# SCHOOL-BASED INSTRUCTIONAL LEADERSHIP SUPPORT FOR INFORMATION TECHNOLOGY AND COMPUTER APPLICATIONS TECHNOLOGY SUBJECT TEACHERS

**By**

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## DECLARATION

I, SUNIA MARSHELL DOKTER, declare that the thesis, **SCHOOL-BASED INSTRUCTIONAL LEADERSHIP SUPPORT FOR INFORMATION TECHNOLOGY AND COMPUTER APPLICATIONS TECHNOLOGY SUBJECT TEACHERS** submitted for the qualification of Master of Education at the University of the Free State is my own independent work.

All the references that I have used have been indicated and acknowledged by means of complete references.

I SUNIA MARSHELL DOKTER, declare that this work has not previously been submitted by me at another university or faculty for the purpose of obtaining a qualification.

August 2020

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SIGNED DATE

## DEDICATION

This thesis is dedicated to my two sons, Jonathan Dokter and Timothy Dokter.

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## ABSTRACT

The objective of this quantitative study was to determine who the instructional leaders are for information technology (IT) and computer applications technology (CAT) in schools, what activities characterise instructional leadership, what new competencies school-based leaders need to develop in order to be effective in their new roles as technology leaders, and how to improve instructional leadership support for IT and CAT subject teachers.

The framework for this study combined three different perspectives: instructional leadership, distributed leadership and ideas on technological pedagogical content knowledge (TPACK).

A pencil-and-paper questionnaire form was distributed to 50 CAT and IT teachers at the secondary schools that offer CAT or IT in the Free State province. Descriptive analysis was carried out using SPSS Version 20.0. The statistics used were descriptive statistics and inferential statistics.

The findings of the study shed light on how schools provide instructional leadership support to IT and CAT teachers. From the findings it is clear that the absence of an instructional leader with technological background and knowledge might lead to CAT and IT teachers feeling neglected. Instructional leaders need to understand the nature and purpose of CAT/IT and to understand CAT/IT as part of the curriculum, and to clarify the responsibilities regarding technology leadership. It is recommended that further studies are undertaken to explore school technology leadership more broadly and in greater depth, to determine the explicit role of technology leadership for CAT and IT subject teachers.



**Keywords:** Instructional leaders, instructional leadership support, distributed leadership, technological pedagogical content knowledge (TPACK), information technology (IT) and computer applications technology (CAT)

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| | |
|---|---|
| CAPS | CURRICULUM ASSESSMENT POLICY STATEMENT |
| CAT | COMPUTER APPLICATIONS TECHNOLOGY |
| CK | CONTENT KNOWLEDGE |
| DBE | DEPARTMENT OF BASIC EDUCATION |
| HOD | HEAD OF DEPARTMENT |
| ICT | INFORMATION AND COMMUNICATION TECHNOLOGY |
| IT | INFORMATION TECHNOLOGY |
| M | MEAN |
| MAR | MISSING AT RANDOM |
| MCAR | MISSING COMPLETELY AT RANDOM |
| PIMRS | PRINCIPAL INSTRUCTIONAL MANAGEMENT RATING SCALE |
| PLC | PROFESSIONAL LEARNING COMMUNITIES |
| SANRAL | SOUTH AFRICAN NATIONAL ROADS AGENCY LIMITED |
| SD | STANDARD DEVIATION |
| SPSS | STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES |
| TPACK | TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE |

# CHAPTER 1: ORIENTATION AND BACKGROUND TO STUDY

## 1.1 INTRODUCTION AND BACKGROUND

Several technological developments took place at the beginning of the 21st century, affecting almost every aspect of our lives. It is partly due to 21st century innovation of technology that there are demands for change and improvement in education, so that schools all over the world can offer quality education (Davies, 2010).

To prepare for the future development of technologies and to encourage the development of the skills described as 21st-century technology skills, many countries have strategised by developing concepts, plans and programmes for developing their national curricula (Law, 2009). Chang (2012) indicates that, in 1980, in the first world, the government of Taiwan, a country well known for learning-technology integration, started investigating how to use information and communication technologies for teaching and learning. The government established the Nine-year Integrated Curriculum Policy, which emphasises the growth of fundamental technology skills. The ability of learners to use IT has, since then, become one of the school curriculum goals. In 2011, the Taiwan Department of Education conducted a Technology Leadership and Training Program for Elementary School and Junior High School Principals, to improve the technological leadership of school principals. In Hong Kong, since 2004, leadership courses for teaching and learning have focussed on the application of IT (Chang, 2012).

The Canadian provincial education ministry (Alberta Learning, 2000, as cited by Flanagan & Jacobsen, 2003) stipulates that all learners from Kindergarten to Grade 12 must be taught to comprehend, and practically apply ICTs for learning. Learning about the use of technology is not meant to be done in a subject or course in itself, instead, it must be learned as cross-curricular skills. Hatlevik and Arnseth (2012:56) state that the Norwegian curriculum considers the ability to use information and communication technology (ICT) as one of five basic skills.

Therefore, in the Norwegian 10-year compulsory school system, acquiring ICT skills is required by almost all subject syllabi. Principals' leadership and vision can impact the educational use of ICT, as reported by Law (2009) as a finding of the Second Information Technology in Education Study in 2006. Principals are required to create and implement school schedules and budgets, and determine what teachers will prioritise during the academic year. In the South African context, ICT is used to enhance the achievement of national education objectives. It is seen as a means for the restructuring of schooling and as a tool for the development of whole-school education. This includes ICT as a management and administration tool, and a platform for incorporating the curriculum. The Department of Basic Education (DBE) believes that ICT developments create access to learning opportunities, address inequality, enhance learning and teaching quality, and promote lifelong learning. The draft White Paper on e-Education: Transforming Learning and Teaching through ICT (Department of Basic Education (DBE), 2004:6) describes "[g]overnment's response to a new information and communications technology environment in education". The White Paper has been in force since 2004 as the official prevailing policy on e-education in South Africa. This policy "supports larger systematic, pedagogical, curricular and assessment reforms that will facilitate improved education and improved use of educational resources such as ICT" (DBE, 2004:14). The intended goal of the ICT policy is that,

> *every South African manager, teacher and learner in the general and further education and training bands, will be ICT capable (meaning, use ICTs confidently and creatively to help develop the skills and knowledge they need as lifelong learners to achieve personal goals and to be full respondents in the global community) by the year 2013 (DoE, 2004:17).*

Through holding a National Colloquium on ICT Policy in April 2012, the South African government, through the communications department, reviewed all government ICT policies that have been in effect since 1994. Subsequently, the

Department of Communications held an ICT Indaba with various stakeholders from across Africa and the world in Cape Town in June 2012. The government hoped that these measures, and others, would help South Africa to develop and improve its ICT capability in the near future, so that it would be prepared for future demands of changing ICT technologies, and would help to provide ICT resources for all schools. Despite these measures, some researchers (Mdlongwa, 2012; Padayachee, 2017) argue that South Africa still faces a great number of obstacles that need to be ironed out before these goals can be realised.

ICT-related education, as part of South Africa's secondary school curriculum, has gone through a numeral of modifications. Currently the South African ICT curriculum is made up of two school subjects, namely Computer Applications Technology (CAT) and Information Technology (IT). With the introduction of CAT and IT in schools across South Africa, it has become imperative for educators and instructional leaders to capacitate themselves to meet the demands of ever-changing technology, technology infrastructure and professional development. Several studies indicate that school leadership is closely linked to the pedagogical use of technology in schools (Hauge & Norenes, 2015). Pedagogical knowledge is essential in the event that school leaders are to monitor educators, which entails assessment, support and the implementation of professional development arrangements.

Flanagan and Jacobsen (2003:124) argue that principals and teachers face the huge task of reinventing schools and classrooms in a society that has been transformed by digital technologies, and, increasingly, school administrators are required to assume leadership responsibilities in areas with which they are unfamiliar, and for which they have received little training. Zahrl (2002: 264) states that the application of ICT in the education process presents a particular challenge to educational leadership. This challenge originates from at least three sources: (a) not all educational leaders are fully versed in the use of educational

technologies; (b) the successful application of ICT presents new challenges; and (c) educational use of ICT is a continually developing process.

At the same time, Jackson and Marriott (2012: 235) emphasise that pedagogical leadership at schools should be understood as the “interaction of principal and teacher influence”, thus, the role of the school leader is under additional pressure when ICT is present in everyday pedagogical practice. School leaders, thus, need to undertake ICT-related professional development activities to support their new roles as technology leaders (Stuart, Mills & Remus, 2009).

Chang (2012) argues that technological leadership differs from traditional leadership. Traditional leadership focusses on the characteristics or actions of leaders to improve operational performance, whereas technological leadership emphasises that leaders will create, manage, direct, and apply technology to various administrative tasks. Chin (2010) states that technological leadership is, therefore, a type of specific organisational leadership practice. Rigby (2014) reports that current studies argue that, “next to teaching, school leadership is a key lever in school reform”. Rigby agrees with Seashore Louis, Leithwood, Wahlstrom, and Anderson (2010), that 21st century principals are regarded to be instructional leaders, and that the actions of a principal as instructional leader play a role in what happens in classrooms.

This study sought to determine how leaders in secondary schools could provide more explicit direction, expectations and instructional support to CAT and IT teachers, and what new competencies school-based administrators need to develop in order to be effective in their new roles as technology leaders.

## 1.2 PROBLEM STATEMENT

While ICTs are changing teaching and learning for the better in several ways, IT and CAT teachers are isolated, in part because many school management members might be uncomfortable about and/or unable to provide leadership in these areas of technology. Some school leaders are uncertain about what it means

to implement effective technology leadership that will improve learning, or their own knowledge of technology may be inadequate to make meaningful recommendations and, therefore, they shy away from giving the necessary support to IT and CAT teachers.

Much research has been done on the impact of technology, particularly computers in education, and numerous reports have been produced all over the world to justify the place of technology in education, and to study the variety of improved learning surroundings that technology provides in the classroom. Salo, Nylund and Stjernstrøm (2015) note that, irrespective of the focus on the effects of school leadership as it relates to teaching practices and learning outcomes, little work has been done on direct instructional leadership. The authors argue that the ideas associated with instructional leadership are equivocal and imprecise, and challenged by modern views of school leadership (transformative and distributed leadership). Nevertheless, there is not much literature on the subject-specific supportive role and responsibilities of the instructional leader towards the IT and CAT teacher. In light of this shortage, this study sought to find answers on how leaders in secondary schools provide direction, set expectations and give instructional support to CAT and IT teachers, and what new competencies school-based administrators need to develop in order to be effective in their new roles as technology leaders.

Although ICT forms the basis of IT and CAT, this study focussed on specific subject support for teachers in their specific schools, and not on ICT integration in schools. ICT integration refers to how technology can be used to enhance a lesson. CAT is the study of the integrated components of a computer system (hardware and software) and the practical techniques for their efficient use and application to solve everyday problems. IT focuses on the development of computer applications using current development tools. The subject develops awareness and an understanding of the social, economic and other implications of using computers.

By focussing on the perceived lack of school leadership support by principals and school management for CAT and IT teachers, this study hoped to determine what the perceived barriers are, and whether and how CAT and IT teachers are supported.

The researcher is a CAT teacher, and I have received no instructional leadership support from instructional leaders with regard to my subject for the past 11 years, which has led to a great deal of frustration and discontent. Thus, the focus of this study was on instructional leadership as one critical success factor for the support of IT and CAT teachers.

Literature indicates that some scholars highlight the extent of principals' insightful understanding of curriculum content and instructional processes (Stein & Nelson, 2003), while other scholars focus more on principals' support of enhanced teaching (Blase & Blase, 1999; Printy, 2010). Burch and Spillane (2003) note that scholars who emphasise the importance of principals' insightful understanding of curriculum content refer to studies of elementary school principals; however, Spillane, Hallett and Diamond (2003) found that, even in elementary schools, a supportive approach via an effective communication style of the principal may be more important than the principal's specific content knowledge. According to Dexter (2008: 549),

> *Up to now, most research on IT leadership focused more closely on organisational concerns such as planning, purchases, and staff. The number of different but equally significant technical and instructional decisions required for IT integration, the rapid pace of technological change and the common deficiency of IT leadership training among traditional school leaders increase the possibility of sharing IT leadership functions in schools; or are spread through a group of staff members to collectively harness an appropriate level of expertise.*

Seashore Louis et al. (2010) agree with Halverson, Grigg, Prichett and Thomas (2007) and Silins and Mulford (2004) that it cannot be expected of secondary

school principals to be responsible for efficient assistance to the numerous subjects that are taught in middle and high schools. Consequently, many of the instructional leadership studies in secondary schools accentuate the progress of enhanced learning environments for teachers, with an emphasis on the ability of principals to promote creative behaviours of teachers, rather than on providing direct support. Looking at support in this way indicates to me that most principals lack clarity on what is expected of them as instructional leaders, therefore, they fail to support CAT and IT teachers. Keep in mind that these two subjects are technologically inclined, therefore, the instructional leader must also be a technology leader.

Researchers indicate that technology leadership's main responsibility is to recognise the correlations amid technology, school vision, school mission, and education policy. Therefore, school leaders should acknowledge the importance of computer and IT for learners, and enhance the technology environment for learner learning. I agree with Chang (2005, cited by Chang, Chin, & Hsu, 2008) "that school leaders should empower, encourage, and collaborate with experts and local businesses to support technology infrastructure". In promoting teaching and learning and nurturing a learning environment, principals ought to model technology leadership behaviours, which means, they should make use of technology for other administrative tasks in their organisation. However, if principals do not have a precise understanding of their role as instructional leaders, how could they be expected to be clear on what their responsibility regarding technology leadership entails?

## 1.3 RESEARCH QUESTIONS

This study proposed to investigate the following research question:

> How do schools provide instructional leadership support to IT and CAT teachers, if at all?

The research question was investigated through the following sub-questions:

- Who are the instructional leaders for IT and CAT at schools?
- What activities characterise instructional leadership support for IT and CAT at schools?
- What are the perceptions of IT and CAT teachers regarding the instructional leadership support they receive?
- What suggestions can be made, based on the data on perceptions and activities relating to instructional leadership, to improve instructional leadership support for IT and CAT teachers at South African schools?

## 1.4 AIMS AND OBJECTIVES

The aim of this study was to determine how to improve instructional leadership support for IT and CAT subject teachers.

The specific objectives that the study addressed were,

- To identify the key instructional leaders for IT and CAT in schools;
- To describe the key activities that characterise instructional leadership support for IT and CAT in schools;
- To seek insights into perspectives of IT and CAT teachers regarding the instructional leadership support they receive and its potential impact on classroom practice; and
- To make suggestions for improving instructional leadership support for IT and CAT teachers in South African schools.

## 1.5 PURPOSE AND SIGNIFICANCE

This study sought to determine how leaders at secondary schools could provide more explicit direction, meet expectations and improve instructional support to CAT and IT teachers, and what new competencies school-based administrators need to develop in order to be effective in their new roles as technology leaders.

Many scholars claim that the management of schools plays a significant role in implementing ICT in schools (Makhanu & Kamper, 2012; Laaria, 2013). Wilmore and Betz (2000:15) state,

> *the successful implementation of ICT in schools depends on principals actively backing it, that they learn too, and that they provide their staff with adequate professional development and support in the change process.*

Anderson and Dexter (2005) found that, in addition to the importance of technology infrastructure, technology leadership is fundamental for effective utilisation of technology in schools. Even though technology leadership responsibilities may have been officially assigned to school leaders as part of their duties, doing so can be problematic, since the perception is that, often, school leaders do not have the experience or background to be assertive in dealing with technology (Stuart et al., 2009). Therefore, this study aimed to determine who the instructional leaders are for IT and CAT in schools, and what activities characterise instructional leadership. The study sheds light on the role and responsibilities of principals, deputy principals and heads of departments (HODs), as technology leaders, and how they can support the CAT and IT teachers at their schools. This study also aimed to explore possible solutions to perceived barriers experienced by instructional leaders.

## 1.6 THEORETICAL FRAMEWORK

The framework that guided this study is a distributed perspective on school leadership and the technological pedagogical content knowledge (TPACK) framework. Hauge and Norenes (2015) state that the distributed perspective acknowledges that school leadership extends beyond the work of the principal, and includes leaders at other levels of the organisation, including teachers. They agree with Spillane and Diamond (2007: 6), that this perception is not only the focal point of the practice of leadership, “it frames it as a product of the interactions of

schools leaders, followers, and aspects of their situation". As indicated by Dexter (2008), planning and operationalising effective school-wide technology use is a complex leadership task, which presupposes the involvement of various actors at different levels in the school. Therefore, the study of leadership aligned to ICT must extend beyond the role of the school principal, to include the larger group of leaders and experts involved in the school, such as the deputy head, school development team, head teachers and technology experts.

Chang et al. (2008) suggest that principals' new leadership roles are becoming increasingly important in schools. Chang et al. (2008) explain that, prior to relevant technology leadership research, which is slowly but surely emerging, leadership theory evolved, over decades, from trait theory, behaviour styles theory, situational theory, and transformational theory, to present a new leadership paradigm. One aspect of distributed leadership, specifically, that needs further inquiry, according to Spillane and Seashore Louis (2005, cited by Klar, 2012) is how other leaders' capabilities can be fostered to encourage their participation in distributed models of instructional leadership. According to Harris (2003: 317), distributed leadership theory offers conceptual clarification in the teacher leadership area.

> *This approach includes the efforts of different groups of people working in a school to direct and organize staff in the procedure of instructional change. Furthermore, it means a collective leadership distribution in which the leadership role includes the work of a variety of people, and where the leadership mission is achieved by numerous leadership experiences. (Spillane et al. 2001:23) Third, it suggests interdependence rather than dependency, recognizing how different kinds of leaders share responsibility in different positions.*

This explanation relates to this study's research question: Who are the instructional leaders for IT and CAT in schools and how do they perceive their roles? Therefore, this study sought to understand how instructional leadership for using ICT for teaching and learning is distributed among school leaders.

This study also drew on the TPACK framework, which was first proposed by Mishra and Koehler in 2006, and thereafter mentioned by several researchers (Harris, Mishra & Koehler, 2009; Schmidt, Baran, Thompson, Mishra, Koehler, & Shin, 2009). The framework is derived from and extends Shulman's (1986) framework on teacher knowledge for teaching, with a special focus on ICTs. The TPACK framework identifies a different kind of knowledge or competency that subject teachers need in order to teach effectively with technology. Therefore, instructional leaders should have some degree of TPACK if they are to assist CAT and IT teachers. This framework will be discussed further in Chapter 2.

## 1.7 RESEARCH METHODOLOGY

The study used a quantitative approach, with a survey conducted through a questionnaire. Quantitative methods emphasise objective measurements and the statistical, mathematical, or numerical analysis of data collection through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques. Quantitative research focusses on gathering numerical data and generalising it across groups of people, or to explain a particular phenomenon (Kumar, 2011).

The survey method and the descriptive method were used in this study. The instrument used for gathering information or data was the questionnaire. Baker (1994: 172) indicates that the survey method is a method of collecting data in which a specifically defined group of individuals is asked to answer a number of questions. Tanur (1982) describes a survey as a means to obtain information on the attributes, behaviour or views of a broad group of people, referred to as the population. Surveys conducted for research purposes, firstly, aim to supply measurable portrayals of some characteristics of the study population. Secondly, the key method of gathering data is by asking people well-thought-out and predefined questions. Thirdly, data is usually gathered through sampling of a proportion of the population surveyed, which is gathered in such a way as to enable

generalisation of the findings to the whole population. The survey method was used to reflect the perceptions of CAT and IT teachers on the instructional leadership support they receive.

The descriptive method was chosen, because, according to Polit and Hungler (1999), the descriptive method looks at individuals, groups, institutions, methods and materials in order to describe, compare, contrast, classify, analyse and interpret entities and events that constitute their various fields of inquiry. In this study, the descriptive method was used to analyse and interpret the data collected from the questionnaire.

Data collection was done using questionnaires. The current study developed the questionnaire for gathering information to answer the research questions, based on previous studies (CERI/OECD, 2010; Dexter, 2008; Educational Testing Service, 2001; Polančič Heričko & Rozman, 2010).

The questionnaire is a quantitative data collection method. According to McMillan and Schumacher (2001: 257), "[a] questionnaire is relatively economical, has the same questions for all subjects and can ensure anonymity". According to Mason and Bramble (1997: 316), the advantage of a questionnaire is that it can reach a large sample. The disadvantages of a questionnaire is that, "once the questionnaire has been distributed, it is not possible to modify the items, even though they may be unclear to some respondents, and a questionnaire cannot enquire or examine deeply into respondents' opinions or feelings" (Gall, Borg, & Gall, 1996: 289).

Questionnaires include statements requesting respondents to react (De Vos, Strydom, Fouché, Poggenpoel, & Schurink, 1998: 151). The questionnaire, as tool of inquiry, is defined by the *New Dictionary of Social Work* (Department of Health and Welfare, 1995: 51) as a set of questions on a form, which are completed by the respondent in response to a research project.

In this study, questionnaires were considered suitable for investigating the perceptions of IT and CAT teachers regarding the instructional leadership support they receive. The research design will be addressed in more detail in Chapter 3.

A population is a group of elements or causes, whether individuals, objects or events, that conform to specific criteria and to which we intend to generalise the results of the research (McMillan & Schumacher, 2001: 169). The population for this research was all schools that offer IT and CAT in five districts, and DoE officials in the Free State province. A purposive sampling method was used. Two educators from each school were selected to respond to the questionnaire.

