Science and Mathematics Education Centre

Associations between Student Levels of Achievement and Perceptions of Teacher-Student Interactions

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Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgement has been made.

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

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ABSTRACT

This thesis reports on a research study of the associations between the interpersonal interactions students have with their teachers and shifts in cognitive achievement. Effect sizes were calculated to determine the shifts students had in cognitive achievement and these were compared to the perceptions of the teacher student interactions that were gathered using the Questionnaire on Teacher Interaction (QTI). This was one of the first times that the QTI was used in a New Zealand Primary School. The 48-item QTI was used and shown to be both valid and reliable within the New Zealand Primary School context.

The study found that there was a correlation between the interpersonal interactions and cognitive achievement of students. Students generally had better achievement shifts with teachers that matched the Tolerant/Authoritative typology and lower shifts with teachers who matched the Directive typology. The study also confirmed that there is variance of teachers within schools. It is this variance that needs addressing and the tools used in this research enable teachers and educators to make decisions about what is working within a classroom and what is not. This leads to opportunities for the professional development of teachers, which will in turn improve both the learning environment and cognitive achievement of the students. Teaching and learning are complex and determining what and where to improve can only happen effectively when you have evidence of what is occurring. The tools used in this study provide that evidence, and when you have the evidence, you have the ability to make powerful changes in the lives of students.

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

aRs	asTTle Reading Score
aWs	asTTle Writing Score
asTTle	Assessment Tools for Teaching and Learning
EHSAS	Extending High Standards Across Schools
GATE	Gifted and talented Education
ICL	Interpersonal Adjective Checklist
NZCER	New Zealand Centre for Education Research
PAT	Progressive Achievement Test
PMI	Positives, Minuses, Ideas
QTI	Questionnaire on Teacher Interaction
STAR	Supplementary Tests of Achievement in Reading

CHAPTER 1

INTRODUCTION

1.1 Introduction

There are strong views about schools and teachers and why some students are successful and others are not. There is often debate about the quality of teachers and of schools. Many studies have looked at the effectiveness of teachers in classrooms. Whether students like or dislike teachers is seen by some to be imperative to the learning outcomes whilst others disregard this notion and consider that students just have to tough it out.

For teaching to be deemed effective, and therefore the teacher to be seen as an effective practitioner there must be an improvement in the level of achievement of the students. Quality teaching has been identified in research as a key influence on high quality outcomes for students' levels of achievement. The belief is that the teacher has a direct impact on the learning provided in the classroom.

The research described in this thesis focuses on the dilemma of improving student levels of achievement within the school. Do teachers who are shown to have better interactions with their students have greater improvement in the results of those students? This study uses the Questionnaire on Teacher Interaction to determine the associations between student levels of achievement and the perceptions of the teacher student interactions at a Primary School.

1.2 Background to the Study

Coastal School is situated in a seaside suburb situated within a large city of New Zealand. The city has a population of approximately 102,000 people and is geographically separated by coastal water. Areas of the city are situated on an isthmus.

There is one co-educational college which has Year 9 to 13 students, seven Primary schools; five cater for students from Year 0 to Year 6, and three that cater from Year 0 to Year 8. There is one intermediate school, which specifically caters for the age group from 10 to 14 years and has students in Year 7 and Year 8.

The School has a Decile Rating of 5. Decile ratings are assessed by the Ministry of Education every five years and are based on factors that include; the value of housing, socio-economic levels, education level of adults, age and ethnicity of population, employment status.

The School has a roll that varies between 420 and 480 students that is made up of 30% Maori, 5% Pacific Island, 5% Asian, 5% Other and 55% New Zealand/European. In 2009 there was a roll of 420 students, 16 classroom teachers and five specialist teachers, there are four syndicates each made up of two Year 7 and two Year 8 classes.

A cluster was developed amongst seven of the local schools that applied for and were awarded funding for the Extending High Standards Across Schools initiative. Extending High Standards Across Schools (EHSAS) is a government initiative designed to raise student achievement by promoting excellence among the country's schools. The principles behind EHSAS were to raise student achievement by promoting excellence in the school system; and supporting high standards.

The objective of EHSAS is to improve student outcomes by assisting schools to further develop effective processes and practices with other schools. A key element of this initiative is for schools to work collaboratively to extend practice.

Part of the approach is for the schools to use evidence-based decision-making to inform teaching practices and support a culture that encourages the effective use of data. The goal of this initiative is to improve student outcomes through developing professional learning communities that are evidence based. The aims set by the cluster are to raise student literacy and numeracy performance to consistently be at or above the national average.

The school has recently completed other Ministry of Education initiatives; the *Literacy Development Project*, 2005-2006 and the *Numeracy Development Project,* 2006-2007. These projects were funded by the Ministry of Education and were aimed at raising the level of teaching in these areas.

Therefore, the purposes of this study are:

1. to study the interpersonal interactions between teachers and students in a primary school in New Zealand.
2. to determine the levels of achievement of the students.
3. to determine whether there are any associations between the teacher student interpersonal interactions and the levels of academic achievement of the students in a primary school in New Zealand.

