundred my Percent support. I believe that if the teachers are happy the children will

be happy. And even if a teacher has personal problem I believe that if they need time out to sort themselves out, to see to it that the kids at home are sorted, that husband at home is ok then that teacher can come to school with peace of mind and do her job or his job to the best of their ability.

How do you basically mentor or coach your teachers?

You know teaching is about people, and how you treat people and how people feel when you work with them especially children. You know. I see a child as clean canvas and whatever you do or teacher the child it is left behind as an impression on that child. It important for me to make sure that teacher know that they are on the right track and I feel that may that may be the teachers are moving off path that is my responsibility to bring them back on the path on the path. And also the goal inside we must all work toward the same goals we can't have different goal. It is important for me to remind them that remember it is this is our goal and these are the thing we need to do to get that goal. So that where mentorship comes in; mentoring somebody is not a one off thing, it is an on going process and it involves little things, small test so that you can actually start moving forward. All that is how people receive you as a mentor, how people receive you, are they willing to learn, are they willing to receive what you have to say , are willing to work on you know or make adjustment and so on. It about reminding them ultimately; Look we are suppose to work as a team these are the goals and this is the things we need to get, in there in the nut cell

How do you monitor your teachers' lesson preparation, teaching and learners' assessment?

Teachers are supposed to hand in weekly preparation every Thursday that is the cut off day and they need to correlate with what is in the child's book. It needs to correlate with the phase planning what big planning for the phase in the school or for the grade. So there must be a connection ... that is one thing. The second is we have moderation section of the learner book once a term, where we have got different level. It can be any learners book. ... may be five or so different level to see where the children are. What they struggling or busy with or where the achiever or hardworking learners are. Then we also have office test that we set up

in mathematics for the different class ... to see the level the children are. We use a lot of tools. The same for science, mathematics and everything ...

How do you support the enhancement of your teachers' professional development?

Well, we show them the positive sign of attending session, workshop training hours or workshop training session department provide them, we encourage them to attend that. We tell them that look if you attend those sessions it has an influence on your IQMS. You know yourself developmental and so on.

How do you promote conducive teaching environment for mathematics and science

We encourage the teacher to participate in in-service training which is department yearly 7 times of workshop teaching mathematics and science. We also make sure that the teachers have all the resource that they may need and that every single child has a text book. We also have quarterly moderation of the work and the teacher hand in they weekly planning to this office and we go through what our weak point are; where we need to work with the kids. ... on weekly first meeting ... constant support is given to the teachers. ... there is also open door policy where the teacher can walk in anytime if they have a problem or anything.

How do you think you should be support to do your work effectively?

Ok, I think I will need on going support from the department and from the principal, which I am enjoying currently. Em, also more time, time is very limited is an invaluable resource which we don't have at this moment, especially towards the end of every team where there so many administrative duties that have to be done. ... I will rather ... spend my time teaching mathematics or natural science in the class teaching...

What are the challenges that you are facing?

It is insufficient time; also we got different levels of learning happening in the classroom where you got the very weak learner as suppose to the achiever. The ... learners are able to do their work very well. Also constant disruption; you know, there are always other things to do like events that needs to take place at the school and so on. So you find it a bit challenging having to complete your syllabus or your lesson plan, your phase plan ... for the team or for the week. You need to think on your feet, you need to be able to change with plan because nothing is constant; things are changing all the time.

Primary School 1

Mathematics and science teachers

How do you find the teaching of mathematics and science?

I personally find it exciting, I like mathematics and I like science even though I didn't like it when I was at school. ... I found [that] the children are a bit taking back, a bit inhibited you know. [Though] they are also willing to learn, ... they get excited when ... learning new things. ... because we have resources they get more exciting to learn ...

What are the challenges you face in teaching mathematics and science?

The challenges are huge classes, especially when you are to do experiment in science, you have to involve every group and because the classes are large. You know children talk and do their own things. In mathematics the challenges would be ... you have children with barriers to learning, each one of them have got barriers somewhere language, special need, and in teaching we need to address specific need as well. So you need to play the role of mediator and teacher at the same time, which is very difficult. You know, if you have an assistant it would make it so easier.