Data analysis involves bringing order, structure and significance to the mass of data in a time-consuming, creative and fascinating process. (Marshall & Rossman, 1995: 111). The researcher made use of descriptive statistics to analyse the quantitative data. Such statistics provide statistical methods for arranging, summarising and presenting a collection of numerical data (Gall et al., 1996: 757). It was anticipated that this method of research would help to determine the number of CAT and IT teachers who experience the same problems with regard to support, and that this information might give the reader a better understanding of the magnitude of the problem.

## 1.8 DELIMITATIONS OF THE STUDY

This study was limited specifically to the perceptions of IT and CAT teachers at schools that offer CAT and IT in the five districts of the Free State province, regarding the instructional leadership support the teachers receive.

## 1.9 LIMITATIONS OF THE STUDY

The findings will not necessarily be representative of other schools or educators who use ICT as an instructional and learning medium, or who focus on the use of ICT to enhance the teaching and learning process. The willingness of teachers to

participate in the study and the honesty of the respondents might have been a delimitation to the study. Collecting data from a single population of IT and CAT teachers in one educational district in the Free State was a limitation, as was the availability of a supportive learning facilitator (subject advisor). Not all schools have HODs for IT and CAT, so availability of HODs might have limited the study. The researcher might have been biased, because she is also a CAT teacher and, therefore, might give her own interpretation of the information collected. Other limitations might be the exclusion of other teachers who could have given valuable information on the use of technology in the classroom – this study involved only IT and CAT teachers. Some schools only have one or two CAT or IT teachers, or offer only CAT, and not IT.

## 1.10 DEFINITION OF KEYWORDS

### Computer applications technology

> *Computer Applications Technology is the study of the integrated components of a computer system (hardware and software) and practical techniques for their efficient use and application to solve everyday problems. Solutions to problems are designed, managed and processed via end-user applications and communicated using appropriate ICT. CAT, as a school subject, is seen as a collection of broader ICT content. ICTs are the combination of networks, hardware and software as well as the means of communication, collaboration and engagement that enable the processing, management and exchange of data, information and knowledge (DoE, 2011b: 9).*

### Information technology

> *IT is the study of the various interrelated physical and nonphysical technologies used to capture data, the processing of data into useful information, and the management, presentation and dissemination of data.*

> *IT studies the activities that deal with solving problems through logical and computational thinking. It includes physical and non-physical components for the electronic transmission, access, and manipulation of data and information (DoE, 2010: 8).*

IT encourages the use of a programming language and subsequent programming constructs in the development of solutions using a high level programming language, such as Delphi or Java.

**Distributed leadership**

Distributed leadership is a term used not only to explain the sharing of power, but to spread it through the situation, the leaders and the followers (Spillane, Halverson, & Diamond, 2004).

**Instructional leadership**

Instructional leadership typically refers to any or all leadership practices that have an oblique impact on learner learning, along with school culture and timetabling procedures, thereby affecting the consistency of the curriculum and instruction provided to learners. (Southworth, 2002). Instructional leadership has been defined by Bush (2013); Liu and Hallinger (2018) and Mustafa, Radzi, Jaafar, Rohana and Nawawi (2015) as a wide variety of professional practices, behaviours and influences that includes notions such as “self-efficiency, the development of professional relationships and the shaping of teaching and learning”. Alig-Mielcarek (2003) describes instructional leadership in terms of the school principal’s actions, and leading a school to educate all the learners to a high level of success. Technological leadership is, according to Brown (2009), the inquiry and ethical practice of learning and enhancing performance through technical leadership development, utilization and management defined by appropriate technological processes and resources.

### Technological pedagogical content knowledge

The acronym TPACK comprises the terms Technology + Pedagogy + Content Knowledge = technological pedagogical content knowledge.

Mishra and Koehler (2006) delineate a model around teaching with technology that "emphasises the connections, interactions, affordances, and constraints between and among content, pedagogy, and technology". This model describes how teachers' understanding of technological knowledge is incorporated into their teaching alongside knowledge of content and pedagogical knowledge.

### Teacher

Locally, a teacher is also known as an educator, and is regarded as a person who has been trained to qualify as a professional and to be able to teach or educate learners in different subjects and /or in different levels of schools. (South Africa, Department of Basic Education, 2011:3) In this study, teacher refers to a teacher at a secondary school, who is responsible for teaching IT and CAT from Grade 10 to 12.

### School

A school is the place where learners, with the teachers, form a group or community with the purpose of teaching and learning. (*Collins English dictionary*, 2014). In South Africa, schools have learners from Grade R to Grade 12, divided into primary schools and secondary schools. In this study, teachers who completed the questionnaire were located in secondary schools in the Free State province where IT and CAT are taught to Grade 10-12 learners between the ages of 16 and 19.

## 1.11 CHAPTER OUTLINE

Chapter 1 introduced the study and presented an introduction, the aims and objectives of the study, the context of the study, problem statement, research questions and research methodology.

Chapter 2 will present a literature review, which will provide perspective on the background of instructional leadership support for CAT and IT teachers.

Chapter 3 will explain the methodology and the data collection strategies that were employed in the research. This will entail detailed explanations on how data were collected and how it was managed and controlled.

Chapter 4 will present the findings of the research derived from the data that was collected on the perspectives of CAT and IT teachers.

Chapter 5 will provide a summary of the research, which will include the conclusions drawn from the findings in Chapter 4. This chapter will also make recommendations and suggestions for providing subject-specific support for CAT and IT teachers at Free State schools. Gaps identified during this study will be identified in this chapter, as will recommendations for further research.

## 1.12 CONCLUSION

This chapter explored the purpose of conducting this study and provided the background and context of the study. The research questions and objectives were introduced, and the chapter outline was presented. In order to efficiently evaluate and define the research issue, that is, how schools provide instructional leadership support to IT and CAT teachers, if at all, the next chapter will concentrate on a literature review involving the presentation of the main concepts: instructional leadership support, distributed leadership and TPACK.

# CHAPTER 2: LITERATURE REVIEW

## 2.1 INTRODUCTION

When CAT and IT were introduced in schools across South Africa, it became imperative for educators and instructional leaders to capacitate themselves to meet the demands presented by these subjects, such as constantly changing technology, managing ICT resources, and increasing access by teachers and school leaders to ICT resources. Most school leaders are uncertain about what it means to implement effective technology leadership to improve learning. Furthermore, school leaders' own knowledge of technology may be inadequate for making meaningful recommendations in support of IT and CAT teachers.

This study focussed on specific subject support for IT and CAT teachers at their specific schools, and not on ICT integration by indicating what the subjects CAT and IT entails, section 1 page 5. This study hoped to achieve a better understanding of the challenges and opportunities faced by CAT and IT teachers with regard to instructional leadership support, and thereby contribute to literature on the topic.

The literature review in this chapter will investigate who the instructional leaders for IT and CAT in schools are, what activities characterise instructional leadership, what exercises portray instructional initiative, and what new skills school-based leaders need to be effective in their new jobs as technology leaders. Therefore, this chapter will explore the literature, in order to provide a theoretical basis for investigating the variables of instructional leadership, and their contribution to providing specific direction and educational support to teachers. The framework of this study combines three perspectives, namely, instructional leadership, distributed leadership and ideas on TPACK.

This chapter will begin with a conceptualisation of the study and exploration of the conceptual framework of instructional leadership and its effects on successful teaching and learning. The section will explain the idea of instructional leadership and will discuss two models of leadership in instruction, that of Hallinger and Murphy (1985) and Weber

(1996). The discussion of the models will be followed by a section that will discuss school leaders' new role as technology leaders. The next section will present a discussion of distributed leadership, and ideas relating to TPACK.

## 2.2 CONCEPTUALISATION OF INSTRUCTIONAL LEADERSHIP

A vast and emergent body of literature has investigated instructional leadership in the field of education administration. Hoy and Miskel (2008) point out that instructional leadership is a specific form of leadership that emphasises enhancing teaching and learning in the school's technical core. They also argue that leadership of this type can come from different sources, including principals, teachers, parents, administrators and learners. In contrast to Hoy and Miskel (2008) Robinson (2010) describes instructional leadership as a collection of leadership activities involving teaching and learning planning, assessment, collaboration and development.

Despite the different ideas of what instructional leadership involves, its role in literature on school management, school efficiency and school progress remains essential and definite (Reynolds, Sammons, De Fraine, Van Damme, Townsend, Teddlie, & Stringfield, 2014). As noted by Tan (2012), the concept of instructional leadership, as studied and evaluated by scholars, has stayed moderately unchanged throughout a long period of sustained change and reform that has been experienced by the school policy and practice environment. According to Dimmock and Tan (2016), understanding the definition and, to a lesser degree, the nature of instructional leadership, has not kept up with the positions and duties of principals and other school leaders, which have changed both qualitatively and quantitatively over the past three decades. They state that the function of the principal has changed, from a narrow emphasis on management, to a wider range of tasks, including guiding learners, teaching, reflecting the vision of school, and enabling and promoting leadership methods to bring about change and continuous improvement in the accountability arenas.

Rigby (2014) proposes that, "next to teaching, school leadership is a key lever in school reform", thereby agreeing with Seashore Louis et al. (2010) that 21st-century principals

are viewed as instructional leaders, and that the activities of a principal as instructional leader are decisive regarding what occurs in classrooms. Marks and Printy (2003: 371) shift instructional leadership from a principled practice to shared practice, when they state, “[i]nstructional leadership, as we reconceptualize it, replaces a hierarchical and procedural notion with a model of ‘*shared* instructional leadership’”.

To explain their understanding of how leadership is implemented in classrooms, Spillane et al. (2001, 2004) identify both principals and educators as performing instructional leadership tasks and fulfilling instructional leadership responsibilities, making the principal conduct and teacher conduct components of the practice of Instructional leadership. Research has focussed on the role of educational leaders as one of the main components of enhancing learner results. Spillane et al. (2002) argue that school leaders are being held accountable by the education department, regardless whether they work with staff members who are responsible for delivering the expected results. Some researchers view instructional leadership as a critical element of ensuring the quality of teaching, modelling efficient teaching practice, overseeing the curriculum, and making quality teaching resources accessible. It is, therefore, according to Rigby (2014), essential for principals to have the necessary educational abilities and dedication to lead efficient schools, and encourage learner success. Salo et al. (2015) argue that, despite emphasis on school leadership's impact on teaching practice and learning outcomes, direct instructional leadership research is scarce. There is not much information about why, when and how the principal directs the work of the teachers in the classroom.

## 2.3 MODELS OF INSTRUCTIONAL LEADERSHIP

Numerous models and ideas explain instructional leadership. In this study, the researcher focussed on the Hallinger and Murphy model (1985), the model of Weber (1996) and the Technology leadership model of Anderson and Dexter (2005).

### 2.3.1 Model of instructional leadership by Hallinger and Murphy

Hallinger and Murphy (1985) describe instructional leadership as the conduct of the principal to foster and enhance the teaching and learning cycle in schools and include teachers , learners, parents , school planning, school administration, school facilities and resources. Hallinger and Murphy (1985) developed their model of Instructional leadership by analysing the educational leadership strategies of primary leaders and reviewing literature on effective schools. From their experimental and hypothetical investigations, they developed a system of instructional administration with three measurements and 11 employment descriptors. The three noteworthy dimensions were, a) characterising the school mission, b) dealing with the instructional programme, and c) promoting a healthy school environment. Under the first major aspect of defining the school's mission, the two job functions defined are: a) outlining simple school goals, and b) communicating school objectives. The second key aspect of managing the instructional programme defines three job functions under instructional leadership: a) supervising and reviewing teaching, b) organising curriculum, and c) monitoring the progress of the learners. The model's third aspect, which focusses on fostering a healthy school environment, consists of five different job functions: a) preserving teaching time, b) encouraging professional growth, c) maintaining high visibility, d) providing teacher incentives, and e) providing learning incentives (Hallinger & Murphy, 1985).

Principals create a positive school environment by securing instructional resources, fostering professional development, maintaining high visibility, creating opportunities for teaching, upholding high academic expectations and providing learner rewards. Table 2.1 summarises these functions and their elements.

**Table 2.1: Elements of Hallinger and Murphy's (1985) model of instructional leadership**

| Defines the mission | Manages instructional programme | Promotes school climate |
|---|---|---|
| • Framing school goals<br>• Communicating school goals | • Supervising and evaluating instruction<br>• Coordinating the curriculum<br>• Monitoring learners' progress | • Securing instructional time<br>• Promoting professional development<br>• Maintaining high visibility<br>• Providing incentives for teachers<br>• Enforcing academic standards<br>• Providing incentives for learners |

Source: Adapted from Hallinger and Murphy (1985: 221)

### 2.3.2 Model of instructional leadership by Weber

According to Weber's model (1996), the instructional leader plays a major role in initiating and contributing to the planning, design, administration and review of the efficacy of a curriculum (Alig-Mielcarek, 2003).

Weber's model of instructional leadership expresses the need for instructional leadership, irrespective of a school's organisational structure. Weber reasons that, regardless of whether the role of instructional leader is combined into that of the principal, such a leader is imperative. He concludes from his review of research that, "The leaderless-team approach to a school's instructional program has powerful appeal, but a large group of

professionals still needs a single point of contact and an active advocate for teaching and learning" (Weber, 1996: 254). Weber's argument is particularly on point in today's theoretical arena of shared leadership and site-based management, and he emphasises the necessity of instructional leadership, despite the class-conscious nature of a school organisation.

Based on his literature review, Weber (1996) identifies five key areas of teaching leadership: a) identifying the purpose of the school, b) managing curriculum and instruction, c) fostering a healthy learning environment, d) observing and enhancing instruction, and e) evaluating the programme (Alig-Mielcarek, 2003). According to this model, the instructional leader assumes a significant job in starting and adding to the arranging, structuring, administrating and investigating the adequacy of an education plan. Persistent examination of the instructional programme, thus, empowers educators to address issues relating to learners through steady refinement and update. Table 2.2 provides the elements of Weber's model of instructional leadership.

**Table 2.2: Elements of Weber's model of instructional leadership**

| Defining the school's mission | Managing curriculum and instruction | Promoting a positive learning climate | Observing and improving instruction | Assessing instructional programmes |
|---|---|---|---|---|
| The instructional leader collaboratively develops a common vision and goals for the school with stakeholders. | The instructional leader observes classroom practice aligned with the school's mission, provides resources and support in the use of instructional best practices, and models and provides support in the use of data to drive instruction. | The instructional leader promotes a positive learning climate by communicating goals, establishing expectations, and establishing an orderly learning environment. | The instructional leader observes and improves instruction through the use of classroom observation and professional development opportunities. | The instructional leader contributes to the planning, designing, administering, and analysis of assessments that evaluate the effectiveness of the curriculum. |

Source: Adapted from Alig-Mielcarek and Hoy (2005: 39)

According to Alig-Mielcarek and Hoy (2005), the models of Hallinger and Murphy and Weber demonstrate the significance of three crucial instructional leadership functions:

- Defining and imparting objectives;
- Monitoring and giving input on the educating and learning process; and
- Promoting and underscoring the significance of expert improvement.

It is clear that effective teaching and learning is possible when principals are engaged in the roles of instructional leadership set out above. Hence, Weber's model, when all is said and done, includes work on shared leadership and empowering informal leaders to build a school that accentuates learner accomplishment. However, based on the researcher's personal teaching experience, even though these roles are now shared among a number of school leaders, the sole responsibility relating to leadership still appears to be located with the principal and, therefore, the researcher wished to seek clarity on who the instructional leaders for IT and CAT are.

### 2.3.3 Technology leadership model of Anderson and Dexter

According to the model presented by Anderson and Dexter (2005), technology leadership includes all in-school technology-related operations, including actions, strategies, and application of technology by organisations. This model demonstrates the two-way relationship between the leadership in technology and the school infrastructure. Samancioğlu, Baglibel, Kalman and Sincar (2015) point out that, as technology leaders, school principals need to build strategies to use new technologies to meet the needs of ever-changing educational settings. Thannimalai and Raman (2018) explain that Anderson and Dexter (2005) presented an integrated technology leadership model based on NETS-A (ISTE, 2002). NETS-A was introduced by the International Society for Technology in Education as a guideline for the knowledge and skills that school leaders need to develop in order to promote and enable the development of appropriate technology in an educational environment. Figure 2.1 portrays the knowledge and skills that school leaders need to have in order to initiate and promote the integration of effective technology.

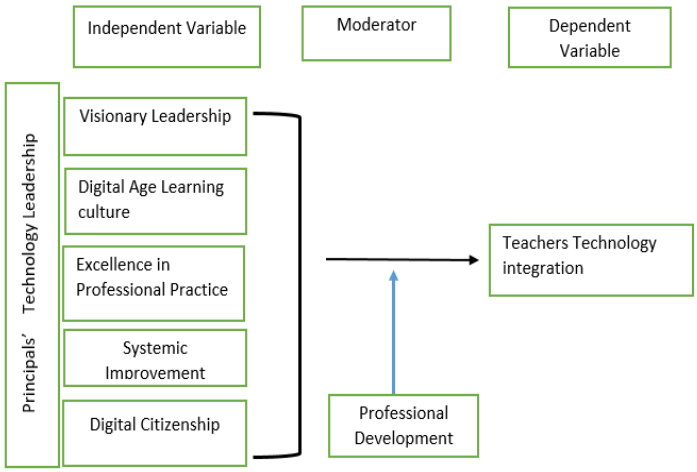


*Figure 2.1: Technology leadership model by Anderson and Dexter*

Source: Adapted from Thannimalai and Raman (2018: 210)

## 2.4 DISTRIBUTED LEADERSHIP

Youngs (2009) argues that, while opinions about distributed leadership can be traced back to the 1920s, in practice and theory it emerged prominently only in the early 2000s (Bolden, 2011; Youngs, 2009). Both Bolden and Youngs say that distributed leadership has become the 21st century paradigm of normatively preferred leadership. Bennett, Wise, Woods and Harvey (2003) assert that distributed leadership is the changing property of an individual community or network where group members pool their expertise. This claim relates to Elmore's (2007: 59) definition of distributed leadership:

> *The role of administrative leaders is primarily to improve people's skills and knowledge within the organization, to establish a shared culture of standards for the use of those skills and knowledge, to put together various sections of the organization in a cooperative partnership and to keep individuals accountable for their cooperation.*

As Harris and Spillane (2008: 33) state, "the emphasis in distributed leadership literature is on leadership rather than leadership roles and it is the nature and quality of leadership

practice that matters". According to Spillane (2005: 144) "distributed leadership serves as both a leadership structure, but also as an analytic lens through which to understand leadership practice and 'the interactions between people and their situation'". Distributed leadership is not delegating. Delegation is about getting others to complete your work for you, and this is certifiably not a sound culture to create with leaders in a school. A distributed perspective has two facets: the leader-plus dimension, and the practical dimension (Neumerski, 2013). The leader-plus dimension recognises that multiple people, including those in officially appointed leadership or management roles, such as assistant principals, mentor teachers and curriculum specialists, may be included in addition to the school principals, leading and managing schools. Bolden (2011) explains that distributed leadership is not a substitution for different structures or practices of administration; instead, it provides space to incorporate different methodologies in a deliberate way. In a knowledge-driven environment, for example, in teaching and learning, it is difficult to complete multifaceted activities without distributing leadership responsibilities (Hartley, 2007). Distributive leadership extends leadership boundaries and gives rise to the idea of teacher leadership. In an environment of distributive leadership, teachers assume greater leadership responsibilities, which raise the question of the role of school principal. The role of the principal in a distributed leadership environment remains important, despite distributed leadership leading to flatter hierarchies and empowerment of teachers, the symbolic and positional authority of the principal remains essential (Harris, 2007). Distributive leadership, therefore, does not aim to abolish established leadership structures, but assumes that there is a partnership "between vertical and lateral leadership processes" and that leadership depends on the interaction between those processes (Leithwood et al., cited in Naicker & Mestry, 2011:101).

Distributed leadership is viewed as "an emergent property of a group or network of interacting individuals" and "the product of conjoint agency" (Harris, 2005: 163). According to Harris and Lambert (2003:16), the idea of distributed leadership expands leadership boundaries to the degree that it requires greater participation from teachers, and uses a wide range of skills, knowledge, and abilities. Distributed leadership is a collective

practice that occurs within and across partnerships, rather than requiring individual behaviour (Bennett et al., 2003).

## 2.5 TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE

As a way of conceptualising what knowledge is involved in good teaching, Shulman (1987) introduced the idea of knowledge of pedagogical content. When IT started becoming an increasingly important part of the everyday practice of teachers, Mishra and Koehler (2006) built on the idea of Shulman and introduced TPACK as a structure for conceptualising the types of information involved in effective technology teaching.

The central issue of TPACK is related to technology integration. Most teachers and administrators acknowledge the potential advantages of technology in the classroom – whether it is used for preparing learners for a technology-driven future, or helping to simplify course, school, and district governance. However, too many teachers regard technology as a silver bullet for solving the problems they face. Sometimes, deliberately or not, it is assumed that the mere existence of digital instruments will enhance education. This is why the TPACK framework is important. It is simplistic to think that adding a good learning management system to your classroom strategy will improve learning. TPACK shows that a relationship between technology, content, and pedagogy and the purposeful use of technology is essential for effective teaching and learning. Such knowledge would not usually be possessed by technologically qualified subject matter experts, or by technicians who know little of the subject or of pedagogy, or by teachers who know little of that subject or about technology. Section 1 page 5 explain what the subjects CAT and IT entails.

TPACK has three knowledge areas: Technology, Pedagogy, and Content Knowledge. Teachers know Pedagogical Content Knowledge is required to simplify a subject and teach it effectively. Technological Content Knowledge refers to Knowledge of how technology, pedagogy and content interact differently in different contexts or how the technology influences the content.