1.3 Questionnaire on Teacher Interaction

The Questionnaire on Teacher Interaction [QTI] (Wubbels & Levy, 1993) was the primary data gathering tool and was used to assess students' perceptions of their teacher's interpersonal behaviour. There is well-documented research using this tool

in a variety of settings to determine the teacher student interpersonal interactions (Fisher & Rickards, 1996; Fisher, Fraser, & Wubbels, 1993; Goh & Fraser, 1996; Fisher, Henderson & Fraser, 1995; Wubbels, Brekelmans, & Hooymayers, 1991).

1.4 Standardised Assessments

Students at the school are tested in literacy and mathematics at the beginning and end of the year. The assessments the school uses are chosen from a range of standardised and normed assessment tools available to all New Zealand schools. The tools used are the Assessment Tools for Teaching and Learning (asTTle), assessing reading and writing, the Supplementary Tests of Achievement in Reading (STAR), assessing reading, and the Progressive Achievement Tests, Mathematics (PAT), assessing mathematics. The assessments are administered under specific conditions, pertaining to each assessment tool. The data collected from the assessments are then used by teachers to plan their teaching and tailor this to the individualised needs of each class and the students within the class. The data collected from the beginning of year and the end of year were analysed to determine if there were shifts in student achievement. Associations between the QTI and the student data were then analysed to identify if the interactions between students and teachers had an effect on students' level of achievement.

1.5 Aim and Research Questions

The overall aim of the study is to identify the interpersonal interactions the students have with the teachers in a New Zealand primary school, how this relates to the level of student achievement and to identify which interpersonal attributes have greatest impact on the students' levels of achievement.

In order to achieve the aim as described above, the research seeks to first answer a number of questions.

1. Is the Questionnaire on Teacher Interaction (QTI) a reliable and valid instrument for use in a primary classroom in New Zealand?

2. What are the students' perceptions of teachers' interpersonal behaviours in a New Zealand primary school?

3. What are the Questionnaire on Teacher Interaction (QTI) profiles of the different classrooms in a primary school in New Zealand?

4. Are there any associations between the students' perception of their teachers' interpersonal behaviour and their achievement in reading?

5. Are there any associations between the students' perception of their teachers' interpersonal behaviour and their achievement in writing?

6. Are there any associations between the students' perception of their teachers' interpersonal behaviour and their achievement in mathematics?

7. Are there significant gains in students' levels of reading, writing and mathematics in Grades 7 & 8, and how are those gains distributed amongst the classes?

1.6 Significance

This study is significant for a number of reasons. It was one of the first times the Questionnaire on Teacher Interaction (QTI) was used in a primary school in New Zealand. This study identifies the interpersonal interactions between teachers and students in a primary school in New Zealand. This will enable teachers to identify the attributes of interpersonal interactions within classrooms and gain an understanding of how their everyday interactions with students are seen by those students.

Secondly, the study looks at the academic gains the students made and the associations between the students' perception of their teachers' interpersonal behaviour and their achievement in reading, writing and mathematics. It will compare the students' levels of achievement and the interaction of the students with their teachers.

Thirdly, it will identify ways that teachers can improve their interpersonal interactions with their students, which then in turn can assist them to improve the levels of achievement of students in their classroom.

> Learning activities always are accompanied by interpersonal interaction and interpersonal sentiments. The reciprocal nature of teacher-student communication makes it a powerful influence on the learning environment, and subsequently student performance. As the behaviour of both teacher and student influence each other mutually, teacher-student interactional behaviour is assumed to be of crucial importance to student learning in the classroom. (Goh & Fraser, 1998, p. 200).

Lastly, it will provide to the school evidence to help teachers with professional development enabling early intervention for less effective teachers. The consequence of this is the likely improvement of teaching and learning at the school.

1.7 Overview of Methods

In this study the dilemma is whether students who have better interpersonal interactions with their teachers achieve better academically. The Questionnaire on Teacher Interaction (QTI) was chosen to ascertain how the students felt about the interpersonal interactions they had with their teachers

The sample included 16 classes at a Primary School. The sample was co-educational and the classes consisted of Year 7 or Year 8 students. The total sample included

approximately 400 students. All students completed a Questionnaire on Teacher Interaction. The assessment data were collected across 2009, from all students enrolled at the school at the time the assessments were given. The assessment data were collected school wide at the beginning and end of the year. Standardised tests were used in reading, writing and mathematics.

1.8 Overview of Thesis

This thesis describes one of the first studies in New Zealand of student teacher interpersonal interactions and relates it to levels of students' achievement. The thesis is divided into six chapters.

Chapter One of this thesis provides the relevant background to the study, describing the school and the setting in which the study was done. The research questions, significance of the study and an overview of the approach taken in the study are also discussed.

Chapter Two contains a review of the literature on effective teaching, the QTI and academic assessment used in New Zealand Primary Schools.

Chapter Three describes the methodology of the study. It describes the administration of the QTI, the collection of academic data, the collection of qualitative data and ethical issues faced during the study.