How does the HoD support you?

Whatever I need, I can just go and ask, she is very open, very helpful. whatever she needs ... to meet, she tries and take it further and make sure that ... whatever help I can get she will try and assist me. In most of the times, I also need positive help and negative criticism as well.

What kinds of resources are you supported with?

Ok, we have text books, we have an initiative kit supply by the department, and we have mathematics kit supply by the department, so we use it in natural science, mathematics and

technology lessons. We have got a resource room where we can make our photo copies, we've got a science laboratory, and we are well resourced.

What motivational support does your HoD gives you?

She praises me when she comes and I present a good lesson. She does not also hesitate to reprimand me I go wrong. She encourages us all to go to workshops that are going to equip us. More importantly I am motivated by the fact that she live by examples.

How do you personally like to be motivated?

You know, if you know your learning material, and if you know what you doing, that is all the motivation you need. Because, if you don't understand a concept you're not going to be confident enough to teach it, You know, so, if I know my material and I know where am going to, that excites me. Because I know what I want to ...

What opportunities are there for you to develop professionally?

Like I said, because we are small school we have one class per grade so that makes our school very small. So, whatever workshop that is run by the department itself we try and attend those work shops. It comes through the HoD and we try and find out from other school. Especially, she leaves to school to find out from other school ... what they are doing [and to check] if we are on the right track. So, it's like communication with other school to see that we are on the right the right track and we also get an outside visit from the department from the mathematics centre especially.

In what ways can you say your HoD is a mentor and coach to you?

Because she been a teacher before, we are also colleagues, we supported each other then, and now more even more so, she support us now. Because she knows what we're doing and what we're experiencing. It is not like she has never taught before; she knows the gaps ... the

barrier, so she understands .... For example, we have observation lesson where she comes in and she observes and give us tips or guidance.

I what way does she mentor you or coach you?

Look, it is easy for someone to come in to see with fresh eyes ... to see you what doing wrong, and no lesson is perfect. ... She comes inside ... not demands change but assist and suggests changes on how things should be done differently and it always good.

Primary School 2

Head of Department

Tell me your understanding of teacher instructional support.

Instructional support for teacher, ok, we normal get the teachers together at the end of every two weeks. We sit down to have a little meeting to find out what the teachers need for the next two week and how we can help the teachers to go through the those two weeks, and together not only me but together as a team, we work together as group. ... together as a group we grow stronger as well. I help them with my experience, I also learn from them because there are times that I tried things and they didn't work and when asked them ...

What instructional resources do you provide your teachers?

Well, I try to get outside help for them if the need be like the ... they have workshop for mathematics and science teachers. We also went to CTLI in Kuris river where they have workshop for over four weeks. Two weeks in the one team and two weeks in another team. So theey stay at the CTLI for two weeks. ... we got substitute teachers in who sort of carry out with the work when the teachers were away. When the teacher came backs she is refreshed and she is learnt new ideas. You know leaving with other teachers as well as ... learning new ways of getting the work across to the children. And we also get outside people to sort of ... workshop for the teachers. Well we have lots of material resources like test books, the small board in the classroom, basically for mathematics and science, and you know teachers can go on into the net and so on some scientific project and pick on something. ... book resources we have more than enough that we use ... we turn not to use too many text books because the internet better help and it is more up to date. The department trains the teachers, ... the department trains the teacher they train for four years, if you go to the university it is one year course and you do a degree as well as your honors and you qualify as a teacher. We have staff development on a regular basis the administrator of the computer room every Thursday. We have lessons and ever since the computer room has been in use we are all computer

literate. We take our children to the computer room and have to teach them, so we need to be computer literate.

How do you motivate your teachers?

Well, I should be the example, I am always excited about a new method or something that I have learnt or have seen it work for me or somebody else. I always come and motivate the teachers in that way and I do any thing to get them to feel excited about mathematics. I know mathematics is not a difficult subject it just got a little bit of logical thinking that is all but some teacher are scared of mathematics and they don't want to teach mathematics. ... I encourage them and motivate them ...