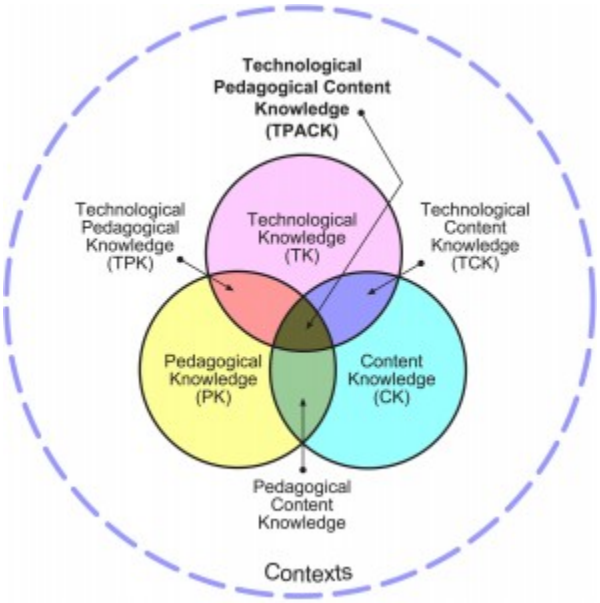


*Figure 2.2: The TPACK framework and its knowledge components*

Source: Koehler and Mishra (2009: 63)

This model was developed by Mishra and Koehler (2006) around the concept that what is being taught and how it is being taught must be the basis for any technology that a teacher plans to use in the lesson to enhance learning. The circles of the TPACK diagram (Figure 2.2) depict understanding of material, pedagogical knowledge and technical expertise. The regions where the circles overlap — where the three types of information are combined — can be described as follows.

- **Pedagogical content knowledge** is the knowledge that teachers have about their content and the knowledge relating to how to teach that specific content. It was first established by Shulman in 1987, and we can see evidence of pedagogical content knowledge in the distinct approaches used by science educators relative to the strategies used by language arts educators, or the teaching techniques used by art teachers as opposed to mathematics educators. This advanced knowledge enables teachers to choose the most efficient methods to teach specific content.
- **Technological pedagogical knowledge** is a set of skills defined by Mishra and Koehler (2006) as being developed by teachers in order to find the best technology to support a certain pedagogical approach. For example , if a teacher wants

learners to work in collaborative groups (pedagogy), they may choose to share their learning in a wiki (a collaborative digital tool) or to communicate what they have learned in a multimodal presentation using, for example, PowerPoint, Glogster or Prezi (digital tools that enable learners to present what they know).

- **Technological content knowledge** refers to the collection of skills already defined by Mishra and Kohler in 2006, learned by teachers to help them find the best technology to assist their learners as they learn content. For example, Computer Applications Technology explains cloud computing in educating the learners about collaborating online with others to work towards a common goal using the Internet as a medium of communication.

The TPACK framework constitutes a valuable tool for evaluating the learning environment and demonstrates a dynamic relationship between learning environment-specific technology, pedagogy, and content knowledge.

The literature identifies several significant sets of knowledge and skills needed by principals so that they can lead ICT adoption and integration that align closely with the technology integration standards. Mishra and Koehler (2006) cite a number of studies in relation to the required knowledge and skills required for ICT integration, which include the ability to make informed decisions about equipment, infrastructure, and teacher professional development (Anthony, 2012; Dawson & Rakes, 2003), managing technology-related policies (Brooks, 2011; Tondeur, Van Keer, Van Braak, & Valcke, 2008), and providing pedagogical and other support to teachers (Closen et al., 2013). In their study of technology and leadership, Anderson and Dexter (2005: 54) note, “where technology had diffused the farthest throughout the school, the principal’s change-facilitation style was that of ‘initiator’”.

However, despite the proven significance of teachers in the process of technology implementation and inclusion, it has been suggested that school officials lack the understanding and experience needed to promote education technology effectively. The overall absence of education technology training for principals can lead to a lack of understanding and lack of perceived authority to influence technological change, which

is a significant factor that eventually affects the functioning of principals (Anthony, 2012; Fletcher, 2009; Raman, Thannimalai & Ismail, 2019). The seven types of knowledge required in the process of technology implementation and inclusion are illustrated in Table 2.3.

**Table 2.3: Seven types of knowledge in the TPACK framework**

| Type of knowledge | Description |
|---|---|
| Content knowledge (CK) | Comprehension of the subject matter to be learned, including knowledge of basic facts, principles, hypotheses and disciplinary procedures |
| Pedagogical knowledge (PK) | Knowledge of the processes and practices of teaching, including classroom management, lesson plan development and delivery, learner evaluation, and an understanding of cognitive, social and developmental theories |
| Technological knowledge (TK) | Knowledge of digital technologies and the skills required to operate them. Includes knowledge of operating systems, computer hardware, software, and the ability to learn and adapt to new technologies |
| Pedagogical content knowledge (PCK) | Knowledge of what teaching approaches fit the content, and likewise, knowing how content can be arranged for better teaching |
| Technological content knowledge (TCK) | Knowledge of what technologies are suitable for specific content, as well as how technology influences and changes the nature of content |
| Technological pedagogical knowledge (TPK) | Knowledge of technological tools for specific classroom tasks such as record keeping, grade books, data analysis, and content organisation, as well as how technological tools change the nature of teaching and learning |
| Technological pedagogical content knowledge (TPACK) | Knowledge of how technology, pedagogy and content interact differently in different contexts, such as personal versus group learning in biology versus social studies versus maths |

Source: Adapted from Mishra and Koehler (2009:63-65)

The concept of TPACK is leading in a new direction, to integrate IT and subject curriculum. Gardner (2008) believes that subject Thinking may be humanity's greatest innovation and it is the most significant and irreplaceable aim of school education. TPACK explores the relationships between technology, curriculum content and different

pedagogical strategies, and shows how subject areas can communicate with each other to create effective discipline-based teaching with the help of educational technologies.

### 2.5.1 School leaders' new role as technology leaders

The progression of innovation in the 21st century demands modification and improvement as a prerequisite for quality instruction in schools everywhere (Davies, 2010). Technology leadership is the combination of strategy and general leadership "techniques", but is more focussed on technology, particularly those related to access to software, upgrading technology, and understanding that the professional expansion and application of technology is often evolving according to the needs of the generations.

School principals, as technology leaders, are required to create approaches to implementing the most proficient methods of utilising current advances in technology, to meet the prerequisite of continuously adjusting to instructional situations. In order to satisfy these expectations, education administrators must develop visions, provide teacher training, set priorities, share resources among employees and guarantee organisational order. Anderson and Dexter (2005) and Dexter (2011) argue that technology leadership speaks to all innovation-related exercises at schools, together with authoritative choices, approaches, and technology implementation.

To be a technology leader requires a considerable amount of administration ability, which principals must apply in various parts of their work. Technology leadership requires that the whole school is considered regarding the use of technology. The vision for technology use incorporates a commitment to this core interest. To be a technology leader requires the ability to learn, adaptability, and the ability to acknowledge change as a consistent factor. Since innovation never stops, there is no menu of innovation must-dos and absolute necessities. Rather, to accomplish jobs, school principals should be proficient and exceptionally talented in numerous territories (McLeod & Richardson, 2013).

Sincar and Aslan (2011) conducted an empirical study and identified four technology leadership dimensions: human centredness, vision, correspondence and cooperation, and support. These four dimensions relate to the leadership models of Weber and

Hallinger and Murphy. For visual measurement, strengthened by the sharing of a dream of effective utilisation of innovation in both organisation and training by teachers, it is recommended that the school principal creates a situation and culture that will enable this vision to be accomplished. The element of technology correspondence and participation concludes that the school principal ought to make an innovation-based correspondence system and culture that grasps all school individuals, to make correspondence progressively successful. Finally, in the support dimension, school leaders should set up a model for the effective use of technology and strive to provide educational methods and technologies that can guarantee high-level learning.

Papa (2011) points out that, in the last century, leadership theories found that leadership in technology is not a distinct theory, but rather a continuum of leadership theories. Chin (2010) argues that the theory of technology leadership varies from traditional leadership theories because the former does not focus on the qualities or actions of the leader, but emphasises that leaders can develop, guide, manage and implement technology in various organisational activities to improve the performance of the organisation.

## 2.6 CONCLUSION

The objective of this chapter was to explore the literature and review the extent to which the literature review is supportive of the topic. Not much literature could be found on the subject-specific supportive role and responsibilities of the instructional leader towards the IT and CAT teacher.

For the purpose of the current study, distributed leadership is characterised as the deliberate circulation of initiative capacities, because a suggested point of view on authority perceives the contribution of all the people who contribute to the practice of authority (Harris & Spillane 2008: 13). Research emphasises the association between instructional initiative and learning results. The explorations of, for example, Cotton (2003) and Gentilucci and Muto (2007), which comprehend instructional administration as an expansive and dynamic procedure by which principals identify with educators' work, demonstrate that instructional leadership affects learner accomplishment to a significant

extent. Research over the last decade highlighted the connection between instructional leadership and learning outcomes.

Instructional leadership and leadership in learning concentrate primarily on the nature and intent of leadership impact, and are aimed at learner learning through teachers. However, instructional leadership (and leadership in general) is not only about skill, but also about purpose. Direct engagement of the leader in curriculum planning and professional development is related to moderate or significant effects on leadership. “This suggests that the closer leaders are to the core business of teaching and learning, the more likely they are to make a difference to learners” (Robinson, 2007: 21).

In the next chapter, the research methodology will be discussed.

# CHAPTER 3: RESEARCH METHODOLOGY

## 3.1 INTRODUCTION

The aim of the study is to shed light on the roles and responsibilities of principals, deputy principals and HODs, as technology leaders, and to make suggestions for ways they can support CAT and IT teachers at their schools. This study provides possible solutions to perceived barriers experienced by IT and CAT teachers. This study hoped to achieve a better understanding of the challenges and opportunities faced by CAT and IT teachers with regard to instructional leadership support, and thereby contribute to literature on the topic.

Chapter 3 will describe the research methodology that was used to study school-based instructional leadership support for IT and CAT subject teachers in a South African province. The chapter will commence by reaffirming the purpose of the study and the research questions. It will move on to a discussion of the research design, and a description of the process of data collection and data analysis, and will conclude with a discussion of limitations and ethical considerations before providing a brief summary of the chapter.

The following research questions guided this chapter:

- Who are the instructional leaders for IT and CAT at schools?
- What activities characterise instructional leadership support for IT and CAT at schools?
- What are the perceptions of IT and CAT teachers regarding the instructional leadership support they receive?
- What suggestions can be made, based on the data on perceptions and activities relating to instructional leadership, to improve instructional leadership support for IT and CAT teachers at South African schools?

## 3.2 RESEARCH PARADIGM

Literature offers a variety of definitions of a paradigm. Denzin and Lincoln (2000: 157) describe paradigms as human constructs that comprise four concepts: ethics, epistemology, ontology and methodology, together, "a basic set of beliefs that guide action". Blaikie (2000: 8) sums up what these concepts refer to: Epistemology refers to "claims about how what is assumed to exist can be known [while] ontological assumptions are concerned with what we believe constitutes social reality". Methodology includes rational, empirical analysis, particularly of the potentialities and limitations of certain techniques or procedures (Grix, 2001, cited by Abou-Assali, 2014). According to Creswell (2014), paradigms are worldviews, or a conventional view of the world and the nature of the research carried out by a researcher. Creswell's presentation of the major elements of each paradigm are provided in Table 3.1.

**Table 3.1: Research paradigms**

| Post-positivism | Constructivism |
|---|---|
| • Determinism<br>• Reduction<br>• Empiricism<br>• Verifying theory | • Understandings from an insider perspective<br>• Subjective meanings of experiences<br>• Social and historical construction<br>• Theory generation |
| **Transformative** | **Pragmatism** |
| • Dogmatic<br>• Entangled with politics and political change<br>• Collective | • The implications of actions<br>• Theoretical lens – reflective of social justice and political aims<br>• Multiple methods (pluralistic) |

Source: Adapted from Creswell (2014: 7).

This study identifies mainly with the post-positivist elements displayed in Table 3.1. Reductionism is an attribute of quantitative research; as Gray (2004) indicates, the quantitative method has an inclination towards reductionism, where the researcher

makes use of deductive reasoning, which starts with a worldwide view of a situation and reverts to the facts. Determinism assesses causes that influence outcomes. This study wished to determine who the instructional leaders are for CAT and IT, what activities characterise their role, and their leadership support to be assessed. Through a quantitative study, a researcher can establish whether support for CAT and IT teachers exist.

Empiricism posits that observation and measurement are fundamental to scientific research. According to Abou-Assali (2014), quantitative research assumes an objective reality that can be measured according to certain identified variables. Quantitative researchers view the world as a reality that can be determined objectively. The ontology of the post-positivist paradigm suggests that the information gains of using a post-positivistic lens are established through cautious scrutiny and measurement of the impartial actuality that exists "out there" in the world. The focus of a transformative paradigm is on the needs of groups or individuals that may be side-lined or neglected (Mertens, 2010). Pragmatism applies to mixed methods research, because pragmatism is not devoted to any one scheme of philosophy and reality.

For post-positivists, the essential part of a study is quantifying observations and studying the behaviour of individuals. Constructivists believe that individuals develop subjective meanings of their experiences as they try to gain insight into the world in which they live and work. These subjective meanings are passed on socially and historically, and are formed through interaction with others (Creswell, 2014).

Constructivism is usually associated with qualitative research. The respondents' perceptions of a situation are being studied. The researcher uses open-ended questions to determine the views of the respondents. This element of constructivism links with this study, which sought to determine what the teachers' perspectives were regarding the support and instructional guidance that was provided to them by school leaders. The ontology of the constructivist paradigm suggests that reality is subjective and experiential, and that findings may be idiosyncratic, rather than generalisable. The aim of constructivist research is understanding and structuring, as opposed to the aim of post-positivist enquiry, which is explanation, prediction and control. Therefore, this

study identifies with the post-positivist paradigm, rather than the constructivist paradigm.

## 3.3 RESEARCH APPROACH

This study followed a quantitative approach to investigating the extent to which school-based instructional leadership for IT and CAT subjects is supported. According to Aliaga and Gunderson (2000, cited by Muijs, 2010), to explain a particular phenomenon, the focus of quantitative research is on gathering and analysing numerical data and generalising it across groups of people. As to what should pass as certified knowledge and required methods for the experiments and surveys that describe and explain phenomena, they need a distinguishing theory supported by quantitative research (Anderson, 2004: 204-207; Kumar, 2005: 12).

Creswell's (1994) definition of quantitative research is very concise. The author defines it as a research approach that explains phenomena by collecting numerical data, which are analysed using mathematics-based methods. This study was conducted to quantify the challenges faced by CAT and IT teachers in relation to their perceptions of instructional leadership at their schools. With this aim in mind, and the fact that the quantitative approach stems from the post-positivist paradigm, the researcher chose to use the quantitative approach.

Leedy and Ormrod (2005) state that, when a researcher wants to explain, predict and control phenomena to answer questions about relationships among measured variables, a researcher will generally use quantitative research. In this study, the researcher measured the degree of variation in the perceptions and value that CAT and IT teachers report about the instructional leadership provided at their schools, therefore, the quantitative approach was found to be the appropriate approach to follow.

## 3.4 RESEARCH DESIGN

A research design is used to organise the analysis and illustrate how all the major components of the research project work together to find answers to the research questions of the study (Kumar (2011). This scholar notes that a research design's

primary purpose is to clarify how a researcher can find answers to the research questions. Kothari (2004) defines a research design as the theoretical context within which research is carried out; it sets out the blueprint for the selection, evaluation and analysis of information. Study design shows decisions on what, where, how much, by what means in relation to a study or analysis. Punch (2005) notes that a research design is a fundamental plan for a research study comprising four key ideas, as illustrated in Figure 3.1.

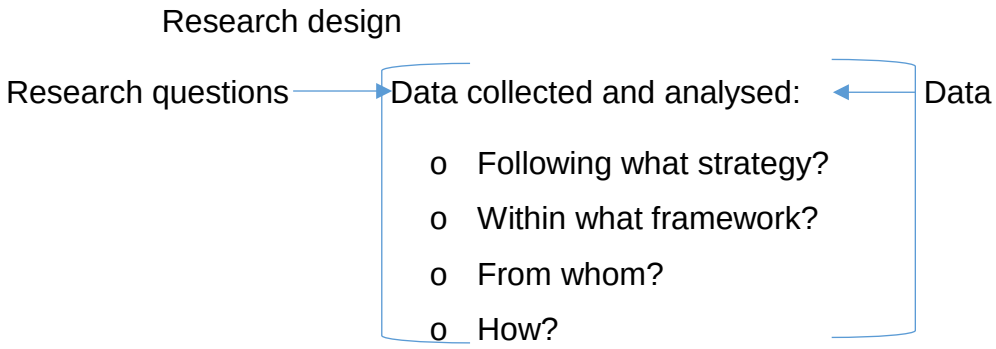


*Figure 3.1: Research design connects research questions to data*

Source: Adapted from Punch (2005: 63)

The aim of this study was to determine who the instructional leaders for CAT and IT are, and what activities characterise leadership support for these subjects' teachers. For the purpose of this study, a descriptive survey research design was applied to identify, analyse and describe the key instructional leaders for IT and CAT at schools, and the key activities that characterise instructional leadership support for IT and CAT at schools.

The framework for this study combines three perspectives, namely, instructional leadership, distributed leadership and ideas on TPACK. From a distributed leadership perspective, as indicated by Spillane, Camburn and Pareja (2007), it is understood that school leadership goes beyond the principal's role and involves leaders at other organisational levels, including teachers (Hauge & Norenes, 2015). According to Muijs and Harris (2003), distributed leadership theory is useful for three key reasons, to provide greater conceptual consistency across the teacher leadership terrain. First, it

integrates into a school the activities of various groups of individuals who collaborate to direct and organise staff in the process of instructional change. Second, it means collective leadership distribution, where the work of the leadership position is shared by a number of individuals, and where the leadership mission is achieved through the participation of many leaders (Spillane 2001: 23). Second, it means interdependence, rather than dependence, and supports the way members of different types share responsibility in different roles (Muijs & Harris, 2003: 440). This perspective informs the present study's research question, which is: How do schools provide instructional leadership support to IT and CAT teachers, if at all? This study drew on the TPACK framework. TPACK is a framework that was first proposed by Mishra and Koehler in 2006 and has since informed many studies on IT integration and support generally (Chai, Koh, & Tsai, 2013, Harris et al., 2009; Koehler & Mishra, 2009; Schmidt et al., 2009). The TPACK framework identifies a different kind of knowledge or competence that subject teachers need in order to teach effectively with technology. Therefore, instructional leaders should have technological pedagogical knowledge in order to be able to assist CAT and IT teachers.

A descriptive research design, as the name indicates, is a design that describes the characteristics of a problem. Kothari (2004: 37) notes that descriptive studies are studies that identify the characteristics of a particular person or community. Leedy and Ormrod (2001, cited by Williams, 2007) state that descriptive research is a basic research method that investigates a situation as it exists in its current state. The ease with which the researcher would be able to obtain a bigger group of respondents' responses led to the selection of this descriptive design (Polit & Beck, 2004). The perceptions of the respondents regarding the instructional leadership support they receive at their schools, the type of support they receive, if any, and who provides the support, will be described by the researcher. The focus of this study was on a single variable, namely, the views or perceptions of CAT and IT teachers about support.

Baker (1994) describes a survey as a way of collecting data that involves a particular group of individuals being asked to answer questions. Muijs (2010) acknowledges that survey research is typified by data collection through questionnaires, which can be administered in a number of ways, whether through web-based or email forms, telephonically or face-to-face, or by postal pencil-and-paper questionnaires. In this

study, a pencil-and-paper questionnaire form was distributed to CAT and IT teachers in the Free State.

A descriptive research design is usually applied when there is not much literature about a topic. There is not much literature on the subject-specific supportive role and responsibilities of the instructional leader towards the IT and CAT teacher. In light of this shortcoming, the researcher wished to find answers to questions on who the instructional leaders for CAT and IT are in secondary schools, how they could provide more explicit direction, what the expectations of and instructional support to CAT and IT teachers involve, and what new competencies school-based administrators need to develop in order to be effective in their new roles as technology leaders.

According to Burns and Grove (1993), the reason for a descriptive design is to elicit respondents' impressions and views of the phenomena under study. Polit and Hungler (1999) indicate that a descriptive survey offers a detailed overview or descriptions of the characteristics of a specific person, situation or community, such as the state of current activities, attitudes, skills, beliefs and knowledge. The descriptive research approach meets the objectives of this study, namely, to determine the perspectives of IT and CAT teachers regarding the instructional leadership support they receive, if they receive any support, and how to improve instructional leadership support for IT and CAT subject teachers.

Based on the number of contacts with the study population, Kumar (2011) indicates that designs can be classified into three groups (as illustrated in Figure 3.2):

- Cross-sectional studies;
- Before-and-after studies; and
- Longitudinal studies.

