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Examination of primary school teachers' analysis of literacy assessment data

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Examination of primary school teachers’ analysis of literacy assessment data

Mary-Anne Zevenbergen

Thesis submitted for degree of
Master of Philosophy
The University of Notre Dame Australia

December 2016
Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other institution.

To the best of my knowledge and belief this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

Mary-Anne Zevenbergen

1 December 2016
Abstract

The 21st century has seen many changes in educational assessment practices across the world. Australia has been part of the international trend promoting greater use of assessment data to improve educational standards. This study took place within the context of a data-driven educational environment. The aim of the study was to examine how primary school teachers use the data from literacy assessments to inform their pedagogical decisions. A mixed methods study, using a purposive sample of teachers, investigated strategies used by teachers to analyse data from assessment to identify students’ abilities and use the data to inform subsequent instruction and intervention to meet the needs of individual students. The study found that while teachers’ had reasonable confidence about analysing data, they needed to improve their skills in detailed analysis of a variety of assessment data so that subsequent teaching was data-based. The study examined what interventions were most frequently employed and found that, while a wide range of strategies was used, not all of them were proven to be effective. The most common types of intervention used by teachers as a result of their data analysis were small groups, individual intervention, commercial programs and direct instruction. Effective analysis of data is acknowledged to be a difficult task. Therefore, the study also investigated what factors influenced teachers’ practices and found that the main barriers to analysis of assessment data were lack of time, lack of knowledge and lack of support. Factors that had a positive influence on teachers’ analysis of assessment data were identified as being collaborative approaches and professional development focused on data analysis skills.
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Definition of Terms

**Australian Curriculum and Reporting Authority (ACARA)**

The Australian Curriculum and Reporting Authority is an independent statutory authority responsible for National curriculum, assessment and reporting in Australia. (ACARA, 2016a).

**Analysis**

Analysis involves the processes of reading factual test results (data), comparing data and also predicting and inferring from the data. (Pierce, Chick, Watson, Les, & Dalton, 2014).

**Assessment**

Assessment is a measurement of how student learning is progressing and occurs on an ongoing basis with the purpose of improving student learning. (Department of Education and Training, Victoria, 2016).

**Evaluation**

Evaluation is making judgements about the value of a grade with the focus on how well a task has been completed (Macquarie University, 2015).

**Independent schools**

Independent schools are a diverse group of non-government schools serving a range of communities. These schools are predominantly funded by private sources. In Australia, these include some Catholic schools along with many other denominational and non-denominational schools (Independent Schools Council of Australia, 2016).
**Intervention**

Intervention is modification of instruction to close the gap between the actual and expected levels of students’ achievement as determined by educational age/grade-appropriate standards (Grigorenko, 2009).

**Literacy**

Literacy is the capacity to interpret and use language features, forms, conventions and text structures in the English language. It also refers to the ability to read, view, listen to, speak, write and create texts for learning and communicating in and out of school. Literacy learning is based on the development of language and communication skills (ACARA, 2016b).

**National Assessment Program for Literacy and Numeracy (NAPLAN)**

All students in Australian schools who are in Years Three, Five, Seven, and Nine take part in this standardised assessment at the same time across Australia annually (ACARA, 2016c).

**Public/government schools**

Public schools are those that are predominantly funded by the government; and are also known as government or state schools (Department of Education, 2016).
CHAPTER ONE: INTRODUCTION

1.1. Introduction

Australia is currently part of an international trend to improve educational standards, increase levels of educators’ accountability and promote greater use of assessment data (Smeed, Ehrich, & Perry, 2010). International and national legislation has had several implications for education and for educators, bringing about changes in curriculum, assessment and reporting practices (Klenowski, 2012). Of particular significance, and relevance, to this study is the changing role of assessment data as a result of new legislation and policy. International legislation, such as the No Child Left Behind Act, will be presented along with the Australian legislation, which underpins the current study.

President Bush of the United States of America legislated the No Child Left Behind (NCLB) Act in 2001 (United States Department of Education, 2002). The Act proposed to close the achievement gap between students through improved accountability, flexibility and choice so that every student reached their full potential. The NCLB was replaced in 2015 when President Obama signed the Every Student Succeeds Act (ESSA) but the requirement of accountability and improvement in educational standards was maintained in the new Act (United States Department of Education, 2015). The legislation required teachers to be more accountable for students’ learning and to use assessment as evidence of students’ academic improvement.

Beginning in 2007, Australia experienced similar changes to those in the United States of America. The Australian Government announced what was known as the ‘Education Revolution’ to improve academic standards, students’ achievement and quality of education (Department of Education, Employment and Workplace Relations, 2008). The policy prioritised “…an approach which combines high expectations of achievement with individually tailored learning opportunities” (p. 25). The policy declared an increase in accountability, transparency and the collection of data to inform parents, schools and governments of student and school achievements (Department of Education, Employment and Workplace Relations,
2008). The Council of Australian Governments (COAG), who set the foundations for policy reforms, agreed on the development of a new framework for performance and assessment in education (Gable & Lingard, 2013). COAG also supported greater transparency and accountability as a means to achieving higher quality education. COAG’s principles mirrored the international trends (Gable & Lingard, 2013).

In 2008, Australian Education Ministers introduced a new policy, the *Melbourne Declaration on Educational Goals for Young Australians* (Ministerial Council on Education, Employment, Training & Youth [MCEETYA], 2008), commonly known as the Melbourne Declaration. The Melbourne Declaration aimed to promote equity and excellence in Australian schools so that all young Australians could become successful learners and MCEETYA, 2008). Eight priorities were identified to reach the goals of the Melbourne Declaration, including promoting world-class curriculum and assessment as well as strengthening accountability and transparency (MCEETYA, 2008). The Melbourne Declaration prioritised literacy and numeracy. It stated that assessment would be used to measure students’ achievement and to inform instruction. The Melbourne Declaration emphasised the need for high quality data to strengthen accountability, provide effective evidence of students’ improvement and to guide schools’ decisions to implement appropriate educational programs (MCEETYA, 2008). The requirements of assessment and collection of quality data are of particular relevance to the current study.

COAG agreed to the appointment of a new independent body, the *Australian Curriculum Assessment and Reporting Authority* (ACARA) to publish relevant, nationally comparable information on all schools to support accountability, school evaluation, collaborative policy development and resource allocation (Zanderigo, Dowd & Turner, 2012). As a result, in 2008 the Australian Government enacted legislation to formally establish the Australian Curriculum, Assessment and Reporting Authority (Federal Register of Legislation, 2016). ACARA, established as an independent statutory authority, aims to improve the learning of all young Australian students through world-class curriculum, assessment and reporting. The Act specified a number of ACARA’s functions. These included; the development and administration of national assessment, and the collection, management and
analysis of student assessment data (Federal Register of Legislation, 2016). Through ACARA, Australian educators received a new curriculum, the Australian Curriculum (AC) to teach. The AC sets consistent national standards to improve learning outcomes and provides descriptions of achievement standards for students. In September, 2015 Australian Education Ministers endorsed the latest version of the AC and teachers have until 31 December 2016 to make the transition to the revised version of the AC (ACARA, 2016d).

In 2012, ACARA received a charter from the Australian Government which established three specific strategic directions relating to curriculum, assessment, data collection and reporting. The strategic directions prioritised assessment to measure student progress; data collection and analysis to support reporting; and evaluation of students and schools (ACARA, 2016e). The directives of the charter are indicative that, even after many years, the Australian government continues to require the use of assessment data to fulfil accountability and policy requirements in education.

Changes to curriculum and to assessment strategies increase demands on teachers and require them to be empowered with the knowledge relevant to using assessment to improve the education of all students (Klenowski, 2012). This knowledge entails skills to access relevant assessment data, strategies to analyse the data and the capacity to understand the analysed data (Campbell & Levin, 2009). In the light of change caused by legislation, the current study aimed to investigate teachers’ strategies to fulfil data analysis expectations. The task of analysing assessment data is a complex one. Therefore, the study also gathered evidence of barriers and enablers experienced by teachers with regard to analysing literacy assessment data.

Klenowski (2012) described Australia’s position in terms of the current international trend and increased accountability. She explained how Australia has responded by implementing policy that prioritises assessment to comply with increasing accountability requirements. Whilst educators face increasing pressure from federal, state, and local accountability policies to improve student achievement, the process of using assessment data to monitor students’ progress has become increasingly important (Klenowski, 2012). Despite an increased amount of assessment data and the requirement to use it, limited support in analysing the data
has been made available (Hamilton, et al., 2009). In order to use assessment effectively, teachers need the skills to convert data into meaningful information that leads to improved educational decisions (Slotnik & Orland, 2010). National and international authorities have introduced policies to make teachers accountable for evidence of assessment and improved student educational standards. However, proof of detailed information to promote the necessary understanding that enables teachers to effectively integrate the complex processes of assessment and data analysis is limited (Black, 2014).

In summary, international and national legislation aimed at improving educational standards have evolved over the last twenty years. However, what remains constant are the requirements of accountability for educators and the use of effective data analysis in achieving higher education standards for students. In Australia, the legislation has led to major changes in curriculum, assessment and reporting practices. It is in this context of educational change that the current study was undertaken.

1.2 Purpose

This research study aimed to investigate and identify the practices that Primary school teachers in Perth, Western Australia, have adopted to advance student learning and improve educational standards by using literacy assessment data to inform practice. Primarily, the purpose of the research was to identify the ways in which teachers analyse the data from literacy assessments to guide their instruction. The research examined teachers’ practices regarding the analysis of literacy assessment data to measure the levels of students’ skills, identify students’ literacy strengths and weaknesses and then use this data to provide appropriate instruction for all students in their classes. A further purpose of the research was to examine the methods primary school teachers employ to link the data from literacy assessment to subsequent instruction and to intervention. The study aimed to identify the most common types of educational intervention used by primary school teachers for literacy. Finally, the research gathered information about the barriers and enablers experienced by primary school teachers relating to analysing literacy assessment data to determine ways in which schools could better support teachers.
1.3 Rationale

Pragmatic observations made by the researcher during collegial meetings highlighted issues with analysing data from literacy assessments. These observations were made possible due to the researchers’ specialised qualifications in assessment and teaching of students with learning disabilities, 22 years of primary school teaching experience, Level 3 teacher status and her leadership role as a literacy coordinator. During collaboration and moderation sessions with colleagues using samples of students’ literacy assessment (common practice in most schools), observations indicated that many colleagues did not commonly use, or had limited knowledge about, detailed analysis of literacy assessments. The teachers did not use deeper levels of analysis to establish students’ literacy strengths and weaknesses. Changes to student instruction should be based on reliable data (Harlacher, Nelson-Walker, & Sanford, 2010), but many teachers appeared uncertain of how to respond to the detailed evaluation of data and use it in subsequent instruction, including support and extension (Young & Kim, 2010). The rationale for the research therefore stems from observations of teacher practices regarding literacy assessment strategies and from sources within current literature on the limited use of assessment data to improve student achievement in a policy-driven environment.

1.4 Significance

The significance of this research is supported by the recent research of Hoover and Abrams (2013), who indicated that assessment is an important component of teaching and learning. The researchers placed great importance not only on assessment but also on the use of assessment data to make instructional or evidence-based decisions (Hoover & Abrams, 2013). This aspect of assessment is highly significant to the research conducted in Perth Primary schools.

In Australia, the Australian Curriculum, Assessment and Reporting Authority (ACARA) uses the Numeracy and Literacy Assessment Program (NAPLAN) as a main assessment method of student achievement using the Australian Curriculum (ACARA, 2016f). ACARA publishes literacy assessment results of Years 3, 5 and 7 students using detailed data analysis, such as specific student error analysis. Detailed interpretation of the analysis assists teachers in determining the instructional
intervention needed to advance the students’ capabilities. This model is relevant to the study because it is grounded on the evidence-based principle of using analysed assessment data to inform instruction. Evidence-based practice is instruction that is based on empirical research (Hempenstall, 2006). Although comprehensive, the NAPLAN model is but one way of analysing literacy assessment data. The research is therefore significant as it identified data analysis strategies that teachers are actually using to inform their literacy programs and, therefore, provided evidence of current classroom practice.

The completed research contributes to the current body of knowledge in the area of teachers’ analysis of literacy assessment data in primary schools. The findings are available to schools, districts and all states in Australia. Quantitative and qualitative evidence from the research provides a range of findings regarding current data analysis practice. This type of data may be used by educators such as school principals and district directors as it will provide comprehensive information on the teachers’ analytical skills, pedagogical practices and issues experienced by them in the area of data analysis. The findings of the research may be valuable in guiding the formation of school plans and appropriate professional development programs to meet the specific needs of primary school teachers, thereby providing them with the capacity to effectively use analysed data to modify instruction and plan intervention to achieve higher levels of literacy education.

The research contributes to the body of current research and literature regarding teachers’ practices in analysing literacy assessment data and the use of data to make instructional decisions. Teaching requires constant decision making but the extent to which teachers collect and gather assessment data, analyse it, and then use this information to make instructional decisions is not well known (Hoover & Abrams, 2013). Young and Kim (2010) stated that what is known about how teachers use assessment data in formative ways is not clear. Young and Kim (2010) identified types of assessments used by teachers but did not describe how teachers make sense of the immense amount of data they may access. Brawley and Stormont (2014) found that a small amount of research has been conducted with teachers in early childhood settings related to data practices including current practices being used and the perceived importance of these practices. The researchers recommended that further
research was needed to promote data collection, analysis, and use of data in decision making by all teachers. The current research aimed to make a positive contribution to literature regarding analysis of literacy assessment data and its uses by primary school teachers, particularly for intervention.

The research’s significance lies in the variety of evidence - current facts, practices and attitudes that have been gathered relating to primary school teachers’ analysis of literacy assessment data. The research provides data that reflects professional practice in different educational sectors. The research data is firstly significant to the people closest to it, such as the teachers and principals, identifying possible issues, weaknesses, strengths and areas of necessary professional development. The research contains significant feedback about literacy assessment analysis practice as required by the educational authorities in Western Australia. The findings may help to shape future practices regarding assessment analysis as an evidence-based tool to aid learning. Issues regarding the analysis of literacy assessment data as experienced by primary school teachers should highlight priorities which can be addressed in order to increase the capacities of teachers.

1.5 Research Questions

The overarching research question guiding the research is: How do teachers use data obtained from literacy assessments in primary schools to inform their pedagogical decisions and what factors influence their practice?

The specific questions of the research are:

1. In what ways do primary school teachers analyse literacy assessment responses to identify students’ strengths and weaknesses?

   This question deals with the analytic strategies that teachers employ that to help them categorise their students’ literacy skills.

2. How is the analysis used to inform instruction and intervention?

   This question provides information about the methods teachers use to link what they have learned from analysing literacy assessment data to their teaching program. It
examines how teachers use the analysed data to modify instruction to meet individual student’s needs.

3. **What interventions are most commonly employed as a result of literacy assessment analysis?**

Many educational interventions are available so this question seeks to gather specific information to establish if certain interventions are used more than others.

4. **What barriers and enablers do teachers experience in analysing literacy assessment data?**

This question seeks to gain more information about the reasons for current practices. It aims to identify the difficulties and the support that teachers have with the process of analysing literacy assessment data.

1.6 Ethical Considerations

As the research involved humans, ethical clearance from the University of Notre Dame Australia’s Human Research Ethics Committee (HREC), the Catholic Education Office and the Department of Education and Training was obtained. Strict ethical processes were put in place such as consent, confidentiality and anonymity.

Informed consent was achieved by providing information letters to the school principals and the teachers detailing their expected involvement. Teachers were advised that participation was voluntary. All completed questionnaires were anonymous and identified in the data by code only. If the teachers wanted to participate, they signed and returned the consent forms to the school administration awaiting collection by the researcher. The consent forms also provided the teachers with details of how to withdraw from the study if necessary.

Meetings with school principals were arranged to describe the research and invite schools to participate. Written permission from each principal was obtained before teachers were invited to participate in the research. Due respect was given to convenient times for completion of the questionnaires and participation in the interviews.
Consideration of the participants’ confidentiality was addressed by the requirements of the HREC. Furthermore, all data was stored on a password-protected computer. The participants’ anonymity was maintained by de-identification of the information supplied in the questionnaires and semi-structured interviews. The privacy of the information provided was preserved by secure storage by the researcher and by the School of Education, University of Notre Dame Australia.
CHAPTER TWO: LITERATURE REVIEW

2.1 Background

Recent legislation regarding improvement in education has been enacted in many countries such as the United States of America, New Zealand, United Kingdom and Canada. Australia has also been part of this worldwide trend (Klenowski, 2012). The legislation has had significant impacts on many aspects of education, particularly assessment. Governments are demanding improved academic achievements from all students in schools and have implemented strict conditions of accountability. Legislation is therefore significant because it is internationally relevant (Harris-Hart, 2010) and provides the rationale for the increased importance of assessment data in education. Relevant international legislation will be briefly discussed. Particular attention will be given to educational legislation in Australia as this is where the current study was conducted.

In the United States of America, the No Child Left Behind Act of 2001 (NCLB) was legislated by President Bush, requiring that all students must reach academic proficiency by 2014 (United States Education Department, 2002). The Centre on Education Policy (CEP) in Washington has conducted continuous reviews of the NCLB and identified ten significant effects of the Act (Jennings & Rentner, 2006). The effects most relevant to this research are: schools have begun paying far more attention to the use of data for instruction, intervention and for meeting individual students’ needs; and more attention has been focused on achievement gaps in English (Literacy). These effects of the NCLB relate directly to the current study’s investigation of teachers’ use of analysed data and the strategies they employ for instruction and intervention. Also relevant is that the NCLB had a significant focus on literacy, the same learning area that the current research addressed.

In December 2015, President Barack Obama signed legislation reauthorising NCLB with the Every Student Succeeds Act (ESSA) (United States Department of Education, 2015). ESSA comprised a number of educational priorities. The priorities relevant to the current research include accountability, high academic standards, nationwide testing and support for intervention where needed.
In Canada, a Ministerial declaration, *Learn Canada 2020*, was issued in 2008. The Declaration promoted enhancement of Canada’s education systems, learning opportunities and overall education outcomes. The Declaration specified eight key areas of focus including collection, analysis and dissemination of high quality data (Council of Ministers of Education, Canada, 2010). The foci of the declaration are relevant to the current study as they centre on processes of collection, analysis and use of educational data. These processes were key areas investigated in the current research.

New Zealand provides another international example demonstrating how legislation, focused on achieving high levels of education, made educators accountable for several aspects of instruction. New Zealand amended its *National Education Goals* (NEGs) in 2004. The goals relevant to this study include: pursuing the highest standards of achievement through differentiated programmes; identifying and removing barriers to achievement; prioritising the development of high levels of competence in literacy; achieving excellence through clear instruction, monitoring student progress and implementing programmes to meet individual needs; providing appropriate support for students identified with special needs (Ministry of Education, 2015).

Australia followed the international trend of developing legislation to promote higher quality and achievement in education. In 2008, Australian Ministers of Education introduced the *Melbourne Declaration on Educational Goals for Young Australians* (MCEETYA, 2008). One of the Declaration’s significant priorities was the development of world-class curriculum and assessment. In 2008, the Australian Government enacted legislation to establish the *Australian Curriculum, Assessment and Reporting Authority* (ACARA) (Federal Register of Legislation, 2016). ACARA served a number of purposes. The functions of ACARA that are relevant to the current research required ACARA to:

- develop and administer a national assessments
- collect, manage and analyse student assessment data and other data relating to schools and comparative school performance
facilitate information sharing arrangements between Australian governing bodies in relation to the collection, management and analysis of school data

(Federal Register of Legislation, 2016. p. 7)

ACARA established a National Assessment Program (NAP), including National Assessment Program - Literacy and Numeracy (NAPLAN), NAP sample assessments for a small, random sample of schools and international sample assessments (ACARA, 2016e). NAPLAN measures the academic skills of primary school aged students in Years 3 and 5 and secondary school students in Years 7 and 9.

In 2012, ACARA received a charter from the Australian Government which required it, as part of national assessment priorities, to: collect data for accountability and reporting, research and analysis, and resource allocation; and analyse data as required by Ministers and their departments to support system management and policy (ACARA, 2016f). ACARA’s priority of assessment data collection and analysis is of central importance to this study as it provides the context for teachers’ assessment, data collection and analysis for accountability purposes.

There is evidence that many countries have instituted educational policies resulting in increased accountability for teachers and an increased focus on assessment. One such consequence of the demands of accountability is that assessment is seen by some educators as a means for ranking students and summarising their learning instead of being a source of information to be used for instruction (Heritage, 2007). Heritage (2007) believes that assessment has become identified with competitive evaluation of schools, teachers and students and for this reason is seen by many teachers as being external to everyday teaching practice. The current research investigated teachers’ opinions and issues they experienced analysing literacy assessment data as part of frequent professional practice.

Literacy, in the context of this study, is defined as …

… a flexible, sustainable mastery of a set of capabilities in the use and
production of traditional texts and new communications technologies using
spoken language, print and multimedia.

(ACARA, 2016b, para. 6)

The components of literacy taught in Australian primary schools are reading, writing, speaking, viewing and listening. Assessment of all of these components and the analysis of collected data were investigated in the research.

2.2. Theoretical framework

The current research, which focussed on analysis of data from educational assessment, was based on a core principle of Vygotsky’s theory of learning, the Zone of Proximal Development (ZPD) (Vygotsky, 1978), and on the model of formative assessment. Vygotsky’s theory of learning and the model of formative assessment share some similar principles (Clark, 2012), providing a solid foundation for the research. The specific definitions, types and purposes of assessment which are relevant to the research are discussed in light of current literature. The main focus of the research, and an important part of assessment, is the analysis of data collected from assessment. The purposes and strategies of data analysis are examined in the literature and defined. Finally, issues which potentially affect assessment data analysis are investigated as either barriers or enablers to teachers’ practice. Each component of the framework will be addressed and supported by current literature. Figure 2.1 represents the theoretical framework for the research.
2.2.1 Theory of learning and model of assessment

Vygotsky’s theory of learning and the model of formative assessment underpin the current research. Vygotsky’s theory of learning is based on the belief that learning only takes place when cognitive ability is improved (Vygotsky, 1978). Formative assessment, initially a model of assessment, was developed into a theoretical framework by analysing research and literature related to other theories (Black & Wiliam, 2009). Formative assessment contains several principles that complement Vygotsky’s theory of learning (Clark, 2012). However, the two theories will be individually addressed.

2.2.1.1 Theory of learning: Vygotsky - ZPD

Vygotsky’s theory of learning developed out of his personal interest in assessing the ways in which learners make progress (Griffin & Cole, 1984, cited in Daniels, 2005). Vygotsky’s theory, a sociocultural one, proposes that human learning is a social process and that human intelligence originates in society. (Vygotsky, 1978). An important concept of Vygotsky’s theory, referring to the improvement of
mental capabilities, became known as the zone of proximal development (Vygotsky, 1978). Vygotsky defined the zone of proximal development as…

… the distance between a child’s ‘actual developmental level as determined by independent problem solving’ and their higher level of ‘potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. (Vygotsky 1978, p. 57).

This definition encapsulates Vygotsky’s view of learning and instruction. Vygotsky used an example comparing the academic abilities of two children and proposed that by giving tasks to, and assisting, the children they were able to improve their intellectual capabilities. The role of the teacher’s input was stressed to be of high importance. The ZPD concept is highly relevant to the research because of his dedication to studying the processes that contribute to advancing learning and the teachers’ role in supporting instruction through providing appropriate, targeted learning opportunities aimed towards closing ‘the gap’ between the students’ actual level of achievement and their potential level of achievement. The current research examined the ways teachers assessed students’ abilities and the strategies they used to support students to reach the highest standard they were capable of reaching.

2.2.1.2. Model of assessment: Formative assessment.

The term ‘formative assessment’ dates back to 1967 when Michael Scriven wrote on the roles of evaluation and identified two forms as being ‘formative’ and ‘summative’ (Wiliam, 2006b). At the time of Scriven’s work, evaluation was synonymous with assessment (Taras, 2005). Scriven used the terms ‘formative’ and ‘summative’ to indicate different ways of gathering information about students’ learning and using it to guide instruction (Greenstein, 2010).

Bloom expanded on Scriven’s work by applying the concepts of formative assessment to educational assessment (Greenstein, 2010). The crucial feature of formative assessment for Scriven and Bloom is that the information from assessment is used in some way to make modifications to instruction (Wiliam, 2006b). Since its inception, formative assessment has attracted growing attention across educational
systems in many different national contexts and has attracted the interest of many researchers (Croussard & Pryor, 2012).

In 1998, Black and Wiliam made a significant contribution through their summary of the findings from 250 studies about formative assessment (Greenstein, 2010). Early work by Wiliam and Black identified five main activities associated with formative assessment:

1. Sharing success criteria with learners
2. Questioning
3. Comment only marking
4. Peer and self-assessment
5. Formative use of summative tests


The activities identified by Wiliam and Black’s work are relevant to the current research component which investigates strategies used by teachers for analysing data from formative assessment.

Although the five activities had been identified, there was still the need to establish a theoretical foundation for formative assessment (Black & Wiliam, 2009). Wiliam and Thompson combined further research with three key processes of learning and teaching identified by Ramaprasad (1983, cited in Black & Wiliam, 2009) to provide theoretical grounding for formative assessment. Ramaprasad’s three processes of learning and teaching were:

- Establishing where learners are in their learning
- Establishing where learners are going
- Establishing what needs to be done to get them there

(Black & Wiliam, 2009, p 4)

The combination of Wiliam and Thompson’s research and Ramaprasad’s processes of learning resulted in a theoretical framework indicating five key strategies:

1. Clarifying and sharing learning intentions and criteria for success;
2. Engineering effective classroom discussions and other learning tasks that elicit
evidence of student understanding;
3. Providing feedback that moves learners forward;
4. Activating students as instructional resources for one another; and
5. Activating students as the owners of their own learning.

(Wiliam, 2006b. p. 17)

The Assessment Reform Group (ARG, 2003) funded Black and Wiliams’ research on assessment and their subsequent publications of findings (Nuffield Foundation, 2015). The ARG (2003) defined formative assessment as:

…the process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they need to go and how best to go there. (p. 9)

The ARG provided ten research-based principles of formative assessment to guide teachers’ practices (Nuffield Foundation, 2015). These principles support the current study because they emphasise teachers’ strategies to gather and interpret data; they prioritise how students’ responses to teaching can be interpreted to indicate their strengths and weaknesses in understanding, and they also emphasise using data to inform instruction and intervention of individual students.

One of the initial steps of formative assessment involves identifying students’ learning needs (Black, 1993). After learning needs have been identified, they are met through restructuring teaching based on data which has been evoked and interpreted (Black & Wiliam, 2009). One example of this process is feedback. Feedback begins by using data, collected through different types of assessment, to identify the student’s actual level of achievement and his/her potential level of achievement, with the purpose of closing the gap between the levels (Black & Wiliam, 1998). This information is communicated back to students in a way that helps them to improve their learning. (Black, Harrison, Lee, Marshall, & Wiliam, 2003). Feedback, as a strategy of evoking, analysing and responding to data is relevant to the current research that investigated strategies being used by teachers to use analysed data to identify students’ abilities and improve their learning.
Formative assessment strategies require teachers to make qualitative judgements about the students’ learning (Crossouard & Pryor, 2012). Although they may be complex forms of analysing data, formative assessment strategies can be used to promote learning (Crossouard & Pryor, 2012). Formative assessment strategies are important to the current research as they involve pedagogy, curriculum and assessment (Crossouard & Pryor, 2012). The current research’s investigation of teachers’ quantitative and qualitative analyses of assessment data highlighted teachers’ pedagogy and assessment practices related to improving literacy.

In conclusion, formative assessment draws on cognitive theory and sociocultural theories from Vygotsky (Clark, 2012). Vygotsky (1978) proposes that students can advance their learning, particularly with adult assistance. Formative assessment strategies rely heavily on the analysis of assessment data for the purpose of advancing learning (Black & Wiliam, 2006). As such, Vygotsky’s theory of learning, particularly the principle of the ZPD, and the model of formative assessment, provide a complementary foundation for the theoretical framework on which the current study was based.

2.2.2. Assessment: definitions, types, purposes.

Educational assessment is an important aspect of the current research and there is much literature on assessment. The definitions, types and purposes of assessment will be examined in relevant literature and discussed. Different types of assessment, such as formative and summative assessment, will be explained. The many purposes of assessment, including those that serve to benefit both students and teachers will be investigated in light of relevant literature. Clarification of the definitions, types and purposes of assessment is important to understanding the main focus of the current research, analysis of assessment data.

2.2.2.1. Definition of assessment.

Assessment is defined in many ways. The following definitions related to educational assessment are relevant to assessment in the context of the current research in Australian primary schools. The Department of Education and Training,
Victoria (2016) define assessment as the ongoing process of gathering, analysing and reflecting on evidence to make informed and consistent judgements to improve future student learning (Department of Education and Training Victoria, 2016). The School Curriculum and Standards Authority (2016) use six principles to define assessment as: an integral part of teaching and learning, educative, fair, designed to meet specific purposes, leading to informative reporting and to school-wide evaluation processes.

The term ‘evaluation’ is sometimes used synonymously with ‘assessment’ and clarification is needed for the purposes of this study. Evaluation involves making judgments about the value of a grade and/or the nature and extent of learning outcomes with the focus on how well a task has been completed (Macquarie University, 2015). Evaluation can provide a useful indication of performance but it is not a process that leads to improvement of that performance (Burke, Lawrence, El-Sayed & Apple, 2009). Evaluation is often summative in nature whilst assessment can be formative in nature.