How do you basically mentor or coach your teachers?

I listen to them more because I feel that what the mentor stand you first list to all the stories. I am a computer person if somebody brings a problem and I don't know much about it, I always go into the computer just to look at what it all about, what the person is talking about. ... I guide them to doing and I leave them with choices. [Example] let put it that way, choices, and the consequence of the choice.

How do you monitor your teachers' in terms of lesson preparation, teaching and learners' assessment?

We have the IQMS that we do during the year. We speak about it constantly so we ... look at each section of the IQMS and we ... discuss issues like the classroom situation, say the classroom situation, how can we do to improve it, do we think that the classroom situations now is ok, if no why not? Then, how can we ... improve the situation in our classroom.

IQMS is a stage for teachers to see how they are faring in their teaching, in the lesson preparation, in the control of the classroom, and also the way they teach the lesson, how they interact with child, how they interact with parents, human relation, how they interact with

children. For each section you are awarded a point from 1 to 4, one been the weak and 4 been excellent. You know, then the score are added and you get a certain score out the total scores. ... we can say as teachers where we think ... and feel we need help ...evaluation takes place when teachers needs come. ...

How do you support the enhancement of your teachers' professional development?

O, yeah when teachers study, I encourage them, like you came and ask for help here, we help each other. If the teacher is busy also with study program we will answer questions, if the teacher needs to write an exams then we make sure that we have somebody in his place to see to his classes. If he needs study time, we make sure that he gets the study time. That is how we help them. We can't do it money wise though.

How do you ensure effective teaching of Mathematics and Science in the classroom?

I go to the classroom to see what teacher are doing, check the learners work books to see the work they do and they performance. Where teacher need help like teaching and learning materials I try to get them for them.

What challenges are facing as an HoD?

Challenges, .. Em, there is nothing is really, I may be just because I'm too long in the service, you know. It's a challenge to help people and to guide people but as I say in our school we work more in a team. It not a one man show, if I can say it that way. You know, we all the same if I'm working in the grade five we are all teachers together and we encourage each other.

Primary School 2

Mathematics and science teachers

How do you find Mathematics and Science teaching in the primary school?

I personally enjoy teaching mathematics especially ... science and mathematics, but I enjoy teaching Mathematics because got a passion for the subject. ... I enjoy teaching it to learners and because I always [remember] that when I was in the school we knew mathematics but we didn't really understand it. We were just taught rules you have to do that and you have to do that. ... many years after that I realized that for example with the equation if I take one number, if I minus 25 on one side I have to minus 25 to the other side but I never ever knew that because I have to take away 25 on one side I have to add 25, and that why I'm adding 25 to the other side because what happen to one side have to go to the other side. I want learners to understand Mathematics more than knowing Mathematics. And science teaching I enjoy teaching Science em is just the opposite of challenges that we have in Science.

What are the challenges you face in teaching Mathematics and Science in the primary school?

Em, ok I come from another school one the poorest school, we were given many different equipment to use in the Mathematics teaching because our Mathematics marks were low, so we were given lot of apparatus to work with. So the learners were very practical involve in the lesson. And when I came here, then they wont asked practical to the learners although there are practical if there are in Grade 6 you know they need to work because learners are at different level and em also the classes are big. Em, and we don't have a science lab where we can go the children can work with the different operator in the lab so children to bring things from in the storeroom at back use to be the lab to the class they have to carry it to four different classes and the desk are slanted in most classes learners can work with the operator they have to see you do things. So I think that is a real challenge.

How does your HoD support you to do your work effectively?

They tell you that the equipment is there for you, you just have to bring it to your class, and the children out in their group, in my class for example I have nothing I can work in my classroom but other classroom the desks are slanted

What kinds of resources are you supported with?

We have text books, that we can use we have different resources different operators that are in the old lab and we have out of the box green box some company sponsored the have Mathematicss and science equipment and technology equipment in there. All teachers know about it that there are available to them.

What motivational support does your HoD provide you?