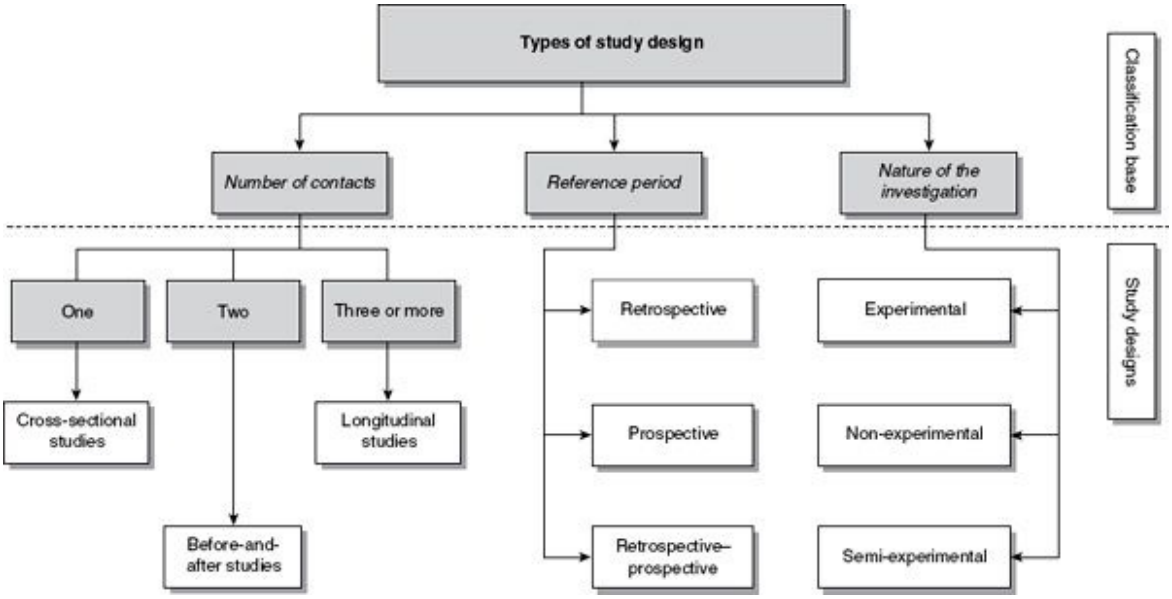


*Figure 3.2: Types of study design*

Source: Kumar (2011: 106)

Kumar (2011) states that, in a cross-sectional study, the researcher decides what (s)he want to know, identifies the study population accordingly, selects a sample (if needed) and contacts the respondents to obtain the required information. This study was a cross-sectional study. The researcher wanted to determine who the key instructional leaders in schools were for CAT and IT, and what are the perspectives of CAT and IT teachers were regarding the instructional leadership support they receive at school. The researcher identified the schools that offer CAT and IT, and the subject teachers who would be requested to complete the questionnaires. There was only one contact session with the respondents: when the researcher met the respondents to hand out the questionnaires, and to explain the study and the importance of the respondents completing the questionnaires.

## 3.5 SAMPLING PROCEDURES

A sample is a group of elements, or a single element, from which data is obtained. The basic sampling requirement is that the sample should be representative of the population from which it is taken. O'Leary (2004) affirms that sampling is a planned method that is occasionally mathematical, and that involves using the most feasible methods to assemble a sample which best represents a larger population. The aim of

sampling is to allow the researcher to get the necessary information accurately, without involving the entire population. As McMillan (1996) points out, the purpose of sampling is to find a group of respondents who will be representative of the larger population or a specific group, and which will provide specific information needed.

In non-probability sampling, the researcher believes that the characteristics within the population are uniformly distributed – this is what makes the researcher believe that every sample will be representative and, as a result, the findings will be reliable (Tongco, 2007). The difference between nonprobability and probability sampling is that nonprobability sampling does not involve random selection and probability sampling does. The sampling technique of this study was one of the non-probability sampling methods, called purposive sampling, or judgemental sampling. As Freedman, Pisani and Purves (2007) point out, the purposive sampling technique involves the researcher selecting sample members on the basis of their knowledge, relationships and expertise regarding the research subject. The main consideration in this sampling design is the judgment of the researchers as to who can provide the best information for achieving the study objectives.

Palys (2008) states that there are different kinds of purposive sampling. Stakeholder sampling comprises identifying the focal respondents who are involved in planning, providing, obtaining or administering the process that is being evaluated. When extreme cases are of interest because they characterise the most precise example of a phenomenon the researcher is interested in, the sampling is called extreme or deviant case sampling. Typically, case sampling is done when the researcher is interested in the case simply because it is not unusual in any way. Paradigmatic case sampling is performed when the case is considered as an example for a given class. When the researcher is interested in occurrences or individuals that cover the range of perceptions in relation to the phenomena that the researcher is studying, the sampling is called maximum variation sampling. Criterion sampling involves looking for individuals who meet a certain criterion, while theory-guided sampling is used by researchers who are pursuing a more deductive or theory-testing approach, and are searching for individuals or cases that exemplify theoretical concepts. Critical case sampling is done when a researcher searches for a decisive case which would help to

decide which of several different explanations is the most plausible or useful because of the generalisations it allows.

In this study, the type of purposive sampling used is criterion sampling, because criterion sampling involves selecting cases that meet some predetermined criterion of importance. The predetermined criterion sampling identified CAT and IT teachers at the 108 secondary schools in the Free State that offer CAT and IT. The researcher was interested in their feedback because this study's aim was to determine what the perceptions of IT and CAT teachers were regarding the instructional leadership support they receive, if any. Information Technology and Computer Applications Technology teachers were considered to be the people who have the required information about the research phenomenon.

A criterion sampling method offers the following advantages (Freedman et al., 2007):

- It is less time consuming than other sampling methods, because only appropriate candidates are targeted;
- Results of purposive sampling are usually more descriptive of the targeted population than other sampling methods;
- Meeting specific objectives is guaranteed; and
- It is useful for certain types of predictions.

Disadvantages of this method are as follows:

- This sampling method is only useful when the researcher has complete information on and knowledge of the population;
- Personal bias due to the potential subjectivity of researchers, is possible;
- Ambiguous responses or omissions of answers are possible;
- Interpretation of omissions is difficult;
- Understanding the whole group is not easy; and
- Statistically, the results obtained through this technique are less reliable.

Kumar (2005) states that purposive sampling is suitable for compiling a historical fact, explain a phenomenon, or establish something that only a little is known about. Research about instructional leadership has been done, but not on who the instructional leaders are for CAT and IT, and what activities characterise their role.

## 3.6 DATA COLLECTION TECHNIQUES AND INSTRUMENTS

A survey design was used for this study. Baker (1994) indicates that a survey is a method of collecting data; it involves a specifically defined group of individuals being asked to answer questions. A survey was suitable for this study, because the advantages of using this strategy include that,

- Data is produced based on real-world observations, also known as empirical data;
- Many people can be involved to obtain data based on a representative sample. This implies that data based on a representative sample is more likely to be obtained than some other approaches and can, therefore, be generalised to a population; and
- Much data can be collected in a short time, at relatively low cost (Kelley, Clark, Brown, & Sitzia, 2003).

The instrument that was chosen for data collection is a questionnaire. The questionnaire is described as a quick and relatively cheap instrument that is used by a researcher for “collecting survey information, providing structured, often numerical data” (Cohen, Manion, & Morrison, 2000: 245).

McMillan and Schumacher (2001) state that a questionnaire is a quantitative data collection method. They agree with Cohen et al. (2000), that a questionnaire is relatively economical and collects only essential information. A questionnaire was considered suitable for this study, to collect data on the perspectives of teachers regarding instructional leadership support at their schools. The questionnaire was handed to teachers of the 108 secondary schools that offer CAT or IT in the Free State province.

The questionnaire consists of three categories, namely, general information about the respondents, problems and opportunities perceived by IT and CAT teachers, and their perspectives regarding the instructional leadership support they receive, with closed and open-ended questions. In order to collect demographic information, information on gender and years of teaching experience was collected to determine the characteristics of the respondents. Open-ended questions included in the questionnaire allowed respondents to respond to questions in their own words and,

thus, to provide more detail; these questions were meant to enable respondents to express their opinions about how they viewed the instructional leadership support they received. Closed-ended questions were included because they are easier to process and to analyse. Likert-scale-type questions were used because the Likert scale is suitable for gathering information on attitudes, beliefs, and self-reported behaviours. Likert scales are helpful to the participant, as it allows the participant to select a pre-determined response to a question. These responses can be quantified easily by the researcher. The questionnaires contained clear instructions to guide the respondents, and instructed them to circle or tick the chosen response. All this was done in an attempt to limit some of the disadvantages of a questionnaire, namely, that items that are ambiguous to some respondents cannot be modified, and that the researcher cannot probe deeply into or assess respondents' opinions or feelings.

The two most typical strategies of managing questionnaires are by means of postal distribution or self-administered completion. Self-administered questionnaires have the advantage of permitting the researcher to develop commonality with respondents, by justifying the aim of the study and clarifying the individual items, if necessary. The information was gathered in this study via self-administered questionnaires, which were distributed some personally, and some send via e-mail to the subjects by the researcher. Every questionnaire was accompanied by a cover letter, in which the study was introduced and it was explained why it was important that the respondent completed the questionnaire. This helped to motivate individuals to respond, leading to a lower non-response rate, and ensuring the anonymity and confidentiality of the respondents.

The researcher collected the questionnaires personally, which guaranteed a high response rate by respondents. The questionnaires needed less time to be arranged, because the questionnaire consisted mostly of close-ended questions, which made it easier to compare the responses to each item.

## 3.7 DATA ANALYSIS

Data analysis involves regulating, structuring and making meaning of the mass of data. It is a time-consuming, creative and riveting process (Marshall & Rossman, 1995),

whereby the researcher organises the data in manageable categories for interpretation. Data were analysed using descriptive statistics. Descriptive statistics is a statistical method used to arrange, summarise and display a number of data (Gall et al., 1996). The Statistical Package for the Social Sciences (SPSS) was used to calculate scale reliabilities and to perform factor analyses. Means, standard deviations, and frequencies were used to describe the sample and the population. After the researcher received the completed questionnaires, all the responses were tabulated and coded, ready for analysis. The results were grouped according to the research questions and objectives. Correlations were used to establish the relationships between instructional leadership support and perspectives of CAT and IT teachers.

## 3.8 VALIDITY AND RELIABILITY

### 3.8.1 Validity

Validity of the research instrument indicates whether it measures what it is supposed to measure (Flick, 2015). Flick (2015: 233-234) refers to three types of validity checks, namely, a) content validity, b) criterion validity and c) construct validity.

The validity of data collection methods is measured by content validity, criterion-related validity and construct validity, while internal validity and external validity apply to the overall study design. Internal validity, according to Punch (2005: 29), relates to the research design of the study and indicates whether it is a true representation of the studied truth. External validity refers the generalisability of the study's findings.

#### *3.8.1.1 Content validity*

Content validity establishes if the measurement instrument captures the essential aspect of the research issue. Leedy and Ormrod (2001) suggest that content validity refers to the degree that the items produced to operate a construct provide an appropriate and representative sample of all the items capable of measuring the value structure. In this study, we can ask if the questionnaire captures the perceptions of teachers about the instructional leadership support. According to Babbie (2007), the

validity of content indicates the degree to which a measure covers the range of meanings included in a concept.

#### *3.8.1.2 Criterion validity*

A criterion is a standard of judgment, or an established standard against which another measure is compared (Kaplan & Saccuzzo, 2005).

#### *3.8.1.3 Construct validity*

The construct's validity depends on the logical relation between the variables. McMillan and Schumacher (2001) state that validity refers to the finding that a measure is right for particular inferences, decisions, effects or uses resulting from the results obtained. In this study, the researcher wanted to determine the perceptions of CAT and IT teachers regarding the instructional leadership they receive, if any. If the results shed light on what is being measured, then the questionnaire (the instrument used in this study) is deemed to be valid. Neuman (2011) refers to construct validity as measurement validity, "as how well an empirical indicator and the conceptual definition of the construct that the indicator is supposed to measure, fit together".

### 3.8.2 Reliability

Reliability is defined as the consistency of measurements. Cohen, Manion and Morrison (2007) note that reliability is about consistency and precision. To make the study accurate, it should be shown that similar findings would be observed in a very similar sense if they were to be dispensed on the same cluster of respondents. Thus, reliability refers to the degree to which test scores are free from measuring error. In this study, the researcher wanted to determine the perceptions of CAT and IT teachers regarding the instructional leadership support they receive at their schools. The researcher made use of a self-administered questionnaire with mostly closed-ended questions and used the computer software, SPSS, for analysis.

### 3.8.3 Pilot study

A pilot study serves as a test run of the study, and it gives the researcher, among other information, an idea of how long it will take to complete the questionnaire. It provides the researcher with an opportunity to check the tool, to determine if it is too long or too short, too simple or too troublesome, to visualise the clarity of the questionnaire items, and to eliminate ambiguities or difficulties in phrasing (Cohen, Manion & Morrison, 2000).

A pilot study of the questionnaire was conducted to test the questionnaire for reliability. The questionnaire was completed by one CAT teacher, one IT teacher and a subject advisor, who critically examined the questionnaire and gave feedback that was used to improve the questionnaire. The researcher also determined how long it took to complete the questionnaire. After the pilot study, some confusing questions were rephrased and some questions were discarded, as they proved to be irrelevant.

## 3.9 RESEARCH ETHICS

In relation to the ethics of science, Mouton (2001) states that it concerns beliefs about what is right or wrong. It is the responsibility of every researcher to ensure that ethical standards are adhered to (Gratton & Jones, 2010).

The following measures were taken to confirm that the rights and welfare of every participant would be protected, and that no one was injured or hurt in any way throughout the analysis procedures: Participation in the survey was entirely voluntary; the respondents were informed about the research; and they had the right to decide whether to participate, or even to stop their participation at any time during the study.

Consent from the research respondents was obtained by the researcher. This consent means that the respondents have adequate knowledge about the study, understand the information and recognise that they have the right of free choice to agree or decline to participate in the study (Polit & Beck, 2004). The researcher presented descriptions of the nature and purpose of the analysis to the respondents and the significance of their participation. Voluntary participation in the study was assured, and failure to participate would not result in penalties. The researcher gave the respondents her

email address in case they decided to contact her about the study and their participation.

The researcher committed herself to maintaining obscurity and confidentiality of all data collected. The respondents were guaranteed that anonymity and confidentiality would be upheld. According to Polit and Beck (2004), anonymity exists when even the researcher is unable to connect a participant to that person's data and confidentiality is retained when respondents are covered in a study when unique individual identities are not connected to the data given and are never reported publicly. The researcher anticipated that fear of victimisation might end in reluctance to participate on the part of the teachers, and a failure to respond honestly to questions associated with instructional leadership support at their schools. The researcher asked the respondents to refrain from indicating their names and alternative personal details on the questionnaire forms. During the data collection process, the researcher numbered the questionnaires to help with data capture and testing. The completed questionnaires and raw data were accessible only by the researcher and her research supervisors. Permission to conduct the study at schools was sought from the Free State DoE and the respective schools. Ethical clearance was sought from the University of the Free State.

## 3.10 CONCLUSION

This chapter described the research methodology, and explained the sample selection, the instrument used for the data collection and the way the data were analysed. The research was conducted using a quantitative, descriptive approach, to determine the perceptions of CAT and IT teachers regarding the instructional leadership support they received, if any. All the CAT and IT teachers in the Free State province were involved in the study, because not all schools offered these subjects yet, and it was feasible. Data collection was administered through a structured questionnaire, which included mainly closed-ended questions, and responses were given on a Likert scale.

The researcher used various steps to enhance the accuracy of the data and ensure compliance with ethical standards. The data analysis and interpretation will be discussed in the following chapter.

# CHAPTER 4: DATA ANALYSIS AND PRESENTATION

## 4.1 INTRODUCTION

While ICTs are changing teaching and learning for the better in several ways, teachers reportedly experience a degree of isolation, partly because many school management members are uncomfortable and/or unable to provide leadership in the area of technology (Blignaut, Hinostroza, Els, & Brun, 2010). The aim of this study was to determine the instructional leadership support for IT and CAT subject teachers, by establishing who the instructional leaders are, and what their major activities in relation to teacher support are.

Data presentation and analysis relates to the research questions that guided this study. Data were analysed to identify how schools provide instructional leadership support to IT and CAT teachers, if at all; and specifically,

- Who are the key instructional leaders for IT and CAT in schools?
- What activities characterise their support for IT and CAT teachers in schools?
- What are the perceptions of IT and CAT teachers regarding the instructional leadership support they receive?
- What suggestions can be made to improve instructional leadership support for IT and CAT teachers in South African schools?

For the purpose of this quantitative study, a descriptive survey research design was used to identify, analyse and describe the key instructional leaders for IT and CAT at schools, and the key activities that characterise instructional leadership support for IT and CAT at schools.

## 4.2 DATA ANALYSIS AND PRESENTATION

A population of 108 CAT and IT teachers was expected, and a total of 51 responses was received from the targeted 108 potential respondents, which constitutes a 47% response rate for the survey. The American Educational Research Association (AERA) 2006, a leading academic organisation and publisher of journals with an emphasis on education studies, has issued comprehensive guidelines for reporting on social science research related to education. However, no matter how detailed these

guidelines are, there is no mention of a minimum or nominally acceptable response rate for survey research. Fowler (2002:42) states that, “There is no agreed-upon standard for a minimum acceptable response rate”.

Of the 51 responses received, only 50 questionnaires were usable, as one questionnaire was incomplete – Sections B and C were not completed. This means that responses represented 46% of the expected population. Of the 50 respondents, 80% completed all the questions that were required to be answered; 6% did not answer all the questions, and 14% did not answer the open-ended questions.

The responses gathered were analysed using SPSS software. The open-ended questions were analysed by content analysis, using a categorisation scheme that describes the relevant coding categories. The categories were formulated from the textual data. Responses were grouped with the relevant themes and coded.

The issue of missing data is relatively common in nearly all research and can have a serious impact on the conclusions that can be drawn from the data. There are several approaches to treating missing data, depending on how much of the data is missing and the pattern or mechanism of the missing data. There are typically three types of missing data. The first, missing completely at random (MCAR), is characterised as if the probability of missing data is not linked, either to the particular value that is to be obtained, or to the set of responses observed. This means that “you can predict anything you may like to know about the data set as a whole from some of the missing data patterns, including the pattern in which data exists for all variables, i.e. for complete cases” (Graham, 2009:552). The statistical benefit of MCAR data is that the analysis is still unbiased. Power in the design may be lost, but the calculated parameters are not skewed by the absence of data.

Data is assumed to be missing at random (MAR) if the probability of missing responses depends on the set of answers received, but is not related to the actual missing values expected to be collected. If the data characters do not fit those of MCAR or MAR, then they fall into the third group, the non-random missing group. In such a scenario, the only way to get an accurate estimate of the parameters is by modelling the missing data. The model for estimating the missing values can then be integrated into a more complex one (Graham, 2009).

Missing values are, therefore, either random or not random. There may be random missing values because the respondent accidentally failed to answer certain of the questions. For example, the respondent may have been tired and/or not paying attention, and the answer is missing. Missing non-random values may occur because the respondent does not answer certain questions on purpose. Looking at the dataset of this study, it appears to be missing completely at MCAR, as it appears the respondents accidentally skipped questions. Therefore, I include the responses and I am transparent about the presentation of results; I also include the percentage of respondents who skipped answering. Table 4.1 presents an analysis of the non-response background information.

**Table 4.1: Non-response demographic categories delineated in questionnaire**

| Question Number | Number of respondents N | Mean returns by respondents | Standard deviation |
|---|---|---|---|
| A3 Area where school is situated | 49 | 2.16 | 0.773 |
| A4 Years of teaching experience | 49 | 4.92 | 1.754 |

The non-response questionnaire item, Years of teaching experience, with the highest mean score of M = 4.92, SD = 1.754, is followed by the item, Area where school is situated, with the M = 2.16, SD = 0.773. One of the respondents (2%) did not indicate the location of the school, or the number of years teaching experience. Data on years of experience clearly indicate that most of the respondents are experienced teachers and, therefore, so the missing data impact on the study to establish their perspectives. The area where school is situated gives the reader an idea of which area gets more support.

### 4.2.1 Demographic information of the respondents

Section A of the questionnaire gathered background information from the participants: gender, level of the highest qualification, number of years of teaching experience, number of years teaching at that school and the area where the school is situated. The demographic information was gathered to determine if it had any influence on the

research findings. Descriptive statistics were used to analyse the teachers' demographics. Table 4.2 presents analysis of the background information on the five demographic variables, namely, gender, location of schools, teaching experience, years at the school and highest qualification. More women (62%) than men (38%) had completed the questionnaire. This was not a surprise, as more women are involved in the teaching profession in South Africa, according to Davids (2018). The reviewed literature suggests that gender, generally, has no impact on the teaching of specific subjects (Teo, 2008; Lin et al., 2013), hence, gender was not significant for this study. The demographic information on the location of schools show 22% of schools are situated in the suburbs, 38% are in urban areas, and 38% of schools are in rural areas. It is interesting to note that there were equal representations of urban and rural schools. Urban schools are schools situated in towns or cities, while suburban schools are schools situated in townships or small towns.