2.2.2.2 Types of assessment.

Many types of assessment are currently used in primary schools. Summative and formative assessment are identified in the literature as the main types of assessment (Daniels, 2005). The School Curriculum and Standards Authority (2016) state that both types are useful for collecting and using information with the aim of improving student learning.

Formative assessment occurs when evidence about student achievement is gathered, interpreted, and used to make decisions about teaching that are likely to be better than the decisions they would have made without the evidence (Black & Wiliam, 2009). In Taras’ (2005) opinion, formative assessment requires feedback which acknowledges a ‘gap’ between the actual level of the work being assessed and the expected standard. The assessment must also explain how the work can be improved to reach the required level (Taras, 2005). Black and Wiliam (2009) suggest that formative assessment is effective in almost all educational settings, curriculum areas, knowledge and levels of education. When teachers use effective practice for
evaluating student learning, they are applying this information in a formative way and therefore formative assessment is pedagogical and should be viewed as part of instruction (Garrison & Ehringhaus, 2007). Formative assessment principles indicate and clearly articulate the necessity of interpreting evidence to inform instruction. As such, the principles of formative assessment are highly relevant to the current research.

Summative assessments are characterised as assessments of learning (Stiggins, 2004 cited in Hoover & Abrams, 2013). Summative assessment is a measure of student learning in relation to curriculum standards at a particular time (Garrison & Ehringhaus, 2007). Taras (2005) suggests that summative assessment must take place so that the quality of work can be evaluated before feedback about the learning is given. This recommendation describes one of the differences between formative and summative assessment. Newton (2007) proposes that the differences between formative and summative assessment relate to purpose, timing and generalisation. He states the purpose of formative assessment is helping students learn while summative assessment’s purpose is to grade students’ work. The timing of formative assessment is frequent while summative assessment happens at the end of a time of teaching (Newton, 2007). Another difference, according to Newton (2007), is that formative assessment tests in a narrow way while summative assessment tests a broader range of abilities. Garrison and Ehringhaus (2007) recommend that a combination of formative and summative assessment is an effective way to gather detailed information about students’ abilities and to adjust teaching based on the information collected in order to promote students’ progress.

Some examples of summative assessment are standardised assessments, benchmark assessments, unit tests, exams and report grades (Garrison & Ehringhaus, 2007). Standardised tests are tests given in a consistent way and are designed to have consistent questions, administration and scoring procedures. Standardised tests have a score which can indicate how far a child’s achievement is from the average for his/her age (The Johnson Center for Child Health and Development, n.d.).

Benchmark assessments, sometimes referred to as interim assessments, evaluate student knowledge and skills within a limited time period and provide results that can be interpreted across cohorts, schools and groups of schools (Perie,
Marion, Gong & Wurtzel, 2007). Diagnostic tests collect detailed information about students’ developmental stages which can be very useful for formative purposes and for identifying learning needs (Van der Kleij, Vermeulen, Schidkamp & Eggen, 2014). Screening tests are recommended as an initial assessment for identifying students struggling to learn and consist of short assessments focused on specific skills that are highly predictive of later abilities (Jenkins & Hudson, 2007).

This literature on types of tests is important to the current research because teachers in Australian primary schools conduct many tests and the research investigated teachers’ analysis of data from both summative and formative assessments.

2.2.2.3 Purpose of assessment

The purposes of assessment indicated within the literature are diverse. Garrison and Ehringhaus (2007) propose that detailed assessment is purposeful because it provides specific information regarding students’ abilities. Klenowski (2012) agrees that assessment, especially when it is linked to national standards, highlights students’ strengths and weaknesses. In Australia, an overarching purpose of assessment is to collect data for accountability and reporting, research and analysis as well as resource funding (ACARA, 2016d). The School Curriculum and Standards Authority (2016) sets out six principles of assessment which define the purposes they serve. Whilst all six principles are essential to effective assessment, three of the principles are specifically relevant to this research. Principles 1, 2 and 4 support using strategies to analyse data, using data to identify students’ abilities and using data to plan teaching, intervention and extension which are targeted foci of the research. Table 2.1 categorises the principles of assessment.
Table 2.1.

**The principles of assessment**

<table>
<thead>
<tr>
<th>Principles relevant to the research</th>
<th>Other principles</th>
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<tbody>
<tr>
<td><strong>Principle 1</strong>: Assessment should be an integral part of teaching and learning and should enable the teacher to make fine-grained judgements about students’ progress that will assist the planning of instructional activities</td>
<td><strong>Principle 3</strong>: Assessment should be fair and not discriminatory, taking into account the diversity of students’ needs. Fair assessments should provide valid information about students’ knowledge and skills using a range of assessments.</td>
</tr>
<tr>
<td><strong>Principle 2</strong>: Assessment should be educative and the teacher should be able to use assessment to identify students that require specific support in instruction.</td>
<td><strong>Principle 5</strong>: Assessment should lead to informative reporting and provide an accurate summary of students’ performance</td>
</tr>
<tr>
<td><strong>Principle 4</strong>: Assessment should be designed to meet specific purposes and used to inform subsequent teaching and intervention, including academic extension.</td>
<td><strong>Principle 6</strong>: Assessment should lead to school-wide evaluation processes through monitoring, planning and reflecting on teaching practices.</td>
</tr>
</tbody>
</table>

Principle 1 refers to a cycle of planning, teaching, evaluating and teaching. Assessment is recommended in current literature to form “part of a cycle of instructional inquiry aimed at ongoing instructional improvement.” (Hamilton, et al., 2009. p8). Therefore, assessment should be part of a process that happens regularly after instruction to inform subsequent instruction. The purpose of assessment is seen to be a regular guide for instruction. There are many other purposes of assessment.

Newton (2007) provides an extensive list of the purposes of assessment ranging from providing valuable information for teachers, students and education authorities. Assessment results assist teachers to group students with similar abilities, monitor their progress and report accurately on their achievement (Newton, 2007). Young
and Kim (2010) agree that assessment is important for planning instruction, modifying instruction as it takes place and for evaluating student abilities. Whilst Newton (2007) states that assessment for diagnostic purposes is usually conducted by educational psychologists, teachers may still find assessments to be valuable in identifying learning difficulties so that appropriate action may be taken to support students where necessary.

For students, the purpose of assessment is to give them feedback about their learning and improvement (McTighe & Brown, 2005). For education leaders and authorities, assessment may serve the important purpose of evaluating programs and curriculum (Young & Kim, 2010). In the light of this diversity, literature that is focused on the specific purposes of assessment data for identifying students’ skills, informing instruction and informing intervention will be reviewed in the context of the current study.

2.2.3 Assessment data analysis: purpose, strategies, issues.

The use of assessment data is considered as part of routine decision-making around instruction (Earl, 2005). However, collecting data is only the first step in the process of academic improvement (Earl, 2005). In order to become effective and meaningful, data needs to be analysed and interpreted (Cramer, Little & Alvarez McHatton, 2014). The purposes, strategies and issues of assessment data analysis, as illustrated in Figure 2.2, will be reviewed in relevant literature.
2.2.3.1 Purpose of assessment data analysis

The purpose of data analysis and how it relates to educational improvement have become key considerations for educators (Campbell & Levin, 2009). Accountability, as a result of the increase in benchmark testing of literacy for students, requires teachers to have the skills to interpret assessment data (Pierce, Chick & Gordon, 2014). This accountability aspect implies that an important purpose of analysing assessment data is to fulfil departmental requirements. Further examination of current literature reveals other purposes for data analysis.

Newton (2007) refers to analysed data as assessment judgements and suggests eighteen categories of purposes for these judgements. The purposes most relevant to the current study are for diagnostic and guidance uses. Detailed data interpretation highlights students’ strengths and weaknesses either before or following instruction (Nichols, Meyer & Burling, 2009). Detailed analysis of assessment data is recommended as crucial for effective instruction (Beckett, Volante & Drake, 2010).
2.2.3.2 Inform instruction and intervention

Assessment data has evolved from being a description of student abilities to being a source of information on what to teach and how to teach it (Timperley, 2009). This perspective implies that the data contains valuable information about student abilities and about instruction that is needed to advance their learning. Campbell and Levin (2007) believe that positive outcomes for students can only be achieved if teachers’ access, understand and apply data effectively. Cramer et al. (2014) state that the practice of analysis is crucial and that data should be used in ways that determine subsequent teaching leading to student improvement. In their view, instruction is informed by analysed data from assessments.

Timperley (2009) agrees that assessment data is required for detailed analysis of students’ needs. Once students’ needs are known, appropriate instruction can follow. De La Paz (2009) describes a practical example of a four-step process teachers can follow to transfer data from assessment rubrics into steps for instruction. The process involves teachers examining the rubric, identifying underlying skills to teach, developing a mnemonic and finally adding supports. Her approach provides a strategy for linking assessment directly with instruction.

Focussed instruction can take place after data from assessments has been collected, analysed and student profiles have been formed (Timperley, 2009). Timperley (2009) advocates careful examination of trends within the data and using current information about the students’ abilities to inform subsequent instruction. For example, reviewing students’ work in a way that links it to teaching is efficient analysis because it provides meaningful information about students’ strengths and weaknesses. (Kerr, Marsh, Ikemoto, Darilek & Barney, 2006). Furthermore, using data systematically to obtain insight about student progress is a logical way to monitor improvement and plan instruction to meet the needs of each student on a continuous basis (Hamilton et al., 2009).

If, after planned instruction, further assessment provides evidence that a student is not achieving the expected standard, intervention is needed to assist the student’s learning. Intervention is modification of instruction to close the gap between the actual and expected levels of students’ achievement as determined by educational age/grade-appropriate standards (Grigorenko, 2009). Rowe (2006)
advocates that it may be necessary to provide more than one type of instruction before implementing intervention. For example, phonics skills should be followed by whole language instruction and intervention to achieve improvement in reading (Rowe, 2006). Parker, Burns and McMaster (2012) believe that identifying an intervention that will result in improvement is difficult without assessment data.

Earl (2005) concurs that the data from assessment be used to determine improvement plans for students. Careful analysis of assessment should reveal the student’s area of weakness and this becomes the target of intervention to help the student achieve the required standard. Both instruction and intervention need to be planned according to careful analysis of assessment data. For example, miscue analysis is a strategy that involves detailed analysis of students’ oral reading accuracy (Beatty & Care, 2009). The results of an Australian study involving miscue analysis provide evidence that the detailed analysis used in miscue analysis identifies students’ abilities and highlights appropriate instruction or intervention to improve students’ reading. Newton (2007) proposes that frequent, detailed analysis of student achievement is required to guide interventions for individual students. Many types of intervention exist and these will be described in light of current literature.

Research on types of interventions by Hattie, Biggs and Purdie (1996) and Hattie (2008) provide evidence that strategies of instruction and intervention differ in the effect that they have on student learning. Hattie et al. (1996) conducted meta-analyses of instruction for achievement and the results indicated that many strategies were being used but that some of these were more effective than others. In Hattie’s research, an effect size of 0.4 represents the average effect of a strategy. Less than 0.4 means that the strategy has less effect on achievement and more than 0.4 means the strategy has more effect on achievement. Hattie et al. (1996) were able to infer from their research that intervention with younger students had the greatest benefits. This finding was true when the interventions consisted of a combination of unstructural methods which focus on a single feature, such as mnemonics, and multi-structural methods which focus on a range of independent strategies such as reading and writing techniques (Hattie et al., 1996).

More recently, after large-scale research involving 800 meta-analyses, Hattie (2008) provided an updated list of instructional and intervention practices that
influenced student achievement. He placed 138 influences in rank order (Hattie, 2008). Some of the highest ranked practices were formative evaluations, micro-teaching, feedback and literacy programs. Lower in the rank order but still considered effective (having an effect size great than 0.4) were practices such as early intervention, small group learning, parental involvement and goalsetting. Refer to Table 2.2 for the list and rankings of intervention strategies relevant to the current study.

Table 2.2

_Meta-analyses by rank order._

<table>
<thead>
<tr>
<th>Rank</th>
<th>Influence</th>
<th>Effect size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Providing formative evaluation</td>
<td>0.90</td>
</tr>
<tr>
<td>4</td>
<td>Micro-teaching</td>
<td>0.88</td>
</tr>
<tr>
<td>5</td>
<td>Acceleration</td>
<td>0.88</td>
</tr>
<tr>
<td>7</td>
<td>Comprehensive interventions for learning disabled students</td>
<td>0.77</td>
</tr>
<tr>
<td>10</td>
<td>Feedback</td>
<td>0.73</td>
</tr>
<tr>
<td>15</td>
<td>Vocabulary programs</td>
<td>0.67</td>
</tr>
<tr>
<td>16</td>
<td>Repeated reading programs</td>
<td>0.67</td>
</tr>
<tr>
<td>19</td>
<td>Professional development</td>
<td>0.62</td>
</tr>
<tr>
<td>22</td>
<td>Phonics instruction</td>
<td>0.60</td>
</tr>
<tr>
<td>23</td>
<td>Teaching strategies</td>
<td>0.60</td>
</tr>
<tr>
<td>26</td>
<td>Direct instruction</td>
<td>0.59</td>
</tr>
<tr>
<td>29</td>
<td>Mastery learning</td>
<td>0.58</td>
</tr>
<tr>
<td>34</td>
<td>Goals</td>
<td>0.56</td>
</tr>
<tr>
<td>45</td>
<td>Parental involvement</td>
<td>0.51</td>
</tr>
<tr>
<td>48</td>
<td>Small group learning</td>
<td>0.49</td>
</tr>
<tr>
<td>52</td>
<td>Early intervention</td>
<td>0.47</td>
</tr>
<tr>
<td>57</td>
<td>Writing programs</td>
<td>0.44</td>
</tr>
</tbody>
</table>

(Adapted from Hattie, 2008, p 297-298)
Some of the instructional practices and interventions in Hattie’s (2008) research, including differentiation, targeted teaching, small group learning and literacy programs are supported by other literature. McTighe and Brown (2005) propose that assessment followed by analysis of students’ abilities, skills and interests form the basis for intervention such as differentiated instruction. According to Watts-Taffe, Laster, Broach, Marinak, Connor and Walker-Dalhouse (2012), differentiation is responsive instruction designed to meet students’ unique needs. Watts-Taffe et al. (2012) provide evidence that students made greater gains in aspects of reading when their teacher differentiated instruction by using small groups after having conducted ongoing assessment of reading and vocabulary skills. Heritage (2007) proposes that instruction to close the gap in learning necessitates differentiated instruction. Differentiation strategies include modifying the process of instruction, the materials, the environment or a combination of these factors. (Watts-Taffe et al., 2012). Tomlinson and Imbeau (2010) recommend that modifying the assessed product of learning is also an important aspect of differentiated learning. Scaffolding, an aspect of differentiated instruction (Burke et al., 2009), adjusts tasks to suit the current ability of students. The principles of differentiation can be found in other types of intervention.

A form of intervention involving differentiation and grouping is the levelling of reading texts. A national survey of 1500 primary teachers in the United States of America identified that levelled texts are one of the most common materials for guided reading or small group instruction (Ford & Opitz, 2008). Glasswell and Ford (2011) state that levelling of texts has a substantial influence on guided reading. Levelling is a complicated task where teachers need to consider many factors of reading when selecting a suitable text for student instruction (Glasswell & Ford, 2011). Some frameworks are available to assist in the process of levelling such as one provided by Fountas and Pinnell (2006, cited in Glaswell & Ford, 2011) which provides a list of hierarchical reading skills and the corresponding text level.

Targeted teaching and additional support are two types of interventions described as effective interventions by a large scale study of Grade One students in America (Wang & Algozzine, 2008). The students had been identified as being at risk for reading. Education Assistants provided additional support and targeted
teaching to the students. The Education Assistants were regularly observed by teachers to ensure that the intervention was implemented correctly. Results from the study showed that students improved their reading substantially as a result of the intervention (Wang and Algozzine, 2008). Targeted teaching is also recommended by Kerins, Trotter and Schoenbrodt (2010) as findings from their study demonstrated that students’ reading skills improved when targeted reading instruction was purposefully planned and implemented.

Structured and targeted intervention can also be provided through commercially produced programmes such as MultiLit Reading Tutor Program (MultiLit, 2007) and MiniLit (MultiLit, 2011). The results from numerous field trials of MultiLit and MiniLit reading programs indicated that the commercial reading program used in the study proved to be a very effective approach for students struggling with reading (Wheldall & Wheldall, 2014). Kerins, et al. (2010) stresses the importance of evidence-based reading programs being employed as intervention. In Australia, an evidence based program called “An Even Start” was developed by the Australian Council for Educational Research (ACER) (Cook, 2009). The program used software which first identified students’ weaknesses in reading and writing and then indicated strategies for intervention to improve the weaknesses. The targeted teaching was conducted by the teacher with individual or small groups of students (Cook, 2009).

Individual students can be supported through individualised intervention (Connor, Morrison, Fishman, Schatschneider & Underwood, 2007; Swart & Nathanson, 2011; Spooner & Woodcock, 2010). A 3-year cluster-randomised controlled longitudinal study in Florida provided evidence that individualised intervention improved reading skills (Connor et al., 2007). Students in the study received 90 minutes of individualised reading instruction on a daily basis and post-tests indicated that substantial reading progress was made (Connor et al., 2007). In South Africa, a study of individualised intervention took each child’s zone of proximal development into consideration and provided evidence that thirty minutes of individualised intervention given daily for a period of twelve weeks was an effective strategy for improving literacy skills (Swart & Nathanson, 2011). The study involved six year old students who were underachieving in reading and writing. After
only three months of individualised intervention, these students had shown noteworthy improvement. Spooner and Woodcock (2010) suggest that individualised intervention is particularly appropriate and effective for improving students’ listening skills in a school and home environment.

Wilkins and Terlitsky (2016) believe that the school and home environments complement one another in advancing children’s literacy development. They propose that student achievement improves when parents are involved in their child’s education. Wilkins and Terlitsky (2016) recommend that teachers use parental involvement as an intervention strategy through school initiatives, establishing positive relationships with parents, keeping parents informed, meeting with parents regularly at times that suit them and initiating home-visiting programs. Floyd and Vernon-Dotson (2008) agree that increased family involvement improves student academic achievement. They support the use of a number of strategies which incorporate this type of intervention, including take home activities such as Literacy bags or family homework. Floyd and Vernon-Dotson (2008) describe a project carried out by a school that recognised the need to increase the amount of parental involvement in their children’s education. School leaders, teachers and volunteer parents helped to make up Home Learning Toolkits. The toolkits were originally designed for students with learning disabilities but once the benefits of the project were recognised by the school community, it was evident that all students at the school benefited from this type of intervention. Involving parents in intervention to improve students’ listening skills is promoted by Spooner and Woodcock (2010). Spooner and Woodcock (2010) promote parents playing meaningful games with their children as part of this intervention strategy.

Intervention strategies such as learning centres, personalised agendas, small group instruction, independent study, tiered activities, learning contracts, compacting and choice boards are alternative strategies (Tomlinson, 1999 as cited in McTighe & Brown, 2005). The range of intervention strategies is diverse. This diversity enables teachers to purposely select approaches that are appropriate to students’ strengths, weaknesses, interests and learning styles.

There are a number of additional intervention strategies that do not specifically involve the student but do promote improved learning, such as creating a
classroom environment that promotes learning (Allred, 2008). Allred (2008) describes seven strategies that teachers can implement to create a positive learning environment. Such an environment would focus on the positive reinforcement and intrinsic motivation of students (Allred, 2008). The importance of fostering motivation is also recognised by the ARG in the context of assessment for learning (Nuffield Foundation, 2015). The ARG proposes that the careful selection of assessment methods is part of recommended practice to maintain student motivation within a positive learning environment (Nuffield Foundation, 2015).

Instructional and intervention strategies informed by assessment data analysis are effective in targeting students’ weaknesses. The types of instructional and intervention strategies described in current literature are diverse. Some strategies have been proven by research to be more effective than others. Despite their differences, the instructional practices and interventions share the common objective to advance student learning.

### 2.2.3.3 Strategies of data analysis

The data gathered for analysis, in the context of this study, have been guided by the literacy learning continuum of the Australian Curriculum (ACARA, 2016b) which specifies the literacy skills required by students in primary school. The importance of detailed data interpretation to highlight students’ strengths and weaknesses either before or following instruction has been indicated by Nichols et al. (2009). Analysing data from assessments involves a number of skills such as ‘reading the data’ to identify factual information, ‘reading between the data which involves interpreting data and reading beyond the data’ which involves making inferences from the data (Curcio, 1987, cited in Pierce et al, 2014). A framework based on Curcio’s (1987, cited in Pierce et al., 2014) model describes essential skills for analysing data such as reading values, comparing values, analysing the data set and finally, seeing the analysed data in light of the local context (Chick & Pierce, 2012). Additional strategies for data analysis and interpretation exist.

Strategies for data interpretation differ. Data interpretation may involve “…an intuitive process, a statistical algorithm, and many variations between these
two extremes” (Nichols et al., 2009, p. 17). Nichols et al. (2009) describe intuitive strategies as those that involve teachers relying on their inherent knowledge of expected levels of student achievement. Statistical algorithms, according to Nichols et al. (2009), is when data is interpreted by calculating assessment responses, such as errors. Nichols et al. (2009) suggest that analysis not only applies to written assessments but also includes what students say and do when demonstrating their knowledge and skills. Butler and McMunn (2011) advocate that observation is a powerful process of analysis and the best strategy to organise the data from observations is anecdotal records or checklists. They state that other effective data analysis processes include ‘change over time data’, grade distributions (range of scores, item analysis) assessment distributions, work samples and videos. Some of these strategies will be discussed in relevance to the context in which they are used.

Data analysis strategies can be utilised in the context of whole school data. The analysis of whole school assessment leads to identifying trends in the abilities of cohorts as well as individual students. NAPLAN, in Australia, is an example of compulsory whole school assessment of Literacy and Numeracy in Years 3, 5, 7 and 9. Analysed assessment results are disseminated to schools in the form of graphs and bands for schools to interpret for their own purposes. In New Zealand, diagnostic tools which are part of Project AsTTle (Assessment Tools for Teaching and Learning), are used for whole school assessment data analysis (Timperley & Parr, 2009). The analysis of large amounts of data to identify students’ abilities can be most effectively achieved by pinpointing trends, either positive or negative (Smeed, 2013). In assessments involving many students, using the strategy of item analysis can make the data more meaningful and lead to the identification of student strengths and weaknesses. Item analysis identifies students who do not show understanding of a topic or concept and may indicate topics needing re-teaching. (Kerr et al, 2006). Presenting analysed data in different ways is a strategy that helps to confirm initial interpretations (Earl, 2005). Using a number of data analysis strategies assists in providing comprehensive evidence of student achievement in whole school or class contexts.

Although teachers are involved in analysis of whole school assessment data, they are also responsible for the analysis of assessment data from the classes they
teach. Some of the strategies applied to whole school data analysis are also effective for data analysis from classes or individual students. For example, strategies such as identifying trends and item analysis are also suitable for identification of students’ abilities within classes.

Data analysis of class assessments varies according to the type of data collected. For example, data can be collected in a range of ways including observations, formal assessments, and conversations with students, family members and other educators (Ontario Ministry of Education, 2006 cited in Campbell & Levin, 2009). Some strategies, such as observations and questioning, can be used effectively to analyse data from formative and summative assessments (Garrison, 2007). Butler and McMunn (2011) promote the use of a learning analysis sheet to record interpretations of student assessment over time.

There are a number of data analysis strategies specific to literacy. Guided reading is a well-documented strategy for small-group instruction but can also provide effective analysis of reading comprehension (Fountas & Pinnell, 2006). After students have read a selected text silently, teachers ask different levels of questions to analyse the students’ comprehension of the text. The strategy of questioning can be valuable in identifying efficient or ineffective reading skills (Fountas & Pinnell, 2006). Students’ oral reading skills can be analysed by using different strategies.

The strategy of miscue analysis, introduced by Goodman in 1965 (Goodman, 1973), is a diagnostic analysis of students’ reading skills observed when they are reading aloud. Goodman (1973) defines a miscue as “an actual observed response in oral reading which does not match the expected response” (p.5). Miscue analysis involves listening to the student read, asking him/her to retell the story, coding the miscues and finally analysing the miscues (Goodman, 1973). Analysis of the students’ miscues reveal their use of phonological, graphic, syntactic and semantic cues in reading. (Goodman, 1973). The strategy continues to be popular with teachers (McKenna & Picard, 2006) and can be used to diagnose weaknesses in reading skills such as decoding or comprehension (Hasbrouck & Tindal, 2006). Close scrutiny of students’ reading errors indicate weaknesses which can then be addressed to assist learning (Gagen, 2007). This type of analysis involves looking for
common patterns, specific deficiencies and repeated mistakes in different reading skills (Gagen, 2007).

Running records, developed by Marie Clay, is another strategy used for analysing students’ skills when they are reading aloud. (Clay, 2000). Running records are acknowledged as popular practice as they assist teachers to analyse students’ reading behaviours (Fawson, Ludlow, Reutzel, Sudweeks & Smith, 2006) and are quick to complete (Fountas & Pinnell, 2006). The importance of running records and the process of taking running records have been clearly described in a document to guide teachers’ practice in South Australia (Department of Education and Child Development, 2012). Taking a running record involves: selecting a text that the student has read previously; noting the reading behaviours using a standard set of conventions; analysing and scoring the running record, and using the data to inform subsequent teaching (Department of Education and Child Development, 2012). A running record sheet can be used to record the student’s exact reading responses. Errors and self-corrections are analysed to determine if the student is using meaning, syntactic and visual reading strategies (Department of Education and Child Development, 2012). Analysis of the data provides information of each student’s reading fluency and accuracy (Fountas & Pinnell, 2006).

A strategy that utilises a variety of reading assessments to analyse students’ strengths and weaknesses is proposed by Rubin (2011). He recommends creating a class reading profile from the results of assessments including a cloze test, a standardised test, informal reading inventory and running records where the results are presented as percentages or percentiles. He also creates a scatter graph to assist in grouping students with similar abilities together. Rubin (2011) proposes that this strategy of analysing data provides a detailed summary of students’ reading abilities.

There are numerous strategies that teachers can apply to analyse spelling. Error analysis is noted as being an effective method for determining spelling strengths and weaknesses (Young, 2007). Standardised tests (although summative) may be analysed (Hoover & Abrams, 2013) to provide formative information about students’ abilities. However, some research indicates that developmental spelling tests are better than norm-referenced tests as they provide information about specific spelling strengths and weaknesses which is valuable for instructional purposes.
Analysis using developmental spelling assessments has been the topic of a number of studies. In a review of developmental-spelling research, Invernezzi and Hayes (2004) recommend that qualitative assessment forms an integral part of instruction and that teachers look carefully at ‘invented’ spelling to identify spelling ability. As a result of developmental spelling analysis, students’ abilities can be categorised as being on one of three tiers: alphabet, pattern or meaning (Invernezzi & Hayes, 2004).

An Australian study by Leask and Hinchliffe (2007) involved development and testing of a specialised tool, Feature Analysis of Non-Word Spelling (FANS), as a method to analyse students’ spelling qualitatively rather than quantitatively. FANS analyses knowledge of a range of spelling features including consonant clusters, long and short vowels, diphthongs and conventional spelling rules. (Leask & Hinchliffe, 2007). A sophisticated scoring system accurately measures different aspects of spelling abilities. Leask and Hinchliffe’s (2007) study found FANS to be a reliable strategy of analysis, particularly following intervention.

Ness (2010) confirms that developmental spelling tests are an effective means of identifying specific spelling skills and linking these skills to differentiated instruction. Analysis of students’ spelling can be performed by asking three questions: What does the student spell correctly? What does the student use but confuse? What features are absent from the students’ spelling? By answering these questions, teachers obtain accurate information of students’ orthographic knowledge (Ness, 2010).

A strategy to analyse students’ writing abilities is described by Parr, Glasswell and Aikman (2007) who introduced teachers to an evidence –based diagnostic writing assessment tool to help them analyse literacy data. The tool is part of Project AsTTle (Assessment Tools for Teaching and Learning) and comprises rubrics and developmental maps which, if used accurately, are efficient methods of analysing writing skills (Parr et al, 2007). De La Paz (2009) suggests that rubrics derived from curriculum criteria can be used to effectively analyse students’ writing skills.

Motivated by declining standards of writing in NAPLAN tests in Australia, Fang and Wang (2011) introduced an alternative strategy for analysing writing called
Functional Language Analysis (FLA). The strategy uses a set of analytical tools that help teachers to evaluate language in students’ writing. FLA analyses the content, organisation, style, tone and voice of students’ writing. Functional language analysis requires sound technical knowledge of texts and provides teachers with the reasons why text components are good or not. Using this technical knowledge to analyse data, teachers are able to identify topics for instruction or intervention that lead to student improvement. (Fang & Wang, 2011). Alternatively, teachers can analyse students’ writing samples to judge their writing skills.

Kim, Al Otaiba, Folsom, Greulich and Puranik (2014) examined the use of writing samples to analyse students’ writing abilities. Their research, conducted with five hundred and twenty-seven first grade students, identified dimensions that can be effectively analysed using work samples. Kim et al (2014) propose that by using writing samples “substantive quality, productivity, syntactic complexity and spelling and writing conventions” (p.1) can be effectively analysed.