I think we are encouraged to go to CTLI for two week course, sometimes just to refresh and also we have meetings, best practice meetings and em where we share knowledge like different terminology. At the moment all the teachers are all busy writing terminology so that we put it up along the walls walk ways for the learners like descending means then we have example like 5, 4, 3, 2, to 1 where the grade 6 learners will be like descending in decimal numbers so that when they do get assessment and there is word like descending or terminology that they don't understand they know they see it around. These all things that out HoD we had meeting where we suppose to come up with a few strategies to teach mathematics to help learners for assessment

How do you personally wished to be motivated to work hard?

Em, you know sometime you teaching your class and you don't quite get something across to your learners, I think the other teacher that might be able to do that to teach that piece of work better then I can to have best practices. You know like every section we best we have in class how do teach this, how do you approach this lesson, that is the kind of motivation I will want

from a HoD to help me with. What is the best way to teach certain lesson, because my way is not always the best way? You know, get ideas from all different teachers how they would do something differently.

What opportunity for teachers support does the department provide you?

The CTLI would be the one, Cape Town teachers. Em and also the bursary the department gives to educators, the department. WCED Mathematics and Science they you bursary to teachers to study Maths and Science further that up the fourth year and even do your honoors in Maths and Science. ... also the meeting with the educators, the new phase and the others.

In what way can you say your HoD is mentor or a coach to you?

Em, helping with the different learning outcome ... Sometime she gives us demonstration lesson, other time she tells us some of the things we can bring into the lesson. Not very much but she try to let us know how to go about things in the right way. We understand it is not easy but ...

What teacher development program have you been provided with since you occupy this teaching post?

Well, I will say that strategy in mathematics, strategies that you can use in class to better the assessment. Well we have quite a few, we have the Grassy Park, the area that we are, a group that comes together monthly or if we busy once in a term may be to discuss problem and support to teachers. So that is all schools in the area. I haven't been to the science meetings with the department they been having so far, we have meeting with the department to discuss Mathematics probably because our numerical level are low and that is the reason why they are pushing us on Mathematics, and much assessment have been done in Mathematics so far.

It like it's difficult for the HoD to do things on their own, they sort of rely on either the principal or the WCED for their support am I right?

Em, I think they all it all comes together, you know the, department the principal and HoD the educators, we all depend on one other. And I think the job of the educator, HoD, principals their also made more difficult because of the fact that everything keep changing. You know assessment changes, then everything just changes all the time, so when we are trying to grapple thing that we getting one thing together another thing is sorted out. I mean like this year we were given new scheduled, work schedule to work with and they say by 2010 that is what their going to introduce and we have to follow that. So em, I think that make out stuff work more difficult and I hope that the new schedule that they giving us they expect us to work on that at least the few more year

Interview

Primary school 3

Head of Department

What is your understanding of teacher instructional support?

Em, my understanding is that when an instruction is given or a duty need to be performed I need to know that the other parties or parties understand what the instructional is and whether they are able to follow the instructional. If I see there are problems then I have to take them through channels whereby I give them guidance and help them to understand. Some of the channels could be workshops and sitting with peer groups, sitting in a group for example grade 1 grade 4 they could learn from other schools.

What instructional resources do you provide your teachers with as a support?

Whatever resources they request, resources they feel they need within the classes, we try our best because we do budget for resources. We try our best to purchase those for them and em also we would if they are not using the resources, we would give them the necessary guidance because we do have internal moderation and we can thereby see what is lacking the class. Em also, we run workshops, if I see internal moderation or IQMS is been taught and can help the rest of the educators, we will get to gather and a demonstration will take place. We invite other department

How do you motivate your teachers especial the science and mathematics teachers in grade six?

I believe that one must be a term player all the times. I don't believe in been authoritative but to be apart of a term and also to let them know that I understand they could also have better

ideas than what I have and I always listen to their view and their recommendation so that they can see that they views are also important.

As an HoD invariable you are a coach or a mentor to your teachers, what do you basically mentor them on?