**Table 4.2: Frequency distribution of demographic information (N=50)**

| Attribute | | Frequency | %* |
|---|---|---|---|
| Gender | Male | 19 | 38.0 |
| | Female | 31 | 62.0 |
| Area where school is situated | No response | 1 | 1% |
| | Suburban | 11 | 22 |
| | Urban | 19 | 38 |
| | Rural | 19 | 38 |
| Years of teaching experience | 1-2 years | 4 | 8.0 |
| | 3-5 years | 10 | 20.0 |
| | 6-10 years | 7 | 14.0 |
| | 11-15 years | 8 | 16.0 |
| | 16-20 years | 5 | 10.0 |
| | 20+ years | 15 | 30.0 |
| | No response | 1 | 2.0 |
| Years at this school | My first year of teaching | 7 | 14.0 |
| | 1-2 years | 1 | 2.0 |
| | 3-5 years | 11 | 22.0 |
| | 6-10 years | 10 | 20.0 |
| | 11-15 years | 12 | 24.0 |
| | 16-20 years | 5 | 10.0 |
| | 20+ years | 4 | 8.0 |
| Highest qualification | Teaching certificate | 2 | 4.0 |
| | Teaching diploma | 8 | 16.0 |
| | Bachelor's degree | 29 | 58.0 |
| | Honours degree | 9 | 18.0 |
| | Master's degree | 2 | 4.0 |

* *Numbers and percentages do not necessarily add up to 100, due to missing data.*

Regarding teaching experience at their current school, 30% of the teachers had at least 20 years of teaching experience, 20% had been teaching for 3-5 years, 16% for up to 15 years, 14% for 6-10 years, 10% for 16-20 years and 8% were novice teachers. The sample of respondents that completed the survey in this study was, therefore, characterised by relatively more experienced teachers (60%), while 28% were less experienced teachers. This validates the responses in some way, because the data is mostly from experienced teachers, even though the selection of the sample of teachers was done randomly.

The majority of respondents in this study (80%) were university graduates with at least a Bachelor's degree (58%) in education, while the remaining 8 (16%) had teaching diplomas and 2 (4%) had teaching certificates, which show that the sample consisted mostly of qualified teachers, although not all are having a formal qualification in CAT or IT to teach the subjects IT and CAT effectively. A teaching diploma is a certification normally granted through a technical or vocational school. A teaching diploma will often allow a teacher to specialise in some teaching area. A Diploma in Grade R Teaching, for example, would allow a teacher to teach only Grade R children. Higher certificates are obtained over a year. These are skills-based qualifications, which means a great deal of emphasis is placed on how skills are applied. The emphasis is on acquiring a collection of skills required to work within a chosen sector, and the training is usually industry focussed. South African government policy on teacher education stipulates the two requirements for appropriately qualified (highly qualified) educators, as documented in the National Qualifications Framework Amendment Act 12 of 2019, and Policy on the Minimum Requirements for Teacher Education Qualifications (2011), being a qualification for initial teacher education at a Bachelor of Education degree (NQF Level 7) level, and an Advanced Diploma in Teaching (NQF Level 7). Qualifications for the continuing professional and academic development of teachers are an Advanced Certificate in Teaching (NQF Level 6); Advanced Diploma in Education (NQF Level 7); Postgraduate Diploma in Education (NQF Level 8); Bachelor of Education Honours degree (NQF Level 8); Master of Education degree (NQF Level 9) or a Doctoral degree (NQF Level 10).

The Advanced Teaching Certificate is designed to recognise specialised academic or professional education studies. The Advanced Teaching Certificate is primarily

vocationally focussed, and the aim of qualification is for teachers to reinforce their subject knowledge or prepare to teach a new topic. Learners may proceed to the Advanced Diploma in Education (NQF 7) from the Advanced Certificate in Teaching, from which they may either proceed to the Postgraduate Diploma in Education or the B Ed (Hons), both NQF Level 8. The Advanced Diploma in Education (ADE) is a NQF Level 7 qualification that was designed and established to meet a recognised need to provide a rigorous and thorough curriculum that equips in-service teachers with the knowledge base of subject matter, pedagogical theory and methodology to demonstrate competence and responsibility as academics and professionals.

## 4.3 RESULTS AND DISCUSSIONS OF FINDINGS

The data analysis program SPSS 20.0 was used to analyse data and obtain descriptive and inferential statistics. Descriptive statistical analysis was used to calculate frequencies, percentages, means and standard deviations.

### 4.3.1 Analysis of research questions

The quantitative analysis in this section uses cross-tabulation and frequency tables to understand views of respondents on how to provide instructional leadership support for teaching of IT and CAT subjects. This presentation will be followed by the interpretation of the results.

#### *4.3.1.1 Research question 1: How do schools provide instructional leadership support to IT and CAT teachers, if at all?*

Respondents responded to nine behavioural statements relating to the activities of instructional leadership concepts as measured by the Principal Instructional Management Rating Scale (Hallinger, 1983; 1990; Hallinger & Murphy, 1985). In the literature, behaviours assessed by the scale were identified as best practices demonstrated by principals at successful schools. Descriptive statistics were used to describe the responses of the teachers on each instructional leadership activity. Means and standard deviations were calculated from the responses, which reflect teachers' expectations of conduct in a specific area of instructional leadership. Table

4.3 lists the items associated with leadership support, presented according to their mean scores and standard deviations

**Table 4.3: Instructional leadership activities: Mean scores and standard deviations**

| Instructional leadership activities | N | Mean | Standard Deviation |
|---|---|---|---|
| Provides appropriate resources for effective instruction | 50 | 4.00 | 3.301 |
| Resources made available | 50 | 3.12 | 2.577 |
| Communicates instructional goals | 50 | 2.88 | 2.553 |
| Courses for professional development | 50 | 4.00 | 2.928 |
| Experts for professional development | 48 | 3.83 | 2.883 |
| Handles learner discipline | 50 | 3.58 | 2.914 |
| Frequently observed by… | 49 | 3.43 | 1.780 |
| Feedback on classroom practice | 49 | 3.92 | 2.139 |
| Plan for instruction | 50 | 3.10 | 1.446 |

For each of the nine job functions, the mean (M) and standard deviation (SD) were extracted to determine the overall perceptions of teachers regarding the main instructional leadership behaviours. The highest means for instructional leadership practices as perceived by teachers were for the functions, resources for instruction (M = 4.00; SD = 3.301), and courses for professional development (M = 4.00; SD = 2.928). The lowest mean for instructional leadership practice was for communicates instructional goals (M = 2.88; SD = 2.553). Feedback on classroom practice had the second-highest mean score (M = 3.92; SD = 2.139), followed by bringing in experts for professional development (M = 3.83; SD = 2.883).

The results in Table 4.3 suggest that teachers perceive providing resources for instruction, communicating about courses for professional development, providing feedback on classroom practice and bringing in experts for professional development as the support they received most. Communicates instructional goals had the lowest

mean (M = 2.88; SD = 2.553), and was, thus, the type of support they received the least of. This means that teachers were not in complete agreement and there was a lot of variation in their responses.

Table 4.4 summarises the descriptive statistics for the teachers' perceptions of the type of support they receive, based on the nature and context requirements of the subjects.

**Table 4.4: Type of support based on the nature and context of the subject**

| Type of support | N | Mean | Standard Deviation |
|---|---|---|---|
| Mostly technical | 49 | 1.86 | 3.342 |
| Mostly pedagogical | 49 | 4.27 | 4.227 |
| Technical and pedagogical support | 49 | 3.96 | 3.867 |
| No response | 1 | | |

Table 4.4 shows that participants received mostly pedagogical support, as this had the highest mean score (M = 4.27; SD = 4.277), followed by technical and pedagogical support (M = 3.96; SD = 3.867). They received the least technical support (M = 1.86; SD = 3.342). These results are, however, generally unreliable, given the high values of the SD and too much variation among the standard deviation.

In Section B of the questionnaire, the teachers indicated who provided/assisted them with support activities. These items were incorporated to determine how participants felt (what their views on the topic were), and also to determine why they held these views, which provides information on the barriers and challenges they face. Table 4.5 provides information on participants' views on whether the school management team understood IT/CAT as part of the curriculum.

**Table 4.5: Understands IT/CAT as part of the curriculum**

| Response | Frequency | %* |
|---|---|---|
| Strongly agree | 14 | 28.6 |
| Agree | 14 | 28.6 |
| Uncertain | 9 | 18.4 |
| Disagree | 7 | 14.3 |
| Strongly disagree | 4 | 8.2 |
| No response | 2 | 2 |

**Numbers and percentages do not necessarily add up to 100, due to missing data.*

Table 4.5 indicates responses on whether teachers' perceptions to whether the school management team understood IT/CAT as part of the curriculum. The same number, 14 (28.6%), of the teachers strongly agreed, and agreed that the leaders understood the place of IT/CAT in the curriculum, 9 (18.4%) were uncertain and 7 disagreed (14%), while 4 (8.2%) strongly disagreed. Teachers' responses about the understanding of IT/CAT by leaders at their school provide an indication of the extent of instructional leadership they receive from leaders at their school. That is, school leaders can only provide support if they are clear about the placement of subjects in the curriculum. Table 4.6 provides information on the extent to which teaching and learning is affected by the insufficient number of computers.

**Table 4.6: Extent to which teaching/learning is affected by the insufficient number of computers**

| Extent of effect | Frequency | % |
|---|---|---|
| A lot | 5 | 10.2 |
| Partially | 11 | 22.4 |
| A little | 10 | 20.4 |
| Not at all | 23 | 46.9 |
| No response | 1 | 2.0 |

**Numbers and percentages do not necessarily add up to 100%, due to missing data.*

Table 4.6 shows that 10.2% of participants have a shortage of computers, which affects the quality teaching and learning; 22.4% partially struggle without a sufficient number of computers, and 46.9% have a sufficient number of computers at their school. As stated in the Curriculum and Assessment Policy Statement (CAPS) for CAT and IT, the infrastructure, equipment and finances available for a subject are the responsibility of the school. Schools are expected to have a technology plan (business plan) for the subject that addresses the following (DoE, 2011b: 12):

- Initial capital layout for setting up a computer laboratory. The layout should provide for the following:
- Entry-level computers (with a lifespan of 4 to 5 years), networked;
- One computer per learner per period (during contact time). Sufficient computers should be provided to enable the practical examination to be completed in two sittings;
- Internet access;
- Data projector or demonstrating software; and
- Software (operating system, Office suite, security software – antivirus, internet security, software for solution development).
- Budget
- Annual running costs, namely,

- Software licensing (operating system, application software, security software, solution development software);
- Breakage and maintenance (regular service plan);
- Insurance; and
- Internet connectivity; and
- Sustainability plan.
- Upgrading or replacing software and equipment every 4 to 5 years.
- Requirements for high-level programming tool to be used for software development:
- High-level software development tool that includes an integrated development environment, which
- Supports both structured and object-oriented methodologies;
- Uses a visual development environment with a graphical user interface builder; and
- Allows for event-driven programming (DoE, 2011a: 11).

The data in Table 4.6 suggests that almost half of the participants struggle at least a little, and 10.2% struggle a lot due to too few computers at their schools. The possible reason for their struggles may be that some schools do not have technology plans, or do not revise their technology plans regularly to account for changes. Table 4.7 provides information on the schools' technology plans. In total 24% of participants pointed out that their schools did not have technology plans, while 72% reported that their schools have technology plans.

**Table 4.7: Availability of technology plans at schools**

| Responses | | Frequency | % |
|---|---|---|---|
| Valid | Yes | 36 | 72.0 |
| | No | 12 | 24.0 |
| | Total respondents | 48 | 96.0 |
| No response | | 2 | 4.0 |
| Total | | 50 | 100.0 |

Although 72% of the schools were reported to have technology plans, not all of them seem to revise their plans regularly. Participants reported that 22% of schools have never revised their plans, while 56% revised their technology plans annually (Table 4.8).

**Table 4.8: Does the school revise the technology plan?**

| Frequency of revision | | Frequency | % |
|---|---|---|---|
| Valid | Annually | 28 | 56.0 |
| | Every second year | 5 | 10.0 |
| | Every third year | 4 | 8.0 |
| | Never | 11 | 22.0 |
| | Total | 48 | 96.0 |
| No response | | 2 | 4.0 |
| Total | | 50 | 100.0 |

Due to the nature of these subjects' computer hardware and software needs, and the need for a network administrator or an IT technician to do maintenance, a technology plan needs to be updated and upgraded regularly. To keep up with technology changes, the school's technology plan needs to be revised at least every second year.

Table 4.9 provides a breakdown of the status of the computer hardware or software and the maintenance as reported by respondents.

**Table 4.9: Computer hardware/software and maintenance**

| Status | | Frequency | % |
|---|---|---|---|
| Computers are out of date and/or need repair | A lot | 12 | 24.5 |
| | Partially | 7 | 14.3 |
| | A little | 19 | 38.8 |
| | Not at all | 11 | 22.4 |
| No network administrator or IT technician | A lot | 13 | 26.5 |
| | Partially | 8 | 16.3 |
| | A little | 7 | 14.3 |
| | Not at all | 21 | 42.9 |

Table 4.9 indicates that 24.5% of participants struggle a great deal with outdated computers or computers that need to be repaired; 19 (38.8%) indicated they struggle a little with outdated computers or computer maintenance. Only 22.4% do not experience these problems. Furthermore, 13 (26.5%) respondents did not have a network administrator or IT technician, whilst 42.9% had support of a network administrator or IT technician; 7 (14.3%) struggled a little and 8 (16.3%) struggled partially without a network administrator or IT technician. This suggests that most schools do have the required technical support, even while there are a few teachers that continue to struggle without assistance.

Table 4.10 provides information on how many teachers struggle with insufficient internet-connected computers and insufficient internet bandwidth or speed**.**

**Table 4.10 Internet-connected computers**

| Response | | Frequency | % | Outcome |
|---|---|---|---|---|
| Insufficient internet-connected computers | A lot | 15 | 30.6 | |
| | Partially | 7 | 14.3 | 32,7 |
| | A little | 9 | 18.4 | |
| | Not at all | 18 | 36.7 | |
| | No response | 1 | 2.0 | |
| Insufficient internet bandwidth or speed | A lot | 15 | 30.6 | |
| | Partially | 14 | 28.6 | 44,9 |
| | A little | 8 | 16.3 | |
| | Not at all | 12 | 24.5 | |
| | No response | 1 | 2.0 | |

**Numbers and percentages do not necessarily add up to 100%, due to missing data.*

The results reported in Table 4.10 indicate that 30.6% of respondents have insufficient internet-connected computers, while 36.7% have sufficient internet-connected computers, 14.3% struggle partially and 18.3% struggle a little with insufficient internet-connected computers. In total, 63.3% struggle with insufficient internet-connected computers. In addition to the problem of insufficient internet connectivity, teachers seem to experience insufficient internet bandwidth or/and speed. Fifteen teachers (30, 6%) indicated that they have insufficient internet bandwidth/speed, which affects them a lot, 28.6% are partially affected, 16.3% are affected a little and 24.5% are not affected at all. Internet technologies form part of the CAT/IT curriculum and insufficient internet connectivity and bandwidth will have a negative impact on this topic. Low bandwidth means slow network performance. In total 75.5% of teachers experience insufficient internet bandwidth or speed, whilst only 24.5% of teachers do not struggle with insufficient internet bandwidth or speed.

#### 4.3.1.2 *Research question 2: Who are the key instructional leaders for IT and CAT at schools? What activities characterise their support for IT and CAT teachers at schools?*

A reliability analysis was first carried out on the 12 items that characterise the activities that indicate support for teachers. Cronbach's alpha coefficient test was used to determine the internal consistency of 12 items. If the items are closely correlated, they will have a strong internal consistency and the alpha coefficient will be close to 1. If the items are poorly constructed and are not highly correlated, the alpha coefficient will be about 0. The alpha coefficient ranged from 0 to 1 (the closer a scaled factor is to 1, the greater the instrument's reliability). The final score for reliability was 0.821, which is within the appropriate good test score range, which is 0.6 to 0.9.

**Table 4.11: Cronbach's alpha coefficient**

| Cronbach's Alpha | Cronbach's alpha based on standardised items | Number of Items |
|---|---|---|
| 0.821 | 0.819 | 12 |

The general rule is that 0.70 and above alpha of a Cronbach has acceptable reliability, 0.80 and above is better, and the best is 0.90 and above. George and Mallery (2003, in Gliem & Gliem, 2003: 231) provide the following rules of thumb: As the value of Cronbach's alpha >0.9 – excellent, >0.8 – good, >0.7 – acceptable, >0.6 – questionable, >0.5 – poor and <0.5 – unacceptable.

Table 4.12 indicates the reliability coefficients of the different items, which ranged from a high of 0.820 (resources made available, and strong knowledge of instruction) to a low of 0.787 (supported by). Thus, according to Cronbach's alpha, items used in the scale for data collection were appropriate and reliable.

**Table 4.12: Cronbach's alpha scores**

| Items | Cronbach's Alpha |
|---|---|
| Provides appropriate resources for effective instruction | 0.794 |
| Resources made available | 0.820 |
| Communicates instructional goals | 0.812 |
| Courses for professional development | 0.802 |
| Experts for professional development | 0.801 |
| Handles learner discipline | 0.803 |
| Frequently observed by …. | 0.815 |
| Feedback on classroom practise | 0.816 |
| Strong knowledge of instruction | 0.820 |
| Classroom activities in line with educational goals | 0.799 |
| Plan for instruction | 0.813 |
| Supported by | 0.787 |

From the responses on the questionnaire, teachers indicated that a variety of individuals provide support to them (Table 4.12). According to Muijs and Harris (2003), distributed leadership theory implies a collective distribution of leadership, where the leadership role is conveyed through the work of a number of individuals, and where the leadership task is achieved through the participation of many leaders.

Table 4.13 indicates how schools provide instructional leadership support to IT and CAT teachers, as deduced from the perceptions of the teachers.

**Table 4.13: Instructional leaders and support provided by them**

| Person providing support | Provides appropriate resources for instruction | | Communicates instructional goals | | Makes resources available | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Principal | 15 | 30.0 | 23 | 46.0 | 20 | 40.0 |
| Deputy principal | 4 | 8.0 | 8 | 16.0 | 4 | 8.0 |
| HOD | 8 | 16.0 | 5 | 10.0 | 8 | 16.0 |
| Other | 10 | 20.0 | 2 | 4.0 | 10 | 20.0 |
| Principal & Deputy principal | 2 | 4.0 | 4 | 8.0 | 1 | 2.0 |
| Principal & HOD | 2 | 4.0 | 3 | 6.0 | 1 | 2.0 |
| Principal & Deputy principal & HOD | 3 | 6.0 | 3 | 6.0 | 1 | 2.0 |
| Principal & Deputy principal & HOD & other | 1 | 2.0 | 1 | 2.0 | 2 | 4.0 |
| HOD & other | 1 | 2.0 | 1 | 2.0 | 2 | 4.0 |
| Principal & other | 4 | 8.0 | | | 1 | 2.0 |

The principal was indicated the most often as providing appropriate resources for instruction (30%), communicating instructional goals (46%), and making resources available (40%). The teachers indicated that Other refers to the subject advisor or the coordinator of the professional learning community (PLC) or peer teacher. Other (20%), HOD (16%) and deputy principal and principal and other (8%) provided appropriate resources for instruction.

The deputy principal was indicated second most often (16%) as communicating instructional goals, but very low on all others, followed by the HOD (10%). One of the key responsibilities of the deputy principal is to promote effective teaching and learning across the school and to achieve this, he needs to communicate the instructional goals of the school for effective teaching and learning to take place. On “makes resources

available", Other was indicated 20%, HOD by 16% and the deputy principal by 8%. This indicates that, if teachers are in need of resources, Other mostly provide it.

Table 4.14 indicates the frequency and percentage of support activities provided by Instructional leaders.

**Table 4.14: Instructional leaders and support activities**

| Instructional leaders | Check to see whether classroom activities are in keeping with our educational goals | | Strong knowledge of instruction | | Feedback on classroom practice | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Principal | 6 | 12.0 | 12 | 24.0 | 4 | 8.0 |
| Deputy principal | 4 | 8.0 | 7 | 14.0 | 3 | 6.0 |
| **HOD** | **23** | **46.0** | **14** | **28.0** | **22** | **44.0** |
| Other | 10 | 20.0 | 10 | 20.0 | 9 | 18.0 |
| Principal & Deputy principal | 1 | 2.0 | 3 | 6.0 | 1 | 2.0 |
| Principal & HOD | | | 2 | 4.0 | 2 | 4.0 |
| Deputy principal & HOD | 3 | 6.0 | | | 5 | 10.0 |
| Principal & Deputy principal & HOD | 3 | 6.0 | 1 | 2.0 | 2 | 4.0 |
| Principal & Other | | | 1 | 2.0 | 1 | 2.0 |
| No response | | | | | 1 | 2.0 |

Table 4.14 displays that the HODs (46%), mostly "Check to see whether classroom activities are in keeping with our educational goals" and also provide "Feedback on classroom practice" (44%). Respondents indicated that the HOD, compared to the principal (24%), Other (20%), and deputy principal (14%), had a strong knowledge of instruction (28%). Teachers are least often observed by the deputy principal (8%) and principal (12%) to see whether classroom activities are in keeping with educational goals. Other (subject advisor, the coordinator of the PLC or peer teacher) was indicated by 20% as observing them to see whether classroom activities are in keeping

with educational goals and giving them feedback on classroom practice (18%). Clearly, middle managers or leaders (Spillane et al., 2002) seem to play a much bigger role in subject leadership than either the principal or deputy. Deputy Principals seem to provide the least support on subject-specific leadership.

Table 4.15 shows who makes arrangements for teachers to meet experts for professional development.

**Table 4.15: Bring in experts for professional development**

| Person providing support | Frequency | % |
|---|---|---|
| Principal | 13 | 26.0 |
| Deputy principal | 2 | 4.0 |
| HOD | 9 | 18.0 |
| Other | 14 | 28.0 |
| Principal & Deputy principal | 1 | 2.0 |
| Principal & HOD | 3 | 6.0 |
| Principal & Deputy principal & HOD | 2 | 4.0 |
| Principal & Deputy principal & HOD & Other | 1 | 2.0 |
| HOD & Other | 1 | 2.0 |
| Principal & Other | 2 | 4.0 |
| No response | 2 | 4.0 |

Teachers indicated that Other (subject advisor, the coordinator of the PLC or a peer teacher) mostly brought in experts for professional development (28%), the principal (26%) and HOD (18%) also bring in experts, as do the deputy principal (4%), both the principal and HOD (6%) and the principal, deputy-principal and HOD (4%). These results are to be expected, as the district supported officers, such as subject advisors or PLC leaders, are more likely to have access to resources to bring in external experts to service teachers from more than one school through professional development workshops.