Reading, writing and speaking can be analysed using a highly individualised strategy according to Nelson and van Meter (2002). The strategy they propose uses written samples for the analysis of written products and active observation of writing processes as these skills may not be evident in the completed piece of writing. Skills such as drafting, editing, structure, audience, writing conventions and cohesion are assessed in detail for each student. Independence and confidence are also observed, analysed and described by the teacher. Work samples are analysed at sentence-level and word-level using codes for errors. Using this same approach, spoken language skills are analysed according to comprehension, topic maintenance and grammar. Strengths in these areas are used in conjunction with written language. Summaries of the analysed data highlight the type of intervention needed and teaching plans are individualised to meet every student’s needs.

Speaking and listening skills can be analysed in a number of ways within a whole language approach (Farrall, 2012). She proposes that data be obtained from actual language samples from discussion in which the child feels relaxed and interested in the topic being discussed. A combination of standardised testing and language samples represents best practice in assessing language. Referral to specialists for further analysis should be regarded as a possibility for students with
substantial weaknesses while analysis of abilities can be undertaken using screening tests, tests for specific age groups, or tests for specific skills.

Analysing listening using the Listening Rating Scale (LRS) is recommended as effective practice by Spooner and Woodcock (2010). The LRS uses a rubric of the four essential skills identified for good listening: sitting skill, looking at the person who is talking, staying quiet and listening to all of the words. Four criteria (each with a score of 1 - 4) are given for each skill. Once the scale has been used to assist each students’ listening, an overall score can be obtained to ascertain whether students have adequate listening skills, moderate listening difficulties or severe listening difficulties. Analysing each student’s scores on the scale indicates the overall strengths and weaknesses of the student’s listening ability. Intervention can then be implemented according to what the analysis indicates.

### 2.2.3.4 Issues: barriers and enablers

The current study investigated the issues experienced by teachers regarding analysis of literacy assessment data. Literature describes many factors that may be classified as enablers or barriers in the process of analysing such data. Data use is described as hard work (Earl, 2005) and this may be the underlying reason for other existing barriers.

Wildy (2009) identified in 1999 that government schools in Western Australia had little interest in assessment data (a significant barrier) and so she began a series of studies investigating this phenomenon. A decade later, Wildy’s (2009) findings indicated that the capacity of teachers to understand and interpret data varied to a large degree. Her findings imply that barriers to data analysis include inadequate knowledge and experience of data analysis. Timperley (2009) concurred and stated that, unless teachers know how to analyse and use assessment data, their instruction will be poorly informed. Poor use of data is considered to be a barrier to analysing data for the purposes of informing instruction (Campbell & Levin, 2009; Hattie, 2005).

In the Australian context of national testing and other school assessment, it has been suggested that teachers are surrounded by a large amount of data and do not
know what to do with it (Smeed, 2013). Smeed (2013) did not imply that national testing is the barrier to analysis but rather the teachers’ ability to use the data meaningfully may impede effective use of the data. Archbald (2011) agrees that teachers have insufficient expertise to analyse data. His opinion supports the notion that one of the barriers to analysing assessment data is the teachers’ lack of expertise in analysing data.

A barrier relating to teacher expertise in the area of statistics was investigated in a study of 704 teachers in Victorian government schools in Australia (Pierce, Chick & Gordon, 2013). The study found that poor understanding of statistical terms and graphs can be a barrier to interpreting assessment data. Pierce et al. (2013) considered NAPLAN data only. However, the current study investigated issues experienced by teachers, some of whom were not required to conduct analysis of NAPLAN data for their class but had done so in a whole school context.

Pierce, et al. (2014) explored teachers’ attitudes, subjective norms and perceived behavioural controls that may impact on teachers’ engagement with assessment data. The study investigated 18 factors affecting teachers’ perceptions of data use obtained from system reports on student achievement. Many of the factors identified are similar to factors investigated in the current study such as ability to interpret data, time taken to analyse data, using analysis to gain information about students’ abilities or knowledge and using analysis for intervention. Results of the study indicated that the majority of teachers (63%) feel confident about analysing assessment data (Pierce et al., 2013). The implication of the study is that lack of confidence may still be considered a barrier for some teachers.

An additional barrier indicated by Kerr et al. (2006) specifically related to data use, found that teachers were required to conduct too much testing and that lack of time was preventing them from analysing data from assessments. The study indicated that teachers found the process of analysing data to be labour intensive (Kerr et al., 2006). In this same study, other barriers to analysis that emerged were that assessment data was presented in a way that was difficult for teachers to interpret for daily teaching purposes and that support for analysing data was insufficient.
Factors that enable data analysis by teachers are addressed by a number of researchers including Timperley (2005), Wayman, Jimerson and Cho (2010), Fullan (2007) and Smeed (2013). Several enabling factors will be discussed in light of the current literature on assessment data analysis. The enabling factors range from one-on-one strategies to whole school strategies.

Enabling factors for whole schools range from professional development on techniques to analyse data from assessments (Timperley, 2005) to improving teachers’ attitudes towards analysing assessment data (Pierce et al., 2013). Timperley (2005) suggested that school leaders are responsible for providing professional development that empowers teachers to learn how to deliver programs that improve student achievement. The most effective professional learning involves small groups of teachers and should be part of a teacher’s job, not additional to it (Wayman et al., 2010). Wayman et al. (2010) provided many recommendations relating to professional development and firmly endorsed that teachers will increase their expertise in data analysis if they participate in frequent learning opportunities.

If teacher expertise in data analysis is lacking, Smeed (2013) indicated that diagnostic tools can enable teachers to analyse literacy assessment data more effectively. Smeed (2013) developed a practical method of data analysis known as the Over Time Assessment Data Analysis (OTADA) tool which is currently being used by many schools in Queensland, Australia. This instrument has been most effective when used in conjunction with professional development. This two-faceted approach is capable of providing teachers with the knowledge and analytical skills they require to interpret the data and identify students’ areas of need (Smeed, 2013).

Teacher attitudes are an important factor in whole school processes such as data analysis (Timperley, 2005). After participating in an action research project, teachers who previously failed to see the advantages of data analysis came to believe that data analysis was useful in improving their instructional practice. Measures of student achievement showed that improvements were as a result of the teachers’ change in attitude (Timperley, 2005). More recently, Pierce et al. (2013) indicated that teacher attitudes may be a barrier to their analysis of assessment data. Timperley (2009) identified a number of conditions required for effective data analysis to take place. One of the conditions was that teachers need to see data from assessments as
being useful for informing their teaching (Timperley, 2009). To change this condition from a potential barrier to an enabler, it may be necessary to change teachers’ assumptions about the purposes of assessment. Smeed et al. (2010) suggested that an ethos of school improvement can motivate teachers to see the purpose of analysing assessment data.

School leaders play an important role in enabling the analysis of data from assessment (Kerr et al., 2006). Research has identified several enabling factors including strong leadership, up-front planning for data collection and use as well as strong teacher capacity for making decisions about teaching based on data from assessments (Kerr et al., 2006). Schools where school leaders invested time and effort to support teachers achieved the best result in supporting teachers with data analysis (Kerr et al., 2006). Therefore, leaders who prioritise, model and plan for data analysis may enable teachers to be more effective analysers of data.

Effective data analysis can be achieved through collaboration (Earl, 2005). Earl (2005) stated that educational change is dependent on collaborative professional learning. In the current study, the ‘educational change’ that has been investigated is the increasing requirement for the analysis of literacy assessment data. Providing time for teachers to work together to discuss and interpret data enables them to engage in the analysis of data (Smeed et al., 2010). Collaboration enables teachers to collectively analyse different types of assessments and to discuss connections between the assessment data and subsequent instruction (Young & Kim, 2010). Wayman et al. (2010) proposed that when teachers collaborate on difficult tasks such as analysis of data, they pool their expertise enabling them to learn together.

Collaboration may also occur with educational coaches or mentors. The use of coaches to support teachers in the practice of data analysis is suggested by Young and Kim (2010) and Kerr et al. (2006) to be an important enabling factor. Coaches can have conversations with teachers about data analysis and model effective practices for them. School leaders who model data analysis practices to teachers promote increased use of the practices (Park & Datnow, 2009, cited in Smeed et al., 2010). Timperley and Parr (2009) suggest that literacy leaders modelling data analysis practice enables teachers to become effective in conducting data analysis without further support.
Time is identified as a potential barrier to data analysis (Young & Kim, 2010). To address this barrier to data analysis, Young and Kim (2010) suggested that teachers should be given instructional time within their teaching day to work on data analysis. If this is not possible, giving teachers time in lieu of time used for data analysis can be considered (Smeed et al., 2010).

The analysis of literacy assessment data can be influenced by a number of factors. Some factors, such as time and knowledge, are barriers and influence teachers’ practice in a negative way. Other factors, such as professional development and collaboration, are enablers and have a positive influence on teachers’ analysis of assessment data. All of the identified barriers and enablers are relevant to the current research as it investigated the barriers and enablers experienced by teachers in their practice of analysing literacy assessment data.

2.3. Summary

The 21st century has seen the development of a world-wide trend to improve education. Many countries enacted legislation to enforce changes and set priorities for improvement. In Australia, assessment and data analysis became priorities in educational settings to meet accountability requirements.

Vygotsky’s theory of learning and the model of formative assessment form the foundation upon which the research was planned. Vygotsky’s concept of the zone of proximal development proposes that improvement in learning can be achieved with guidance and collaboration. Formative assessment involves seeking and interpreting evidence of learning. Formative assessment comprises five key strategies, several of which complement Vygotsky’s theory of learning. Assessment, in the context of the current research, is defined by six principles. Important processes of assessment include gathering, analysing and using data to inform learning and intervention. The main types of assessment are formative and summative assessment. Assessment serves many important purposes. The use of data from assessments is considered central to effective instruction. Analysing data serves many purposes but the key purpose is to inform instruction. A wide range of
strategies for analysing data exists. The key strategies for analysing data from literacy assessments include miscue analysis, profiles, tools, written samples, rating scales and rubrics. Many issues are associated with analysis of assessment data either as barriers or as enablers to the process. Teachers’ use of data is thoroughly investigated in the research and will be further discussed in the next chapter.
3.1 Research Approach

The conceptual framework which underpins the research and outlines the main aspects of the research design is represented in Figure 3.1. The overarching and specific research questions required the careful selection of appropriate theoretical and practical approaches so that the research questions were thoroughly addressed. The overarching research question required investigation of methods used by Primary school teachers in employing the data obtained from their students’ literacy assessments to inform their pedagogical decisions, and also examined what factors influenced their practice. A quantitative approach would accurately collect and reflect some of this information but not all of it. Additional qualitative research was necessary to gather the personal, in-depth data that could not be represented statistically.

![Conceptual framework for addressing the research questions](image_url)

*Figure 3.1. Conceptual framework for addressing the research questions*
3.2 Epistemology

3.2.1. Quantitative Research

The main concept of quantitative research is using quantity (or numbers) to answer the research question (Punch, 2005). More than that, quantitative research is a deductive approach which involves the collection of numerical data and presents a relationship between theory and research (Bryman, 2012). Walter (2013) states that quantitative research methods provide statistical measurements such as relationships and variables. The research questions posed in this study explored the relationships between literacy assessment data and teachers’ practices of using analysis of the data for instructional purposes. Therefore, according to the previously stated definitions for quantitative research, this research approach was considered appropriate for answering the research questions investigating teachers’ analytical and instructional methods. One of the research questions investigated the most commonly employed types of interventions. This question, and the question investigating barriers and enablers to analysing literacy assessment data, were best answered using descriptive statistics and variables. Walter (2013) explains how quantitative research gathers data from a large number of sources and evaluates it using statistics to answer research questions. According to Creswell (2007), inquiry-based techniques such as experiments and surveys are used in quantitative research. A survey questionnaire was used in the current research to collect the quantitative data and will be fully described.

3.2.2. Qualitative Research

Qualitative research is an approach “…that begins with assumptions, a world view, the possible use of a theoretical lens, and the study of research problems inquiring into the meaning individuals or groups ascribe to a social or human problem” (Creswell, 2003, p. 37). A qualitative approach was appropriate for the current research as previous research has indicated that analysis of literacy assessment data is an area of difficulty for most teachers (Kerr et al. 2006; Pierce et al. 2013, Wildy, 2009). Through qualitative research, the problem was investigated
from the teachers’ personal perspective and the teachers’ responses provided detailed information about issues experienced with analysing data. Walter (2013) proposes that qualitative research is primarily about examining understandings and making interpretations about people in their social world. Qualitative research is an approach that studies reality from the inside (Sarantakos, 2013). In the context of the current research, this approach necessitated gathering information about the analysis of literacy assessment data and any associated factors from the teachers themselves.

According to Neumann (2006) qualitative research is inductive and employs particular procedures that are seldom replicable. He also states that data is presented as words, images, observations and transcripts. Bryman (2012) explains that it is an approach that usually emphasises words rather than quantities in the gathering and evaluation of data. Researchers using qualitative approaches aim to develop a theory or trend using open-ended strategies such as narratives and phenomenon (Creswell, 2003). These principles of qualitative research were included in the research through the semi-structured interviews which were recorded and transcribed as the information, such as precise comments, could not easily be obtained from the same participant a second time. The interviewees’ words (recorded as transcripts) and the researcher’s observations formed part of the analysis of how teachers undertake the analysis of literacy assessment data.

3.3 Theoretical Perspective

3.3.1. Positivism.

The theory of positivism is the perspective that provides the fundamental principles of the design of the quantitative component of the research. Positivism arose from the philosophies of Aristotle, Bacon, John Locke, August Comte and Emanuel Kant (Mertens, 2005) and is associated with many social theories. Positivism emphasises causal laws, empirical observations, value-free research and objectivity (Neuman, 2006). Positivists believe that there is one true reality that is understandable, identifiable and measurable (Ponterotto, 2005). A positivist approach uses scientific methods in objective ways to offer reasons for certain observations with control and predictability (Crotty, 1998). The principles pertaining to
objectivity, empirical observations and measurability are evident in the design of the quantitative component of this research. A survey questionnaire, which fits the positivist criteria, was selected as the method of data collection.

Positivism is a theoretical perspective that promotes a belief that knowledge is arrived at through gathering facts that provide the basis for scientific laws (Bryman, 2012). According to Sarantakos (2013), positivism is a philosophy that explores, explains, develops and tests theories. A positivist researcher gathers quantitative data from large samples and employs the use of statistics (Neuman, 2006). The chosen design and methods for the quantitative component of this research comply with the principles proposed by current theorists. Sarantakos (2013) states that positivism guides quantitative methodology, design and methods. Sarantakos’s (2013) statement supports the research design based on the principles of positivism and its practices for quantitative research.

3.3.2. Interpretivism

The theory of interpretivism is the perspective that provides the underlying principles of the design of the qualitative component of the research. Interpretivism has its roots in the work of Max Weber and Wilhelm Dilthey who emphasised subjectivity and respect for the fact that there are differences between people and the objects of the world (Bryman, 2012).

Research guided by interpretivism relies as much as possible on people’s views and opinions (Creswell, 2007). This theoretical component is evident in the qualitative component of this research, the semi-structured interviews, in which the participants’ views and opinions were thoroughly discussed and respectfully investigated. Creswell (2007) continues to explain how meanings are derived through interaction between people. In the context of this research, this interaction occurred between the researcher and the participants in the semi-structured interviews, enabling the researcher to gain deeper meaning through discussion around the participants’ experience in analysing literacy assessment data and any related issues. A depth of meaning was obtained through semi-structured interviews that would have been difficult to obtain using other research methods.
In contrast to positivism, interpretivism promotes an inductive approach to making meaning and it advocates the construction of theories and models from the information that has been gathered through interaction with people (Gray, 2013). The decision to use semi-structured interviews was based upon the need to make meaning of teachers’ current practice by discussing the analysis of literacy assessment data. In addition, theories were constructed from common themes that were found within the transcriptions.

Interpretivism provides the theoretical perspective for a number of social research approaches such as phenomenology and hermeneutics. As such, phenomenological research was posited to be effective in gathering information to answer the research questions and was selected in the design for this research. Sarantakos (2013) states clearly that qualitative research falls within the parameters of interpretivism and the planned research was guided by the principles of this theoretical perspective.

3.4. Paradigm

3.4.1. Pragmatism

The paradigm of pragmatism is one that enables researchers to gather information using methods that are most appropriate and effective in obtaining satisfactory outcomes for the topic of their research (Tashakkori & Teddlie, 2010). An important principle of pragmatism is that it is not dedicated to one system of philosophy (Cherryholmes, 1992; Murphy, 1990, both cited in Creswell, 2007). Through pragmatism, choices in research are determined by what the researcher deems suitable for the study to be successful (Mertens, 2005). Mertens explains that this paradigm enables methods to be matched to particular questions and purposes of research without being bound to one prescribed approach. The research questions in this study indicated the need for different methods to be used to accurately answer the questions. Using one research approach was not judged to be the best way to answer the different research questions. This paradigm allowed the researcher flexibility to choose what was considered to be the most appropriate method for each question.
In pragmatist research, knowledge is gained through action and reflection (Biesta, 2010). The survey questionnaires required participants to reflect on the questions being asked and share details of their practices by completing the questionnaire. Sound reflection and detailed answers provided the researcher with knowledge of the teachers’ practices. Semi-structured interviews provided in-depth knowledge through reflection as participants carefully considered and shared their thoughts, opinions and experiences regarding analysis of literacy assessment data.

3.5 Methodology

3.5.1. Mixed Method Research

As previously discussed, in pragmatist research, paradigms can be mixed, resulting in mixed method research (Onwuegbuzie, Johnson, & Collins, 2009). According to Sammons (2010), mixed methods research is able to address a broader range of research questions than other research types and it results in more robust and interesting data than other approaches used in isolation. The questions in this research contained four questions addressing related, but diverse, aspects of the analysis of literacy assessment data. The questions required identification, correlation, categorisation and explanation. This indicated the need for a mixed method approach using both quantitative and qualitative research methods.

Mixed method research enabled the strengths from one approach to compensate for another approach’s weaknesses (Punch, 2005). In the context of this research, using only quantitative research methods would not have gathered enough in-depth data to fully answer all the research questions. Qualitative research methods were used in the study to provide data that quantitative methods were unable to do, particularly where the questions required investigation of the teachers’ personal experiences, knowledge, attitudes and opinions to using the analysis of literacy assessment data in different ways to improve student achievement. Table 3.1 summarises how quantitative and qualitative methods were combined to answer the research questions.
### Table 3.1.

*Combining quantitative and qualitative data to answer research questions*

<table>
<thead>
<tr>
<th>Research question</th>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>In what ways do primary school teachers analyse literacy assessment responses to</td>
<td>Graph, mode</td>
<td>Clarification of process</td>
</tr>
<tr>
<td>identify students’ strengths and weaknesses?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How is the analysis used to inform instruction and intervention?</td>
<td>X</td>
<td>Explanation</td>
</tr>
<tr>
<td>What interventions are most commonly employed as a result of literacy assessment</td>
<td>Graph, frequency table</td>
<td>X</td>
</tr>
<tr>
<td>analysis?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What barriers and enablers do teachers experience in analysing literacy assessment</td>
<td>Percentages</td>
<td>Opinions, experience</td>
</tr>
<tr>
<td>data?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note.  X = Method not used to collect data

Bryman (2012) states that mixed method research leads to completeness of data and fills gaps that any single approach may address. As Table 3.1 shows, the quantitative research component aimed to present descriptive statistics (for example, graphs, tables, modes and percentages) to provide comprehensive information about different analytical techniques being practiced to identify students’ literacy strengths and weaknesses, and to compose a list of teachers’ most commonly used literacy intervention strategies. The quantitative research also aimed to present the barriers and enablers described by teachers. The qualitative research component aimed to provide descriptions of commonalities, trends and quotes from the transcripts that explained how teachers used their analytical skills to inform instruction and
intervention, clarify their knowledge and practice of analytical techniques and describe fully the issues identified as barriers or enablers in the process of analysing literacy assessment data.

Mixed method research involves collecting, analysing and interpreting quantitative and qualitative data in a single study or series that examines the same phenomenon (Leech & Onwuegbuzie, 2007). The current research represented a single study on the phenomenon of literacy assessment data analysis in primary schools in Perth. Survey research and phenomenological research methods were combined in the current research to collect comprehensive qualitative and quantitative data for analysis and interpretation.

3.5.2. Survey Research

Survey research is considered to be the most commonly used method of collecting data (Sarantakos, 2013). In survey research a choice of strategies may be used such as mail, telephone, personal interview, e-mail or Web-based surveys (Mertens, 2005). Survey research involves collecting information through oral means or written questionnaires and is able to measure variables, test hypotheses and make inferences about what is being researched (Neuman, 2006). In surveys, people (referred to as respondents) answer questions about topics such as their beliefs, attitudes and opinions (Neumann, 2006). The planning and design of the survey questionnaire used in the research is fully described in section 3.6.1.

3.5.3. Phenomenological Research

Phenomenology originates primarily from the writings of the German mathematician, Husserl (1859 – 1938), who proposed that people make sense of their world and ascribe meaning to how they construct their everyday life (Creswell, 2007). Phenomenology is strongly philosophical and writers following on from Husserl did not always agree on the best use of this type of research (Creswell, Hanson & Plano Clark, 2007). However, today there is agreement that phenomenological research involves the lived experiences of more than one
individual in regards to a particular phenomenon (Creswell, 2007). It involves investigating what chosen participants have in common, in relation to their experience of a certain phenomenon (Creswell, 2007). In the current research, the common phenomenon was teachers’ experience in literacy assessment analysis and their practices of using analysed data to inform instruction. Phenomenological research is used when a deeper understanding of an experience is needed, by making interpretations of the participants’ experiences (Creswell, 2007). The data from phenomenological research is examined thematically to identify the essential meanings of participants’ experiences of a particular phenomenon (Miles, Huberman & Saldana, 2014). This level of understanding about teachers’ experiences of analysing data and using it to inform teaching was required for in-depth qualitative data to answer the research questions.

3.6. Method

In line with the literature on survey and phenomenological research, survey questionnaires and semi-structured interviews were selected as the most appropriate data collection instruments for the current research. The planning and creation of these instruments will be further discussed.

3.6.1. Survey questionnaire

A survey questionnaire is an appropriate instrument for the current research as it is cost-effective, quick to administer, convenient and has consistency of format (Bryman, 2012). As such, it effectively collects data from a large number of teachers, allowing them to complete the questionnaire at a time that suits them. Although online surveys are currently common, a paper questionnaire was preferred for the current research for a number of reasons. A questionnaire on paper enabled easy distribution, allowed participants to quickly assess the length of the questionnaire and provided participants with the opportunity to complete the questionnaire at different times, if needed. A paper questionnaire also allowed for secondary data analysis by the researcher (Walters, 2013).

Substantial planning guided the design of the questionnaire with considerations being given to meeting research requirements and timely collection of
data. Construction of the questionnaire as a quantitative measuring instrument followed a procedure recommended by Punch (2005). Firstly, the variables to be measured were: data analysis strategies to identify students’ literacy skills; types of intervention used as a result of data analysis and their frequencies; and factors affecting analysis of assessment data. Secondly, measuring techniques were considered. Likert-type scales are widely used for measuring quantitative data (Neuman, 2006) and many questions in this questionnaire used this form of measurement. Tables within the questionnaire were used to collect data on strategies, types of intervention and factors affecting analysis of literacy data.

Careful wording of the questions took place to ensure clarity, erase ambiguity and provide accurate information to answer the research questions. The length of the questionnaire was considered important. A completion time of 20 minutes was posited as reasonable for participants to adequately answer all questions, thereby minimising non-responses and non-completions.

The questionnaire contained two separate parts to minimise the possibility of statements used by the researcher in the Likert-type scales (Part B of the questionnaire) biasing the participants’ responses in Part A of the questionnaire (Appendix A and B). Following the mixed format described by Sarantakos (2013), the questions appeared in a logical sequence (see Figure 3.2.).

![Figure 3.2. Sequence of questions](image-url)

The first section of the questionnaire gathered demographic information such as teachers’ ages, years of teaching experience, qualifications and current grade being taught. While these details do not directly address the research questions, they were used to guide the selection of a range of participants for the semi-structured interviews. The second section gathered data on the strategies teachers use to analyse students’ answers in literacy assessments to identify their specific strengths and
weaknesses. Strategies for the analysis of reading, spelling, writing, listening, and speaking were identified.

The section regarding intervention gathered teachers’ responses regarding types of intervention implemented as a result of literacy assessment data analysis. Teachers were required to list specific interventions that they used. They were also required to indicate the frequency of the intervention’s use by choosing “always”, “often” or “sometimes”.

The final section of Part A used a Likert-type scale to gather data on the extent to which certain factors affected teachers’ analysis of literacy assessment. Teachers were also able to provide additional factors to the list. Teachers were required to indicate the degree to which the factor affected their analysis of assessment through indication on a “not at all”, “sometimes”, “often”, or “always” scale.

Part B of the survey questionnaire contained two sections using Likert-type scales. The first section gathered data on assessment practises, types of analysis and the practice of using assessment results to plan instruction. The teachers were required to indicate their responses as “hardly ever”, “sometimes”, “frequently”, or “almost always”. The second section collected data on factors relating to the analysis of literacy assessment data such as its importance, its complexity, its purpose and teachers’ perceived level of confidence and competence due to professional development. The Likert-type scales were: “strongly agree”, “agree”, “disagree”, and “strongly disagree”. A neutral response was not offered so as to ensure the teachers carefully considered the choices.

3.6.1.1 Pilot test

A pilot test of the survey questionnaire was conducted with six teachers (Mertens, 2005). The teachers were of different ages, gender, teaching experience, were from different schools and teaching different grade levels. The teachers were asked to complete a feedback sheet and to measure the time taken to complete the questionnaire. Their feedback indicated that:

- the questionnaire took longer than 20 minutes to complete
question 2 needed rephrasing to improve clarity
question 10 was confusing as the meaning of ‘support’ was unclear
answers to question 9 seemed to be repeats of answers to question 8
there was adequate space for answers.

Acting on the feedback, the researcher omitted or restructured the questions indicated. No specific feedback was given for Part 2 therefore no changes were made to this section.

3.6.2. Semi-structured interview

The interview is regarded as one of the main data collection tools in qualitative research and is one of the most powerful ways researchers have of understanding others (Punch, 2005). Many types of interviews exist such as structured, semi-structured and unstructured interviews (DiCicco-Bloom & Crabtree, 2006). Semi-structured interviews are specifically recommended as an appropriate method of generating qualitative data (King & Horrocks, 2010).

Semi structured interviews are in-depth interviews in which detailed accounts from people can be elicited (DiCicco-Bloom & Crabtree, 2006). Semi-structured interviews were chosen because they allowed the flexibility needed to gather qualitative data about the participants’ personal experience with regard to assessment analysis, use of analysed data in instruction, use of analysed data for intervention, and the issues teachers experience with regard to using analysis as an assessment practice. Careful planning was exercised in compiling the list of guiding questions so that they could gather specific data to answer the research questions, while still allowing participants to discuss their thoughts freely. Figure 3.3 describes the progression of interview questions.

Figure 3.3. Progression of interview questions
It is recommended that between five and ten specific questions are developed for semi-structured interviews to allow for in-depth discussion of the different aspects of the research issue (Whiting, 2008). All nine of the guiding questions were open-ended, providing the opportunity for the interviewee to discuss any relevant information regarding the analysis of literacy assessment that he/she felt was important. The first question set the specific topic for discussion in a general way gathering information about the teachers’ personal view, and understanding, of assessment analysis. The questions progressed to the role of analysis of assessment in the teachers’ classroom practice. The subsequent questions discussed strategies to identify students’ literacy skills and intervention strategies used. The final questions regarded factors influencing the teachers’ analysis practices. Refer to Appendix C for the semi-structured interview questions.

3.7. Sample

As this was a mixed method study, the selection of a sample was guided by Teddlie and Yu (2007) who suggest that a mixed method researcher is able to select representative samples and also samples that yield rich information to generate complementary data. Purposive sampling is a selection of sampling units within the section of the population with the most information on the specific characteristic being studied (Guarte & Barrios, 2006). Purposive sampling was considered the most appropriate strategy for the current research as it was highly likely that data on literacy assessment analysis in primary schools would not be easily sourced from people other than teachers in primary schools. As a result of the sample being purposive and chosen according to common criteria, such as primary school teachers, assessors and analysers of literacy assessment data, the sample also had a fairly high degree of homogeneity (Guest, Bunce & Johnson, 2006).

Purposive sampling can be subjective and the researcher may rely on their experience and judgement in determining an appropriate sample size (Guarte & Barrios, 2006). For the quantitative component of the research, a sample size of 100 teachers was considered to be a realistic number to provide the data needed to address the research questions, considering; time to complete the research, accessibility to schools and availability of participants. To ensure the sample
represented different educational systems and sectors, teachers from equal numbers of Catholic schools, independent schools and government schools were invited to participate. Schools within each sector were chosen in a range of locations and represented different socio-economic indices. It was planned to invite a particular school, with which the researcher had prior connections, to participate in the research. The researcher was not working at the school at the time of the research. No dependent relationships existed at the school.

Participants for the semi-structured interviews were purposively selected according to responses from the survey questionnaire. When the goal of data collection is to describe shared perceptions, beliefs or behaviour among a relatively homogenous group, a sample of twelve is considered to be adequate (Guest, Bunce & Johnson, 2006). Fifteen participants were initially selected for the semi-structured interviews. This number of participants allowed for flexibility according to data saturation. Data saturation refers to the point in collection of qualitative data when no new data is found that contribute to the researched category (Francis et al., 2010). Therefore, slightly less or slightly more than fifteen participants for the semi-structured interviews may have been required. With a small sample size where participants share similar experiences with respect to what is being researched, saturation will generally be reached sooner. (Guest, Bunce & Johnson, 2006). Table 3.2 summarises the schools and teachers included in the sample.