That can be a very difficult ... because you find many people very different character. So ... you have to know each character, because each individual is differently and unique and if you treat everyone differently according to the way they understand or accept instruction. If they are finding difficulties in anything, I need to keep it very confidential, do not discuss it with anyone else and that is how they gain confident in you.

How do monitor your teachers in terms of lesson preparation and teaching and learner assessment?

That is why we have internal moderation. ... the ...plan by the school, then we have internal moderation whereby we check teacher portfolios, we call it support and guidance. .. we call in learners books to see what is been done in the class and how teacher controls the learners work. ... once that have done, all the moderation assessment documents how often the teacher assessing whether he is been following the planning whether everything is been followed the work schedule and learning program. I write out report but I make it very clear to the individual that it is only for support, it won't be held against him for IQMS because IQMS is something and I will give them a little repot so that they can refer to and after that the following term will call in the teachers that followed those guidelines.

How do you ensure effective teaching of mathematics and science in the classroom?

Am very assertive person when I walk pass the classes I can hear what is happening in the classes. All the same you cannot know mathematics without knowing the table multiplication. Children have to see the broader picture and that is the encouragement I give them. If the

child works with the concrete, from the concrete work to the semi-concrete and from there you take it to the theoretical part ... that is the encouragement I give them.

Also children must know the multination table to do mathematics, no matter anyone says, if a child doesn't know the times table, they can never know mathematics. Multination, division table and so on we encourage, we coach them to so that they tune to the tables. The department has supply us with many concrete apparatus for practical work, we use that even in science. I can not talk about certain things in science. The child is to see things clear, picture and not to visualize. For the reason, we also have computer laboratory whereby the child is taken up to the computer lab to exercise [to practice] on the computer, it can [show] the encyclopaedia where the child sees the real thing no matter what. ...

How do you promote a conducive teaching and learning environment for Mathematics and Science teaching at the Grade 6 level?

Em, the, you will find that children are inclined to be very much tensed depending on the educator who teaches in the class. You can teach mathematics any where not necessary in the classroom. You can do mathematics outside; you can do mathematics just whatever way you decide to do it, or plan to do it because it includes everything beyond the parameter of a classroom. ... We encourage our Grade 7 science to participate do because they do planning and something like that, at Observatory peer competition at the moment where they are going to research on the different planet and they are at the second round ... in the competition. They see the practicalities of things that involve mathematics and science. We take them to science lab in Canal walk to where they see the practical of the things. Life and living consist of water, how we eat healthily, how do we serve our water. We have got a vegetable outside whereby the children for science go out to work in the vegetable garden. So it is not confine to the classroom only.

How are you supported to enable you to provide effective instructional support to the teachers?

The support I got around say from the department, as I told you in the beginning when I got to know, am only for six years, I got to know the educator, some of them were very hostile, they have a whole attitude why must we change, it's difficult to change. I have to find out each individual character to get the support from the educators because I told them I am also working; I am a part of the team; I also got a work to do. The principal sees my determination and my sincerity and dedication in my work, I get a lot of support, and there is a lot of support all depends on how you respond to people around you and intend they will support you. If they see that you are not going to condemn them, you will get the support. You need ... their support... But all depends on the one that is giving them the instruction.

What kind of support do you think could have enhanced you to support the teachers effectively?

I have bee teaching for [long], this is my 34th year of teaching. I have been in management position in my previous school where I have taught for 26 years. Having other HoDs above me when I was teaching and they lacked understanding and fairness, ... not giving enough support. I told myself I will apply for a promotion post. I know from which angle to come in and how to approach the people. So experience has taught me how to approach educators because if you become authoritative attitude, you will never get the support from them.

What are your challenges in the course of supporting the mathematics and science teachers at this Grade 6 level?

At the Grade 6 level, let me tell you when I walk pass the Grade 6class and Grade 4 class, and hear my grade 7 learner always say 4 over 10. 2 over 5 for fractions, and I taught the child haven't seen the clear picture. Why can they just say 2 fifth and 4 tenth? In the Grade 7 class I did a practical lesson

Interview

Primary school 3

Mathematics and science teachers

How do you find the teaching of mathematics and science in the primary school Grade 6?