Table 4.16 summarises responses on who handles learner discipline.

**Table 4.16: Handles learner discipline**

| Person providing support | Frequency | % |
|---|---|---|
| Principal | 19 | 38.0 |
| Deputy principal | 5 | 10.0 |
| HOD | 6 | 12.0 |
| Other | 3 | 6.0 |
| Principal & Deputy principal | 6 | 12.0 |
| Deputy principal & HOD | 5 | 10.0 |
| Principal & Deputy principal & HOD | 4 | 8.0 |
| Principal & Deputy principal & Other | 1 | 2.0 |
| Principal & Other | 1 | 2.0 |

From Table 4.16 it is clear that Other (subject advisor, peer teacher, coordinator of PLC) handles learner discipline the least (6%) and the principal (38%), as expected from the head of the institution, handles learner discipline the most, followed by the HOD (12%) and the deputy principal (10%). These responses, again, seem to raise questions about the role of deputy principals.

Table 4.17 shows which instructional leader teachers were indicated as being supportive, providing information about courses for professional development and helping the teachers plan for instruction.

**Table 4.17: Instructional leadership support activities**

| Instructional leader | Informs about courses for professional development | | Supported by | | Plan for instruction | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Principal | 11 | 22.0 | 11 | 22.0 | 7 | 14.0 |
| Deputy principal | 3 | 6.0 | 9 | 18.0 | 5 | 10.0 |
| HOD | 11 | 22.0 | 7 | 14.0 | 25 | 50.0 |
| Other | 12 | 24.0 | 2 | 4.0 | 8 | 16.0 |
| Principal & Deputy principal | 2 | 4.0 | 3 | 6.0 | 3 | 6.0 |
| Principal & HOD | 6 | 12.0 | 5 | 10.0 | | |
| Principal & Deputy principal & HOD | 1 | 2.0 | 7 | 14.0 | 2 | 4.0 |
| HOD & Other | 1 | 2.0 | 4 | 8.0 | | |
| Principal & Deputy principal & Other | | | 1 | 2.0 | | |
| Principal & Other | 3 | 6.0 | 1 | 2.0 | | |

In Table 4.17, Other (subject advisor, peer teacher, coordinator of PLC) informs teachers most often about courses for professional development (24%), though the principal (22%) and the HOD (22%) also informs them. A role of the subject advisor and coordinator of the PLC is providing curriculum support to teachers, which they provide by informing teachers about courses for professional development. Teachers indicated that the principal (22%), deputy principal (18%) and HOD (14%) were supportive. Planning for instruction is mostly done by the HOD (50%), as the HOD is responsible for guidance on the latest ideas and approaches to the subject, and by Other (16%), the principal (14%) and the deputy principal (10%). Other, the principal and deputy principal need to ensure effective teaching and learning take place, therefore, need to oversee the planning for instruction.

#### *4.3.1.3 Research question 3: What are the perceptions of IT and CAT teachers regarding the instructional leadership support they receive?*

Teachers' perceptions regarding the instructional leadership support they receive were analysed according to four factors. The first factor is leaders' understanding of pedagogical content knowledge, which comprises the knowledge and understanding of IT/CAT as part of the curriculum and the nature and purpose of IT/CAT. The second factor is demonstrating an understanding of technology needs and concerns of teachers and learners; the third, maintaining a positive relationship with teachers and leaners regarding technology, and the fourth, communicating effectively with teachers about technology.

The responses under strongly agree and agree were combined to indicate absolute agreement for ease of understanding of differences, while the strongly disagree and disagree responses were combined to indicate disagreement.

Table 4.18 provides information on participants' views on whether the school management team understood IT/CAT as part of the curriculum.

**Table 4.18: Understands IT/CAT as part of curriculum**

| Response | Frequency | Percent | Outcome |
|---|---|---|---|
| Strongly agree | 14 | 28.0 | 58% |
| Agree | 15 | 30.0 | |
| Uncertain | 9 | 18.0 | |
| Disagree | 7 | 14.0 | 22% |
| Strongly disagree | 4 | 8.0 | |
| Total | 49 | 98.0 | |
| No response | 1 | 2.0 | |
| Total | 50 | 100.0 | |

The table shows that 15 teachers (30%) agreed, 14 (28%) strongly agreed, 9 (18%) were uncertain, 4 (8%) strongly disagreed and 7 (14%) disagreed. The results show

that 58% of teachers agreed that the school management team understood IT/CAT as part of the curriculum, whilst 22% disagreed.

Table 4.19 provides information on respondents' views on whether the school management team understands the nature and purpose of IT/CAT.

**Table 4.19: Nature and purpose of IT/CAT**

| Response | Frequency | Percent | Outcome |
|---|---|---|---|
| Strongly agree | 13 | 26.5 | 57% |
| Agree | 15 | 30.6 | |
| Uncertain | 7 | 14.3 | |
| Disagree | 9 | 18.4 | 26% |
| Strongly disagree | 4 | 8.2 | |
| Subtotal | 48 | 98.0 | |
| No response | 2 | 2.0 | |
| Total | 50 | 100.0 | |

Fifteen teachers (30.6%) agreed that the leaders do understand the nature and purpose of IT/CAT, 13 (26.5%) strongly agreed, 7 (14.3%) were uncertain, 4 (8.2%) strongly disagreed and 9 (18.4%) disagreed that leaders understand the nature and purpose of IT/CAT. The total of teachers that agreed that leaders do understand the nature and purpose of IT/CAT is 57%, and those who differ, 26%.

Table 4.20 displays teachers' opinions of their leaders' understanding of their technology needs.

**Table 4.20: Understanding technology needs**

| Response | Frequency | Percent | Outcome |
|---|---|---|---|
| Strongly agree | 18 | 36.0 | 64% |
| Agree | 14 | 28.0 | |
| Uncertain | 5 | 10.0 | |
| Disagree | 9 | 18.0 | 24% |
| Strongly disagree | 3 | 6.0 | |
| Subtotal | 49 | 98.0 | |
| No response | 1 | 2.0 | |
| Total | 50 | 100.0 | |

Table 4.20 indicates that 18 teachers (36%) strongly agreed that the leaders do understand their technology needs, 14 (28%) agreed, 5 (10%) were uncertain, 3 (6%) strongly disagreed and 9 (18%) disagreed. The total of teachers who were positive that their leaders do show an understanding of their technology needs was 64%, while 24% disagreed on this.

Respondents were asked to rate their agreement regarding the following statement: The school management team at this school maintains positive relationships with teachers and learners regarding technology. Their responses are shown in Table 4.21.

**Table 4.21: Positive relationships with teachers and learners regarding technology**

| Response | Frequency | Percent | Outcome |
|---|---|---|---|
| Strongly agree | 19 | 38.0 | 72% |
| Agree | 17 | 34.0 | |
| Uncertain | 3 | 6.0 | |
| Disagree | 8 | 16.0 | 20% |
| Strongly disagree | 2 | 4.0 | |
| Subtotal | 49 | 98.0 | |
| No response | 1 | 2.0 | |
| Total | 50 | 100.0 | |

Seventeen teachers (34%) agreed that the leaders do have positive relationships with teachers and learners regarding technology, 19 (38%) strongly agreed, 3 (6%) were uncertain, 2 (4%) strongly disagreed and 8 (16%) disagreed (Table 4.21). From the data it is evident that most of the teachers (72%) experienced positive relationships with teachers and learners regarding technology, while 20% disagreed.

Table 4.22 displays teachers' responses regarding their agreement on whether the school management team communicates effectively with them about technology.

**Table 4.22: Communicate about technology with teachers**

| Response | Frequency | Percent | Outcome |
|---|---|---|---|
| Strongly agree | 17 | 34.0 | 60% |
| Agree | 13 | 26.0 | |
| Uncertain | 6 | 12.0 | |
| Disagree | 11 | 22.0 | 26% |
| Strongly disagree | 2 | 4.0 | |
| Subtotal | 49 | 98.0 | |
| No response | 1 | 2.0 | |
| Total | 50 | 100.0 | |

As reported in Table 4.22, 13 teachers (26%) agreed that the leaders do communicate with them about technology, 14 (28%) strongly agreed, 7 (14%) were uncertain, 4 (8%) strongly disagreed and 7 (14%) disagreed. The results in Table 4.22 indicate that 60 of the teachers were positive about the leaders' communication regarding technology.

Figure 4.1 portrays the type of support teachers reported receiving from the various instructional leaders. Teachers indicated that the type of support they receive varies, from mostly technical or pedagogical, to both technical and pedagogical. From this graph it is clear that HODs provide the most support, both technical and pedagogical, followed closely by principals.

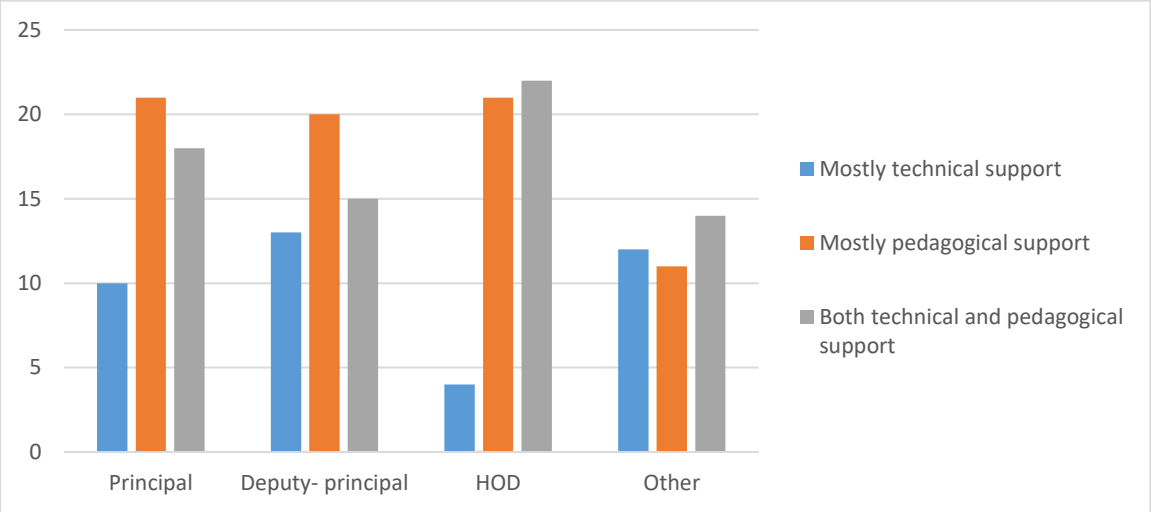

*Figure 4.1: Type of support*

Correlations were used to establish the relation between instructional leadership support and the perceptions of teachers. Using Kendall's Tau-b test, the statistical significance of relations between selected variables was established. The relationship between two ordinal variables was determined using Spearman's rho and Kendall's Tau-b. Spearman's rho produces typically higher coefficients of association than the Tau-b of Kendall. The researcher chose to use Kendall’s Tau-b, because the distribution of Kendall’s Tau-b has better statistical properties and usually works better with small samples, like that of this study. The level of significance was set at 0.05. Using a correlation analysis to analyse the data collected, the p value should be less than or equal to 0.05 (p 0.05) for statistically significant correlation.

Table 4.23 indicates the correlation between Positive relationships with teachers and learners regarding technology, and Communicate about technology with teachers.

**Table 4.23: Correlation analysis of teachers' perceptions regarding instructional leadership support**

| **Kendall's Tau-b** | | **Understanding of technology needs** | **Positive relationships with teachers and learners regarding technology** | **Communicate about technology with teachers** |
|---|---|---|---|---|
| Understanding of technology needs | Correlation coefficient | 1.000 | 0.793** | 0.787** |
| | Significant (2-tailed) | . | 0.000 | 0.000 |
| | N | 50 | 50 | 50 |
| Positive relationships with teachers and learners regarding technology | Correlation coefficient | 0.793** | 1.000 | 0.820** |
| | Significant (2-tailed) | 0.000 | . | 0.000 |
| | N | 50 | 50 | 50 |
| Communicate about technology with teachers | Correlation coefficient | 0.787** | 0.820** | 1.000 |
| | Significant (2-tailed) | 0.000 | 0.000 | . |
| | N | 50 | 50 | 50 |
| ** Correlation is significant at the 0.01 level (2-tailed) | | | | |

The correlation coefficient for Positive relationships with teachers and learners regarding technology (r = 0.793) and Communicate about technology with teachers (r = 0.787, p value = 0.000 significance) indicates a strong relationship between these variables. This significance level, the p value (quoted under Significant (2-tailed)) is 0.000 (reported as p <0.001), which is less than 0.05 and, therefore, significant for predicting teachers' perceptions about the leaders' Understanding of their technology needs, having Positive relationships with teachers and learners regarding technology, and Communicating about technology with teachers. If the leader understands what the teachers' technology needs entail, it will lead to a positive relationship with teachers and learners regarding technology, and good communication about technology with teachers.

Table 4.24 explores correlations from the data that required respondents to demonstrate perceptions regarding pedagogical content knowledge.

**Table 4.24: Perceptions regarding pedagogical content knowledge**

| **Kendall's Tau-b** | | **Understands IT/CAT as part of the curriculum** | **Nature and purpose of IT/CAT** |
|---|---|---|---|
| Understands IT/CAT as part of the curriculum | Correlation Coefficient | 1.000 | 0.915** |
| | Significant (2-tailed) | . | 0.000 |
| | N | 50 | 50 |
| Nature and purpose of IT/CAT | Correlation Coefficient | 0.915** | 1.000 |
| | Significant (2-tailed) | 0.000 | . |
| | N | 50 | 50 |
| ** Correlation is significant at the 0.01 level (2-tailed) | | | |

The correlation value presented in Table 4.24, between the questionnaire items between Understands IT/CAT as part of the curriculum and Nature and purpose of IT/CAT, is 0.915, which is a strong positive correlation, which could indicate that leaders who understand IT/CAT as part of the curriculum will also understand the nature and purpose of IT/CAT. The p value (quoted under Significant (2-tailed)) is 0.000 (reported as $p < 0.001$), which is less than 0.05 and, therefore, significant for predicting teachers' perceptions of the pedagogical content knowledge of the leaders.

The Kendall Tau-b test was used to determine if the number of years teaching at that school influence sthe IT and CAT teachers' perceptions of the instructional leadership support they receive. The result is shown in Table 4.25.

**Table 4.25: Years teaching at this school and support received**

| Kendall's Tau-b | | Years at this school | Supported by |
|---|---|---|---|
| Years at this school | Correlation coefficient | 1.000 | -0.088 |
| | Significant (2-tailed) | . | 0.426 |
| | N | 50 | 50 |
| Supported by | Correlation coefficient | -0.088 | 1.000 |
| | Significant (2-tailed) | 0.426 | . |
| | N | 50 | 50 |

The results in Table 4.25 show that the Years at school and Supported have neither a higher score of correlation nor statistical significance, as p (0.426) is >0.05, which indicates that the years teachers have been teaching at a particular school have no or little impact on how they perceive the support they receive.

The teachers were asked in Section C of the questionnaire to describe one area of their principals' leadership that, if improved, could provide them with appropriate technology support. In Question 2, they were asked to indicate whether they believe it should be compulsory for principals and HODs to have adequate TPACK: 12% (n = 6) of the respondents did not answer the two open-ended questions, and 10% (n = 5) answered only Question 2; 78% answered both questions.

Figure 4.2 indicates the area of leadership of the principal that, if improved, could provide appropriate technology support.

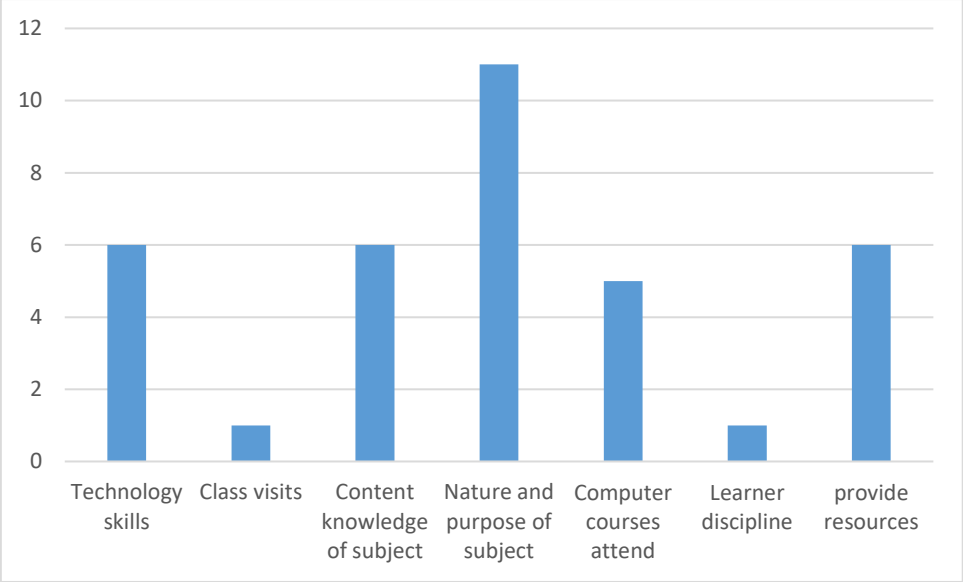


Figure 4.2: Area of leadership in need of improvement

Teachers indicated that, if principals were aware of the nature and purpose of CAT/IT subjects, they would be able to provide teachers with appropriate technology support. Some teachers would like principals to improve their technology skills or, if they lack it, acquire these skills. Content knowledge is another area that could be improved, and this area relates to the nature and purpose of the subject.

TPACK refers to the understanding that arises from interactions between content, pedagogy and knowledge of technology (Koehler & Mishra, 2009). Technological pedagogical knowledge refers to an understanding of how learning and teaching can change in particular ways through using various technologies. Figure 4.3 portrays the people teachers believe must have adequate TPACK.

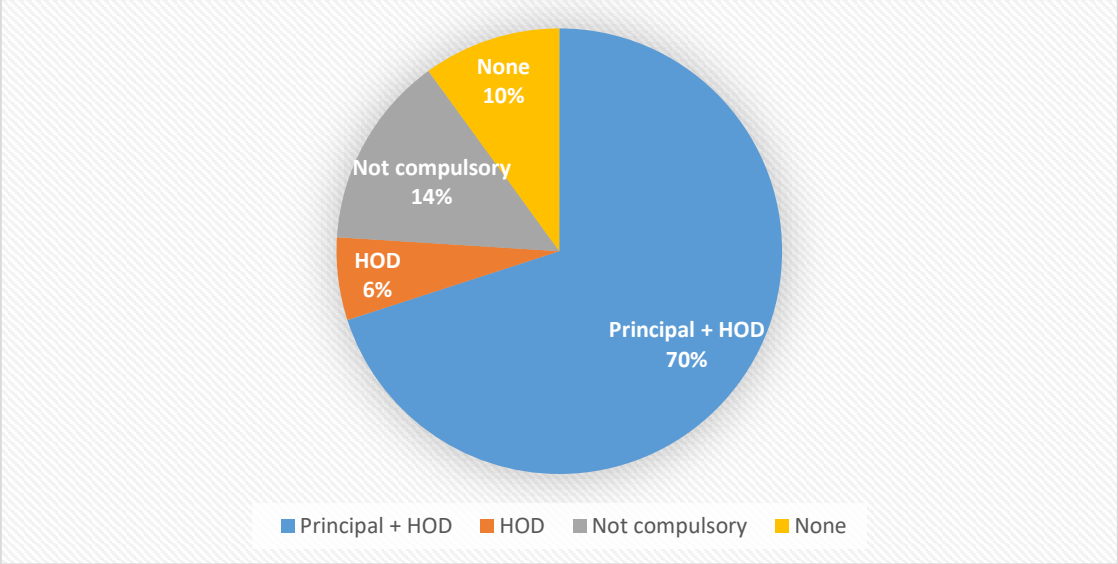


Figure 4.3: TPACK for principals and HODs

The graph in Figure 4.3 shows that 70% of responders indicated that both principals and HODs must have adequate TPACK, whilst 5 (10%) indicated that this type of knowledge is not really necessary, though respondents did not refer to either of the two types specifically. According to the results, 14% of respondents indicated that it is not compulsory for the principal or HOD to have adequate TPACK, and 6% indicated that the HOD must have adequate TPACK.

## 4.4 DISCUSSION OF FINDINGS

The findings of the question relating to how schools provide instructional leadership support to IT and CAT teachers indicate that teachers generally did not perceive the instructional leadership support they received at school as positive. This perception is indicated by the standard deviation scores being much higher than the mean scores. Phillips (2009: 2) states, in a study on instructional leadership, administration, and management, that instructional leadership requires specific objectives; the allocation of instructional resources; curriculum management; the monitoring of lesson plans; and teacher evaluations. This recommendation relates to the activities of instructional leadership concepts as measured by the Principal Instructional Management Rating Scale (Hallinger & Murphy, 1985), namely, “providing resources for instruction, courses for professional development, feedback on teachers’ classroom practice and the bringing in of experts for professional development”, which teachers indicated were

positively received at their schools. Principals were viewed as being effective in providing resources for instruction. This finding corresponds with that of Mangin and Stoelinga (2008), who see efficient principals as the ones who provide education material to learners and teachers. Alig-Mielcarek (2003) describes instructional leadership in terms of the school principal's behaviour, which leads the school to a high level of achievement in educating all the learners. This activity identifies and expresses shared expectations, discusses and offers input on the teaching and learning process, and encourages the advancement of discipline at the school.