Table 3.2.

Summary of schools and teachers in the sample.

<table>
<thead>
<tr>
<th>Educational sector</th>
<th>Schools approached</th>
<th>Schools participated</th>
<th>Teachers who completed questionnaires</th>
<th>Teachers who were interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>8</td>
<td>6</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>Independent</td>
<td>9</td>
<td>2</td>
<td>41</td>
<td>9</td>
</tr>
<tr>
<td>Catholic</td>
<td>8</td>
<td>1</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>
3.8. Data collection

Once Ethics clearance from all relevant institutions had been obtained, principals from Catholic, Government and Independent Primary schools were contacted requesting an appointment to describe the research and extend an invitation for the school’s participation. The principal was given a Plain Language Statement (also known as a Participant Information sheet (see Appendix D) that provided details of the research’s aims, context and processes. After consent was given from the principals, teachers were contacted and invited to participate in the research. The quantitative data was gathered first through the questionnaires. Results from the questionnaires led to the selection of participants for the semi-structured interviews. When data saturation showed that sufficient semi-structured interviews had been conducted, the quantitative and qualitative data was holistically analysed. Figure 3.4 represents the data collection procedure and the methods used.

![Figure 3.4. Procedure and methods of data collection](image)

3.8.1. Quantitative data collection

Once the principal had agreed to the staff participating in the research, they were contacted via email or in person (as decided by the principal) and given Participant Information Letters and Letters of Consent. A date for collection of the signed Consent Forms was arranged prior to delivery of the questionnaire. An effective time for completion of the questionnaires would have been a 20 minute period in the regular staff meetings as it would have minimised non-responses and partial- or non-completions. This was discussed with the principals, but all principals declined to give this time due to the full agendas for staff meetings. Teachers were given clear written instructions for completing the questionnaire and for returning it to the school administration. Completed questionnaires were collected either on the arranged day, or when it was confirmed that participants had made them available for
collection. Photocopies were made for the researcher to complete the analysis and the originals were delivered to the University of Notre Dame School of Education for secure storage. A letter of appreciation was written to the principal and staff thanking them for their contribution to the research.

3.8.2. Qualitative data collection

Four significant principles influenced data collection during the semi-structured interviews: careful planning, simulating data collection procedures, maintaining ethical and professional standards and being fully prepared for the interview (Punch, 2005). Careful planning considered convenient times and place for interviews. Preparation and practice of interviewing skills was achieved through simulation of data collection procedures. Ethical and professional standards involved appropriate consent, confidentiality and respect. Strategies used to address each of these data collection principles will now be discussed.

A convenient time and place for the interview was made with the teachers who indicated that they wished to participate in an interview. Teachers were advised that an audio-recording of the interview would be made using an iPad and they were fully informed of their rights regarding confidentiality of all information that they provided. To maximise the quality of discussion and the resulting information, a venue which allowed for comfort, a reasonable degree of quietness and minimal interruption was selected, either at the school or at another location. (Doody & Noonan, 2013).

In preparation for conducting the interview, time was spent rehearsing the questions. This was to reduce the researcher’s reliance on the list of proposed questions so that she could pay more attention to the participants’ responses. The researcher was prepared to depart from the planned itinerary during the interview as digressions can be very productive as they follow the participant’s interest and knowledge (Whiting, 2008). Therefore, a colleague was approached to engage in a simulation of the interview and to provide practice in dealing with questions that may have deviated from the topic. Phases which occur during the interview are; building rapport, apprehension, exploration, cooperation, participation and lastly, concluding the interview (Whiting, 2008). These phases guided the way in which the interview was facilitated. As each of the phases was reached, conversation progressed from
general to being more related to the research topic. Pertinent observations made during the interview such as the participant’s attitude and expressed emotions were formally noted during the interview. The interview was concluded in a positive way, thanking the participant for their input and engaging them in general conversation once again. When no new categories or themes emerged, the point of saturation had been reached (DiCiccio-Bloom & Crabtree, 2006) and signalled that, after fourteen interviews, data collection was complete.

3.9. Data Analysis.

3.9.1 Quantitative data analysis.

Part A of the survey questionnaires provided data appropriate for general descriptions so descriptive statistics were used to analyse the data (Sarantakos, 2013). The software package SPSS Statistics 22 was used for quantitative data entry and analysis. A code was allocated to each questionnaire to de-identify it. The educational sector and name of the participating school was recorded. Variables for each question in the survey questionnaire were identified, labelled and given a value. String variables were allocated to questions 4, 5, 7 and 8 of the first section of the questionnaire. Numeric variables were allocated to questions 8 and 9 of the first section. A separate data set was created for Part B of the questionnaire which contained Likert scales and numeric variables were allocated for each statement. Missing or invalid responses were also given a value so that the data would represent an accurate result. Graphs, percentages, frequency tables, mean values and modes were generated using SPSS. The visual representations were used to summarise the statistical data in different ways. The summarised data was then interpreted, searched for trends and investigated for statistical answers to the research questions.

3.9.2. Qualitative data analysis.

Transcripts of the interviews were typed using a word processor program. Analysis of the qualitative data included the three components advocated by Miles and Huberman (1994). These components are; analysis data reduction, data display and drawing and verifying conclusions. The data was analysed according to the steps recommended by Miles and Huberman (1994). Firstly, codes were allocated to the
transcripts de-identifying the participants. To reduce the data, the transcripts were investigated for keywords, phrases and categories. Notes and quotes from the researcher’s records formed part of the data reduction. Matrices were created to analyse and display this set of data (Sarantakos, 2013). Each transcript was searched line by line for commonalities which provided detailed data such as patterns and common themes relating to: types of intervention, assessment data analysis, and issues relating to assessment data analysis. Memos were written throughout the analysis as important ideas contributing to the analysis become evident (Punch, 2005).

Bracketing took place as part of the analysis process to remove any researcher assumptions or preconceived ideas about the participant responses (Sarantakos, 2013). Firstly, the researcher was meticulous about not allowing previous observations of teachers’ analysis practices, which formed part of the rationale of the current research, to bias her analysis of the participants’ responses. Secondly, when analysing responses, the researcher ignored any information that was collected as a result of a leading question rather than an open-ended question. Bracketing was also achieved by open-minded analysis which is a recommended strategy for preventing bias due to current literature reviews (Chan, Fung & Chien, 2013). Using this strategy, the researcher did not allow relevant literature to lead her analysis in a particular direction.

After analysis, a set of generalisations which covered the consistencies observed in the data was identified. The generalisations were examined and these, together with appropriate quotations that reflect the themes, were interpreted to answer the research questions. Figure 3.5 represents the qualitative data analysis process.
3.9.2.1 Member checks

Participants were asked to confirm the accuracy of the transcription by reading and signing a copy. The member checks confirmed that the interviews had been correctly transcribed. The member checks supported the quality of the data that had been collected.

3.10. Triangulation

Quantitative and qualitative data were combined to gain a more complete understanding of the phenomenon being studied (Mertens & Hess-Biber, 2012). In this study, statistical information gathered from the survey questionnaire was combined with the qualitative information gathered from the semi-structured interviews. Quantitative and qualitative data were examined for commonalities and trends. By employing different methods and comparing a variety of data sources as recommended by Torrance (2012), the study examined the research questions from different perspectives and thereby gained a comprehensive picture of Primary school teachers’ practices regarding the analysis of literacy assessment data.
3.11 Summary

The chapter describes the methodology of the research. Mixed method research was posited to provide the best answers to the research questions so a combination of quantitative and qualitative research approaches were employed. Survey research and phenomenological research were judged to be the most effective methodologies for the research. A survey questionnaire was the method used to collect quantitative data whilst a semi-structured interview was selected to collect qualitative data. A purposive sample included teachers from all educational sectors and different locations. Data was collected sequentially with participants for the semi-structured interviews being selected after analysis of the survey questionnaire results. Detailed quantitative and qualitative analysis included member checks and bracketing. Triangulation provided comprehensive results of the research. These results will be further articulated in Chapter Four.
CHAPTER FOUR: RESULTS

4.1. Introduction.

The primary purpose of this research was to investigate the strategies used by Primary school teachers to analyse data from Literacy assessments for the purposes of identifying students’ skills in Literacy, and for planning subsequent instruction and intervention. Another purpose of the research was to identify the enabling factors and barriers that impact teachers’ analysis of assessment data. Data was collected using a mixed method approach. This chapter provides the quantitative and qualitative describes the results of the survey questionnaire and the semi-structured interviews, providing explicit information pertaining to teachers’ analysis of data from Literacy assessments and the factors that teachers experience as enablers or barriers to the process of assessment data analysis. Background information such as participating schools, demographic information (teachers’ gender, age, teaching experience, qualifications and current class) will be summarised.

4.2. Summary of schools and teachers.

Teachers from Government, Independent and Catholic schools participated in the research. Government schools represented 67% of the schools that participated. 23% of the schools were Independent schools and 10% of the schools were Catholic schools. Eight Government schools, nine Independent schools and eight Catholic schools were invited to participate in the research. Teachers from six Government schools, two Independent schools and one Catholic school actually participated in the research. The majority (six of the nine schools) that participated in the research were Government schools. However, the greatest number of teachers who participated were from Independent schools. Figure 4.1 summarises the schools that participated.
Different response rates were experienced from teachers from each of the educational systems and sectors. The number of questionnaires delivered to each school was determined by the number of Primary school teachers at the school. One hundred and thirty-one (131) questionnaires were delivered to Government schools and nineteen (14.5%) were completed by the teachers. Forty-one (41) questionnaires were delivered to independent schools with 100% response rate. Forty (40) questionnaires were delivered to the one Catholic school that had agreed to participate and four (10%) were completed. The overall response rate was 30.2%.

Nine (9) interviews were conducted with teachers in Independent schools and five (5) interviews were conducted with teachers in Government schools. No teachers from Catholic schools volunteered to participate in an interview. Table 4.1 provides details of the number of schools that participated, the number of teachers who completed questionnaires and the number of teachers who participated in interviews.
Table 4.1.

Summary of schools' participation in the research.

<table>
<thead>
<tr>
<th>Educational sector</th>
<th>Schools approached</th>
<th>Schools who participated</th>
<th>Questionnaires delivered</th>
<th>Questionnaires completed</th>
<th>Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>8</td>
<td>6</td>
<td>131</td>
<td>19 (14.5%)</td>
<td>5</td>
</tr>
<tr>
<td>Independent</td>
<td>9</td>
<td>2</td>
<td>41</td>
<td>41 (100%)</td>
<td>9</td>
</tr>
<tr>
<td>Catholic</td>
<td>8</td>
<td>1</td>
<td>40</td>
<td>4 (10%)</td>
<td>0</td>
</tr>
</tbody>
</table>

4.3 Demographic

The questionnaire collected demographic data about the teachers which included; gender, age, years of teaching experience, qualifications and the grade currently being taught by the teachers. A wide range within each demographic was indicated by the data. The ranges and other results for each demographic have been individually addressed.

4.3.1. Gender.

Findings showed that 88% (n=56) of the teachers were female and 12% (n=8) of the teachers were male. There was a large difference between the percentage of female and male participants, which is consistent with the differences within the teaching profession. See Figure 4.2 for the percentages of male and female teachers who participated in the quantitative questionnaire component of the research.
4.3.2. Age.

Data regarding the age of participants showed that their ages ranged between twenty-one and more than fifty years old. The largest percentage of teachers (36.51%) were aged between 41 and 50 years old. There were more teachers older than 50 (25.4%) than there were teachers aged between 21 – 30 years old (20.63%). This means that the majority of participants (61.91%) were older than 40 years. Figure 4.3 represents the percentages for each age range.

Figure 4.2. Percentage of male and female participants

Figure 4.3. Percentage of participants in each age range.
### 4.3.3. Teaching experience

The participants had a wide range of teaching experience. Almost half of the teachers (45.16%) had more than sixteen years of experience which indicates a high level of experience. 33.87% of teachers had between six and fifteen years of experience while 20.97% of teachers had between one and five years of experience and would be considered as having relatively little teaching experience. Figure 4.4 represents the teaching experience (in years) of the teachers who participated in the study.

![Figure 4.4. Years of teaching experience](image)

**Figure 4.4. Years of teaching experience**

### 4.3.4. Qualifications

The range of qualifications varied extensively from diplomas (three year qualification) to postgraduate degrees. Many teachers held two qualifications so the data was recoded to display the highest qualification held by the participant. The majority of the teachers (61.9%) held a Bachelor degree. A broad range of Bachelor degrees were held by different teachers including Bachelor of Education, Bachelor of Education Special Needs, Bachelor of Teaching and Learning, Bachelor of Arts, Bachelor of Commerce, Bachelor of Media and Bachelor of Science. Approximately a quarter (25.4%) of the participants held postgraduate degrees. Postgraduate degrees included Graduate Diploma in Education, Postgraduate Certificate in Education,
Master of Teaching and Master of Education. No teachers held a Doctorate qualification. Figure 4.5 illustrates the highest qualification held by the participants.

![Figure 4.5. Qualifications]

### 4.3.5. Current year level being taught.

All year levels from Year 1 to Year 6 were represented in the study. There were also some composite classes being taught, such as Year 1/2, Year 2/3 and Year 3/4, where two year levels are combined in one class. However only four teachers were teaching composite classes. Of the non-composite classes, the majority (n=14) of participants were Year 1 teachers, with the smallest number of participants (n=3) being Year 6 teachers. Seven of the participants had leadership roles as well as teaching roles and it was their responsibility to teach students from a range of year levels. This group of participants included Curriculum Coordinators, language specialists, Support Coordinators and EASL (English as a Second Language) teachers. Figure 4.6 represents the percentages of year levels reflected in the study.
4.4. Analysis of literacy assessment data.

The questionnaire distributed to participants investigated different aspects of teachers’ analysis of data from literacy assessment. Firstly, it established the frequency of literacy assessment. Teachers were then asked to identify strategies for analysing student assessment to ascertain student’s skills in different components of literacy, such as reading, spelling, writing, listening and speaking. The questionnaire also required teachers to specify intervention used as a result of analysing assessment data. The final section of the questionnaire sought information about factors that could potentially affect teachers’ analysis of literacy assessment.

4.4.1. Frequency of literacy assessment.

As the majority of the questionnaire focused on the analysis of assessment data, it was necessary to establish that teachers had assessment data to analyse in the first instance. The type of assessment was not prescribed due to the range of possible assessments. By determining the frequency of assessment, the researcher sought to establish a basis for the remaining questions. The results indicated that all teachers conducted literacy assessment and were, therefore, able to answer the subsequent questions which all related to the analysis of literacy assessment data.
The most common frequency of assessment was weekly, with 50% of teachers implementing this practice. Assessing literacy on a daily basis was less common and practiced by 24.2% of teachers. Fortnightly assessment was conducted by 11.3% of the teachers. A small percentage (4.8%) of teachers assessed literacy every month. The remainder of the teachers used different intervals of literacy assessment but did not specify the intervals. Table 4.2 illustrates the frequency of literacy assessment in Primary schools.

Table 4.2.

<table>
<thead>
<tr>
<th>Frequency of Literacy assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
</tr>
<tr>
<td>Weekly</td>
</tr>
<tr>
<td>Fortnightly</td>
</tr>
<tr>
<td>Monthly</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>24.2%</td>
</tr>
<tr>
<td>50%</td>
</tr>
<tr>
<td>11.3%</td>
</tr>
<tr>
<td>4.8%</td>
</tr>
<tr>
<td>9.7%</td>
</tr>
</tbody>
</table>

4.4.2. Strategies to analyse students’ assessment to identify strengths and weaknesses in reading, spelling, writing, listening and speaking.

The questionnaire asked teachers to identify strategies they used to analyse literacy assessment data to identify students’ strengths and weaknesses in reading, spelling writing, listening and speaking. They were asked to provide two strategies for identifying weaknesses and two strategies for identifying strengths for each of the areas of Literacy. The total for each strategy was obtained by adding first and second responses. Teachers may be using more than two strategies. However, the results represent the two strategies recorded. The findings will be reported for each separate component of literacy.

4.4.2.1. Reading assessment.

4.4.2.1.1. Analysis to identify reading strengths.

Close examination of the data revealed common words or phrases in the teachers’ responses which were able to be coded. Categories then emerged from the
codes. Nine categories were determined to represent the teachers’ responses. The nine categories were: comprehension and questioning; oral reading; guided reading; miscue analysis and running errors; benchmark assessment; standardised tests; rubrics, checklists, anecdotal records; formative assessment and placement tests. These nine categories are not all analytical strategies. However, the categories indicate what methods teachers consider to be analytical strategies.

The most common category of strategies used by teachers to identify reading strengths was comprehension and questioning as 40.6% of teachers used this strategy. Oral reading strategies were used by 36% of the teachers to identify reading strengths by analysing fluency, rate, accuracy and word recognition. 31.3% of the teachers used Guided Reading as a method to identify students’ reading strengths. Slightly fewer teachers (27.9%) used miscue analysis and running records. Standardised tests were used by 20.3% of teachers compared to 12.5% of teachers who used benchmark tests. However, a greater diversity of benchmark tests were used compared to standardised tests. Five teachers used AlphaAssess (Alpha Literacy, n.d.), three teachers used York Assessment of Reading Comprehension (YARC) (Psychological Assessments Australia, 2012), three teachers used Progressive Achievement Tests – Reading (PAT-R) (ACER, 2006) and only one teacher noted the use of the Fountas and Pinnell Benchmark Assessment System (Fountas & Pinnell, 2006). The Holborn Reading Test (Watts, 1980) were recorded by three teachers. The least common strategies were: rubrics, checklists, anecdotal records (6.3%); formative assessment (3.2%) and placement tests (1.6%). Six teachers recorded only one response (rather than the two responses requested) to analyse reading assessment to identify students’ reading strengths. Table 4.3 describes the categories of methods, the teachers’ responses and the corresponding results.

Table 4.3.

*Teachers’ analysis of reading assessment to identify reading strengths.*

<table>
<thead>
<tr>
<th>Analysis method</th>
<th>As response 1 (%)</th>
<th>As response 2 (%)</th>
<th>Overall %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehension and questioning</td>
<td>15.6</td>
<td>25</td>
<td>40.6</td>
</tr>
</tbody>
</table>
Oral reading * 18.8 17.2 36.0
Guided reading 17.2 14.1 31.3
Miscue analysis and running errors 21.9 6.3 27.9
Benchmark assessment 7.8 4.7 12.5
Standardised tests 12.5 7.8 20.3
Rubrics, checklists, anecdotal records 4.7 1.6 6.3
Formative assessment 1.6 1.6 3.2
Placement tests - 1.6 1.6

Note: - = item not noted. *Includes fluency, rate, accuracy and word recognition

4.4.2.1.2. Analysis to identify reading weaknesses.

Initial analysis of the data identified common words or phrases in the teachers’ responses which highlighted categories within the data. The data was recoded and further analysis identified twelve categories of analysis methods. These twelve categories are not all analytical strategies. However, the categories indicate what methods teachers consider to be analytical strategies.

The six categories used by more than 17.2% of the teachers are: oral reading; miscue analysis and running records; comprehension and questioning; benchmark assessment; standardised tests and guided reading. The six categories used by less than 3.2% of the teachers, are: placement tests; curriculum, scope and sequence; rubrics, checklists, anecdotal records; formative assessments; classroom observations; and diagnostic assessments.

The results indicated that the most commonly used strategy of analysis to identify reading weaknesses is oral reading and this strategy is used by 42.2% of the teachers. Miscue analysis and running records are used by slightly fewer teachers (32.8%) to identify reading weaknesses. Methods analysing comprehension and questioning and also benchmark assessments are used with similar frequency (28.2% and 28.1% respectively). Four teachers indicate the use of AlphaAssess benchmark levels (Alpha Literacy, n.d.), three teachers use Progressive Achievement Tests – Reading (PAT-R) (ACER, 2006) and three teachers use York Assessment for
Reading Comprehension (YARC) (Psychological Assessments Australia, 2012). One teacher notes the National Assessment Literacy and Numeracy (NAPLAN) and one teacher notes the Fountas and Pinnell Benchmark Assessment System (Fountas & Pinnell, 2006). Standardised tests are used to identify reading weaknesses by 21.8% of the teachers. Three teachers note the use of the Holborn Reading Test (Watts, 1980) and one teacher uses the Burt Reading Test (Gilmor, 1981). Guided reading is used by 17.2% of the teachers. A small percentage of teachers (less than 3.2%) used placement tests, curriculum scope and sequence, formative assessment, rubrics, checklists and anecdotal records to analyse reading assessment data to identify students’ reading weaknesses. Fifty-eight teachers use a minimum of two methods of analysing students’ reading weaknesses while eight teachers report using a single method of analysing assessment data to identify reading weaknesses. Table 4.4 describes the categories of analysis methods, two responses given by the teachers and the overall results.

Table 4.4.

Teachers’ analysis of reading assessment to identify reading weaknesses.

<table>
<thead>
<tr>
<th>Analysis method</th>
<th>As response 1 (%)</th>
<th>As response 2 (%)</th>
<th>Overall %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral reading*</td>
<td>31.3</td>
<td>10.9</td>
<td>42.2</td>
</tr>
<tr>
<td>Miscue analysis and running records</td>
<td>21.9</td>
<td>10.9</td>
<td>32.8</td>
</tr>
<tr>
<td>Comprehension and questioning</td>
<td>9.4</td>
<td>18.8</td>
<td>28.2</td>
</tr>
<tr>
<td>Benchmark assessment</td>
<td>7.8</td>
<td>20.3</td>
<td>28.1</td>
</tr>
<tr>
<td>Standardised tests</td>
<td>10.9</td>
<td>10.9</td>
<td>21.8</td>
</tr>
<tr>
<td>Guided reading</td>
<td>9.4</td>
<td>7.8</td>
<td>17.2</td>
</tr>
<tr>
<td>Curriculum, scope and sequence</td>
<td>1.6</td>
<td>1.6</td>
<td>3.2</td>
</tr>
<tr>
<td>Rubrics, checklists, anecdotal records</td>
<td>1.6</td>
<td>1.6</td>
<td>3.2</td>
</tr>
<tr>
<td>Placement tests</td>
<td>3.1</td>
<td>-</td>
<td>3.1</td>
</tr>
<tr>
<td>Formative assessments</td>
<td>1.6</td>
<td>-</td>
<td>1.6</td>
</tr>
</tbody>
</table>
4.4.2.2. Spelling assessment

4.4.2.2.1. Analysis to identify spelling strengths.

The data showed that a large range of methods were used by teachers to identify students’ strengths in spelling through analysis of spelling assessment data. Further analysis of the research data identified that recurring words or phrases in the teachers’ responses signalled common categories. The data was recoded and seventeen categories emerged. While these categories are not all analytical strategies they indicate the methods teachers consider to be analytical strategies.

The most common strategy for analysing assessment data to identify students’ spelling strengths was using student writing samples, with 45.3% of the teachers using this strategy. Commercial spelling programs were used by 26.6% of the teachers. Of these teachers, seven used the Diana Rigg Placement test, three used Sound Waves (Murray & Watson, 2010) and three used Vocabulary, Connectives, Openers and Punctuation (VCOP) (Andrell Education, n.d.). Smart Words, Words Their Way (Bear, Templeton, Invernezzi & Johnston, 2009), and Crack the Code (Flynn, n.d.) were each used by one teacher. Three types of testing were used with similar frequencies as methods of analysis to identify students with strong spelling skills (standardised tests, 23.5%; weekly spelling tests, 21.8%; and testing, 18.8%). Ten teachers specified the use of the South Australian spelling test (Westwood, 2005) and two teachers specified the use of the Waddington Spelling Test (Waddington, 2000). Benchmark assessments were used by 11.0% of the teachers with two teachers specifying National Assessment Program Literacy and Numeracy (NAPLAN) and two teachers recording the use of Progressive Achievement Tests (PAT) (ACER, 2006). Three categories of tests were used with similar frequencies: pre- and post- tests (7.8%); diagnostic assessment (7.8%); differentiated tests (6.3%). The analysis methods used least frequently (by less than 3.2% of the teachers) are:

<table>
<thead>
<tr>
<th>Classroom observations</th>
<th>-</th>
<th>1.6</th>
<th>1.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic assessments</td>
<td>-</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Other</td>
<td>1.6</td>
<td>-</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Note - = item not noted. *Includes fluency, rate, accuracy and word recognition.
phonic assessments; editing; accuracy analysis; student conferences; ‘Look, Cover, Write, Check’, word-building; scope and sequence; online and partner testing. Nine teachers recorded only one method of analysis for identifying students’ spelling strengths instead of two. Table 4.5 describes the categories of methods and summarises the teachers’ responses.

Table 4.5.

*Teachers’ analysis of spelling assessment to identify spelling strengths.*

<table>
<thead>
<tr>
<th>Analysis method</th>
<th>As response 1 (%)</th>
<th>As response 2 (%)</th>
<th>Overall %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student writing samples</td>
<td>20.3</td>
<td>25</td>
<td>45.3</td>
</tr>
<tr>
<td>Commercial programs</td>
<td>14.1</td>
<td>12.5</td>
<td>26.6</td>
</tr>
<tr>
<td>Standardised tests</td>
<td>14.1</td>
<td>9.4</td>
<td>23.5</td>
</tr>
<tr>
<td>Weekly spelling test</td>
<td>10.9</td>
<td>10.9</td>
<td>21.8</td>
</tr>
<tr>
<td>Testing</td>
<td>12.5</td>
<td>6.3</td>
<td>18.8</td>
</tr>
<tr>
<td>Benchmark assessment</td>
<td>4.7</td>
<td>6.3</td>
<td>11.0</td>
</tr>
<tr>
<td>Pre and post tests</td>
<td>7.8</td>
<td>-</td>
<td>7.8</td>
</tr>
<tr>
<td>Diagnostic assessment</td>
<td>4.7</td>
<td>3.1</td>
<td>7.8</td>
</tr>
<tr>
<td>Differentiated tests</td>
<td>1.6</td>
<td>4.7</td>
<td>6.3</td>
</tr>
<tr>
<td>Phonic assessments</td>
<td>1.6</td>
<td>1.6</td>
<td>3.2</td>
</tr>
<tr>
<td>Editing</td>
<td>1.6</td>
<td>-</td>
<td>1.6</td>
</tr>
<tr>
<td>Accuracy analysis</td>
<td>1.6</td>
<td>-</td>
<td>1.6</td>
</tr>
<tr>
<td>Student conferences</td>
<td>1.6</td>
<td>-</td>
<td>1.6</td>
</tr>
<tr>
<td>Look, Cover, Write, Check</td>
<td>1.6</td>
<td>-</td>
<td>1.6</td>
</tr>
<tr>
<td>Word-building</td>
<td>1.6</td>
<td>-</td>
<td>1.6</td>
</tr>
<tr>
<td>Scope and sequence</td>
<td>-</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Online and partner testing</td>
<td>-</td>
<td>1.6</td>
<td>1.6</td>
</tr>
</tbody>
</table>

*Note: – = item not noted*

4.4.2.2.2. *Analysis to identify spelling weaknesses.*

The data collected from the questionnaires identified that teachers employed many methods of analysing spelling assessments in order to identify students’
spelling weaknesses. Closer analysis of the teachers’ responses identified many common responses. The data was recoded and thirteen categories were identified. These categories are not all analytical strategies. However, the categories indicate what methods teachers consider to be analytical strategies.

Seven categories had a percentage of 15.9% and higher. These categories were: student writing sample; standardised tests; diagnostic assessment; weekly spelling test; testing and commercial spelling programs. Six categories had a percentage of 9.4% or less. These categories were: phonic assessments; benchmark, assessments; accuracy analysis; differentiated tests; ‘Look, Cover, Write, Check’; online and partner testing, and dictation.

Analysing student writing samples dominated as a strategy to identify spelling weaknesses. This strategy was indicated by 17.2% of teachers as their first method of analysis and it was indicated by 26.6% of teachers as their second method of analysis. These results indicated that, in total, 44.8 % (n=28) of teachers analysed student writing samples to identify spelling weaknesses. Standardised tests were used by 25% of teachers. The use of the South Australian Spelling Test (Westwood, 2005) was recorded by six teachers and the Waddington Spelling Test (Waddington, 2000) was noted by two teachers. The strategies of weekly spelling tests, testing and commercial spelling programs were each used by 18.8% of the teachers to identify students’ weaknesses. The Dianna Rigg Placement Test and Words Their Way (Bear, et al., 2009) were each used by five teachers, Vocabulary, Connectives, Openers and Punctuation (VCOP) (Andrell Education, n.d.) and Sound Waves (Murray & Watson, 2010) were used by three teachers each and Smart Words was used by two teachers. Crack the Code (Flynn, n.d.) and the Allwell placement assessments (Academic Assessment Services, n.d.) were used by one teacher. Phonic assessment analysis and diagnostic assessment were used to a slightly lesser degree than the other types of tests (10.9%), as were benchmark tests (9.4%). Two teachers specified Progressive Achievement Tests (ACER, 2006) and one teacher recorded using National Assessment Program Literacy and Numeracy (NAPLAN). The least frequently used strategies were: accuracy analysis (4.7%); differentiated tests (3.2%); ‘Look, Cover, Write, Check’ (1.6%); online and partner testing (1.6%) and dictation (1.6%). Fourteen teachers recorded only one method of analysing spelling
assessments to identify student weaknesses. Table 4.6 describes the categories of methods and summarises the results.

Table 4.6.