Mathematic, children seems to fear mathematics, in born fear of mathematic, am a grade 6 educator, and find that the sometime the foundation at the bottom has not been properly laid. I feel they want to do too much down in the grade 1 that the children grasp and grasp and they stand with their hands full of nothing. The do the work in the hundreds and the thousand but basically they don't even know their number combination. So ... they should spend more time down there teaching the children ... to master the number combination and once they lay the foundation, I feel learners would not be scared. I get learners in grade six ... those still have to rely counting on their fingers.

What can you say are the challenges you face in the teaching mathematics and science?

Ok, I just told you now the children must know the basis. They must know their bonds, the 2+5, 3+7, they must know the bound and it must be laid there in grade 1, the foundation so that the other grade can build. ... the children must not fear mathematics. That is the problem; they are scared of mathematics because the foundation has not been properly laid. ...I found it a big challenge because I still have to teach the children to master the number bonds; you see I still have to teach them to master bonds they don't like mathematics.

How does the HoD support you?

The HoD is aware of my difficulty and she can just show me the way of teaching mathematics to them making it simpler keeping them for detention giving them the medial work and so on she just guide me on that basis but am sitting with the baby I have to teach that child the HoD

doesn't have free period because she has a class of her on. The only way the HoD can support me is to visit my class to see how the children are progressing, to give me new ideas and so on. But the HoD does not have much time to help me, because the HoD herself has a class. The department must provide more teachers.

What kind of resources are you supported with?

School doesn't support me with any resources. I have to see that I buy my own beads and books and what have you, I have to buy my own. But they do send me on workshops on how to teach mathematics and science, we do have visitors from the area managers and so on.

In what ways can you say your HoD is a mentor and coach to you?

By encouraging us to give extra classes to these learners, and always coming in to checking our works seeing if there has been any improvement and so on. There is new method they will come back any new book they will come and they will come and show us and show us and so on.

How do you personally like to be motivated?

I love it, I love new idea, I like new challenges, but I myself am a strong mathematician, I was taught in the old way and you can wake me up in the middle of the night and I will give an answer when you give me a mathematical problem. My tables ...I like to be motivated. I enjoy being motivated, because I like new methods, new approaches, short cuts, different approaches.

What teacher development programs have you been taken through since at post?

We always go to workshops, always go to workshops unfortunately those workshops ...they take our knowledge, it's a workshop, our input, they use our input, it does not tell us something or anything new.

Interview

Primary school 4

Head of Department

What is your understanding of instructional support?

I believe that teacher needs to be supported, em they need to have resource, such as text books obviously, em that is teachers need to be supported with experience. I feel as an HoD I have certain experience that I can pass on to em [my] teachers. I also believe that you need to keep up to date to what is going on and as HoD I feel and as a ... you pass on information that could be relevant to whomever it might be relevant to. ... Also, to listen to problems and come with suggestions ... of how to do things...

What instructional resources do you provide your teachers with?

Em we do have a problem because we don't have a dedicated science room, so that is a problem but we do have teacher aid. He helps set up things for experiment for the Science. The resource we have for mathematics ... I can remember geoboard and geostripes, we have ... materials that can be used to teach in a concrete state. We feel that if they work in concrete it is easier to abstract from the concrete. We have Cuisenaire rods for teaching fractions; we have die-block for teaching dismal fractions; we have geostripe for teaching angles and makes and things like that. We have scale for teaching measurement, all the things they need for measurement and experiment and measure for concrete experience.

How do you motivate your teachers?

We have regular meetings. Our school is structured in such a way that we have
the academic side of the curriculum, we run planning meetings, at least once a team, ... our structures is such that we have Grade leaders in charge of Grades. Em, we plan together, we

use our staff development time which we have on Friday, and we have Grade meetings, each grade have an hour a week for a grade meeting. And the HoD can come to Grade meeting if it is necessary if there is a problem. Em we enable to take courses, if there are courses available they can go to courses.

As an HoD invariably you are like a coach or a mentor to your teachers, what do you basically mentor them on?