In turn, Marks and Printy (2003) describe instructional leadership as a change, from a principal-centred practice to a shared practice. To the second research question on who the key instructional leaders for IT and CAT in schools are, teachers responded by indicating that they received different types of support from different instructional leaders. They indicated the principal as the person who provides appropriate resources for instruction, communicates instructional goals and makes resources available. The HOD provides support relating to the plan for instruction, and gives feedback on classroom practice, and others (subject advisor, peer teacher, coordinator of PLC) inform teachers about courses for professional development. Spillane (2005) and Harris (2007) argue that the central notion of distributed leadership is that leadership is not confined to one individual, but derives from multiple experiences at different points in the organisation. This conclusion indicates that distributed leadership involves more than the role of delegating leadership. The subject advisor, peer teacher, and coordinator of the PLC informs teachers about courses for professional development, as do the principal and the HOD.

The findings indicate that teachers are mostly observed by the HOD and Others. Deryakulu and Olkun (2009) point out that the literature indicates that leaders should be knowledgeable of the areas of content they observe. Bennet (1995, cited by Deryakulu and Olkun, 2009: 54) agrees that teachers want supervision from content specialists, since “supervisors with knowledge of the content provided better feedback, knew what instructional approaches to recommend based on the content taught, offered fairer evaluations of the teacher's success in the classroom and had up-to-date awareness of topic trends and issues”. This indicates the teacher’s need of having a supervisor who has TPACK knowledge. TPACK shows that a relationship

between technology, content, and pedagogy and the purposeful use of technology is essential for effective teaching and learning. TPACK represents a range of skills that are fundamental to the work of technology teachers.

The teachers' impressions of the type of support they received were evaluated based on the nature and context requirements of the subject, which refers to the three basic elements of pedagogical content knowledge: understanding of content, understanding of teaching, and understanding of technology. The teachers indicated that they received mostly pedagogical support, as this had the highest mean score (M = 4.27; SD = 4.277). Stein and Nelson (2003: 446) argue that, "without information that ties subject matter and learning and teaching to actions of leadership, leadership floats, detached from the very processes it aims to rule". Secondly, technical and pedagogical support (M = 3.96; SD = 3.867) requires awareness of the pedagogical requirements and limitations of a variety of technical resources in relation to pedagogical designs and methods that are disciplinarily and developmentally acceptable. This relates to leaders demonstrating an understanding of the curriculum needs and concerns of teachers and learners. Teachers received the least technical support (M = 1.86; SD = 3.342). This finding is evident from Table 4.7, which indicates that 24.5% of participants struggled a great deal with outdated computers or computers that needed to be repaired; 19 (38.8%) indicated they struggled a little with outdated computers or computer maintenance. Furthermore, 13 (26.5%) participants did not have access to a network administrator or IT technician, though maintenance of equipment is an important factor in support. Having to use unreliable equipment discourages teachers.

## 4.5 SUMMARY OF THE RESULTS

The findings presented in Table 4.3 on the question of how schools provide IT and CAT teachers with instructional leadership support, suggest that teachers were mainly assisted in the following areas: being offered instructional materials, engaging in professional development courses, receiving input on their work in the classroom and having experts brought in for professional development.

Who are the primary teaching leaders in schools for IT and CAT, and what activities define their service in schools for IT and CAT teachers? In effective schools, the

literature on instructional leadership provides references to the principal as the primary source of this leadership – this is also evident from the results of this study, as teachers indicated that the principal was their prime supporter in most of the support activities.

The teachers' impressions of the teaching leadership help they received were evaluated on the basis of four factors that are a) the leaders' understanding of pedagogical content awareness, which consists of IT/CAT information, and understanding of IT/CAT as part of the programme, and IT/CAT design and intent; b) showing an understanding of teachers' and learners' development needs and concerns; c) maintaining a productive technical relationship with the teachers and the leaners with respect to technology; and d) interacting effectively with technology teachers.

## 4.6 CONCLUSION

This chapter discussed the data analysis and interpretation. What this study attempted to achieve was to decide who the main IT and CAT instructional leaders in schools are, and what behaviours define their support for IT and CAT teachers at schools. The results of data analysis show that most teachers still consider the principal to be the leader of instruction even as they receive most subject-specific guidance from their HOD's and other leaders such as subject advisors and PLC leaders. In the next chapter the research results, recommendations and conclusions will be discussed.

# CHAPTER 5: CONCLUSION, INTERPRETATION AND DISCUSSION

## 5.1 INTRODUCTION

This chapter will present the conclusions drawn from the data discussed in Chapter 4. This chapter will begin with a summary of the entire study, and will provide an overview of the problem, the purpose statement and research questions, methodology, literature-related findings, action implications, and recommendations for future research. The main objective of this study was to determine who the instructional leaders are for IT and CAT subject teachers, to define problems faced by IT and CAT subject teachers, and investigate the roles and responsibilities of instructional leaders as technology leaders.

## 5.2 SUMMARY OF RESEARCH

After CAT and IT were introduced in schools in South Africa, it became essential for educators and instructional leaders to prepare themselves for the ever-changing needs of technology and ICT support management. While the responsibility for technology leadership could have been formally delegated to the school leaders as part of their duties, Stuart et al. (2009), quoting Flanagan and Jacobson (2003), state that this can be problematic, because instructional leaders may not have the experience or context to be comfortable about providing leadership regarding technology. Research shows that ICT skills are a crucial factor that influences technology leadership. Tan (2010) reports on research papers that examined the functional roles of technology leadership in relation to technology integration in schools, that is, what technology leaders are doing or should be doing. Tan concludes that, in general, the merits of the claims of what technology leaders are doing or should be doing are not explicitly stated in these documents and, thus, further research in this area is warranted. It is against that background that the present study was conceptualised, with the express purpose of contributing insights into the leadership environment and activities needed for CAT and IT success.

## 5.3 OVERVIEW OF THE PROBLEM

It appears that teachers of information technology are expected to manage learner education, and sometimes do computer laboratory maintenance, as well as the responsibilities provided by the administration according to their defined duties. This study sought to explore how schools provide instructional leadership support to IT and CAT teachers. It contributes insights about who the instructional leaders are, what activities characterise instructional leadership support and what the perceptions of the IT and CAT teachers are regarding the instructional leadership support they receive.

## 5.4 PURPOSE STATEMENT AND RESEARCH QUESTIONS

The aim of this study was to unpack support for IT and CAT subject teachers in terms of instructional leadership, by investigating who the instructional leaders are and what they do to provide the appropriate support.

The research questions that guided this study to investigate how schools provide instructional leadership support to IT and CAT teachers were investigated by asking the following sub-questions:

- Who are the instructional leaders for IT and CAT at schools?
- What activities characterise instructional leadership support for IT and CAT at schools?
- What are the perceptions of IT and CAT teachers regarding the instructional leadership support they receive?
- What suggestions can be made, based on the data on perceptions and activities relating to instructional leadership, to improve instructional leadership support for IT and CAT teachers at South African schools?

The study sheds light on the role and responsibilities of principals, deputy principals and department heads and others, as technology leaders, and explored how they help CAT and IT teachers at their schools. This work also offers possible solutions for perceived obstacles that the teachers face in terms of guidance and leadership support.

## 5.5 METHODOLOGY

This study used a survey design, administered by means of a questionnaire. The pencil-and-paper questionnaire form and e-mail forms were distributed to CAT and IT teachers of the 108 secondary schools that offer CAT or IT in the Free State province. The questionnaire was completed by 50 teachers, which represented 46% of the expected population. The survey instrument used for evaluating instructional leadership was the PIMRS, which Hallinger and Murphy (1985) had developed. Descriptive statistical analysis was used to calculate frequencies, percentages, means and standard deviations. Cross-tabulation and frequency tables were used for the quantitative analysis, to indicate the actual perspectives of participants.

## 5.6 REVIEW OF RELATED LITERATURE

A great deal of research has been done on instructional leadership, with the goal of capturing the various complexities needed for sustaining a culture of teaching and learning, and managing optimal learning (Bisschoff & Watts, 2013; Bush, 2013; Hallinger, 2003; Robinson, 2007; Spillane, 2006). Previous research on the topic of instructional leadership revolves mostly around the principals' perspectives and their roles in support of ICT integration into classrooms, and less on supporting the teaching of technology-specific subjects such as IT and CAT. Previous studies mainly investigated the general integration of ICT in schools and the effect of the principal's leadership on learner achievement (Guvhu, 2019; Robinson, 2010; Salo et al., 2015). As a result of education reforms, considerable emphasis is now on the incorporation of ICT into the curriculum subject and using ICT to enhance not only teaching and learning, but also school administration.

School administration is the section that creates and promotes an effective learning environment for learners. It is well understood that senior school administrators have a significant influence on classroom and curriculum activities and that using ICT in schools includes aspects of school life, to the degree that it impacts the life of all staff (teaching and non-teaching). If school administrators have better knowledge of ICT integration, they can be expected to provide adequate support for CAT and IT teachers.

The literature on instructional leadership in successful schools is rife with references to the principal as the primary source of this leadership. It is indicated by Edmonds (1981, cited by Leech, Pate, Gibson, Green & Smith, 2009), that the principal has to be the person instructional personnel look up to for leadership. Literature (Anderson and Dexter 2005; Brockmeier et al. 2005; Creighton 2003; Grady and Gosmire 2007; Hew and Brush 2006; Holland and Moore-Steward 2000; Kozloski 2006; Sharp 1998 and Haines 2018), confirms that principals should be technology leaders. Anderson and Dexter (2005) indicate that school leaders, as technology leaders, are expected to generate ideas about how to use emerging technology to meet the needs of ever-evolving educational environments. Chin (2010), therefore, defines technical leadership as a kind of functionally-focussed leadership activity. This correlates with the definition by Chang et al. (2008: 241) of a technology leader, as "one who leads the school in improvement or restructuring, and makes use of emerging technologies as the core resources for educational change". ***Is this the case?*** If principals take up their assigned role to guide instructional personnel, why do many schools still experience lack of support for CAT/IT teachers? The question then arises, how good is the knowledge of the principal to provide the support needed by teachers, or to guide the department head in providing such support? The answer to this question is evident in the responses to the open-ended questions, to which teachers indicated that the principal and HOD lack knowledge of technology, and technological skills. It is, therefore, recommended that more studies are conducted to establish the knowledge of principals and HODs on technology, and to determine their technological skills, and whether school leaders do serve as technology leaders.

Robinson (2010) points out that there are several persuasive explanations for further research into the capacity required for effective instructional leadership – the clearest justification for this is the need for school leaders to provide research-informed training and development opportunities. Building instructional leadership skills, Robinson argues, encompasses more than educating individual leaders or leadership teams. It also includes establishing suitable institutional and external conditions to enable the exercise and creation of relevant capabilities. A broader perspective is also adopted by Fullan, Hill and Crevola (2006), who argue that research on the skills needed for successful instructional leadership will inform the development of instructional

systems and resources, as well as instructional leadership development. Research-informed resources must be generated and enforced to make sure that instructional leadership is scaffolded by good tools, i.e., tools that are simple and which integrate acceptable task-related theories when, for example, educational leaders monitor classrooms, evaluate teachers, choose curricula or assess learner learning (Robinson & Timperley, 2007).

The concept of leadership in school technology has been described by Anderson and Dexter (2000) as decision-making by administrators on technology goals, policies, budgets, committees and other structural support to improve technology's role in learning (Deryakulu & Olkun, 2009:46). Though technology infrastructure is important, Anderson and Dexter (2005) found that technology leadership is even more necessary for the efficient use of technology in schooling. According to Seferoğlu (2001), IT teachers seem to be expected to manage both learner education and computer lab maintenance, as well as administrative responsibilities in relation to their specific duties. As a result, information technology teachers face various issues in an educational, administrative, technical, and individualistic way. Chang (2012) states that five dimensions of technological leadership are derived from empirical leadership literature in general and, in particular, the efficacy of principals as technology leaders: vision, planning and management; staff development and training; technological and infrastructure support; evaluation and research, and interpersonal and communication skills. Early research examined and verified these five dimensions (e.g., Chang et al., 2008; Chang, Hsiao & Hsu, 2007; Chang & Hsu, 2009; Chin & Chang, 2006), and applied them to relevant studies (Chang, 2012; Thannimalai & Raman, 2018).

Cory (1990) found that vision, planning and management were very important features of technology leadership. To develop this vision, the principal and HOD need to understand the direction and trends of technology development. As far as staff growth and training are concerned, Ford (2000) suggests that the most critical tasks of a technological leader are planning and resource-building for staff development. In relation to technological and infrastructure support, Anderson and Dexter (2000) report that technology leaders must provide professional help when instructors and staff need support. Evaluation and research must set technological objectives and establish professional development strategies (Cory, 1990; Ford, 2000). In technological

leadership, interpersonal skills are essential in relation to the dimension of interpersonal and communication skills. When incorporating new technologies in a school, the leader must be capable to arrange for help; thus, good communication is the first ability that instructional technology leaders need to have (Bailey, 1997; Jewell, 1998; Moursund, 1992).

These dimensions are in line with the PIMRS instructional leadership job functions: providing resources for instruction, communicating about courses for professional development, providing feedback on classroom practice, and bringing in experts for professional development. It is for that reason that the PIMRS was used in this research to study the behaviour of technology leaders.

## 5.7 DISCUSSION AND INTERPRETATION OF FINDINGS

The findings on who the key instructional leaders are for CAT and IT, and what activities characterise their support of IT and CAT teachers, indicate that the leadership tasks are fulfilled through the interaction of multiple leaders, including the principal, deputy principal, HOD (currently known as departmental heads), and subject advisors. Among the team of leaders, the principal scored the highest on providing appropriate resources for instruction, communicating instructional goals, making resources available, handling learner discipline and providing support. In line with the research question, it is evident that the principal was identified as the outstanding instructional leader in supporting CAT/IT teachers, even though the data suggests room for improvement for principals to score even higher on this role.

The major finding on how schools provide instructional leadership support to IT and CAT teachers indicates that the teachers perceive the type of support they received as varying from technical to pedagogical. Teachers stated that appropriate resources for instruction, making resources available, and communicating instructional goals are mostly provided by the principal. Activities that encompass offering courses for professional development and bringing in experts for professional development reside mostly with other people (subject advisors, coordinators of the PLC and peer teachers), and not necessarily the principal, which indicates a communication gap with regard to professional development of CAT/IT teachers. It is suggested by Leithwood

and Riehl (2003) and Leithwood et al. (2004), as cited by Dexter (2008: 543), that "Recommendations for what leaders should know and can do can be organized into three basic leadership functions: setting direction, developing people and getting the organization to work". This links to planning for instruction and professional development, and communicates instructional goals (PIMRS) instruments.

Communicates instructional goals had the lowest mean (M = 2.88), which indicates the possibility that CAT/IT teachers experienced problems, which is confirmed by their responses to the open-ended questions. Some teachers indicated that the area of the principal's leadership that could be improved by appropriate technology support, is communication skills. Hallinger and Murphy (1985) indicate the communication of the school goals as the primary function of instructional leadership. Research shows that, when core support, shared vision and common goals are in place, teachers are identified as collaborative, committed to their school, and more responsible for school improvement, which, ultimately, has a positive impact on learner outcomes.

Teachers indicated that the type of support they receive can be either technical or pedagogical, or both technical and pedagogical.

Findings of this study exposed the barriers and challenges teachers experience with computers that are outdated and or which need repair, and lack of access to network administrators and IT technicians: 30% of teachers referred to challenges related to too few internet-connected computers, and insufficient internet bandwidth or speed. While not overwhelming, this finding is important for suggesting a possible area for improvement.

More interestingly, the findings show that the HOD provided mostly pedagogical and technical support, which is evident from the findings of planning for instruction (50%), having strong knowledge of instruction; and teachers observed by, which implies that the HOD takes on the role of instructional leader for CAT/IT. This links to the framework that guided this study, the TPACK framework. Stein and Nelson (2003: 445) define leadership content knowledge as "that knowledge of subjects and how learners learn them that is used by administrators when they function as instructional leaders". The indication of the support given by the principal, others, and deputy principals supports the distributed leadership framework that guided the study.

Majocha (2015) reports on Spillane's (2005) argument that leadership requires interactions between many leaders and followers, since work is assigned to each person in different ways. Bush (2013) points out that instructional leadership is not, in fact, the school principal's sole possession. Teachers holding various positions of authority at the school all undertake activities to achieve the purpose of enhancing teaching. Part of the wide-ranging context, for example, is the dispersal of instructional leadership by subject area, which shows the demands of the specific subject matter, and how it is perceived within the broader curriculum, and how it affects the type of teacher support (Spillane, 2006).

The views of teachers on the instructional leadership support they receive were evaluated according to four considerations: first, the leaders' understanding of pedagogical content knowledge, which comprises the knowledge and understanding of IT/CAT as part of the curriculum and the nature and purpose of IT/CAT; second, demonstrating an understanding of the technological needs and concerns of teachers and learners; third, fostering a constructive technology-related partnership with teachers and leaners; and fourth, actively engaging with teachers about technology. This links with Brown (2009), who explains that educational technology is composed of two components: technological and pedagogical. The technical component refers to the hardware, software, audio-visual, and other media bases, as well as the technical component features. The pedagogic dimension relates to the technology's teaching and learning processes and applications. The technological and pedagogical aspects are both important and interconnected.

There is a strong positive correlation between who understands IT/CAT as part of the curriculum, and also understanding the nature and purpose of IT/CAT. Teachers indicated that, if principals are aware of the nature and purpose of CAT/IT subjects, they would be able to provide teachers with appropriate technology support. This is evident from the responses to the open-ended questions, in which teachers indicated that principals and deputy principals need to have enough knowledge to acknowledge the importance of technology, otherwise they would not be able to assist or understand the problems pertaining to various situations in the classroom. Teachers need access to appropriate software, reliable equipment and continuous technological and pedagogical support. Some teachers would like principals to improve their technology

skills, or acquire it, if principals lack these skills. Content knowledge is another area that should be improved, and this area relates to the nature and purpose of the subject. Instructional leaders need to participate in more professional development programmes, in order to develop constructive skills regarding ICT, and content knowledge, which would enable them to act as a technological managers. Seventy percent of the teachers indicated that both principals and HODs must have adequate TPACK.

An IT teacher indicated that both IT and CAT are only offered as extra subjects at his school. He indicated that classes include learners from several schools that no longer offer or never offered CAT or IT. There is a deficiency of instructional leadership at schools where CAT and IT are offered as additional subjects. This participant is his school's network administrator and he administers the budgets that supply all technical acquisitions by the school; his role comprises the full gamut of identifying needs, planning, budgeting, purchasing and installing and implementing technology. As a result, IT teachers are required to manage learner education, computer maintenance and administrative responsibilities in accordance with their established duties.

## 5.8 LIMITATIONS OF THE STUDY

This study was limited specifically to the perceptions of IT and CAT teachers at schools that offer CAT and IT in the five districts of the Free State province, regarding the instructional leadership support the teachers receive.

## 5.9 RECOMMENDATIONS

It is recommended, based on the findings of the study, that further research is undertaken to explore school technology leadership more broadly and in greater depth, to determine the explicit role of technology leadership for CAT and IT subject teachers. Studies should also focus on new competencies that school-based leaders need to develop that can enable them to provide effective support for CAT and IT teachers that can also benefit learners.

Future studies should also be done on instructional leaders' TPACK knowledge and the impact TPACK knowledge will have on CAT and IT teachers' perceptions of

instructional leadership support. Studies need to determine how instructional leaders with TPACK knowledge can give appropriate support to CAT/IT teachers. Spillane and Seashore Louis (2002:97) argue that “the need for school leaders to have rich content and pedagogical knowledge of each subject area is too general and creates unrealistic and unattainable expectations for the profession”. It is, therefore, imperative to determine what kind of content and pedagogical knowledge it takes for leaders to lead effectively, thus, enabling the provision of better support to CAT and IT teachers.

To get the necessary support and management for CAT/IT as stipulated in the policy document, CAT/IT must be assigned to relevant or own departments. Currently, CAT/IT is assigned to departments where the departmental head (HOD) does not have the capability to manage these subjects.

## 5.10 CONCLUSION

From the findings of the study it is clear that a single leader cannot fulfil the role of providing instructional leadership for IT and CAT at schools. The absence of an instructional leader with technological background and knowledge might lead to CAT and IT teachers feeling neglected. This might also be the reason why CAT and IT learner numbers continue to decline. These findings suggest that further research is needed on effective technology leadership. The question that arises is, if the principal has been identified as the key instructional leader for providing support to CAT/IT teachers, why are so many teachers still complaining about not receiving suitable support?

Principals need be informed about technological developments (changes and/or innovations in technology), so that they understand the need for updating and upgrading computers and computer components. Instructional leaders need to understand the nature and purpose of CAT/IT and to understand CAT/IT as part of the curriculum, and to clarify the responsibilities regarding technology leadership. School leaders need to ensure that there is a system of technical and pedagogical support to facilitate the use and maintenance of technology. More research is needed to conceptualise instructional leadership practices for CAT and IT teachers.