*Teachers’ analysis of spelling assessment to identify spelling weaknesses.*

<table>
<thead>
<tr>
<th>Analysis method</th>
<th>As response 1 (%)</th>
<th>As response 2 (%)</th>
<th>Overall %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student writing samples</td>
<td>17.2</td>
<td>26.6</td>
<td>44.8</td>
</tr>
<tr>
<td>Standardised tests</td>
<td>15.6</td>
<td>9.4</td>
<td>25.0</td>
</tr>
<tr>
<td>Weekly spelling test</td>
<td>9.4</td>
<td>9.4</td>
<td>18.8</td>
</tr>
<tr>
<td>Testing</td>
<td>12.5</td>
<td>6.3</td>
<td>18.8</td>
</tr>
<tr>
<td>Commercial spelling programs</td>
<td>9.4</td>
<td>9.4</td>
<td>18.8</td>
</tr>
<tr>
<td>Phonic assessments</td>
<td>7.8</td>
<td>3.1</td>
<td>10.9</td>
</tr>
<tr>
<td>Diagnostic assessment</td>
<td>10.9</td>
<td>-</td>
<td>10.9</td>
</tr>
<tr>
<td>Benchmark assessments</td>
<td>3.1</td>
<td>6.3</td>
<td>9.4</td>
</tr>
<tr>
<td>Accuracy analysis</td>
<td>1.6</td>
<td>3.1</td>
<td>4.7</td>
</tr>
<tr>
<td>Differentiated tests</td>
<td>1.6</td>
<td>1.6</td>
<td>3.2</td>
</tr>
<tr>
<td>Look, Cover, Write, Check</td>
<td>1.6</td>
<td>-</td>
<td>1.6</td>
</tr>
<tr>
<td>Online and partner testing</td>
<td>-</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Dictation</td>
<td>-</td>
<td>1.6</td>
<td>1.6</td>
</tr>
</tbody>
</table>

*Note:* – = item not noted.

### 4.4.2.3. Writing assessment.

#### 4.4.2.3.1 Analysis to identify writing strengths.

The data showed that an extensive range of methods are used by teachers to analyse students’ writing and to identify their strengths. To focus the data and make it more meaningful, it was closely examined for commonalities. Several commonalities were identified so the data was recoded. Seven categories emerged. These categories are not all analytical strategies. However, the categories indicate what methods teachers consider to be analytical strategies.
Three of the categories were used by more than 23.4% of the teachers and four were used by 15.6% or less of the teachers. The three most often employed categories of analysis methods were student writing samples, language skills and writing programs. The four least often employed categories were: rubrics and checklists; whole school assessments; moderation; and descriptors.

By far the most dominant method of analysis used by teachers was analysing student writing samples. This method of analysis was the highest ranked first response (32.8%) and the highest ranked second response (20.3%) with an overall response of 53.1%. To identify students’ writing strengths, teachers analysed different types of writing samples such as journals, daily writing, weekly writing tasks and different genre.

The language skills category was determined by the researcher according to the Language strand in the Australian Curriculum: English (F-10) because the methods noted by teachers are part of the sub-strands that comprise sentence and clause level grammar, word level grammar, vocabulary, punctuation, structure and spelling (Australian Curriculum, Assessment and Reporting Authority, 2016b). This method of analysis is practiced by 28.1% of the teachers. Of these teachers, eight analysed sentence structure, four analysed punctuation, one analysed grammar and one analysed a combination of the above language skills.

A writing program, used by 23.4% of the teachers, was the next most frequently used method of analysis to identify students’ writing strengths. It should be noted that 20.3% (n=13) of the teachers recorded this method of analysis as their first response compared to only 3.1% (n=2) who recorded it as their second response. All of the teachers who used a writing program as a method of analysis came from the same school and identified the writing program as Vocabulary, Connectives, Openers and Punctuation (VCOP) (Andrell Education, n.d.).

The remaining analysis methods are used with far less frequency than student writing samples, language skills and writing programs. The methods are: rubrics and checklists (15.6%); whole school assessment (12.5%) moderation (10.9%) and descriptors (4.7%). Descriptors, such as judging standards and A-E exemplars, were used by teachers to analyse writing and identify students’ strengths. Nine teachers
employed a single method of analysing writing assessment to identify students’ writing strengths.

Many additional methods of analysis were noted. However, no commonalities were present and they had a frequency of less than 4 so the researcher coded all these methods as ‘Other’. This category included methods such as National Assessment Program Literacy and Numeracy (NAPLAN), Allwell Assessment, student conferences and goal setting, marking writing, anecdotal records, common assessment, curriculum needs, project writing inquiry, scaffolded lessons, self-assessment and editing. Table 4.7 describes the categories of methods and summarises the teachers’ two responses.

Table 4.7.

*Teachers’ analysis of writing assessment to identify writing strengths*

<table>
<thead>
<tr>
<th>Analysis method</th>
<th>As response 1 (%)</th>
<th>As response 2 (%)</th>
<th>Overall %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student writing samples</td>
<td>32.8</td>
<td>20.3</td>
<td>53.1</td>
</tr>
<tr>
<td>Language skills</td>
<td>10.9</td>
<td>17.2</td>
<td>28.1</td>
</tr>
<tr>
<td>Writing program</td>
<td>20.3</td>
<td>3.1</td>
<td>23.4</td>
</tr>
<tr>
<td>Rubrics, checklists</td>
<td>7.8</td>
<td>7.8</td>
<td>15.6</td>
</tr>
<tr>
<td>Whole school assessment</td>
<td>4.7</td>
<td>7.8</td>
<td>12.5</td>
</tr>
<tr>
<td>Moderation</td>
<td>3.1</td>
<td>7.8</td>
<td>10.9</td>
</tr>
<tr>
<td>Descriptors</td>
<td>1.6</td>
<td>3.1</td>
<td>4.7</td>
</tr>
<tr>
<td>Other</td>
<td>15.6</td>
<td>21.9</td>
<td>37.5</td>
</tr>
</tbody>
</table>

4.4.3.2.2. *Analysis to identify writing weaknesses.*

The data showed that teachers use an extensive range of methods to analyse writing assessments in order to identify students’ writing weaknesses. Recoding focussed the data and identified seven categories. The seven categories that emerged were the same ones that emerged from the data for writing strengths. These categories are not all analytical strategies. However, the categories indicate what methods teachers consider to be analytical strategies.
The data showed that individual teachers used the same method of analysis for the purpose of identifying students’ writing strengths and weaknesses. By far the most common analysis method used by teachers to analyse data and identify students’ writing weaknesses was using the students’ writing samples. This method was used by 52.1% of the teachers with twenty (20) teachers indicating its use as their first response and thirteen (13) teachers indicating its use as their second response. The data showed that teachers analysed a variety of writing samples such as daily writing, journal writing, writing different genre, free writing and cold writing.

The remaining methods of analysis were each used by less than 20.3% of the teachers. Four methods were used with similar frequencies: rubrics and checklists (20.3%); language skills (18.7%); writing program (16.2%) and whole school assessment (15.6%). Of the teachers using analysis of language skills, three focussed on punctuation only, three on grammar only and one on paragraphs, connectives, fluency, grammar, spelling and language. The writing program was identified as Vocabulary, Connectives, Openers and Punctuation (VCOP) (Andrell Education, n.d.) and was recorded by eleven teachers from the same school. No other teachers indicated the use of a writing program as a method of analysing assessment and identifying student weaknesses in writing. Moderation (used by 10.9% of teachers) involved using students’ work samples, but the teachers were more specific as to how they analysed the students’ writing assessments. Moderation included moderated writing tasks and comparing students’ work to the A-E exemplars. One teacher referred specifically to using the Early Years Writing Rubric K-2 developed by the Western Australian Primary Principals Association (WAPPA).

Whole school assessment was recorded as a method of analysis by 15.6% of the teachers. Of the teachers using this method, two specified annual whole school assessment and two specified whole school assessment of narrative, syntax and grammar. One teacher utilised whole school NAPLAN style assessment as a method of analysis.

Using descriptors to analyse students’ writing and identify weaknesses was used by 6.2% of the teachers. One teacher used criteria provided by the Vocabulary, Connectives, Openers, Punctuation (VCOP) program (Andrell Education, n.d.) and
one teacher used the criteria specified by the Early Years Writing Assessment
designed by Western Australian Primary Principals’ Association (WAPPA). Seven
teachers recorded only one method of analysing writing assessment data to identify
students’ weaknesses and seven teachers did not record any analysis method.

In the recoding process there were a large number of different analysis
methods noted by teachers that did not contain commonalities and were used by less
than two (2) teachers. The researcher coded these in a category named ‘Other’.
When calculated as an overall percentage the category gives the appearance of being
substantial (42.2%). Methods of analysis in this category included observations,
marking, editing, referring to student records, Diana Rigg dictation, guided reading,
spelling tests, pair-wise comparison, benchmark assessments, assessment services
and understanding of basic writing skills such as direction of writing and spaces
between words. One teacher noted the use of the Allwell Assessments to judge
students’ writing weaknesses. Seven teachers recorded using National Assessment
Program Literacy and Numeracy (NAPLAN) to analyse writing weaknesses through
using past NAPLAN tests, analysing NAPLAN data and using components of
NAPLAN as criteria to judge students’ writing. Table 4.8 describes the categories of
methods and summarises the teachers’ two responses.

Table 4.8.

*Teachers’ analysis of writing assessment to identify writing weaknesses.*

<table>
<thead>
<tr>
<th>Analysis method</th>
<th>As response 1 (%)</th>
<th>As response 2 (%)</th>
<th>Overall %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students’ writing samples</td>
<td>31.3</td>
<td>20.8</td>
<td>52.1</td>
</tr>
<tr>
<td>Rubrics, checklists</td>
<td>10.9</td>
<td>9.4</td>
<td>20.3</td>
</tr>
<tr>
<td>Language skills</td>
<td>7.8</td>
<td>10.9</td>
<td>18.7</td>
</tr>
<tr>
<td>Writing program</td>
<td>12.5</td>
<td>4.7</td>
<td>16.2</td>
</tr>
<tr>
<td>Whole school assessment</td>
<td>7.8</td>
<td>7.8</td>
<td>15.6</td>
</tr>
<tr>
<td>Moderation</td>
<td>3.1</td>
<td>7.8</td>
<td>10.9</td>
</tr>
<tr>
<td>Descriptors</td>
<td>3.1</td>
<td>3.1</td>
<td>6.2</td>
</tr>
<tr>
<td>Other</td>
<td>18.8</td>
<td>23.4</td>
<td>42.2</td>
</tr>
</tbody>
</table>
4.4.2.4. Listening and speaking assessment.

4.4.2.4.1 Analysis to identify listening and speaking strengths.

The data identified a comprehensive range of methods used by teachers to analyse assessments and identify students’ listening and speaking strengths. On initial analysis, words and phrases in the teachers’ responses indicated some commonalities. The data was recoded and seven categories of analysis methods emerged. These categories were oral presentations; oral responses; observation; speaking skills; rubrics and checklists; group discussion, and anecdotal records. These categories are not all analytical strategies. However, the categories indicate what methods teachers consider to be analytical strategies.

The most dominant analysis method, used by 56.3% of the teachers, was oral presentations. This analysis method was the highest ranked method in Response 1 (31.3%) and Response 2 (25%) which was evidence of its priority as a preferred method to analyse students’ listening and speaking strengths. Teachers noted that oral presentations included “News-telling” (daily, fortnightly, rostered), “Community Circles”, daily talks, presenting to class and oral project presentations.

The second most frequently used method of analysis, used by 18.8% of the teachers, was oral responses. There was a substantial difference (37.5%) between the frequency of using oral presentations and using oral responses. Teachers noted that oral responses include questioning, comprehension assessment and the ability to follow instructions. Observation, used by 17.2% of the teachers, was the next most frequently used method of analysing students’ listening and speaking strengths. The data indicated that 15.6% of teachers noted the use of this analysis method as their first response while 1.6% of teachers noted it as their second response. The remaining analysis methods were used with similar frequencies. These were speaking skills (12.6%); group discussion (12.5%); rubrics and checklists (12.5%) and anecdotal records (11%).

A number of additional methods of analysis noted by the teachers contained no commonalities and were used by less than 1% of the teachers. These methods
were described as “Other”. This category contained analysis methods such as cross-curricular links, feedback from other teachers, moderation, reading narratives, pal cards, guided reading, story-mapping, sequencing, self-assessment with iPads, oral language overview, goal setting, comparison of age-appropriate norms, viewing (Behind The News), whole body listening and formal assessments. Although the overall percentage of this group of analysis methods appears to be relatively high (34.3%) when compared to other methods of analysis, it is important to note that the individual methods of analysis are each only used by one (1) teacher.

Four (4) teachers indicated that they used no method of analysing assessment to identify students’ listening and speaking strengths. Eight (8) teachers indicated that they rely on a single method of analysis. Table 4.9 describes the categories of methods and summarises the teachers’ responses.

Table 4.9.

Teachers’ analysis of speaking and listening assessment to identify strengths.

<table>
<thead>
<tr>
<th>Analysis method</th>
<th>As response 1 (%)</th>
<th>As response 2 (%)</th>
<th>Overall %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral presentations</td>
<td>31.3</td>
<td>25.0</td>
<td>56.3</td>
</tr>
<tr>
<td>Oral responses</td>
<td>12.5</td>
<td>6.3</td>
<td>18.8</td>
</tr>
<tr>
<td>Observation</td>
<td>15.6</td>
<td>1.6</td>
<td>17.2</td>
</tr>
<tr>
<td>Speaking skills</td>
<td>6.3</td>
<td>6.3</td>
<td>12.6</td>
</tr>
<tr>
<td>Rubrics and checklists</td>
<td>4.7</td>
<td>7.8</td>
<td>12.5</td>
</tr>
<tr>
<td>Group discussion</td>
<td>3.1</td>
<td>9.4</td>
<td>12.5</td>
</tr>
<tr>
<td>Anecdotal records</td>
<td>9.4</td>
<td>1.6</td>
<td>11.0</td>
</tr>
<tr>
<td>Other</td>
<td>10.9</td>
<td>23.4</td>
<td>34.3</td>
</tr>
</tbody>
</table>

4.4.2.4.2 Analysis to identify listening and speaking weaknesses.

Initial data analysis indicated that teachers used a wide range of methods to analyse listening and speaking assessments for the purpose of identifying students’ weaknesses. Further analysis indicated commonalities in the data. The data was recoded and seven categories of analysis methods emerged. These categories were
the same ones that were identified by teachers for analysis to identify listening and speaking strengths.

Oral presentations were the most common method of analysis, used by 40.6% of the teachers, to identify students’ weaknesses in speaking and listening. Oral presentations were indicated as the most frequently used method of analysis in Response 1 and Response 2. One teacher specified the use of oral presentations in inquiries. Observations were indicated as the next most common method of analysis (21.9.0%). There was a difference between how many teachers used observations (11%) rather than oral presentations (20.3%). In Response 1, 18.8% of teachers used observation while Response 2 indicated 3.1% of teachers use observation. Response 1 (18.8%) presented observation as a frequently used method of analysis even though the overall result (11%) ranked it as less frequent.

Oral responses were used by 18.8% of the teachers. Teachers specified oral recall, listening and attending in their responses. Group discussion was used as a method of analysis to identify weaknesses by 15.6% of the teachers. Impromptu speeches and formal speeches were noted by teachers as tasks for group discussion. Rubrics, checklists and speaking skills were used with similar frequency (12.65 and 12.5 % respectively. One teacher specified the use of a listening skills checklist. Teachers specified speaking skills such as vocabulary, articulation, fluency, clarity, sentence structure, context and confidence.

A number of additional methods of analysis noted by the teachers contained no commonalities and were used by less than 1% of the teachers. During recoding, these methods were described as “Other”. The additional methods of analysis included overall class mark, reading aloud, Guided Reading, progress maps, lack of exposure, dictation, ‘Think Pair Share’, deeper investigation, questioning, speech therapist assessment, language therapy and Individual Education Plan (IEP). Although the overall percentage of this group of analysis methods appears to be relatively high (31.2%) when compared to other methods of analysis, it is important to note that the individual methods of analysis were each only used by one (1) teacher. Seven teachers did not indicate a method of analysing listening and speaking assessments. Fourteen teachers recorded only one method of analysing assessment to
identify students’ weaknesses. Table 4.10 describes the categories of methods and summarises the teachers’ two responses.

Table 4.10.

*Teachers’ analysis of speaking and listening assessment to identify weaknesses.*

<table>
<thead>
<tr>
<th>Analysis method</th>
<th>As response 1 (%)</th>
<th>As response 2 (%)</th>
<th>Overall %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral presentations</td>
<td>20.3</td>
<td>20.3</td>
<td>40.6</td>
</tr>
<tr>
<td>Observation</td>
<td>18.8</td>
<td>3.1</td>
<td>21.9</td>
</tr>
<tr>
<td>Oral responses</td>
<td>9.4</td>
<td>9.4</td>
<td>18.8</td>
</tr>
<tr>
<td>Group discussion</td>
<td>4.7</td>
<td>10.9</td>
<td>15.6</td>
</tr>
<tr>
<td>Rubrics and checklists</td>
<td>6.3</td>
<td>6.3</td>
<td>12.6</td>
</tr>
<tr>
<td>Speaking skills</td>
<td>7.8</td>
<td>4.7</td>
<td>12.5</td>
</tr>
<tr>
<td>Anecdotal records</td>
<td>6.3</td>
<td>3.1</td>
<td>9.4</td>
</tr>
<tr>
<td>Other</td>
<td>15.6</td>
<td>15.6</td>
<td>31.2</td>
</tr>
</tbody>
</table>

4.5. Types of intervention.

Teachers were asked to list the types of intervention they used and the frequency of use. Teachers indicated the frequency of intervention as ‘frequently’, ‘often’ or ‘sometimes’. The data indicated a range of interventions used by the teachers. Twelve distinct types of intervention emerged from the data. These types of intervention were: small groups, individual intervention, commercial program, direct instruction, levelled intervention, differentiation, school program, support, support teacher and referral. Ranking the types of intervention was achieved by combining the frequencies of use. Those interventions that were used ‘always’ and ‘often’ were ranked higher than those that were used ‘sometimes’.

The most commonly used intervention was small group teaching with 60% of teachers using small groups ‘always’ (31%) or ‘often’ (39%). A small number of teachers (5%) sometimes used this type of intervention. There was a substantial difference (25%) between small group intervention and individual intervention.
Individual intervention, commercial literacy programs and direct instruction were used with similar frequencies ranging from 37% to 40%.

Levelled intervention and differentiation formed the next group of interventions. The interventions had similar frequencies (25% and 23%). However, this group of interventions was used considerably less than the previous group of interventions. Approximately 14% fewer teachers employed either levelled intervention or differentiation. Levelled intervention and differentiation were used either ‘always’ or ‘often’ but never ‘sometimes’.

School programs, used with a frequency of 14%, were either used ‘always’ or not at all. School programs included writing programs and extension programs. Support and teacher support were two similar types of interventions. Teachers who noted ‘support’ as an intervention did not specify the type of support. Therefore the responses were coded separately. The categories of ‘support’ and ‘teacher support’, if combined because of their similarity, represented a higher ranking than differentiation.

A small percentage of teachers (11%) used referral to specialists as intervention. Referrals to specialists included referral to psychologists and speech therapists. Teachers who used referral differed considerably in their frequency of referral with 2% of teachers using it ‘often’ and 9% using it ‘sometimes’.

Many additional interventions were noted in the data. These interventions had no commonalities and were noted by few teachers. The interventions were coded as ‘Other’. This group of interventions included computer programs, assessment modifications, teaching “to the gaps”, reducing print on pages, open –ended tasks, home-based support, peer buddies, using strengths in a multi-sensory approach, breaking down or extending tasks, intentional thinking, modelling, goal setting, rubrics, observations, streaming and one-to-one conferencing. Table 4.11 describes the types of interventions and the frequencies of their use.

Table 4.11.

Types of intervention and their frequency of use.
### Factors affecting teachers’ analysis of student assessment.

A Likert-type scale required teachers to indicate the degree to which their analysis of student assessment was affected by the following factors: time, confidence, knowledge, professional development, and colleague support. Teachers were also able to specify different factors that, in their experience, affected their analysis of student assessment. Teachers described the degree of effect as either ‘not at all’, ‘sometimes’, ‘often’ or ‘always’. Factors that often or always affected teachers’ analysis practices were considered to be potential barriers to this practice. However, factors affecting teachers’ analysis of data either sometimes or never were considered to be potential enablers to teachers’ practice.

The factor that was indicated as having the most substantial effect on teachers’ analysis of students’ assessment was time. Almost half of the teachers recorded that time affected them either often (24%) or always (23%). Fewer teachers (16.5%), considered time to have little effect of their analysis of data. A majority of teachers indicated a reasonably high level of confidence with analysing students’ assessment data, with 75.3% of teachers noting that confidence sometimes or never affected their analysis practices. For these teachers, confidence presented as a potential enabler. However, for a small group of teachers (18.5%), who noted that...
confidence often affected their analysis of assessment, confidence could be a potential barrier.

The majority of teachers (67.7%) noted that knowledge of data analysis affected their analysis of assessment sometimes (52.3%) or not at all (15.4%). For 20% of the teachers, knowledge had a regular effect on their practice and 7.7% of the teachers, noted that knowledge always had an effect on their practice. With regards to professional development, over half (58.3%) of the teachers noted that professional development sometimes affected their analysis of data, along with 27.7% of teachers who noted that it often affected their practice. Insufficient evidence made it difficult to determine if the teachers indicated that professional development had a positive or negative affect on their analysis practice. For colleague support, a more even distribution of the degree of affect was noted. This distribution indicated that teachers noted similar frequencies for three degrees of effect: not at all (24.6%), sometimes (29.2%), and often (26.2%). Fewer teachers (12.3%) noted that colleague support always had an effect on their analysis of assessment. Table 4.12 describes the factors and the corresponding degrees of affect.

Table 4.12.

Factors affecting teachers’ analysis of assessment data.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Degree of affect (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not at all</td>
</tr>
<tr>
<td>Time</td>
<td>1.5</td>
</tr>
<tr>
<td>Confidence</td>
<td>33.8</td>
</tr>
<tr>
<td>Knowledge</td>
<td>15.4</td>
</tr>
<tr>
<td>Professional Development</td>
<td>10.8</td>
</tr>
<tr>
<td>Colleague support</td>
<td>24.6</td>
</tr>
</tbody>
</table>

Eight teachers each recorded one additional factor not on the questionnaire that affected their analysis of assessment. These additional factors were standardised
tests, work load, administration deadlines, Individual education Plans (IEPs) and Group Education Plans (GEPs), too many school tests, experience in year level, knowledge of curriculum and timing of standardised assessment. The factors that always had an effect on the teacher’s ability to analyse data were standardised tests, work load and administration deadlines. The factors that often had an effect on teacher’s practices were IEPs, GEPs and too many school tests. Factors which sometimes affected teacher’s ability to analyse data were experience in year level, knowledge of curriculum and timing of standardised assessment. Table 4.13 lists the additional factors and the degree to which the factor affects analysis of assessment data.

Table 4.13.

Other factors affecting teachers’ analysis of assessment data.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Degree of affect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not at all</td>
</tr>
<tr>
<td>Standardised tests</td>
<td>-</td>
</tr>
<tr>
<td>Work load</td>
<td>-</td>
</tr>
<tr>
<td>Administration deadlines</td>
<td>-</td>
</tr>
<tr>
<td>IEP’s, GEP’s</td>
<td>-</td>
</tr>
<tr>
<td>Too many school tests</td>
<td>-</td>
</tr>
<tr>
<td>Experience in year level</td>
<td>-</td>
</tr>
<tr>
<td>Knowledge of curriculum</td>
<td>-</td>
</tr>
<tr>
<td>Timing of standardised assessment</td>
<td>-</td>
</tr>
</tbody>
</table>

*IEP= Individual Education Plan, GEP= Group Education Plan

4.7. Practice and Analysis

The questionnaire contained eighteen statements related to teachers’ use of literacy assessments, teachers’ beliefs about analysing assessment data and their
opinion about professional development on the analysis of literacy assessment data. Participants were required to select from the categories of; ‘hardly ever’, ‘sometimes’, ‘frequently’ or ‘almost always’ for the first ten statements and ‘strongly agree’, ‘agree’, ‘disagree’ or ‘strongly disagree’ for the last eight statements. Throughout the analysis, regular use of a particular practice, such as using miscue analysis, was determined by the percentage of responses for ‘frequently’ and ‘almost always’.

Almost all teachers (n=62) noted that they used literacy assessments. Regular use of literacy assessments by teachers was indicated by a total of 81.5% of the teachers, with 56.9% of these teachers using literacy assessments frequently and 24.6% of these teachers using them almost all of the time. The two teachers who gave an invalid or missing response for statement 1 (I use literacy assessments.) completed other statements which indicated that they were in fact assessing literacy.

Statements 2, 5 and 8 examined teachers’ practice regarding the scores or results from literacy assessment. For statement 2 (“I think only the scores are important”) 53.8% considered the scores from assessments to be important in only a few instances. More than a third of teachers (36.9%) indicated that the scores were important some of the time. Statement 5 (“I use the scores to determine students’ strengths and weaknesses in literacy”) indicated that most teachers use scores in this way but to varying degrees. Approximately half of the teachers (50.5%) noted regular use of scores to determine students’ skills, with 41.5% of teachers using it frequently and 9% using it almost always. This assessment practice was used less frequently by 36.9% of the teachers.

Statement 8 (“I use literacy assessment results to plan what to teach next”) investigated teachers’ practice regarding the use of assessment data. Almost all teachers (96.8%, n=62) indicated that they used literacy assessment results to plan what to teach next. A large number of teachers (82.8%, n=53) used results from literacy assessments to regularly inform subsequent teaching. Of these teachers, 33.8% noted that they used this practice almost all the time, while more teachers (49.2%) noted that they used the practice frequently. The use of literacy assessment results to inform teaching was indicated as consistent practise with teachers.
All teachers reported using standardised tests but with varying frequency. Almost half of the teachers (43.1%) used standardised tests regularly. More teachers indicated that they used standardised tests frequently (38.5%) rather than always (4.6%). More than half of teachers (52.3%) sometimes used standardised assessments which indicated that this was not regular practice. In comparison, tests designed by the teachers themselves were used regularly by a total of 35.4% of teachers, with more teachers (27.7%) using it frequently than almost always (7.7%). Almost half the teachers (49.2%) sometimes used this form of assessment while 12.3% of teachers hardly ever used this method of assessment as part of their assessment practice.

Statements 6 and 7 investigated teachers’ use of miscue analysis and running records. Running records and miscue analysis were practiced with varying degrees from hardly ever to almost always. Both types of assessment were not used regularly by more than half of the teachers. Miscue analysis was not common practice for 61.5% of the teachers. The use of running records is not common practice for 50.8% of the teachers. However, for the teachers who did use these assessments, running records were used more frequently and by more teachers compared to miscue analysis. Running records constituted regular practice for 43.1% of teachers, with 24.6% of teachers using it frequently and 18.5% of teachers using it almost all of the time. In comparison, a total of 25% of teachers noted this as regular practice with 20% using the assessment frequently and 5% using the assessment almost all of the time.

Statements 9 and 10 examined teachers’ analysis practices. Statement 9 specifically referred to analysing errors made by students in assessments while Statement 10 involved a higher level of analysis to judge students’ literacy knowledge. The majority of teachers (81.2%) analysed students’ errors regularly, either frequently (58.5%) or almost all of the time (23.1%). A high percentage of teachers (70.8%) regularly practiced the higher level of analysis, which is analysing assessment data to judge students’ literacy knowledge. This assessment practice was occasionally used by 24.6% of the teachers. It was indicated therefore, that analysing students’ errors and analysing literacy assessment data was practiced regularly by the
majority of teachers. Table 4.14 describes the first ten statements and summarises the analysed responses.

Table 4.14.

Likert-type scale responses regarding teachers’ assessment and analysis practice.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Hardly ever</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Almost always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I use Literacy assessments.</td>
<td>-</td>
<td>15.4</td>
<td>56.9</td>
<td>24.6</td>
</tr>
<tr>
<td>2. I think only the scores are important.</td>
<td>53.8</td>
<td>36.9</td>
<td>4.6</td>
<td>-</td>
</tr>
<tr>
<td>3. I use standardised literacy tests.</td>
<td>3.1</td>
<td>52.3</td>
<td>38.5</td>
<td>4.6</td>
</tr>
<tr>
<td>4. I design my own literacy tests.</td>
<td>12.3</td>
<td>49.2</td>
<td>27.7</td>
<td>7.7</td>
</tr>
<tr>
<td>5. I use the scores to determine students’ strengths/weaknesses in literacy.</td>
<td>3.1</td>
<td>36.9</td>
<td>41.5</td>
<td>9.0</td>
</tr>
<tr>
<td>6. I use miscue analysis.</td>
<td>27.7</td>
<td>33.8</td>
<td>20.0</td>
<td>5.0</td>
</tr>
<tr>
<td>7. I use running records.</td>
<td>15.4</td>
<td>35.4</td>
<td>24.6</td>
<td>18.5</td>
</tr>
<tr>
<td>8. I use literacy assessment results to plan what to teach next.</td>
<td>-</td>
<td>12.3</td>
<td>49.2</td>
<td>33.8</td>
</tr>
<tr>
<td>9. I analyse literacy errors students make.</td>
<td>-</td>
<td>13.8</td>
<td>58.5</td>
<td>23.1</td>
</tr>
<tr>
<td>10. I judge students’ literacy knowledge through analysis of literacy assessment data.</td>
<td>1.5</td>
<td>24.6</td>
<td>55.4</td>
<td>15.4</td>
</tr>
</tbody>
</table>

Statements 11 to 18 in the Likert scale relate to the analysis of literacy assessment data. The statements examine teachers’ opinions regarding the importance and practise of the process of analysing data as well as the purposes of analysing data. The last two statements investigate teachers’ opinions about professional development on analysing literacy assessment. For statements 11 to 18, teachers chose from four different responses; ‘strongly agree’, ‘agree’, ‘disagree’ and ‘strongly disagree’. Table 4.15 lists the statements and summarises the analysed responses.
Table 4.15.