We try and have a standard to the school and when new teachers come in we make sure they know what our school requires, how the work is to be set out, what label we require from them. But em we also watch teachers test work particularly test, we em, look the test and we help; mentor through the sociology test. If we feel that there is not a balance in the test that are set then we look at the work that they do and we see how we can improve that work. And then of course we also monitor, not very regularly we do take in the work and look at pupils' work that they are doing.

How do you monitor your teachers in terms of teaching, lesson preparation and learners' assessment?

Right, em, we don't specifically monitor lesson preparation, but we have what we called an educators portfolio, where all the lesson plan are put in there and the assessment plans the teacher are require to submit an assessment plan in the second Friday of each team exactly what there are going to be assessing and when they are going to be assessing. And this goes out the parents because it departmental requirement this goes to the teachers parent. So the whole term is plan, by the second week of each term the whole is planned, to... what would be required of them. .. the educator side is taken every year ... just to check that we are all on board and then we meet together to discuss our learning program for the whole phase. .. in fact, the intermediate and senior phase get together and discuss the learning program for the whole phase and then we...link with the foundation phase as well so that there is no overlapping. So we do that part of

How do you support the enhancement of your teachers' professional development?

We try once a term to have a speaker come in, em, it could be on learning difficulties or it could be how to make your lessons more interesting and things like that. We try and do that once a term and fortunately ... I support and then of course we encourage the teacher to go courses that are available. ...

How do you manage to create good teaching and learning environment for your Mathematics and Science teachers?

Well, we believe that teachers need to be creative so we try not to be telling them what to do. We do have certain standard but we allow them to be free to experiment within that. ... I think teachers need to know that they are trusted, ... and obviously if there is a problem with results we need know and see why there is a problem with the results and we try to see how we can mediate that. ... we do enter ... competition and that help to see what we can improve, problem solving is quite important we have initiated, all the 7 teachers have initiated the science expo where the children have to take the problem to solve and they to show the results of that experiment. That is something quite new. We make sure there are apparatus for the teachers to work with, and how to show them how they can do with it. So a regular staff development, and one on one is necessary.

How do you ensure effective mathematics and science teaching and in the classroom?

Well, we have IQMS so we visit the classrooms, new teachers we visit classroom we see the results of their work. Em, with mathematics we have extra minutes em we have extra mathematics lessons for those who are struggling in class. We also stream our mathematics so that in our grading, Grade 6 for example we have three classes normally that we have an extra teacher to teach in this case the principal and so we steam them into four streams. Three of the streams are equally divided and we take the top girls in each class and make them intends enrichment class....

How are you personally support to enable you do this work effectively?

Em, I do what I think need to be done. Em I don't really get a lot of support, I feel that am the one that is giving the support, em that I've being in the school for a very long time I've got a lot of experience. So I feel that am the one who is giving the support even though I might not be in charge mathematics, I think I know more than the person who is, so I have to encourage them.

How do you think you could be supported to do the work?

Em, I'll like to have more time, I will like to have time, there never seems to be enough time. Em, we do have a problem in our school, we don't have a science laboratory. And I think that will raise the level of our science if we have a laboratory.

What are your challenges in supporting mathematics and science teacher?

I'm very concerned; I'm very concerned that we don't have enough time in our teaching time to achieve the level of proficiency that we should be achieving. I feel that I've being in the school for a long time. I feel that the quality of the work that the children are producing is not what it used to be. ... I think that the new teachers that are coming in don't have such a good experience by themselves to be able to give a rich experience to the pupils. I feel that our curriculum is too wide and because of that there is not much focus on numeracy and literacy as they should and ... because we've got other things.

What do you think should be done to enhance this work?

I feel that we should have more time; we should have fewer subjects, and have more time to focus on laying foundations. I feel the primary school we are laying foundation, ... there need to be solid foundation; I feel that once the child can read, can think and make deductions and things like that they can teach themselves. As teachers we have to be role models.

Primary School 4

Mathematics and Science teachers

How do find Mathematics and Science teaching?