As a CAT teacher, I realised that CAT/IT is not properly dealt with at school level. The struggle to obtain resources, leaders without appropriate knowledge about the subject and the absence of professional development courses, leave teachers feeling despondent. Many learners are interested in the subject, but due to the shortage of resources, they cannot be accommodated. Urban schools are better resourced than suburban and rural schools and, therefore, produce better results. This leads to some suburban and rural teachers feeling incompetent, and believing that their complaints are being ignored. This boils down to one aspect being needed: an instructional leader who is a technology leader.

According to this research, these subjects are allocated under the mathematics and science departments, and in some schools under the commerce department. This is part of the reason why the subjects do not receive the attention they deserve. Effective monitoring and control is one of the challenges teachers experience, due to the fact that the HOD lacks appropriate subject knowledge. Teachers look to the principal for complete support, not realising that principals will not always be able to help them, because principals are not specialists in all subjects offered at a school. The aim of this research study was to investigate teachers' perceptions regarding the instructional leadership support they receive and how to improve instructional leadership support, and findings show that the role and responsibilities of principals, deputy principals and HODs need to expand/change to include that of being technology leaders.

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# APPENDIX A. ETHICAL CLEARANCE LETTER

UFS·UV

[redacted]

**Faculty of Education**

11-May-2017

Dear **Mrs Sunia Marshell Dokter**

Ethics Clearance: **School-based instructional leadership support for Information Technology and Computer Applications Technology subject teachers**

Principal Investigator: **Mrs Sunia Marshell Dokter**

Department: **School of Mathematics Natural Sciences and Technology Education (Bloemfontein Campus)**

**APPLICATION APPROVED**

With reference to you application for ethical clearance with the Faculty of Education, I am pleased to inform you on behalf of the Ethics Board of the faculty that you have been granted ethical clearance for your research.

Your ethical clearance number, to be used in all correspondence is: **UFS-HSD2017/0207**

This ethical clearance number is valid for research conducted for one year from issuance. Should you require more time to complete this research, please apply for an extension.

We request that any changes that may take place during the course of your research project be submitted to the ethics office to ensure we are kept up to date with your progress and any ethical implications that may arise.

Thank you for submitting this proposal for ethical clearance and we wish you every success with your research.

Yours faithfully

Dr. MM Nkoane
Chairperson: Ethics Committee

**Education Ethics Committee**
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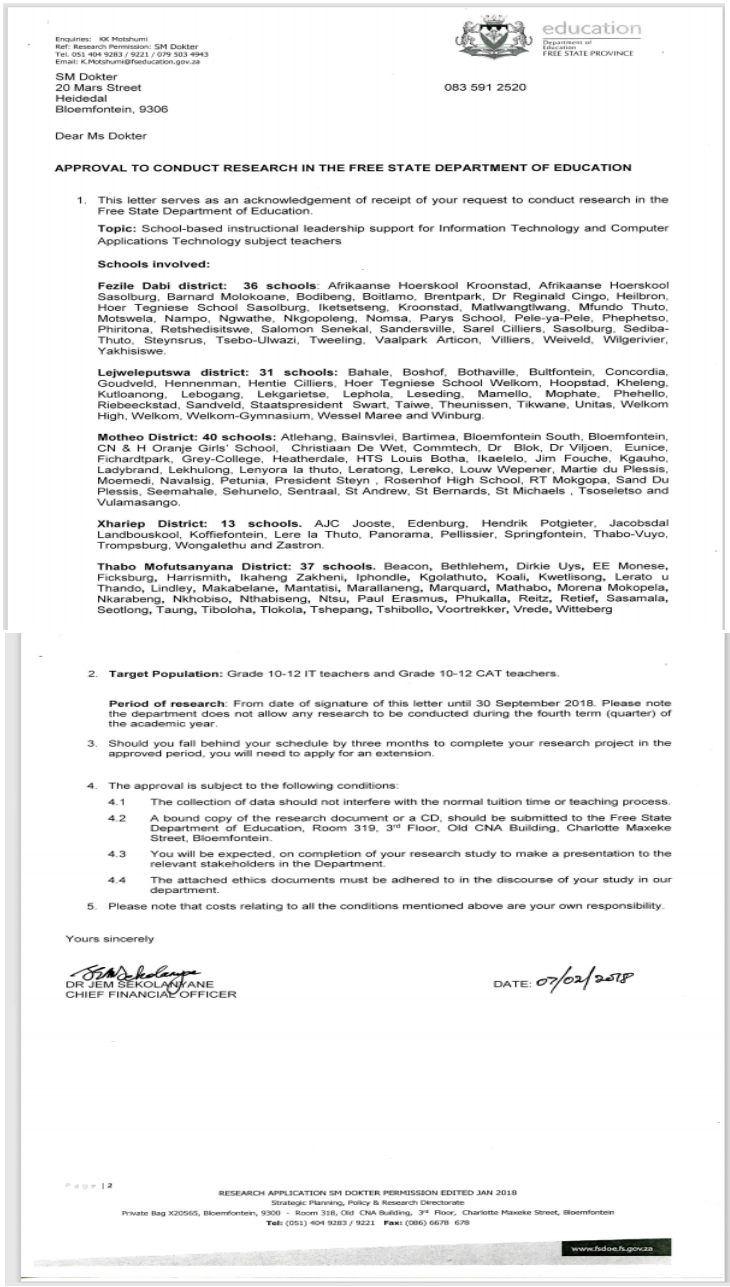
# Appendix B: RESEARCH APPROVAL LETTER FROM FREE STATE DEPARTMENT OF EDUCATION



Enquiries: KK Motshumi
Ref: Research Permission: SM Dokter
Tel. 051 404 9283 / 9221 / 079 503 4943
Email: K.Motshumi@fseducation.gov.za

education
Department of Education
FREE STATE PROVINCE

SM Dokter
20 Mars Street
Heidedal
Bloemfontein, 9306

083 591 2520

Dear Ms Dokter

**APPROVAL TO CONDUCT RESEARCH IN THE FREE STATE DEPARTMENT OF EDUCATION**

1. This letter serves as an acknowledgement of receipt of your request to conduct research in the Free State Department of Education.

   **Topic:** School-based instructional leadership support for Information Technology and Computer Applications Technology subject teachers

   **Schools involved:**

   **Fezile Dabi district: 36 schools**: Afrikaanse Hoerskool Kroonstad, Afrikaanse Hoerskool Sasolburg, Barnard Molokoane, Bodibeng, Boitlamo, Brentpark, Dr Reginald Cingo, Heilbron, Hoer Tegniese School Sasolburg, Iketsetseng, Kroonstad, Matlwangtlwang, Mfundo Thuto, Motswela, Nampo, Ngwathe, Nkgopoleng, Nomsa, Parys School, Pele-ya-Pele, Phephetso, Phiritona, Retshedisitswe, Salomon Senekal, Sandersville, Sarel Cilliers, Sasolburg, Sediba-Thuto, Steynsrus, Tsebo-Ulwazi, Tweeling, Vaalpark Artcon, Villiers, Weiveld, Wilgerivier, Yakhisiswe.

   **Lejweleputswa district: 31 schools:** Bahale, Boshof, Bothaville, Bultfontein, Concordia, Goudveld, Hennenman, Hentie Cilliers, Hoer Tegniese School Welkom, Hoopstad, Kheleng, Kutloanong, Lebogang, Lekgarietse, Lephola, Leseding, Mamello, Mophate, Phehello, Riebeeckstad, Sandveld, Staatspresident Swart, Taiwe, Theunissen, Tikwane, Unitas, Welkom High, Welkom, Welkom-Gymnasium, Wessel Maree and Winburg.

   **Motheo District: 40 schools:** Atlehang, Bainsvlei, Bartimea, Bloemfontein South, Bloemfontein, CN & H Oranje Girls' School, Christiaan De Wet, Commtech, Dr Blok, Dr Viljoen, Eunice, Fichardtpark, Grey-College, Heatherdale, HTS Louis Botha, Ikaelelo, Jim Fouche, Kgauho, Ladybrand, Lekhulong, Lenyora la thuto, Leratong, Lereko, Louw Wepener, Martie du Plessis, Moemedi, Navalsig, Petunia, President Steyn , Rosenhof High School, RT Mokgopa, Sand Du Plessis, Seemahale, Sehunelo, Sentraal, St Andrew, St Bernards, St Michaels , Tsoseletso and Vulamasango.

   **Xhariep District: 13 schools.** AJC Jooste, Edenburg, Hendrik Potgieter, Jacobsdal Landbouskool, Koffiefontein, Lere la Thuto, Panorama, Pellissier, Springfontein, Thabo-Vuyo, Trompsburg, Wongalethu and Zastron.

   **Thabo Mofutsanyana District: 37 schools.** Beacon, Bethlehem, Dirkie Uys, EE Monese, Ficksburg, Harrismith, Ikaheng Zakheni, Iphondle, Kgolathuto, Koali, Kwetlisong, Lerato u Thando, Lindley, Makabelane, Mantatisi, Marallaneng, Marquard, Mathabo, Morena Mokopela, Nkarabeng, Nkhobiso, Nthabiseng, Ntsu, Paul Erasmus, Phukalla, Reitz, Retief, Sasamala, Seotlong, Taung, Tiboloha, Tlokola, Tshepang, Tshibollo, Voortrekker, Vrede, Witteberg

2. **Target Population:** Grade 10-12 IT teachers and Grade 10-12 CAT teachers.

   **Period of research**: From date of signature of this letter until 30 September 2018. Please note the department does not allow any research to be conducted during the fourth term (quarter) of the academic year.

3. Should you fall behind your schedule by three months to complete your research project in the approved period, you will need to apply for an extension.

4. The approval is subject to the following conditions:

   4.1 The collection of data should not interfere with the normal tuition time or teaching process.

   4.2 A bound copy of the research document or a CD, should be submitted to the Free State Department of Education, Room 319, 3rd Floor, Old CNA Building, Charlotte Maxeke Street, Bloemfontein.

   4.3 You will be expected, on completion of your research study to make a presentation to the relevant stakeholders in the Department.

   4.4 The attached ethics documents must be adhered to in the discourse of your study in our department.

5. Please note that costs relating to all the conditions mentioned above are your own responsibility.

Yours sincerely

DR JEM SEKOLAMANE
CHIEF FINANCIAL OFFICER

DATE: 07/02/2018

Page | 2

RESEARCH APPLICATION SM DOKTER PERMISSION EDITED JAN 2018
Strategic Planning, Policy & Research Directorate
Private Bag X20565, Bloemfontein, 9300 - Room 318, Old CNA Building, 3rd Floor, Charlotte Maxeke Street, Bloemfontein
Tel: (051) 404 9283 / 9221 Fax: (086) 6678 678

www.fsdoe.fs.gov.za

## APPENDIX C: LETTER FROM THE EDITOR

### Declaration

20 August 2020

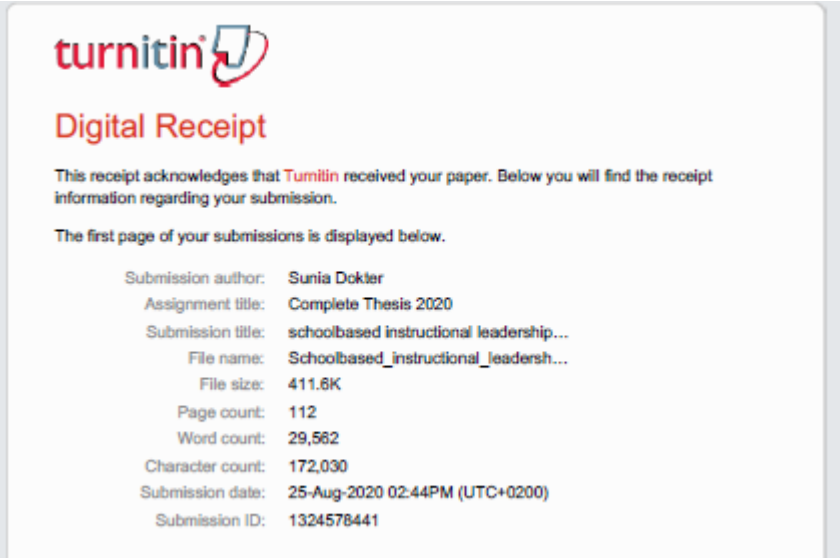
Hester Sophia Human
PO Box 4
Otjiwarongo
Namibia

Student: SM Dokter

Thesis: School-based instructional leadership support for information technology and computer applications technology subject teachers

I confirm that I edited this thesis, checked the references, and made recommendations for changes to the text.

# Appendix D: TURNIT IN REPORT



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| Submission ID: | 1324578441 |

SCHOOL-BASED INSTRUCTIONAL LEADERSHIP SUPPORT FOR INFORMATION TECHNOLOGY AND COMPUTER APPLICATIONS TECHNOLOGY SUBJECT TEACHERS

By

SUNIA MARSHELL DOKTER

BA Ed (UFS), B Ed (Hons) (CUT)

Submitted in fulfilment of the requirements for the Degree of Master of Education

in the

SCHOOL OF MATHEMATICS, NATURAL SCIENCES AND TECHNOLOGY EDUCATION

FACULTY OF EDUCATION

at the

UNIVERSITY OF FREE STATE

BLOEMFONTEIN

August 2020

Supervisor: Dr Thuthukile Jita

## Appendix E: LETTER REQUESTING PERMISSION FROM PRINCIPAL

Mrs. S.M. Dokter
20 Mars Street
Heidedal
BLOEMFONTEIN
9306

The Principal
Xxxxxx Secondary School
XXXXXXXXXX
9306

**Request for permission to conduct research**

Dear Sir/Madam

I hereby request permission to conduct research with teachers in your school.

My name is Sunia Dokter, and I am presently studying for a Master's degree with the University of the Free State. As part of my Masters programme, I am required to conduct research on an aspect of interest with a view to making a contribution to our knowledge and understanding of the issue under study. The title of my research project is:

*School-based instructional leadership support for Information technology and Computer Applications Technology teachers in the Free State.*

The purpose of the study is to determine the key instructional leaders for IT and CAT in schools, and what activities characterise their support, if any, for IT and CAT teachers in schools.

I am particularly interested in how schools provide instructional leadership support to IT and CAT teachers and its impact on their classroom practices. The study has the potential to benefit *instructional leaders* by pointing out the challenges, the successes and the needs for supporting CAT/IT teachers in the Free State.

The study will involve teachers completing a questionnaire on IT and CAT teacher's perspectives about the instructional leadership support they receive.

I undertake to observe confidentiality and to protect participants from physical and/or psychological harm. No names of the schools and/or persons shall be used in any reports of the research. All participants will be asked to participate voluntarily in the study and may withdraw at any time should they so wish.

Upon completion of the study, I undertake to provide the Ministry of Education and Training with a copy of the research report and to share my findings with the CAT and IT teachers in the school as necessary.

I have already applied for and received permission from the Ministry of Education and Training to conduct the study.

If you need any further information and /or have suggestions, please do not hesitate to contact me and/or my research supervisor Dr T. Jita at jitaT@ufs.ac.za or +27514017441.

Thank you for your kind consideration of my request.

Yours sincerely

Sunia Dokter

## Appendix F: INVITATION TO PARTICIPANTS

The CAT/IT teacher

XXX Secondary School

Xxxxxxx

**INVITATION TO PARTICIPATE IN A RESEARCH STUDY**

Dear Sir/Madam

My name is Sunia Dokter, and I am presently studying for a Master's degree with the University of the Free State. As part of my Masters programme, I am required to conduct research on an aspect of interest with a view to making a contribution to our knowledge and understanding of the issue under study. The title of my research project is:

*School-based instructional leadership for Information technology and Computer Applications Technology teachers in the Free State.*

The purpose of the study is to determine the key instructional leaders for IT and CAT in schools, and what activities characterise their support, if any, for IT and CAT teachers in schools.

You have been identified as one of the teachers who teaches CAT/IT. The study has the potential to benefit you and other teachers who are teaching CAT/IT by pointing out the challenges, the successes and the needs for supporting from their instructional leadership at their schools.

The study will involve completing a questionnaire.

I undertake to observe confidentiality and to protect participants from physical and/or psychological harm. No names of the schools and/or persons shall be used in any reports of the research. All participants will be asked to participate voluntarily in the study and may withdraw at any time.

Upon completion of the study, I undertake to provide the Ministry of Education and Training with a copy of the research report and to share my findings with the CAT and IT teachers in the school as necessary.

I have already applied for and received permission from the Ministry of Education and Training to conduct the study.

If you need any further information and /or have suggestions, please do not hesitate to contact me and/or my research supervisor Dr T. Jita at jitat@ufs.ac.za or +27514017441.

Thank you for your kind consideration of my request.

Yours sincerely

Sunia Dokter

If you agree to participate in the study entitled:

*School-based instructional leadership for Information technology and Computer Applications Technology teachers in the Free State.*

Please complete the attached consent form

- *I hereby give free and informed consent to participate in the abovementioned research study.*
- *I understand what the study is about, why I have*
- *I understand what the potential benefits and risks are.*
- *I give the researcher permission to make use of the information collected from my participation for research purposes only.*

*Participant's Signature: ……*

*Date: ……*

*Researcher's Signature: ……..*

*Date: ……*

## Appendix G: TEACHER SURVEY

Dear Teacher

Thank you for taking the time to complete this survey. Your assistance in completing the questions as completely and accurately as possible is appreciated and will greatly assist in the analysis of instructional leadership for CAT and IT teachers.

All information that is collected in this study will be treated confidentially. While results will be made available to the Ministry of Education and Training, you are guaranteed that neither you, this school nor any of its personnel will be identified in any report of the results of the study. Participation in this survey is voluntary and any individual may withdraw at any time.

This questionnaire asks for information about school-base instructional leadership support for CAT and IT teachers and should take approximately 35 minutes to complete.

### SECTION A

### BACKGROUND QUESTIONS

*These questions are about you, your education and the time you have spent in teaching. In responding to the questions, please mark the appropriate box.*

1. **What is your gender?**

   Male ☐ Female ☐

2. **What is your highest formal education qualification?**

   Teaching Certificate ☐
   Teaching Diploma ☐
   Bachelor's Degree ☐
   Honour's Degree ☐
   Master's Degree ☐

3. **Where is your school situated?**

Suburban ☐ Urban ☐ Rural ☐

4. **How long have you been teaching?**

My first year 1-2 years 3-5 years 6-10 years 11-15 years 16-20 years $20^{+}$ years

☐ ☐ ☐ ☐ ☐ ☐ ☐

5. **How long have you been teaching at this school?**

My first year 1-2 years 3-5 years 6-10 years 11-15 years 16-20 years $20^{+}$ years

☐ ☐ ☐ ☐ ☐ ☐ ☐

**SECTION B**

1. **Activities that characterise support for CAT and IT teachers**

Indicate who provides/assist you with the following:

| | | Principal | Deputy-principal | HOD | OTHER |
|---|---|---|---|---|---|
| a) | Provides appropriate resources for effective instruction. | | | | |
| b) | If I need resources, they are made available to me by my | | | | |
| c) | Communicates instructional goals for the school. | | | | |
| d) | Informs me of courses for professional development. | | | | |
| e) | Brings in experts in certain areas for professional development. | | | | |
| f) | Handles learner discipline. | | | | |

| | | | | | |
|---|---|---|---|---|---|
| g) | I am frequently observed by my …….. | | | | |
| h) | My ……. provides feedback with specific action steps to improve my classroom practice. | | | | |
| i) | My ……. has a strong knowledge of instruction. | | | | |
| j) | My ……. check to see whether classroom activities are in keeping with our educational goals | | | | |
| k) | Planning for instruction | | | | |
| l) | I feel supported by my | | | | |

2. **Teacher's perceptions on instructional leadership behaviours**

**How strongly do you agree or disagree with the following statements …**

*Please mark the extent to which you disagree or agree which each of the following:*

*Please mark one choice in each row.*

***Interpersonal and communication skills***

| The school management team at this school | | | | | |
|---|---|---|---|---|---|
| | Strongly Agree | Agree | Uncertain | Disagree | Strongly Disagree |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| a) Demonstrate an understanding of technology needs and concerns of teachers and learners | | | | | |
| b) Maintain positive relationships with teachers and learners in regard to technology | | | | | |
| c) Communicates effectively with teachers about technology | | | | | |
| ***Pedagogical Content Knowledge*** | | | | | |
| d) Demonstrate knowledge and understanding of the subject content | | | | | |
| e) IT / CAT as part of the school curriculum | | | | | |
| f) The nature and purpose of IT / CAT | | | | | |

**3. Type of support**

Indicate the type of support you receive from the following by marking with a X

| What type of support do the following provide you | Mostly technical support | Mostly pedagogical support | Both technical and pedagogical support |
|---|---|---|---|
| | 1 | 2 | 3 |
| Principal | | | |
| Deputy-principal | | | |
| Head of Department | | | |

## 4. Planning and resource management

a) Do your school have a technology plan?

Yes ☐ No ☐

b) How often does the plan been revised?

Annually ☐ Every second year ☐ Every third year ☐

c) Is teaching and learning adversely affected by the following?

*Tick one box for each* row

| | A lot | Partially | A little | Not at all |
|---|---|---|---|---|
| Insufficient number of computers | | | | |
| Insufficient number of internet-connected computers | | | | |
| Insufficient Internet bandwidth or speed | | | | |
| School computers | | | | |

| | | | | |
|---|---|---|---|---|
| out of date and/or needing repair | | | | |
| • No network administrator or or IT technician | • | • | • | • |

**SECTION C**

**Teacher's perceptions regarding the instructional leadership support**

1. Briefly describe one area of your principal's leadership that, if improved, could provide you with the appropriate technology support you need.

2. Do you think it's compulsory for principals and Head of departments to have adequate technological pedagogical content knowledge of IT/CAT? Justify your answer.

This is the end of the questionnaire.

Thank you very much for your cooperation!