*Likert-type scale responses regarding teachers’ opinions of analysis.*

<table>
<thead>
<tr>
<th>Statement</th>
<th>Responses %</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Analysis of literacy assessment is important.</td>
<td></td>
<td>67.7</td>
<td>27.7</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>12. Analysis of students’ responses is easy.</td>
<td></td>
<td>6.2</td>
<td>41.5</td>
<td>49.5</td>
<td>1.5</td>
</tr>
<tr>
<td>13. Standardised literacy tests can be analysed.</td>
<td></td>
<td>18.5</td>
<td>75.4</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>14. Literacy assessments can be analysed to indicate students’ specific weaknesses.</td>
<td></td>
<td>27.7</td>
<td>66.6</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>15. Literacy assessments can be analysed to indicate students’ specific strengths.</td>
<td></td>
<td>27.7</td>
<td>69.2</td>
<td>-</td>
<td>1.5</td>
</tr>
<tr>
<td>16. Analysis of literacy assessment data should be used for planning teaching.</td>
<td></td>
<td>55.4</td>
<td>35.4</td>
<td>6.2</td>
<td>1.5</td>
</tr>
<tr>
<td>17. Professional development on analysis of literacy assessment would be helpful.</td>
<td></td>
<td>41.5</td>
<td>50.8</td>
<td>4.6</td>
<td>1.5</td>
</tr>
<tr>
<td>18. Professional development on analysis of literacy assessment has been sufficient.</td>
<td></td>
<td>7.7</td>
<td>41.5</td>
<td>46.2</td>
<td>1.5</td>
</tr>
</tbody>
</table>

A total of 95.4% of teachers indicate agreement that analysis of literacy assessment is important, with 67.7% recording strong agreement with the statement. Teachers differ on their opinions that analysis is an easy process with 41.5% indicating that it is easy while 49.5% indicate that it is not easy. A high percentage of teachers (93.9%) agree that standardised assessment can be analysed, with 18.5% of these teachers indicating strong agreement with the statement.

Responses for statements 14 and 15, which state that literacy assessments can be analysed to indicate specific student strengths and weaknesses, indicate a similar result. In both cases, almost 97% of teachers agree with the statements and, of these
teachers, 27.7% strongly agree that analysis of literacy assessments can be used to indicate students’ strengths and weaknesses. A high proportion of teachers (90.8%) agree that analysis of literacy assessment data should be used to plan teaching. Furthermore, 55.4% of these teachers strongly agree with the statement. Less than 8% disagree with the statement. Teachers overwhelmingly indicate that professional development on analysis of literacy assessment would be helpful to them with 92.3% of teachers agreeing or strongly agreeing. However, the responses relating to the sufficiency of professional development on analysis of literacy assessment indicates a distinct split in teachers’ opinions. 46.2% disagree while 41.5% agree with 7.7% of teachers expressing strong agreement with the sufficiency of professional development on the analysis of literacy assessment.

4.8. Semi-structured interviews.

4.8.1. Background.

Teachers were invited to participate in semi-structured interviews. Fourteen participants representing a range of educational sectors, ages, experiences, genders and class levels participated. The interviews were conducted at a time chosen by the participant, either during the school day or after school. Through being friendly, maintaining eye contact, clarifying questions (if needed) and answering the questions with confidence, it was perceived that the participants engaged positively during the interviews. The interviews were recorded (with consent) and transcripts were made following the interviews. There were eight guiding questions for the semi-structured interviews (see Appendix C). The questions addressed teachers’ data analysis practices including; confidence in analysing data, issues in analysing data, using data analysis for instruction and intervention, support with analysis and ways to improve their data analysis skills. The time estimated for the interview was twenty minutes but each interview was concluded when saturation was reached.

4.8.2. Responses from semi-structured interviews.

Analysis of the responses was accomplished by close interrogation of the data, such as line-by-line examination of the transcripts. Common responses relating to each question were highlighted. Themes that emerged from final analysis
The semi-structured interviews started with investigating teachers’ perceptions of analysing assessment data. Teachers indicated that their data analysis practices differed depending on whether it was individual or whole school analysis of assessment data. Most teachers’ responses indicated that analysing assessment data is a process involving detailed investigation of assessment results to gather comprehensive information regarding students’ literacy skills. Participant 2 stated that, “…it means breaking up, looking at results and looking at what the student needs from those results”. Participant 5 noted that, “teachers need to know the weak points” and that analysing assessment data provides this knowledge.

Several teachers identified the process of assessment data analysis as one that highlights gaps in students’ knowledge and provides evidence of what skills need to be taught in normal instruction or as part of intervention to improve achievement. Participant 6 explained that analysing assessment data increased her understanding of her students and as a result she could identify “what they’re struggling with, where the gaps are and what they know”. Participant 7 stated that analysing assessment data “gives me a teaching point, helps me to plan literacy intervention and it helps me to know where I’m going”.

Of the fourteen participants, four identified themselves as being in a leadership or specialised role in the school, such as a Literacy Coordinator, Head of Teaching and Learning and Head of Academic Support. These teachers perceived analysing assessment data to be a technical, advanced process, which identified trends of learning in classes, cohorts and year groups and a strategy that monitored students’ progress over time, leading to reflection of teaching practice and informing the provision of teaching resources for support in literacy. Participant 5 explained that analysing assessment data helped the school to recognise that the students were “becoming weak in reading, spelling or writing. We need to focus on this so what do we buy, what expertise do we get in and how does it change our teaching practice because it’s obviously a trend”. When discussing analysing assessment data in a
whole-school context, Participant 14 explained that, “they start to look at the way they are teaching based on the results and student’s whole progression on a micro level and what to do with that.” Both of these participants placed the analysis of assessment data as a highly informative educational process.

Participants were asked to describe their confidence in analysing assessment data. Responses indicated a wide range from teachers being highly confident to lacking in confidence. Numerous reasons were given for the varying degrees of confidence such as expertise (or lack of it), knowledge and professional development. Some teachers explained that their confidence varied depending on what type of literacy data they were analysing and the amount of professional development they had received on data analysis technique. A number of teachers expressed confidence in areas of Literacy about which they were passionate. Some said they felt confident because the analysis was already done for them, as in NAPLAN. Others explained that their confidence in analysing assessment data was not that strong because they were not taught how to do it at university or they were in a process of learning to analyse data as a whole school approach.

Discussion of the importance of analysing literacy assessment data drew responses that indicated that nearly all teachers perceived the practice as important and a majority indicated a positive attitude towards it, despite their level of confidence in practising it. Participant 1 clearly emphasised that data analysis was important and served a specific purpose: “Yes it is. Why assess if you are not going to use it?” Participant 7 acknowledged the importance of analysis emphatically: “Definitely. Otherwise you are working in the dark.” She also explained that data analysis was important to highlight students’ abilities.

When asked to explain why they thought data analysis was important, it was clear that teachers viewed the importance of analysing assessment data from different perspectives. Overall, teachers’ responses indicated that the importance of analysing assessment data was to improve students’ achievements. The response, “to get every boy to reach their full potential” (Participant 4), encapsulated the essence of many teachers’ responses.

Analysing assessment data was seen to be important for other reasons such as providing evidence of students’ learning for accountability purposes and providing
reasons why students were underachieving. Participant 9 explained it was important because it enabled her to investigate the data closely and plan for what to teach next: “Analysing it allows you to have a look at the technical side of what they’re doing, showing gaps and it allows you to teach to them.” Teachers recognised the importance of analysing literacy assessment data to identify students’ skills and it was stated that, “It’s important because of the diverse nature of children and their strengths and weaknesses. The data is pretty accurate.” (Participant 12)

Whilst explaining the importance of analysing assessment data as a means of knowing reasons why students do not do well in certain literacy tasks, Participant 10 stated that she needs “to analyse their writing and see why it is they are not strong writers.” A respondent who agrees that analysing assessment data is important in recognising reasons for underachievement says that she looks at “why they’ve written what they have so it points out why they’re struggling.” (Participant 2)

When describing what was easy about analysing assessment data, teachers’ responses were diverse but the majority of them highlighted one factor that made the analysis of assessment data easy: knowledge. The response, “There’s no point looking unless you know what you’re looking for.” (Participant 7) describes the majority of teachers’ opinions. Other responses related to knowledge in areas such as curriculum assessment policy, information technology and definition of data analysis terms. Participant 10 explained that, in her experience, it was easier when “analysing against the judging standards.” Participant 12 said that he thought that analysing assessment data was easy because of online tools which provide graphs and overviews.

The difficulties associated with analysing assessment data were examined. As with the previous question, the teachers’ responses were diverse but the majority of responses related to knowledge; knowing how to analyse the data, knowing how to identify underlying problems from the data and knowing how to transfer information from the data. Responding to the question, Participant 11 replied, “I wish I had someone who could walk me through the analysis of data because they never taught me that at uni.” A participant expressing a similar experience said that having the knowledge to get the detail out of data was difficult and she had “never had a good base of what to do and how to do it” (Participant 8).
Many teachers noted that the hardest part of analysing assessment data was knowing how to interpret the data and understand discrepancies. The response, “It’s a sophisticated process which needs time, which is a challenge in itself,” (Participant 12) reflected the opinions of a number of teachers. Several teachers indicated that they found it difficult to understand assessment data about students’ abilities that did not correlate with that student’s performance, showing the students’ abilities to be higher or lower than what the students were demonstrating in other ways. A large number of teachers found that analysing data was difficult due to lack of time as indicated by responses such as: “Time also plays a factor” (Participant 9) and “You do a lot in your own time after school or in D.O.T.T. (Duties Other Than Teaching) time” (Participant 11).

Teachers were asked to explain how they thought analysis should be used for intervention. Overall, teachers’ responses indicated that intervention should be determined by tests or assessment results. Some specifically mentioned that data from assessments would indicate students’ strengths and weaknesses, resulting in intervention. The following response is an example of similar responses describing how analysis is used for intervention: “Once you analyse, you need to identify the children and see where they are at…. Usually you group them.” (Participant 9) Analysed data was described as “evidence” (Participant 14) for the need and implementation of intervention. Agreeing with this opinion Participant 5 said, “If a child is behind, he’ll always be behind unless we do something to close the gap. The data is helpful to identify that.”

Other important processes that emerged from the interviews regarding the use of analysis for intervention were; collaboration between colleagues about data and intervention, and comparing the results of whole school assessments to standardised assessments to ensure consistent findings on which to base any type of intervention. Although the question did not specifically ask for types of intervention being used, many teachers included types in their responses resulting in better explanations of how analysis was used for intervention.

Teachers’ most effective assessments which identified students’ literacy strengths and weaknesses were examined. The majority of responses indicated that a combination of standardised and diagnostic tests were the most effective assessments
for this particular purpose. One group of teachers from the same school used a whole school approach using the Allwell assessments to identify students’ strengths and weaknesses in Literacy. Several teachers from other schools named assessments for reading, writing and spelling with responses similar to this: “We do PAT-A and we do the Red Box test. We do PAT-Vocab as well. We do South Australian spelling test then we started using Words Their Way. For writing we do our own test but also sometimes across the school.” (Participant 11) Many teachers gave reasons why their chosen assessments were effective such as “I like the Holborn (Watts, 1980) because it shows me the fluency. It’s not just the level. So the Holborn (Watts, 1980) would be the best and the South Australian because that’s what I base my groups on” (Participant 8). Other respondents noted different assessments such as observations, screening tests and class spelling tests as being their most effective assessment for identifying students’ strengths and weaknesses.

Teachers were asked to explain how they used the assessment identified in the previous question to plan intervention. A common pattern emerged in the responses indicating that the majority of teachers used a sequenced approach; assessment, analysis, collaboration and then the implementation of an intervention. The following response encapsulated the essence of many other responses: “Gather a range of assessments, discuss things. You would then identify something. If it needed intervention, you would get the parents in and work on a plan together” (Participant 14).

The group of teachers from the school using Allwell assessments as a whole school approach gave very detailed responses about how intervention was structured based on the results of the assessments. Many teachers explained that the assessment results helped them to group students for differentiated intervention such as in Guided Reading groups. Assessment results were used by many teachers to provide either support or extension. As Participant 1 explained “focus groups are identified for intervention and extension” by searching the assessment data for “commonalities”.

The support that teachers received regarding analysis of assessment data was also examined. Listening to the teachers’ responses and reading over transcripts, highlighted an important difference: the experiences of teachers from the one school
using Allwell assessments as a whole school approach were very different to the experience of teachers from other schools. The group of teachers from the same school were in agreement that a substantial amount of support in data analysis was provided and that teachers were learning to analyse data more effectively as a result. “The teachers are guided though the process” (Participant 5) describes the type of support teachers were being given. The teachers received further assistance through regular collaboration with a curriculum leader to discuss not only the analysis of data but to monitor data and student progress.

In general, the experiences of teachers in the other schools were not as positive. The majority of this group of teachers were involved in some group sessions regarding data but receive limited or no explicit help in analysing data themselves. Group gatherings such as staff meetings, moderation and team meetings were sometimes used to discuss the analysed data or results. Responses such as: “we can share our concerns together”, “we request it”, “we have to initiate that ourselves” and “it’s nice to collaborate but not really effective” indicated that these teachers experienced little support in the process of analysing assessment data.

Teachers were asked to describe what would help them to use analysis of data more effectively. Teachers’ responses indicated a range of what they would like to improve this skill and that the primary vehicle for improvement should be professional learning. The category of professional learning was formed by responses which indicated improving knowledge of data, language of data, school professional development, dialogue with specialists to improve understanding, and watching online videos about analysing data. This response was similar to many of the teachers’ responses and reflected the teachers’ preference to improve by learning from others: “I think sitting with another teacher who has a really good grasp of analysing data and having conversations and watching that person” (Participant 6). Agreeing with the idea of using other people to teach about analysis of assessment data, Participant 13 believed that “getting experts in to show different ways to do analysis” would be a way of helping teachers to analyse assessment data independently. Teachers’ responses indicated that their analysis of data would be better if the process became consistent and regular, if they could transfer what the
data was telling them into meaningful intervention and if they had more help in class because analysis of data was a very time-consuming process.

Each participant was invited to make final comments relevant to analysing Literacy assessment data. Overall, the teachers expressed that the process challenged them in many ways. Key words in the responses such as: “stressful”, “overwhelmed”, “held accountable”, “tough”, “inspiring” and “learn new things” show the variety of the responses.

Close interrogation of the responses, as part of data condensation, revealed numerous themes. The identified themes were able to be further condensed into five categories. Table 4.16 summarises the themes and categories that emerged from the interviews.

<table>
<thead>
<tr>
<th>Category</th>
<th>Themes</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify students’ strengths and weaknesses in literacy.</td>
<td>• Gaps</td>
<td>You’re looking at what they’ve done well.</td>
</tr>
<tr>
<td></td>
<td>• Recognise students who are struggling</td>
<td>I need to analyse their writing and see why they are not good writers.</td>
</tr>
<tr>
<td></td>
<td>• Finding points of need</td>
<td></td>
</tr>
<tr>
<td>Inform instruction and intervention.</td>
<td>• Identify groups of students</td>
<td>Analysis is there to help with planning and teaching.</td>
</tr>
<tr>
<td></td>
<td>• Identify levels for groups</td>
<td>Your data analysis is what informs your teaching, tells you where to go.</td>
</tr>
<tr>
<td></td>
<td>• Plan for progress</td>
<td>By looking at the analysis we might find a group of slow movers</td>
</tr>
<tr>
<td></td>
<td>• Target skills</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Inform teaching</td>
<td></td>
</tr>
<tr>
<td>Types of intervention.</td>
<td>• Education Assistant</td>
<td>We have support classes and the flexibility of groups. The support teacher comes on Tuesday.</td>
</tr>
<tr>
<td></td>
<td>• Small groups</td>
<td>I would target a small group.</td>
</tr>
<tr>
<td></td>
<td>• Refer to a specialist</td>
<td>I ask the school psychologist</td>
</tr>
<tr>
<td></td>
<td>• Extension</td>
<td>We have the gifted and talented program</td>
</tr>
<tr>
<td></td>
<td>• Individual Education Program (IEP)</td>
<td>I take them individually.</td>
</tr>
<tr>
<td></td>
<td>• Refer to literacy leader</td>
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</tr>
<tr>
<td></td>
<td>• Differentiation</td>
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<tr>
<td></td>
<td>• Engage the parents</td>
<td></td>
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</tbody>
</table>
The head of curriculum meets with all year groups each week.
We run an extensive writing program.
We have a program called Crack the Code. (Flynn, n.d.) You can go to other literacy people in the school.
You target the children at their needs.
On an individual basis - some kids are on IEPs.
We’ve adopted the Sound Waves program. (Murray & Watson, 2010)

Barriers
- Time
- No support with analysis
- No whole school approach
- Difficult
- Need someone with expertise
- New curriculum
- Product knowledge
- Need a range of samples
- Lack of confidence
- Under-resourced

It’s just another add-on.
I need to know what I’m looking for.
It has to be an on-going analysis.
Nutting it out is hard.
It would be good to have someone who’s an expert.
There’s no program on the SCASA website.
We really need someone to say this is how you do it.

Enablers
- Work with other teachers
- Professional development
- Whole school approach
- Support from literacy team

It’s helpful if teachers are doing similar ways.
Sharing and more P.D.
Just having some cohesiveness would be more helpful.
It’s good to have someone who’s an expert.
I have tremendous support from the literacy team.

4.8.3. Summary.

The survey questionnaire collected comprehensive information on teachers’ analysis of literacy assessment data, purposes of data analysis, types of interventions
employed as a result of assessment and factors affecting their analysis of literacy assessment data. Results indicated that teachers frequently assessed literacy and regarded analysis of the data as important. A large range of methods were noted for analysing data for reading spelling, writing, speaking and listening but not all of these were analytical strategies. Results indicated that data analysis was usually used to identify students’ abilities, inform instruction and intervention. Intervention was used by all teachers in the study and a diverse range of interventions was indicated. Numerous factors affecting teachers’ analysis of literacy assessment data were identified.

The semi-structured interviews provided a substantial amount of in-depth information relating to the analysis of Literacy assessment data and relevant topics. The transcripts provided insight into the teachers’ opinions, beliefs, practices and challenges regarding the process of analysing Literacy assessment data. Responses from each question highlighted themes – recurring statements indicating common experiences, opinions or statements. The themes were able to be grouped into five main categories: identify students’ strengths and weaknesses in literacy, inform instruction and intervention, types of intervention, barriers and enablers. These categories are important as they correlate with the main research questions of the study and will be discussed, with the quantitative findings, in Chapter Five to explore teachers’ practise of literacy assessment data analysis.
CHAPTER FIVE: DISCUSSION

5.1. Introduction

The overarching aim of the research was to investigate how teachers used the data obtained from literacy assessment in Primary schools to inform their pedagogical decisions and to examine what factors influenced their practice. The specific questions which guided the research were:

1. In what ways do teachers analyse literacy assessment responses to identify students’ strengths and weaknesses?

2. How did the teachers’ analysis inform instruction and intervention?

3. What interventions are most commonly employed as a result of literacy assessment analysis?

4. What barriers and enablers do teachers experience in analysing literacy assessment data?

A mixed method research design was used to gather a range of quantitative and qualitative data to address each research question in a comprehensive manner. In this chapter, the key findings will be discussed in light of relevant literature. Table 5.1 summarises the key findings of the research.

Table 5.1.

*Key findings of the research.*

<table>
<thead>
<tr>
<th>Area</th>
<th>Findings</th>
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<tr>
<td>Teachers’ reported data analysis</td>
<td>• Large range of strategies</td>
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<td></td>
<td>• Different levels of analysis</td>
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<td></td>
<td>• Some analysis of summative assessment</td>
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5.2. Data analysis

Most of the teachers recognised the importance of analysing literacy assessment data but practiced it in varying degrees from almost all of the time to only some of the time. Approximately half of the teachers judge students’ literacy strengths and weaknesses by analysing literacy assessment data on a frequent basis. Earl (2005), Hamilton et al. (2009) and Timperley (2009) recommend that teachers analyse assessment data regularly so that they can provide the most appropriate instruction based on actual evidence of students’ achievements in literacy assessments.

Less than half of the teachers are not implementing strategies that are recommended to be effective for analysing literacy assessment data. Instead they are using instructional strategies or different types of assessments. This indicates that most teachers lack knowledge of appropriate analytical strategies. These teachers need to improve this skill and the frequency with which they use it. The teachers not yet analysing literacy assessment data on a regular basis would benefit by firstly
recognising how important analysis is to provide teaching that meets students’ needs. Secondly, these teachers would need to become more knowledgeable about how to analyse the assessment data to identify students’ common errors and trends in results. If they analyse in this detail, they know where there students are in their learning and what they need to be taught to improve or address difficulties (Timperley, 2009).

Teachers were analysing data from both summative and formative assessments. The strategy of using scores from summative assessment to assist in judging students’ literacy skills was practised by half of the teachers. Garrison et al. (2007) acknowledge that scores can be an example of summative assessments and that scores can still be analysed to determine students’ strengths and weaknesses. However, the current study indicated that teachers were using the scores with minimal further analysis. Nichols et al. (2009) recommend that to identify strengths and weaknesses effectively, detailed interpretation of data is needed. Teachers therefore need to analyse summative assessments in a more detailed manner by examining the errors made in the assessments. Teachers in a study conducted by Goetz, Olah and Riggin (2009) analysed summative assessments in a number of ways such as counting correct/incorrect responses, identifying individual student errors and by categorising errors according to content area. These strategies of analysis could be used by teachers in the study to improve the depth of their analysis of summative assessments. Hoover and Abrams (2013) recommend that using summative assessments in a formative way has a positive impact on instruction. For this reason, teachers in the study need to learn how to collect meaningful data about their students’ abilities from the summative assessments so that they can improve their learning.

To address teachers’ minimal use of data analysis, a diagnostic tool, such as the Over time Assessment Data Analysis (OTADA) which is currently used by many teachers in Queensland, Australia (Smeed, 2013), may have a number of benefits. Using a diagnostic tool such as OTADA would guide teachers through analysis processes, increase their knowledge of analytic strategies and increase their interpretation of analysed data. The use of a tool such as OTADA, may reduce the diverse range of strategies being used by teachers and promote the use of a number of effective analytic strategies within schools. This was found to be true of a group of teachers from a school using a whole school approach to data analysis. The teachers
indicated more advanced analytical skills, greater understanding of how analysis impacted instruction and more frequent analysis practices than schools without whole school approaches to data analysis. A whole school approach to data analysis therefore supports teachers in their practice of analysing data from literacy assessments.

Data analysis may also be improved by increasing teachers’ statistical knowledge (Pierce et al., 2014). Being familiar with statistical terminology and interpreting information from graphs is a skill that teachers need to have, particularly those teachers involved with analysing NAPLAN results. Chick and Pierce (2012) believe that understanding data leads to improved teaching. If teachers had the foundational knowledge of statistics, they would be more likely to engage in deeper analysis of data from assessments and be able to display the information in ways, such as graphs, that highlight their students’ literacy abilities.

5.2.1. Analysis of reading assessment data

Teachers reported a wide range of strategies to analyse reading but the main categories of strategies used by teachers to identify reading strengths and weaknesses were: comprehension, questioning, miscue analysis, running records, oral reading and guided reading. These strategies are not primarily analytical but indicate teachers’ practices. Comprehension and questioning are consistent with strategies noted as being effective for analysing students’ reading skills (Fountas & Pinnell, 2006). Reading comprehension and questioning form an important component of the guided reading instructional approach. Guided reading involves students’ reading silently. Therefore asking different levels of questions is an effective way to analyse students’ comprehension of the text. (Fountas & Pinnell, 2012). Teachers indicated that they used questioning for the purpose of identifying students’ reading strengths more than they used it to identify students’ reading weaknesses. Fountas and Pinnell (2012) strongly support the use of guided reading as a means of analysing students’ reading strengths and weaknesses.

Miscue analysis and running records were indicated by many teachers as their primary strategy to analyse reading strengths and weaknesses. Miscue analysis is a diagnostic tool for analysing reading and involves analysing errors that students
make when reading, such as adding, substituting, omitting or repeating words. (Goodman, 1973). Running records are very similar in format to miscue analysis and provide detailed information on students’ reading strategies, fluency and accuracy (Fountas & Pinnell, 2012). Due to the similarity of these strategies, it is possible that teachers indicated the use of running records when they were actually using miscue analysis, and vice versa. However, the popularity of these analytic strategies was clearly indicated.

Beatty and Care (2009) would agree that miscue analysis can be valuable for analysing students’ reading. Not only is miscue analysis popular but it is an effective strategy for analysing many components of reading such as semantic, syntactic, graphic and graphophonic skills (Gagen, 2007; Goodman, 1973; Hasbrouck & Tindal, 2006). Miscue analysis is quick for teachers to administer and provides clear evidence of students’ reading behaviours. Miscue analysis is particularly effective for analysing weaknesses in reading from a young age (Hasbrouck & Tindal, 2006; Gagen, 2007) where standardised tests have limited application. Teachers relying heavily on miscue analysis and running records should be cautioned to analyse the records in a way that identifies both students’ reading strengths and weaknesses.

Rubin (2011) recommends using multiple reading assessments to assess students’ strengths and weaknesses and create a profile for each student. Components that he recommends include a cloze test, a standardised test, an informal reading inventory and running records. Results from the current study indicated that many teachers used a combination of standardised assessments and diagnostic assessments to identify reading strengths and weaknesses, in line with many of Rubin’s (2011) recommendations. However, teachers do not indicate the use of a cloze test for identifying reading skills. Neither do the findings indicate the use of student profiles to gather comprehensive data about single students as suggested by Rubin (2011). The group of teachers from the same school were building students’ literacy profiles from one year to the next, enabling monitoring of students’ skills over time. Rubin (2011) recommends having profiles that reflect current abilities (Rubin, 2011).
5.2.2. Analysis of spelling assessment data

Results from the study indicated that teachers used a wide range of formal and informal strategies to analyse students’ spelling. Informal methods indicated by teachers included writing samples and weekly spelling tests. Formal methods of analysis included standardised spelling tests, such as the South Australian Spelling Test (Westwood, 2005) and the Waddington Diagnostic Spelling Test (Waddington, 2000). Hoover and Abrams (2013) would support teachers using summative tests but advocate that the true value of tests lies in analysing the responses in a formative way. Teachers did not indicate that they analysed the standardised spelling tests in a formative way. The only exposure many teachers had to analysing summative data using a formative approach was when school leaders discuss analysed NAPLAN results in a formative way. Other teachers had experienced spelling analysis as part of a whole school approach to data analysis and were increasing the quantity and quality of data analysis. Teachers could continue to use standardised spelling tests if they learnt how to effectively analyse each student’s spelling errors in a formative way.

The majority of teachers indicated that they determined students’ spelling abilities by analysing students’ writing samples. The use of this analytic strategy is not widely recommended as a whole strategy Kim, Al Otaiba, Folsom, Greulich and Puranik (2014) partly support the use of writing samples to analyse students’ spelling but only when it is completed in combination with analysing students’ overall writing skills. Kim et al. (2014) included a dictation task to analyse students’ spelling as part of their overall analysis of writing skills. Dictation, as a strategy for analysing spelling, was not indicated by any of the teachers in the study and should be considered as an evidence-based strategy that will assist in the analysis of spelling data. Writing samples may be used to analyse spelling when analysis of dictation and overall writing skills are also considered.

Commercial spelling programs were used to analyse students’ spelling. Several different programs were noted including Phonic Sight Word Sequence Placement Test (Rigg, 2015), Sound Waves (Murray & Watson, 2010) and VCOP (Andrell Education, n.d.). Although teachers reported that these programs were effective, they do not have published research-base and should not be used as primary strategies. Teachers may consider using the programs as supplemental
strategies to evidence-based ones, such as Words Their Way (Bear, et al., 2009), if they have evidence that the programs are effective in providing accurate, detailed information about students’ spelling skills.

In proposing a better approach to analysing spelling, Invernezzi and Hayes (2004), Leask and Hinchliff, (2007), Ness (2010) and Young (2011) recommend using qualitative approaches to analysing spelling in preference to quantitative ones, such as standardised spelling tests. Invernezzi and Hayes (2004) recommend a developmental spelling test. The test focuses on analysing students’ invented spelling to determine if the students’ spelling is at an alphabet, pattern or meaning level. Ness (2010) recommends a developmental spelling tests that focuses more on analysing the spelling through questioning to obtain orthographic knowledge.

Leask and Hinchliffe (2007) propose that Feature Analysis of Non-Word Spelling (FANS) is an effective strategy that teachers could use to analyse numerous components of spelling. Many dimensions of spelling are scored in the analysis including initial consonant, consonant cluster short vowel, long vowel, final consonant, and conventional spelling rules. In comparison to standardised tests, FANS provides a qualitative analysis of how students’ spell non-words which provides detailed information about students’ spelling abilities.