Em, I think mathematics is taught very well, I think science needs a lot of work. I don't just talk specifically to my school, I talk generally, I think science needs a lot more work. Em, I think a lot more could be done with science. I enjoy teaching it, but I always feel there is more that one could be done.

What are your challenges in teaching mathematics and science?

My specific challenges are that we don't have science room, science laboratory, we did have one, but we have to sacrifice it for a classroom. So, our science equipment will not be as handy as will be in the science laboratory. To compensate for that the school has given us a teacher aid, who, if we are doing science experiment or doing science we go and find it. It's put in the storeroom so that we can build science room but at least if you give her less instruction she will go and find it for you. So that has made it better otherwise we are very equipped with our mathematics equipments.

How does the HoD support you in your course of teaching Mathematics and Science?

The mathematics HoD is very useful because she helps me with [resources] and she go through the way she will like things to be set up if it is specific worth setting up things. She is very knowledgeable [in the area] and she helps a lot, clears up any questions we have as well. She also teaches across the Grades, she teaches from Grade 4 and 5 up so that she can see the progression, so she is better able to give you input on where you should be. Science, likewise it is a subject that in Grade 6 it got enormous potential and we divide ourselves up between component, and the physical science component and we are

encouraged there as much as possible to use the equipments and to make it exciting. Personally, I told you already I will love to do a thousand more things.

What are some of the resources we are supported with?

Well, we are well supported with mathematics equipment. We can do mathematics in any form, and we got all the basic equipment. The measuring stick, we got the, we got the meter, we got mathematics games, we got flash cards for fractions, we got fractions games, we are very well equip. Science also, it all there, but is not handy, as I explain to you. It has to be put away but we have got the science equipment and got a budget and the moment we actually looking at what we need in the way consumable and chemical and what have you for next year, so with these reason we are very fortunate. If we can motivate it we can. ...

What motivational support does your HoD give you?

As I say, it answers my questions when am not sure about the method, em just very supportive, am very fortunate you know, she is so nicely. She is very encouraging; she makes you feel like you doing well. I mean, I have learnt an incredible amount from that lady over time. So I think the most important thing is her encouragement, her mental support you know and if I may...she is tactful about telling me how to make it right.. She is vastly experienced teacher am very fortunate ... here.

What opportunity does the internal department support you with?

Em, well, as I say we now at a state where it budget time for the next year and they are coming to certain things, what can we get you, what can we give you to make it go better. And that even include training if necessary. You know a course em sort of, it is more important we need to know within reason how our HoDs, our department will motivate us.

In what way can you say your HoD is a mentor or a coach to you?

Well, I think I have already answered that question. She is great, I mean she is supportive and I have learnt a lot from her, she is vastly knowledgeable, and em, yeh. I think, I think, you know and and, she support not only myself all of us teacher in that, she is the one who is going to say you are doing it right or not doing it right or this is how you can fix but she does even gives suggestions as how to fix it. So we are fortunate to have her, I don't want her to leave the school...

What teacher development programs have you been taken through since at post?

Yes, we do, we, we, we if there is any change in policy document or like that em the HoD get the horrible, the horrible job of reading it and trying to unpack it and figure it out and it is pass on during staff development meeting to us. So em we get the documentation and hopefully been simplify or unpack for us. So I do get enough, a lot of support there. I don't think it ever enough. I think, I think science; we had a visitor recently, a science teacher from Pretoria and she brought out an aspect of science which I will like to grow in. ... You know ..., people think those are high school things and I will like to. .. She was quite surprised in her. She came to see what we do and try to tell us what she does

How do you personally think they could have motivated to do more?

I think by giving me more time to do the subject, you know time tabling we have got such a vast number of subjects area or learning area we study and it get bigger any time they introduce new once, and the more they introduce the more thin your times becomes. And science is not the subject that you can thin. Because mathematics is, well, but you know science is even less, mathematics you get your four five hours a week whatever ten period, eleven period. Science you get your three hours, I could do with a lot more because we stretching, that is tabling problem. My HoD did what she can, and I asked for extra time of half an hour for science this year and we got it in Grade 4, 5, and 6. I think if I could have more time I could do more.