The developmental spelling analysis recommended by Young (2011) includes word lists, natural writing samples, editing, word sorting and researcher-developed derivational constancy spelling lists, particularly for students at later stages of spelling development. Each task is analysed for inconsistencies and the scores determine what developmental spelling level the students are at. Together with the developmental spelling analysis, Young (2011) recommends the strategy of error analysis for effectively analysing spelling strengths. She proposes that taking note of correct spelling provides valuable information about students’ spelling strategies, which can then be used to develop their areas of weakness.

A small number of teachers in the current study indicated that they relied on only one type of strategy to analyse students’ spelling. Whilst many single strategies are recommended as effective practice, other researchers recommend combining strategies (Young, 2011). Teachers could consider more than one strategy as this would result in a more comprehensive analysis of students’ abilities. Teachers could align their practice of spelling data analysis with recommended practice by selecting
a combination of effective analyses that suit the age of their students and provide the best evidence of spelling strengths and weaknesses.

5.2.3. Analysis of writing assessment data

Findings from the current study indicated that a wide range of strategies was used to analyse writing and that the strategies were not primarily analytic strategies. The more commonly used methods included writing samples, evaluating language skills, writing programs, whole school assessment, rubrics and checklists. Less commonly used strategies included moderation, descriptors, NAPLAN, Allwell placement tests, student conferences, goal setting and a writing program. The diversity of strategies suggested that teachers were given little guidance about, and had limited knowledge of, the most effective analytic strategies. Such diversity would likely result in difficulties moderating analysed writing assessments as teachers were using different methods of analysis.

The most common strategy used by teachers to identify students’ writing strengths and weaknesses was through a variety of different types of writing samples. Samples of students’ writing included journals, different genre, free writing and daily writing. The sample represented a respectable variety of writing types. Kim et al. (2014), Nelson and van Meter (2002) and Fang and Wang (2011) support the use of writing samples as effective practice for analysing students’ writing. Kim et al. (2014) established that by analysing students’ writing the important skills relating to quality, productivity, syntactic complexity, spelling and writing conventions could be analysed. Teachers’ in the current study used the writing samples differently to Kim et al.’s (2014) recommendations. The samples were mainly used for moderation purposes with groups of teachers relying on their own understandings of writing skills to allocate appropriate grades rather than analyse writing skills to identify patterns and trends. To bring their practice in line with Kim et al.’s (2014) recommendations, teachers would need to focus on analysing the individual students’ writing skills rather than simply allocating grades.

Whilst some teachers indicated that they analysed language skills used in written texts, such as vocabulary and grammar, to identify writing strengths, the study indicates this was undertaken in a limited way. A better approach is
recommended by Fang and Wang (2011) who advocate the use of Functional Language Analysis (FLA), an analytical tool, to identify skills and the reasons why students’ writing is strong or weak. FLA would guide teachers in analysing the content, organisation, style, tone and voice of students’ writing. FLA would provide some reasons why students’ writing was weak and therefore guide the teachers’ decisions on how best to address the weaknesses. Findings in the current study indicated that few teachers have the skills to determine reasons for writing strengths and weaknesses. By using a tool such as FLA, teachers would align themselves with recommended practice, improve their understanding of students’ abilities and be better informed about instruction that would lead to improvement.

Comparison of relevant literature and study findings indicated that teachers needed to develop a much deeper level of analysis to determine students’ writing strengths and weaknesses. To analyse writing skills more effectively, highly individualised, detailed analysis of students’ writing samples is recommended (Nelson & van Meter, 2002). According to a strategy advocated by Nelson and van Meter (2002), skills such as drafting, editing, structure, audience, writing conventions and cohesion can be carefully analysed to ensure comprehensive information about students’ writing strengths and weaknesses. Using this strategy, teachers would be able to analyse writing at a deeper level by analysing sentences and words within the writing samples. Nelson and van Meter (2002) suggest that teachers combine detailed analysis of students’ writing with active observation of writing skills that may not be apparent in students’ final writing product. Anecdotal records and observation were described by teachers as appropriate methods of analysing writing. Butler and McMunn (2011) also regard observation as a powerful strategy and propose that careful observation provides valuable information about students’ abilities.

The current study indicated that teachers used rubrics to analyse writing strengths and weaknesses. De La Paz (2009) supports the use of rubrics and proposes that when rubrics are derived from curriculum criteria they are effective for analysing students’ writing skills. Teachers could improve their practice in analysing writing by developing rubrics that align with criteria from the Australian Curriculum for their particular year group. Parr et al. (2007) agree that rubrics can be used for the
effective analysis of writing. Their strategy is an evidence-based diagnostic tool for analysing writing. The tool comprises rubrics and developmental maps that assist in the analytical process. Some teachers in the current study were already using rubrics but none were using developmental maps. By combining the strategies as recommended by Parr et al. (2007), teachers would be better equipped to analyse students’ writing in a more comprehensive way than currently evident.

5.2.4. Analysis of listening and speaking assessment data

Teachers used a wide range of strategies to analyse listening and speaking assessment. Particularly noticeable were the many different strategies used by individual teachers. The recorded strategies were not, however, primarily analysis techniques. When totalled, this group of strategies almost equalled the most popular strategy. The diversity could be due to factors such as teacher preference, lack of common approaches or insufficient knowledge of recommended strategies for the analysis of listening and speaking. Some of the strategies indicated by individual teachers included cross-curricular links, feedback from other teachers, moderation, story-mapping, whole body listening and formal assessments. These strategies represent a mix of assessment, curriculum information and colleague support. The way in which they were used to analyse students’ listening and speaking skills was not clearly specified.

The preferred strategy for most teachers was through observing students’ oral presentations. Farrall (2012) supports analysing oral presentations. However, she suggests that more effective practice would be to include standardised testing. There was limited evidence of the use of standardised testing for analysing listening and speaking in the current study. Teachers preferred to use strategies that were designed by themselves such as rubrics.

The practice of using rubrics is supported by Spooner and Woodcock (2010). They have developed a Listening Rating Scale (LRS) as a rubric containing four essential criteria for effective listening. The LRS is suitable for 3 to 11 year old children and would be appropriate for use in primary schools. The four criteria used by Spooner and Woodcock (2010) are sitting still, looking at the person talking,
staying quiet and listening to all of the words. Teachers could demonstrate improved practice by developing rubrics similar to those proposed by Spooner and Woodcock (2010), with appropriate criteria from the Australian Curriculum that is relevant to the grade level of the students in their class being reflected in the rubrics.

The use of more than one strategy to assess and analyse listening and speaking skills is viewed as best practice (Farrall, 2012; Nelson & van Meter, 2002). However, it was evident in the current study that many teachers only used one method of analysis. To align themselves with recommended practice, teachers need to consider the inclusion of additional strategies to analyse students’ speaking and listening skills. One way teachers can ensure they use more than one strategy is by implementing Nelson and van Meter’s (2002) highly individualised strategy which recommends that oral language strengths be used in conjunction with written language. Whilst components of Nelson and van Meter’s strategy, such as observation, are evident in the current study, strategies using detailed analysis of oral language in conjunction with written language are not. Teachers should consider screening tests and language samples as additional methods of analysing speaking and listening as these have been found to be effective (Farrall, 2012).

5.3. Purpose of analysing literacy assessment data

Teachers in the current study identified a number of purposes for analysing literacy assessment data, such as identifying students’ strengths and weaknesses, planning what to teach and planning what type of intervention to implement. Most of the teachers indicated that analysis would clearly identify the students’ literacy strengths and weaknesses. Almost all of the teachers agreed that knowledge of students’ abilities should be used for planning teaching. However, findings indicated that not all of these teachers actually carried out the practice of using analysed data to inform their teaching all of the time.

A key finding in the study was that, by analysing data, most teachers were identifying students’ weaknesses more than students’ strengths. Nichols et al. (2009) and Young (2007) suggest that this is not effective practice as data that has been analysed in detail highlights both students’ strengths and weaknesses. Kerr et al.
(2006) suggest that certain strategies that teachers use on a daily basis, such as reviewing students’ work, has the potential to provide valuable information about students’ strengths and weaknesses if appropriate attention is paid during the reviewing process. Teachers are able to analyse students’ strengths and weaknesses through routine, uncomplicated processes such as marking students’ work (Kerr et al., 2006). The key point is that, to align with recommended practice, teachers need to actively focus on the strengths indicated by the analysed data and not only on the weaknesses, as their practice indicated. Identified strengths are important in providing a holistic view of students’ abilities (Young, 2007).

While the findings indicated that most teachers identified students’ weaknesses, very few of them were able to suggest reasons for the weaknesses. A study by Goetz et al. (2009) found that the same two issues were true in their study. This may suggest that the ability of teachers to effectively identify students’ weaknesses but not know the causes of the weaknesses is more widespread than the current study indicates. Without the knowledge of why students’ are struggling to master certain skills, teachers will find it difficult to help them improve that particular skill. FLA is a tool that, as part of the analysis process, provides reasons for students’ low achievements in literacy. Teachers could use a tool like FLA to assist them in identifying reasons for students’ weaknesses and make data-based decisions about subsequent teaching. If teachers are unable to ascertain the cause of weaknesses in literacy, referring the student to a specialist, such as a speech therapist, is considered as sound practice and will potentially provide teachers with underlying reasons for students’ literacy weaknesses (Farrall, 2012). With this knowledge, teachers will be better equipped to plan appropriate instruction or intervention for the student.

The majority of teachers agreed that analysis of literacy assessment data should inform planning. After teachers had analysed assessment data, they identified gaps in student knowledge and planned their subsequent instruction to address the deficiencies. Parr (2009) and Cramer et al. (2014) strongly believe that analysed assessment data informs instruction which then leads to academic improvement, making analysis an important consideration for teachers and schools looking to improve outcomes for students in the area of literacy.
Nichols et al. (2009) propose that best practice requires data analysis to be completed before and after instruction. The research findings indicated that most analysis of assessment data usually took place before further instruction was planned. This was particularly true of analysing NAPLAN data where teachers were presented with the NAPLAN results a few months after the tests were completed. School leaders analysed trends within the data and suggested specific instruction to improve the literacy weaknesses that were indicated. For example, one school noted that the students demonstrated poor skills in persuasive writing so all teachers planned specific instruction to improve the students’ persuasive writing skills. There was little indication of analysis of assessment directly after instruction, interrupting the ‘plan, teach, evaluate, teach’ cycle. A group of teachers from a single school employed a sequential strategy to inform their intervention. The strategy involved a sequence of assessment, analysis, collaboration followed by intervention. The practice of using data in such a systematic way is supported by Hamilton et al (2009). Newton (2007) would agree that these teachers are implementing effective practise by using frequent, detailed analysis of data to guide their intervention.

Teachers need to consistently and regularly analyse literacy assessment data so that instructional decisions are based on evidence (Timperley & Parr, 2009). Once analysis of students’ abilities is practised regularly before and after instruction, teachers will demonstrate that they are able to use analysed data to plan their teaching so that it meets the needs of all students.

Teachers recognised that an important purpose of analysed assessment data was to identify individual students’ needs so that appropriate planning for differentiated instruction and intervention could be conducted. Teachers determined the type of intervention based on the students’ weaknesses which Earl (2005) recognises as effective practice. The analysed data was also used by the teachers to identify groups of students who would benefit from academic extension. However, the provision of academic extension was less common than the provision of academic support. The reason indicated for providing more academic support than academic extension was that most schools focussed on addressing students’ weaknesses as a means to improving academic standards as a whole.
5.4. Types of intervention

All teachers in the study implemented some type of intervention for students and there was a diverse range of interventions being used by teachers. The most frequently used interventions included small groups, individual intervention, commercial programs, direct instruction, levelled intervention, differentiation, school programs and support. In total, twenty-six different types of interventions were used by teachers. This group of interventions included modifications that were student-focused, home-based, teaching-centred and practical. The large range of very different interventions could be due to a lack of knowledge about recommended interventions, lack of school-approved interventions, personal preference for certain types of interventions and interventions guided by school resources. The types of interventions will be individually discussed in relation to their implementation by teachers.

The most common intervention was the use of small group instruction. The study found that teachers used the analysed data to group students who have similar abilities, particularly for reading and spelling. Teachers used small group instruction as it allowed teachers to meet the needs of more than one student at a time. Although small group instruction was used by many teachers, Hattie (2008) provides evidence that this type of intervention is only moderately effective in improving students’ learning. Teachers using small group instruction to provide intervention should not be discouraged in this practice as specific interventions used with small groups of students, such as levelled instruction, differentiation and targeted intervention have been shown to be effective (Ford & Opitz, 2008; Fountas & Pinnell, 2012; Glaswell & Ford, 2011; McTighe & Brown, 2005; Wang & Algozzine, 2008; Watts-Taffe et al., 2012).

Levelled instruction was mainly used for levelling reading texts for use in guided reading groups and is regarded as helping students to make a substantial improvement in their reading (Glaswell & Ford, 2011). Teachers in the study generally used analysed data from assessments to judge the abilities of the students and selected texts to match their abilities. Although frameworks to assist with levelling are available (Glasswell & Ford, 2011), their use was not indicated and teachers relied on their subjective knowledge of texts and students to determine an
appropriate level. By selecting texts that matched the students’ reading skills, teachers effectively differentiated instruction for each of the groups in their class.

Differentiation is strongly supported by McTighe and Brown (2005), Heritage (2007) and Watts-Taffe et al. (2012). Heritage (2007) believes that differentiation is essential in helping students reach their full potential. Differentiation can be implemented using a number of strategies including modifying the process of instruction, the materials, the environment, the product (final assessment) or a combination of all of these (Watts-Taffe et al., 2012). Scaffolding, an aspect of differentiation, is a strategy that adjusts tasks to suit the current abilities of students (Burke et al., 2009). Scaffolding is also an important aspect of explicit instruction (Archer & Hughes, 2011). Teachers in the study differentiated tasks in spelling and reading by providing tasks that were matched to the students’ abilities but were challenging enough to help them learn new skills. Inclusion of some of the differentiation strategies described by Watts-Taffe et al. (2012) would increase their repertoire of recommended strategies.

Targeted intervention, another type of intervention involving small groups of students, has been proven to substantially improve students’ reading (Wang & Algozzine, 2008). Targeted intervention involves the use of analysed data to identify underachieving students. These students then become the ‘target students’ for intervention. This type of intervention involves focused practice of literacy skills and frequent monitoring of progress. Targeted intervention is conducted by trained teaching assistants who use scripted lesson formats and sequence of skills. Students who received ten to fifteen minutes of explicit instruction on a daily basis improved their reading substantially (Wang & Algozzine, 2008). Although teachers in the study did not specify targeted intervention as an employed intervention, the types that they did specify contain elements of what is considered to be effective practice (Wang & Algozzine, 2008). For levelled instruction and differentiation, teachers selected target students through assessments, analysis and observations. Many teachers used educational assistants to teach targeted students the skills that they did not have. However, to gain the full benefit of targeted intervention with small groups of students, teachers would need to ensure that students are receiving the
recommended explicit instruction on a daily basis and from an appropriate, qualified and experienced person so that they make the necessary improvements in literacy.

Individual intervention was frequently employed by teachers. In the current study, individual intervention was provided by teachers, educational assistants or literacy coordinators. Although teachers reported the effectiveness of individual intervention, research has found it to be an intervention which has been cited as having only a small effect on improving students’ achievement (Hattie, 2008). However, other researchers advocate the use of individualised intervention as a strategy that is effective for improving skills, particularly for listening, reading and writing (Connor et al., 2007; Spooner & Woodcock, 2011; Swart & Nathanson, 2011). Considering the different professional opinions on the effectiveness of individual intervention, teachers should monitor the effectiveness of the approach regularly (Hamilton et al., 2009). If there is evidence that students are improving as a result of the intervention, the intervention should be continued. If not, an appropriate, alternative intervention would need to be considered.

Commercially produced literacy programs and direct instruction are two very different types of intervention but were employed with similar frequency. This suggests that teachers have different knowledge of interventions or that their choice of interventions is guided by time and availability of resources. Teachers may prefer commercially produced programmes as they can use another adult to implement them instead of finding the time to implement it themselves. Teachers used York Assessment of Reading for Comprehension (YARC) (Psychological Assessments Australia, 2012), as one such intervention (which is primarily an assessment tool but it also provides good follow-up to individual students) and Alpha Assess which is a benchmarked literacy kit. A few teachers used MultiLit (MultiLit, 2007), especially with older students who were still struggling to become fluent readers. The use of commercial literacy programs is supported by a number of experts in the field (Cook, 2009; Wheldall & Wheldall, 2014). Hattie (2008), within his work on effect sizes of interventions, did not specifically rank the effectiveness of commercial programs but provided evidence that some literacy programs, such as vocabulary and writing programs could be used as effective interventions for struggling learners. Vocabulary programs containing vocabulary instruction and knowledge of word meanings are
suggested as being the most effective for improving reading comprehension (Hattie, 2008). Writing programs that involve teaching strategies for planning, editing, and revisiting work are particularly effective for low achieving writers. Therefore, if teachers choose commercial programs to provide literacy intervention they need to select programs that contain these elements. Direct instruction, is described as having seven major steps (Hattie, 2008). In direct instruction the teacher needs to have clear goals for the lesson, state the learning criteria to the students, motivate the students to engage in learning, provided guided practice for the students, close the lesson in a way that students can seek clarity and the give the students the opportunity to practice the new skill independently. Teaching guides may be available to show teachers how to present the lesson. When used in this way, the intervention is indicated it to be highly effective (Hattie, 2008). Despite the complex nature of the intervention, many teachers implemented it. Teachers indicated that their implementation had a positive influence on students’ learning.

Teachers specified explicit teaching as an intervention that they employed. Explicit teaching is different to direct instruction but has many similarities. Explicit teaching is a “…structured, systematic, and effective methodology for teaching academic skills” (Archer & Hughes, 2011. p.1). There are six essential steps to presenting explicit instruction: state lesson goals; present new information in small steps; model procedures; provide examples; use clear language; and avoid digressions. Other principles of explicit instruction require teachers to ensure a high frequency of responses from students, guided practice, give students timely feedback, use scaffolding of tasks and allow students to practice until skills are automatic (Archer & Hughes, 2011). Direct instruction and explicit teaching share a number of core components such as a structured approach, goal-setting, guided practice, engaging students and providing ample opportunity for students to practice skills. Direct instruction and explicit teaching are fundamentally instructional approaches but can also be used for intervention (Hattie, 2008). This is especially true when it is necessary to reteach a skill (as indicated by analysed data), as teachers can reteach content using the highly structured formats of direct instruction and explicit teaching.

The types of intervention discussed so far have provided support for underachieving students. However teachers indicated that analysed data was also
used to identify students for academic extension. In Hattie’s (2008) research enrichment refers to broadening the education of some students and is indicated as being a moderately effective type of intervention. Enrichment for writing was specifically indicated in the current study. A school leader provided enrichment to a group of students using explicit instruction in writing skills. Teachers of the students reported the enrichment to be successful in broadening the skills of the students.

Intervention requiring parental involvement was a strategy employed by some teachers who found it difficult to find the time to provide the intervention at school or who believed that if students practiced skills at home with their parents’ help, they would improve their skills. There are differing opinions about the effectiveness of involving parents in intervention. Wilkins and Terlitsky (2016), and Floyd and Vernon-Dotson (2008), support the strategy as they believe that student achievement improves when parents are involved in their child’s education. Involving parents in certain types of intervention may be more successful than others. For example, involving parents in intervention to improve listening skills is recommended by Spooner and Woodcock (2010) as effective practice. Home-school programs are cited as having minimal effect on students’ improvement (Hattie, 2008). Teachers using intervention strategies that extend beyond the school environment are recommended to carefully consider what they are expecting the parents to do and to select interventions that can be effectively employed in the home environment. The success of the intervention should be closely monitored and, if students are demonstrating progress as a result of the intervention, then it can be continued.

Teachers who have identified students requiring intervention, for support or extension, need to become well acquainted with types of intervention that are proven to be effective such as those identified by Hattie (2008). Teachers need to consider wisely the interventions being employed as not all interventions lead to educational improvement. By choosing a range of effective strategies that meet the needs of students, and by delivering the interventions in recommended ways, teachers will demonstrate sound practice and be more likely to observe student progress as a result.
5.5 Barriers to analysis of literacy assessment data

The current study indicated a number of factors that are barriers to teachers’ practice of analysing data from literacy assessments. Lack of time, insufficient knowledge of data analysis and inadequate professional development on data analysis were found to be the major barriers experienced by teachers. These findings will be individually discussed.

Time was a significant barrier for teachers in relation to analysing literacy assessment data. Teachers stated that the primary reason for not having enough time for analysing assessment data was heavy workloads due to a full curriculum. Kerr et al. (2006) discovered that many teachers in America were required to conduct too much testing, leaving little time for analysing data. This factor was not evident in the current study. Whilst many teachers found their workload too heavy they did not make specific reference to an extensive amount of testing as part of this workload. Some teachers found that analysing data takes time because it is a complicated process. Earl (2005) and Cramer et al. (2014) would concur that it is a complicated process, as they perceive effective data analysis as a series of steps leading to academic improvement. Kerr et al. (2006) propose that, to address the shortage of time, school leaders could give more assistance in the analysis of data, thereby reducing the amount of time teachers would need to spend on analysing data. Assistance could include professional development and organising for teachers with more expertise to assist those with less expertise (Kerr et al., 2016). The use of coaches is recommended as a method to guide teachers through data analysis thereby decreasing the amount of time spent on analysing data by themselves (Young & Kim, 2010). Coaches also help to improve teachers’ knowledge of data analysis and interpretation (Young & Kim, 2010) which was identified as a barrier.

The majority of teachers experienced a lack of knowledge regarding data analysis strategies which was a substantial barrier to their practice of data analysis. This phenomenon may extend beyond the current study as similar results were indicated in Wildy’s (2009) study which found that the capacity of teachers to understand and interpret data varied to a large degree. Archbald (2011) agrees that teachers have insufficient expertise in analysing data which suggests that the issue may be more common than it appears.
In the current study, teachers specified that knowledge, or rather the lack of knowledge, of a number of skills related to analysing data is what hindered their practice. Most teachers analyse their students’ work through examining test scores and determine students’ ability by what they do or do not know. This is a simplistic view of students’ abilities and does not provide the teacher with a sufficient picture of the students’ capabilities. Some teachers have experience analysing data at a deeper level and are able to use graphed data to compare groups of students’ results. These teachers are able to recognise trends that indicate categories of strengths or weaknesses in areas of literacy. Although most teachers stated that they transferred information from the analysed data into effective instruction or intervention, many teachers experienced difficulty with this practice. Knowledge of how to actually analyse data is a skill that Parr (2009) advocates to be highly necessary for effective teachers. Furthermore, teachers need to be able to interpret the data they have analysed (Cramer et al., 2014). Smeed (2013) advocates that being able to transfer information from the data into meaningful teaching practice is a required pedagogical skill.

Many teachers find the process of analysis to be a difficult one and its complexity hampers their proficiency (Earl, 2005). Teachers’ indicated that knowledge of curriculum policy, information technology and definition of analysis terms had an impact on their analysis of assessment data. Poor understanding of statistical terms and graphs is a common barrier to interpreting assessment data (Chick & Pierce, 2012). This finding corresponds with teachers’ experiences in the current study. To address this barrier, a tool which contains a range of recommended examples of analysis (Smeed, 2013) may assist teachers to improve their analytical skills by engaging them in a range of analytical strategies. To improve their lack of knowledge in analysing data to obtain meaningful results, teachers need to understand what the analysed data means. A framework for professional statistical literacy would increase teachers’ capacity to understand data and interpret data at different levels of analysis (Chick & Pierce, 2012). A framework which involves reading values, comparing values, analysing the data set and finally seeing the analysed data in light of the local context (factors relating to the collection of data) is appropriate for teachers. Chick and Pierce (2012) believe that the skills that teachers need are fairly straightforward and recommend that a simple, professional
development session with practical analysis tasks would sufficiently equip teachers with the skills they need to interpret a variety of data.

Professional development was found to be a factor influencing teachers’ analysis of assessment data. The majority of teachers found that professional development on the process of analysing assessment data was inadequate and therefore a barrier to their practice. Teachers generally thought that their knowledge and implementation of data analysis techniques would be better if they had more professional development which was relevant to the data collected from their year group. Wayman et al. (2010) and Timperley (2005) believe, as do the teachers in the study, that professional development would assist them to increase their expertise in analysing assessment data. The most effective way of providing professional development on specific topics is to organise professional development for small groups of teachers (Wayman et al., 2010). This was different to how teachers in the study generally received professional development as most professional development was usually presented to all the teaching staff at the beginning or end of a term. By planning targeted professional development and modelling data analysis practice, school leaders may address the problem of inadequate professional development and increase teachers’ ability to implement data analysis effectively (Kerr et al., 2006; Timperley, 2005).

A barrier experienced by a large proportion of the teachers is the lack of support they receive from school leaders in the process of analysing assessment data. Kerr et al. (2006) found that the same barrier emerged in their study. Whilst almost all the teachers have participated in whole-school discussion of assessment data (e.g. NAPLAN), many would also like to have individual support in improving their own analytical skills. Although most of the teachers in the current study spend time moderating with other teachers, the focus tended to be on allocating grades and not on the analysis of students’ skills. The preference for many teachers would be to have a person who has the skills to analyse data to guide them through the process. Assigning mentors and coaches to teachers may address this barrier and increase the likelihood of teachers conducting further data analysis without support (Park & Datnow, 2009 as cited in Smeed et al., 2010; Timperley & Parr, 2009; Young & Kim, 2010).
5.6. Enablers to data analysis

The research findings identified several factors that have a positive influence and enable teachers to analyse data from assessments more effectively. The enablers were professional development, confidence, whole school approach and collaboration. Many teachers found that professional development relevant to their grade level had enabled them to improve their skills for analysing assessment data. Whilst lack of professional development has been discussed as a barrier, it was a factor that, depending on the teachers’ individual experiences, either hindered or enabled their data analysis practice. The quantity and focus of professional development received by teachers in the current study varied considerably. Those teachers who had received more professional development specifically on the analysis of assessment data were able to analyse and interpret assessment data at more complex levels adding weight to the need to provide quality professional development in this area. Wayman et al. (2010) have found that teachers do increase their expertise in data analysis if they participate in frequent opportunities to do so. Therefore, a practical engagement with analysing data and not just discussion about it, as was the experience of some of the teachers in the current study, is beneficial.

The teachers’ level of confidence in analysing assessment data was found to be reasonably high for the majority of teachers. A similar finding was evident in a study by Pierce et al. (2013) which found that 63% of teachers felt confident about analysing data. Teachers indicated different reasons for being reasonably confident about analysing data. Confidence was experienced by teachers when analysing an area of literacy that they were well experienced in or that they had recently had professional development for. Some teachers, who had experience in analysing assessment data, indicated that their experience lead to their confidence. A few teachers indicated that they felt confident when supported by a more knowledgeable colleague.

An additional enabler in the current study was that of using a whole school approach to the analysis of assessment data. The whole school approach promoted an ethos of school improvement and teachers found this to be supportive of their participation in data analysis. A principal, who had recently initiated a new program
of assessment and data analysis, emphasised implementation of the program for student improvement and supported the teachers by providing opportunities for professional learning. This approach is effective for enabling teachers to analyse assessment data (Smeed et al., 2010). Teachers’ involved in a whole school approach receive more support and are consistently involved in data analysis processes tend to improve their analytical skills (Smeed et al., 2010). Using a whole school approach to data analysis combined with professional development and additional support, enabled teachers to analyse and interpret data with increasing expertise.

Collaboration was found to be an important enabler. Collaboration is seen to be particularly effective for difficult tasks such as data analysis because it supports teachers to collectively analyse data and combine their expertise to improve their analysis of data (Wayman et al., 2010; Young & Kim, 2010). Collaboration is supported by Earl (2005) and Smeed et al. (2010) who believe that collaboration leads to effective data analysis as teachers can collectively engage in discussion around the data and interpret the data with colleague’s support. Young and Kim (2010) believe that collaboration provides an opportunity for teachers to analyse different sets of data and discuss how to link the data to instruction.

5.6. Summary

The study findings clearly indicated that the majority of teachers engaged in the process of analysing literacy assessment data but that their skill levels and frequency of data analysis varied greatly. A diverse range of methods for analysing literacy assessments of reading, spelling, writing and listening and speaking were being used by teachers. Common strategies were identified in the study but in general, a large number of different strategies were indicated for each of the areas of literacy.

The findings identified three main purposes of data analysis. These were to inform instruction, identify students’ abilities and identify students requiring intervention. The range of strategies teachers used to inform their pedagogical decisions was extensive. Intervention was implemented by all teachers as a result of
data analysis. However, the frequencies of intervention differed and numerous types of interventions were used.

Many factors emerged as being barriers to teachers in their analysis of literacy assessment data. The major barriers were lack of time, insufficient knowledge of data analysis, lack of support and inadequate professional development on data analysis techniques. The findings identified factors that enabled teachers to analyse data more effectively. These were confidence, professional development, collaboration and a whole school approach to data collection and analysis.

The overall findings of the study have addressed the specific research questions relating to: data analysis strategies; using data analysis to inform instruction and intervention; identifying the most commonly used interventions; and identifying the barriers and enablers to data analysis. The overarching research question will be addressed in Chapter Six.
6.1. Chapter Overview

This final chapter will address the overarching research question: How do teachers use the data obtained from literacy assessments in Primary schools to inform their pedagogical decisions and what factors influence their practice? Recommendations, based on the findings of the research, will be made for educators and schools to consider. The limitations of the study will be noted. Suggestions for further research, considering the limitations and the areas within the research topic that showed the potential for further investigation, will be put forward.

6.2. Overarching Findings

The findings of the study illuminated primary school teachers’ practice of analysing literacy assessment data. A summary of overarching findings will be discussed to describe how teachers’ use the data that they obtain from literacy assessments to inform their practice and the factors that influence their practice. Table 6.1 summarises the research areas and the overarching findings.

Table 6.1.
Summary of research areas and overarching findings

<table>
<thead>
<tr>
<th>Area</th>
<th>Overarching finding</th>
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<tbody>
<tr>
<td>Teachers’ analysis of literacy assessment data</td>
<td>Teachers collect a variety of assessment data but analysis is poor.</td>
</tr>
<tr>
<td>Analysis for instruction and intervention</td>
<td>Teachers use analysis for instruction and intervention but it is inconsistently used</td>
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<tr>
<td>Teachers’ knowledge of data analysis</td>
<td>Professional development is required in strategies for data analysis</td>
</tr>
<tr>
<td>Factors influencing data analysis</td>
<td>Time to complete data analysis is required. Whole school and collaborative approaches may be beneficial to data analysis</td>
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</table>
6.2.1. Teachers’ analysis of literacy assessment data

Primary school teachers in different educational sectors teaching a range of year levels practice analysis of literacy assessment data. Most of the teachers in the study analysed data from a range of literacy assessments to judge students’ literacy knowledge. However, varying degrees of expertise in data analysis were evident. Many teachers analysed data on a superficial level. For example, they used assessment scores from benchmark, summative or standardised tests to determine students’ strengths and weaknesses in literacy. Scores such as these represent students’ achievement in particular assessments and, unless the assessments are analysed further, will not identify the students’ strengths, weaknesses and levels of understanding. Without this information, teachers will find it difficult to make data-based decisions that lead to students’ improvement.

Although teachers used a wide range of strategies to identify students’ strengths and weaknesses, not all of the strategies were supported by current literature. Moderation of writing samples was reported as a frequently-used strategy but poor data analysis was conducted on the writing samples. Teachers allocated grades to writing samples and did not examine the samples further to identify common trends or areas needing improvement. The teachers neglected to explore errors in depth which resulted in poor analysis of the data.

Effective data analysis requires qualitative judgement such as categorising errors, comparing data and making inferences. Teachers used very few qualitative strategies to analyse assessment data. They relied predominantly on quantitative analysis such as assessment scores, number of errors and overall achievement. In some cases, teachers used more advanced analysis methods such as miscue analysis. Detailed interpretation of the analysed data, in this instance the miscues, was lacking. Teachers conducted initial analysis but were unable to effectively interpret the data to extend their knowledge of students’ abilities. Without meaningful interpretation, the benefits of the data analysis were minimised.

Teacher’s levels of data analysis varied according to their knowledge and expertise in analysing data, their teaching experience and their confidence. Teachers participating in a whole school approach to analysing literacy assessment data showed greater understanding and more effective implementation of the practice of data analysis than teachers working in schools without a targeted, common approach.
These teachers were more effective in transferring the analysed data to inform their instruction and intervention.

### 6.2.2. Data analysis for instruction and intervention

The vast majority of teachers in the study agreed that analysis of assessment data should be used to plan instruction. However, the findings indicated that teachers’ practice of using data analysis to inform instruction and intervention was inconsistent and irregular. Teachers who recognised the importance of data to inform their instructional and intervention decisions tended to analyse data from assessments regularly. There was clear evidence that teachers involved in the whole school approach to data analysis had developed skills in using analysed data from assessments to effectively inform instruction and intervention.

Teachers frequently analysed assessment data to identify gaps in students’ learning. However, not all the areas of literacy were assessed and analysed to the same extent resulting in inconsistent practice. Reading and spelling instruction was better informed by data analysis than writing, speaking and listening. If students’ weaknesses were clearly identified through data analysis, they generally became the foci for subsequent instruction. Teachers who were unable to interpret analysed data independently found it difficult to use the information in making appropriate decisions about what to teach to address the areas of concern and still cover the required curriculum.

A wide range of strategies for data analysis were employed by teachers to inform instruction. While having a range of methods to analyse data may be an advantage, having too many methods, especially in one school, suggests a lack of common pedagogy, consistency, and a lack of knowledge about recommended, evidence-based practices for using data analysis to guide instruction. The diversity of methods makes it difficult to achieve consistent, effective practice within and across schools.

Teachers indicated that it was easier to use analysed data to inform intervention than it was to inform instruction. This may be due to the basic level of analysis being completed by most teachers which highlighted the students’ literacy
weaknesses. The literacy weaknesses indicated by the teachers’ analytical strategies became the focus for interventions. A diverse range of interventions were employed with varying degrees of frequency, indicating lack of consistency in addressing students’ literacy weaknesses. Some of the interventions were evidence-based but many were not, indicating that teachers lacked knowledge of recommended interventions or were limited by availability of resources.

In comparison, the teachers participating in the whole school approach to data analysis demonstrated a very structured implementation of assessment, analysis, and intervention. School leaders helped teachers to select appropriate intervention decisions that were based on analysed data from assessments. Their school provided the resources they needed to implement the interventions effectively. The approach used by these teachers indicated a high level of consistency and effectiveness in using data analysis to inform intervention.

6.2.3. Teachers’ knowledge of data analysis

The investigation of how teachers’ use data analysis to inform instruction and intervention has indicated two important issues: teachers’ knowledge of data analysis varies a great deal and teachers’ knowledge of data analysis is not advanced enough to enable them to independently analyse data at an inferential level. Despite the majority of teachers expressing confidence in analysing data, the need for professional development regarding strategies for analysing literacy assessment data was frequently expressed by the teachers.

Many teachers used a basic level of data analysis on assessments which provided them with a score or a level such as those gained from standardised, benchmark or class tests. They were able to gain the factual information from the data which requires little skill. Some teachers’ knowledge enabled them to compare scores of these kinds within or across grades to identify patterns or trends in students’ abilities. Comparison of data requires limited interpretation skills. Interpretation of data is a higher level of analysis and it was evident that many teachers lacked the skills to independently interpret analysed data in a meaningful
way. Qualitative approaches to data analysis, which are necessary for the interpretation of the data, were minimally employed.

The advanced level of making inferences from analysed data was rarely indicated by all teachers. Most of the teachers involved in the whole school approach to data analysis were gaining this advanced skill, under the guidance of school leaders who already used the skill effectively. Making inferences involves looking beyond the data and forming opinions about students’ abilities that are not directly observed in the data. It also involves the transfer of information from analysed data into effective instruction and intervention. Inferential skills in data analysis were not regularly evident.

The current skills being used by most teachers highlighted the need for professional development on different strategies of data analysis, particularly the more advanced skills. Professional development which provided teachers with the skills to interpret assessment data would make the analysed data meaningful and guide their instruction to meet the needs of all students. Professional development on inferential data skills would assist many teachers to formulate comprehensive profiles of students’ literacy skills and make evidence-based decisions about teaching and learning that lead to students’ improvement.

6.2.4. Factors influencing data analysis

The study identified a range of factors that influenced teachers’ data analysis. The factors either hindered or enabled data analysis. The overarching findings were that teachers needed more time to analyse the data from literacy assessments and that whole school and collaborative approaches may be beneficial to data analysis. These findings will be individually addressed.

The majority of teachers indicated that lack of time affected their analysis of data. Different reasons were indicated for this issue. Teachers explained that heavy workloads demanded most of their time. Responsibilities such as planning, assessing, organising, preparing and reporting were time consuming. As a result, little time was left for analysing assessment data. Although teachers recognised the importance of analysing and using data, it was not indicated as a priority in their duties as a teacher.
Teachers mostly failed to see how the analysis of data could be integrated into their schedules and make them more effective teachers. Teachers explained that another reason for time affecting their analysis of data was that they found the analysis of data to be a difficult, time-consuming practice. This inferred that most teachers were ill-equipped with the skills required to effectively analyse data from assessments. Most teachers indicated that they received little support in data analysis which meant that they were left to complete the process with the skills and time that they had. It was evident that the issue of lack of time was having a negative influence on teachers’ practice of data analysis and would have to be addressed.

The findings of the study identified a number of factors that teachers proposed had a positive influence on their analysis of assessment data. However the overarching finding was that collaborative and whole school approaches may result in superior analysis and application of analysed data. Most teachers worked independently on the analysis of assessment data, with little support from school leaders, to guide their practice. Teachers frequently indicated the need to complete data analysis with another teacher as it affirmed their initial analysis and they could learn skills from others that improved their analysis. Teachers expressed the need for someone with expertise to model effective data analysis. As this issue was not addressed some teachers adopted a different approach to data analysis.

Using their own initiative, teachers’ organised time outside of school hours to complete data analysis with another teacher or a group of teachers. These teachers usually taught the same year levels. Collaboration on data analysis improved teachers’ confidence and skills. They were able to pool their expertise on data analysis and although the level of analysis may have not been as advanced as it could have been, teachers still gained more information about students’ abilities than if they had been analysing data independently. Through collaboration, teachers slightly increased their knowledge of data analysis and developed some common approaches to the practice.

A group of teachers in the study developed common approaches through a whole school approach to data analysis. Although the school used an external consultant for the assessment, teachers were still involved in assessment and analysis
of the assessment data. Collaboration in this approach occurred within different contexts such as whole staff, teaching teams and individual support. The whole school approach created an ethos of improvement and while it was indicated that teachers had not yet mastered all the skills needed for advanced data analysis, they were improving their skills, confidence and application of analysed assessment data.

6.3. Recommendations

Examining the overarching findings of the study within the context of the current literature on the topic enables a number of recommendations to be made. The recommendations relate to improving primary school teachers’ strategies and expertise in analysing literacy assessment data and using it effectively to improve students’ achievement. The recommendations include: improving range and coordination of literacy assessment data for analysis, improving teachers’ knowledge of data analysis through providing professional development, improving the variety of interventions used as a result of literacy assessment data analysis, providing sufficient time for analysis and using a whole school approach.

6.3.1. Improve range and coordination of literacy assessment data for analysis

Teachers used a range of literacy assessments although summative tests were used more than formative ones. The use of summative tests, such as standardised tests, is recognised as acceptable assessment practice (Garrison & Ehringhaus, 2007). The study identified that improvements could be made in how teachers analyse the range of assessments they use for each of the areas of literacy.

Improving analysis of spelling may occur by combining the use of standardised tests with developmental tests (Invernezzi & Hayes, 2004; Young, 2007). For example, using a standardised test such as the Holborn spelling test (Watts, 1980) and a developmental spelling test such Words Their Way (Bear, et al., 2009) provides information about the students’ spelling abilities that may not be indicated by using a standardised test score on its own. By using more than one type of test, teachers can gather a range of assessment data which will provide a
comprehensive summary of students’ abilities. School leaders may consider whole school spelling programs which provide the necessary resources for teachers along with professional development by a consultant specialised in the use of analysing standardised and developmental tests.

The study findings indicate that minimal analysis of writing is taking place. A recommendation to analyse students’ writing in greater detail is by using a diagnostic tool. Such a tool has been used effectively in New Zealand (Parr et al., 2007). The use of an analytical tool such as Functional Language Analysis (Fang & Wang, 2011) is further recommended because it provides comprehensive analysis of writing as well as suggestions for subsequent instruction and intervention.

Teachers indicate one main strategy, oral presentations, for analysing listening and speaking. It is recommended that more strategies be implemented by teachers. Analysing listening using the Listening Rating Scale (Spooner & Woodcock, 2010) is one recommendation for analysing students’ listening skills effectively and comprehensively. A second recommendation is a highly individualised strategy for analysing students’ speaking (comprehension, topic maintenance and grammar) and involves writing detailed notes for each student (Nelson & van Meter, 2002). Schools may consider using literacy coordinators to assist with implementing the strategy and support teachers to keep detailed anecdotal records for the students they teach.

6.3.2. Improve teachers knowledge of data analysis through providing appropriate professional development

The majority of teachers had a basic knowledge of data analysis. The findings indicated that while teachers felt reasonably confident about analysing assessment data, they still wanted professional development to increase their knowledge of the process. Professional development targeting techniques to analyse summative tests is recommended to increase teachers’ expertise in analysing different types of data (Hoover & Abrams, 2013). Targeted professional development on the statistical aspects of analysis may improve teachers’ analysis of data (Chick & Pierce, 2012). Consultants or experts in educational data analysis may be used to deliver
professional development, particularly on the more advanced strategies of analysis as
detailed analysis is needed for effective instruction (Beckett et al., 2010).

Delivering professional development to small groups is believed to be the
most effective model of professional development (Wayman et al., 2010). This
would require a change for many schools in Western Australia, where professional
development is usually presented to large groups of teachers. An additional
recommendation to improve teachers’ knowledge of how to analyse effectively is by
using mentors, coaches or modelling (Kerr et al., 2006; Young & Kim, 2010).
Teachers strongly indicated that they wanted to be shown how to analyse data by
someone else and by considering the use of coaches, mentors and of modelling,
teachers’ knowledge and practice may be improved.

6.3.3. Improve the variety of interventions used as a result of literacy
assessment data analysis

A vast range of interventions were recorded in the study, with some of them
being considered to be reasonably effective (Connor et al., 2007; Ford & Opitz,
2008; Hattie, 2008; Wang & Algozzine, 2008). However, the implementation of
highly effective, research-based interventions are recommended to improve teachers’
practice in this area and lead to student improvement. Some of the most effective
types of intervention that are relevant to literacy include formative evaluation,
feedback, vocabulary programs and repeated reading programs (Hattie, 2008).
Formative evaluation is an effective intervention when frequent analysis of learning
is conducted by the teacher. Vocabulary programs should focus on words and
meanings of words in order to be an effective intervention. Repeated reading, as an
intervention, requires students to read short texts repeatedly until fluency is reached
(Hattie, 2008). Therefore, it is not enough for teachers to simply provide programs
for intervention. They need to implement programs with proven content.

Teachers may consider using levelled intervention (Glaswell & Ford, 2011)
which has particular relevance for guided reading, an approach being used by a
number of teachers. Many teachers used small groups of students as a strategy for
intervention. Differentiation and targeted intervention, employed by some teachers in
the study, are recommended small group interventions and (Heritage, 2007; McTighe
& Brown, 2005; Wang & Algozzine, 2008; Watts-Taffe et al., 2012). Teachers using these strategies could be assigned to model them to other teachers.

Teachers can increase their knowledge of effective interventions in a number of ways. Professional development, conferences, professional reading and participation in school-based action research focused on interventions would provide teachers examples of recommended interventions. Teachers could select the most appropriate interventions to match the needs as identified by the analysed assessment data. By considering these recommendations, the types of interventions employed by primary school teachers could become more streamlined and effective.

6.3.4. Provide sufficient time for analysis

The study found that time was a considerable barrier to the teachers’ practice of data analysis. It is recommended therefore, that strategies to provide time for teachers to analyse assessment data be considered. One way is to give time during the school day for teachers to analyse assessment that the students have done (Young & Kim, 2010). An alternative way would be to provide teachers with time in lieu of the time they have spent analysing assessment data, particularly when a lot of data analysis is required (Smeed et al., 2010). This idea suggests compensating teachers for time spent on analysis by providing them with a period of time during the school day when their teaching responsibilities are undertaken by another teacher, such as a relief teacher. Providing more time for collaboration amongst teachers to analyse assessment data together may minimise the time needed for data analysis as collaboration leads to pooling of expertise and sharing of ideas (Earl, 2005; Smeed et al., 2010; Young & Kim, 2010).

6.3.5. Use a whole school approach

Numerous findings in the study indicated that teachers from a school where the analysis of assessment data was presented as a whole school approach, showed greater knowledge, frequency and implementation of data analysis. It is therefore recommended that designing a whole school approach to the analysis of assessment data be strongly considered by school leaders. As part of a whole school approach, a
diagnostic tool such as Over Time Assessment Data Analysis (OTADA), may be beneficial in developing sound analytical skills for an entire school of students (Smeed, 2013). OTADA is being used effectively in many schools in Queensland, Australia (Smeed, 2013) so it may also have the potential to help teachers in Western Australia.

6.4. Limitations

The research was conducted with a small number of teachers from different educational sectors of Perth Primary schools so it is acknowledged that the sample size may not accurately represent practice in other primary schools in Western Australia or nationally. Participation in the research was voluntary and, while this is ethical, it may have limited the research as some teachers who may be the most experienced in the use of literacy assessment data analysis may have opted not to participate. Alternatively, teachers who were uncertain of their abilities in using assessment data may have also opted not to participate, which may have impacted on results. Wording of questions in the survey questionnaire may have limited the accuracy of responses due to teachers’ lack of understanding of the terminology.

6.5. Suggestions for further research

Educational policy, such as the implementation of national testing, has prioritised the role of data in Australian education (Smeed et al., 2010). This study focused on the analysis of data within the area of literacy in Primary schools. The teachers in the study came from a range of educational sectors and represented a range of ages, gender and teaching experience. Teachers of different year levels were well presented in the study. The study produced key findings even though the sample size was small. In light of all the above, conducting further research on the same topic but with a large sample of teachers (with educational sectors being equally represented) would potentially provide comprehensive data for comparisons and for generalisability.

Secondly, a suggestion is made for research to investigate the effects of targeted professional development on data analysis. This type of research would enable comparison of teachers’ skills before and after the professional development program. If successful, the model of professional learning used may be implemented
on a larger scale to improve the analytic expertise of many teachers; a skill recognised by literature as being essential (Cramer et al., 2014).

Thirdly, literature indicates limited research on data practices within early childhood settings (Brawley & Stormont, 2014). Therefore, a study investigating data collection practices, analysis of data and the strategies early childhood teachers use to link analysed data with instruction would be enlightening. The results of this research may add to the literature on current practices in early childhood settings.

Finally, further research investigating data analysis practices in different learning areas such as numeracy, would determine teachers’ practices in these areas. Findings may establish if the strategies for analysing numeracy assessment data are similar to those for analysing literacy assessment data. The research could identify how data analysis is used to improve students’ learning holistically and also investigate if teachers experience factors that present as barriers or enablers to their data analysis practices in a variety of learning areas. The findings of this research may establish the extent to which analysis of numeracy assessment data is taking place and how effective it is in guiding instruction and intervention so that the needs of all students are effectively catered for. Comparison between the findings of the research may be compared with the findings of the current study to establish if teachers require different analytical skills for different learning areas.

6.6. Final comments

This chapter has presented summaries for each of the key findings of the study, related to the overarching research question. A number of recommendations based on the findings of the study, in the light of current literature, have been proposed for consideration. Topics for further research, connected to the phenomenon researched in the current study, have been suggested. The topics are considered relevant and may contribute valuable information to the current body of literature on data use in education.

The current study employed a mixed method research approach to investigate how teachers in Primary schools use data obtained from literacy assessment to inform their pedagogical decisions and to determine what factors influence their practice. Despite the limitations of the study, comprehensive qualitative and
quantitative data was gathered to provide evidence of, and insight into, teachers’ data analysis practices. Analysis of the data lead to several key findings.

The study, although small, is an authentic reflection of the participants’ data analysis practices in a data-driven environment. Descriptive statistical data and qualitative themes highlight teachers’ practices and perceptions. The findings highlight the challenges faced by teachers to meet data analysis requirements and the strategies they implement to promote improvement for every student.
References


*Medical Education, 40*(4), 314-321


MultiLit (2007). *The MultiLit reading tutor program (Revised)*. Sydney: MultiLit Pty Ltd.


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Appendices

Appendix A: Survey Questionnaire Part A

_SCHOOL_ ……………………………………………               _DATE_ …/……/……

**General Information**

1. **Gender**
   - ○ male
   - ○ female

2. **Age**
   - ○ 21-30
   - ○ 31-40
   - ○ 41-50
   - ○ 50 plus

3. **Years of teaching experience**
   - ○ 1-5 years
   - ○ 6-10 years
   - ○ 11-15 years
   - ○ 16-20 years
   - ○ 20 plus years

4. **What qualifications do you hold? e.g. B.Ed**
   …………………………………………………………………………

5. **Grade currently teaching e.g Year 2**
   …………………………………………………………………………

_This survey regards the analysis of Literacy assessment data._

6. **How often do you assess Literacy?**

   - ○ Weekly
   - ○ Fortnightly
   - ○ Monthly
   - ○ Other-specify
   ……………………………

7. **List ways you analyse students’ assessment responses to identify students’ strengths and weaknesses.**
<table>
<thead>
<tr>
<th>LEARNING AREA</th>
<th>WAYS TO IDENTIFY STRENGTHS</th>
<th>WAYS TO IDENTIFY WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>Spelling</td>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>Writing</td>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>Listening and</td>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>Speaking</td>
<td>2.</td>
<td>2.</td>
</tr>
</tbody>
</table>

Please turn to page 2
Intervention is any instructional plan or process that is implemented instead of the ‘normal’ instructional program and is guided by assessment results.

8. Give examples of different types of intervention you use as a result of Literacy assessment and state if you use them “Always”, “Often” or “Sometimes”.

<table>
<thead>
<tr>
<th>Type of intervention</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. How do these factors affect your analysis of student assessment?

Tick one box for each factor.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Not at all</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Confidence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Professional Development</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Colleague support</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Other (specify)….</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Other(specify)….</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Any further comments?

..........................................................................................................

IMPORTANT: Please place ONLY the completed questionnaire in the envelope provided.

Return the Consent form and the envelope to the Administration office who will store them separately. Thank you!
Appendix B: Survey Questionnaire Part B

**SCHOOL** ..................................................  **DATE** ....../....../......

Tick the most appropriate answer.

<table>
<thead>
<tr>
<th></th>
<th>Hardly ever</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Almost always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I use Literacy assessments.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I think only the scores are important.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I use standardised literacy tests.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I design my own literacy tests.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I use the scores to determine students’ strengths/weaknesses in literacy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I use miscue analysis.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I use running records.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I use literacy assessment results to plan what to teach next.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. I analyse literacy errors students make.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. I judge students’ literacy knowledge through analysis of literacy assessment data.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Analysis of literacy assessment is important.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Analysis of students’ responses in literacy assessments is easy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Standardised literacy test results can be analysed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hardly ever</td>
<td>Sometimes</td>
<td>Frequently</td>
<td>Almost always</td>
</tr>
<tr>
<td>---</td>
<td>-------------</td>
<td>-----------</td>
<td>------------</td>
<td>---------------</td>
</tr>
<tr>
<td>14. Literacy assessments can be analysed to indicate students’ specific weaknesses.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Literacy assessments can be analysed to indicate students’ specific strengths.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Analysis of literacy assessment data should be used for planning teaching.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Professional development on analysis of literacy assessment would be helpful.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Professional development on analysis of literacy assessment has been sufficient.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Any other comments about the analysis of literacy assessment data?

................................................................................................................................................
................................................................................................................................................
Appendix C: Semi-structured interview questions

School _____________________                                           Date________
Teacher____________________                                           Grade____

Questions for semi-structured interviews

1. What does analysing assessment data mean to you?
   ........................................................................................................

2. How would you describe your/ your colleagues confidence in analysing assessment data? Why?
   ........................................................................................................

3. Do you think analysis is important? Why? Why not?
   ........................................................................................................

4. What do you find/think is easy about analysing assessment data?
   ........................................................................................................

5. What do you find/think is difficult about analysing assessment?
   ........................................................................................................

6. Explain how you think analysis should be used for intervention?
   ........................................................................................................

7. Describe any support you / your staff get with analysis of assessment.
   ........................................................................................................

8. What would help you /the staff to use analysis better?
   ........................................................................................................

9. Would you like to make any other comments?
Appendix D: Plain Language Statement

Insert Title and Name
Principal
School
[Insert Postal Address]

Dear [Insert Title and Surname of Site Manager]

Examination of Primary school teachers’ analysis of literacy assessment data.
My name is Mary-Anne Zevenbergen and I am writing to you on behalf of University of Notre Dame Australia. I am conducting a research project that aims to examine Primary school teachers’ analysis of data from literacy assessments. It investigates strategies that teachers use to analyse errors and to identify student strengths and weaknesses in literacy (reading, spelling, writing, speaking and listening). The research identifies if, and how, the analysis of errors is used in subsequent instruction and intervention. Finally, the research examines barriers and supports that teachers experience in their task of analysing literacy assessment data. The project is being conducted under the supervision of Assoc Prof Dianne Chambers and forms part of my Master of Philosophy degree.

I would like to invite [insert Department site] to take part in the project. This is because Department site has Primary school teachers who are experienced in the analysis of literacy assessment data. [Insert Department site] is one of approximately 10 schools in the Perth Metro area approached for their participation. The benefits of this research will primarily be to teachers and principals. Teachers have the opportunity to benefit from the process of evaluating, reflecting and describing their current knowledge and practice regarding analysis of students’ assessments. The benefits for principals will be the research data which will provide a comprehensive summary of teachers’ common practice regarding the analysis of literacy assessment and its role in planning instruction. Evidence of assessment analysis issues found in the research may be helpful in identifying topics for professional development. Current studies show that there is limited evidence of detailed analysis of assessment. Therefore, your participation would contribute to evidence-based literature.
What does participation in the research project involve?
I seek access to Primary school teachers (Year 1 to Year 6) who will be invited to participate by completing a 2-part questionnaire that relates to strategies that teachers use to analyse literacy assessment data and how they use the analysis to inform their instruction (intervention and extension). The questionnaire is estimated to take approximately 20 minutes in total. Teachers will be invited to opt-in to participating in semi-structured interviews by providing their contact details on the consent form. The interviews will take place at a time and place suitable for them to further discuss the topic. The interviews are estimated to take approximately 20 -25 minutes. Transcripts of the interviews will be returned to the participants who will check the accuracy of the information collected.

I will keep the school’s involvement in the administration of the research procedures to a minimum. However, it will be necessary for the teachers to return signed consent forms and questionnaires to the school administration office for collection by the researcher.

To what extent is participation voluntary, and what are the implications of withdrawing that participation?
Participation in this research project is entirely voluntary. Participants may withdraw at any time. If any member of a participant group decides to participate and then later changes their mind, they are able to withdraw their participation at any time. However, as the questionnaires are anonymous it will not be possible to withdraw the submitted data once the questionnaires have been completed.

There will be no consequences relating to any decision by an individual or the school regarding participation, other than those already described in this letter. Decisions made will not affect the relationship with the researcher or University of Notre Dame Australia.

What will happen to the information collected, and is privacy and confidentiality assured?
Information that identifies anyone will be removed from the data collected by using codes. The data is then stored securely on a password-protected laptop and can only be accessed by the researcher. The data will be stored for a minimum period of 5 years, after which it will be destroyed. This will be achieved according to University policy at the time. The data will be used only for this project, and will not be used in any extended or future research without first obtaining explicit written consent from participants.

Consistent with Department of Education policy, a summary of the overall research findings will be made available to all schools who participate. If 10 or more teachers from your school participate, a summary of the results for your school will be provided. The summary will be available by August 2016 after completion of the thesis in July 2016.
Is this research approved?
The research has been approved by the Human Research Ethics Committee of University of Notre Dame Australia. The approval number is 015106F and has met the policy requirements of the Department of Education as indicated in the attached letter.

Who do I contact if I wish to discuss the project further?
If you would like to discuss any aspect of this study with a member of the research team, please contact me on the number provided below. If you wish to speak with an independent person about the conduct of the project, please contact Assoc Prof Dianne Chambers by calling 94330170.

How do I indicate my willingness for the teachers to be involved?
If you have had all questions about the project answered to your satisfaction, and are willing for the teachers to participate, please complete the Consent Form on the following page, scan it and email it to me.

This information letter may be kept for your records.

Mary-Anne Zevenbergen
Higher Degree Research student
University Notre Dame Australia
Email: maryanne.zevenbergen1@my.nd.edu.au
Mobile: 0413343593
Appendix E: Letter of Consent

EXAMINATION OF PRIMARY SCHOOL TEACHERS’ ANALYSIS OF LITERACY ASSESSMENT DATA

INFORMED CONSENT - PRINCIPAL

I, (principal’s name) ___________________________________________ from (school’s name)
__________________________________ hereby agree to my staff participating in the above
research project.

• I have read and understood the Information Sheet about this project and any questions have
been answered to my satisfaction.

• I understand that my staff may withdraw from participating in the second phase of the project
at any time without prejudice.

• I understand that all information gathered by the researcher will be treated as strictly
confidential, except in instances of legal requirements such as court subpoenas, freedom of
information requests, or mandated reporting by some professionals.

• I understand that the protocol adopted by the University Of Notre Dame Australia Human
Research Ethics Committee for the protection of privacy will be adhered to and relevant sections
of the Privacy Act are available at http://www.nhmrc.gov.au/

• I agree that any research data gathered for the study may be published provided the school’s
name, my name, the staff’s names and other identifying information is not disclosed.

• I understand that my staff may be contacted for an interview if they provide their contact details
and that these interviews will be audio-recorded with their consent.

<table>
<thead>
<tr>
<th>PRINCIPAL’S SIGNATURE:</th>
<th>DATE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESEARCHER’S FULL NAME:</td>
<td>MARY-ANNE ZEVENBERGEN</td>
</tr>
<tr>
<td>RESEARCHER’S SIGNATURE:</td>
<td>DATE:</td>
</tr>
</tbody>
</table>

If participants have any complaint regarding the manner in which a research project is conducted, it should be directed to the Executive Officer of the Human Research Ethics Committee, Research Office, The University of Notre Dame Australia, PO Box 1225 Fremantle WA 6959, phone (08) 9433 0943, research@nd.edu.au