Chapter Four looks at the use of the Questionnaire on Teacher Interaction (QTI) and whether it is a reliable and valid instrument for use in a primary school in New Zealand. It describes what the students' perceptions of teachers' interpersonal behaviours in a New Zealand primary school are and provides a profile for individual classrooms. The effect size for the school-wide assessment data is also presented.

The associations between the students' perceptions of their teacher and the shifts in academic achievement are described in Chapter Five.

Chapter Six concludes this study by presenting the final conclusions drawn from the associations between teacher student interactions and levels of academic achievement.

The next chapter reviews the literature based around the research that has already been done on both; interpersonal interactions between teachers' and their students, and assessment and effective teaching.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

New Zealand is undergoing a monumental shift in education. 'Teachers make the difference' is the catch cry of the moment. There are endless reports in the media not only in New Zealand but across the world and countless pieces of research looking into the teaching profession, education, schools and how to improve the cognitive achievement of students. The question of what makes an effective teacher has been researched, questioned, challenged and debated for well over one hundred years (Borich, 1988; Hattie, 1998; Stronge, Ward, & Grant 2011; Wubbels & Levy, 1993).

In the past, good teachers were those who were believed to be good citizens. Honest, hardworking and well educated (Wubbels & Levy 1993). As the years have passed and times have changed so have the views on education and how people learn. Teaching styles have been investigated, along with personality traits, attitudes and interests. The process of teaching versus the product has also been extensively researched (Borich 1986; Wubbels & Levy, 1993).

For a long time the teacher was held responsible for the learning that took place in the classroom, more recently that focus has shifted to the students. The belief by many is that the student is responsible for the learning that takes place, and the teacher is the deliverer, the inspirer, the motivator. If this is the case, then the interpersonal interactions the teacher has with the students are even more important than previously thought (Fraser, & Walberg, 2005; Hattie, 2009, 2012; Marsh, & Roche, 1997). Collecting the students' thoughts and feelings and correlating them into a useable format that allows a picture to be formulated of what is going on in the classroom on a daily basis is valuable (Marsh, 1984).

Some believe it is only about shifts in academic or cognitive achievement, whilst others, firmly argue that teaching is more than just the learning that is shown in the books or by the marks gained in assessments. Increasingly, schools are coming under pressure to deliver results, to show that the children in their schools are learning. Teachers are expected to be able to do more and more in an ever increasing curriculum. Schools are complex environments and understanding the environment of a school, let alone a classroom is a difficult and multifaceted process. What happens in the classroom is a truly unique and personal experience for all involved. No two people experience things the same, and so finding out what happens in the classroom can be very challenging. All see things differently and outside observers can only make certain judgements. Wubbels and Levy (1993) wrote that, when comparing the perceptions of teachers, students and observers, only the students' and the observers' perceptions agree, whereas teachers often see things quite differently (den Brok, Bergen & Brekelmans, 2006; Fisher & Rickards, 1999; Wubbels, Brekelmans & Hermans, 1987).

2.1 Learning Environment Research

Research into learning environments has been undertaken in varying ways and different tools have been devised in order to gain a true picture of what happens in the classroom from day to day. Research into learning environments began with Lewin in 1936. He looked at the connection between behaviour and the environment and suggested that behaviour is a function of personality and environment (Chard, 2006; Wubbels, Créton, Levy & Hooymayers, 1993). Further research has followed and Rudolph Moos in the 1970s began looking at learning environments and the effect the environment had on students to reach their potential (Brekelmans, Levy, & Rodriquez, 1993; Chard, 2006; Fraser, 1998, 2012; Fraser & Walberg, 2005; Koul & Fisher, 2006; Wubbels & Levy, 1993).

Learning environments influence students, how they learn, what they learn and how well they achieve (Chandra & Fisher, 2006; den Brok, Bergen & Brekelmans, 2006; Saunders & Fisher, 2006). Wang, Haertel and Walberg, (1993) believe that cognitive

and affective outcomes are directly influenced by the learning environment the students are in. The work that has been done by both Walberg and Moos has been instrumental in the development of a variety of learning environment tools. Though there are many tools in existence, they follow similar concepts of design. The instruments use a series of scales and within those scales are particular items that ask the students a series of questions in order to identify the perceptions they have of the teacher, the classroom, and the learning that takes place (Chandra & Fisher, 2006; Fraser 2012; Waxman & Chang, 2006).

The questions posed by this research are whether there are any associations between the interpersonal interactions the students have with their teachers and cognitive achievement. In other words, if the students and teachers form good relationships will the learning in those classrooms be better than those who do not. This research has used the Questionnaire on Teacher Interaction (QTI) to determine the perceptions the students had of the interpersonal interactions with their teachers. The following section discusses the development of the QTI.

2.2 The Leary Model

The Leary Model was developed in 1957 and describes interpersonal behaviours. Leary believed that personality is the centre of interpersonal behaviour and that a person's personality directly influences the way they communicate with others. Leary created a model to measure both normal and abnormal behaviours using the same scale. He believed that if people were around a particular type of behaviour for a length of time they will start to take on that type of behaviour themselves (Wubbels, Créton, Levy & Hooymayers, 1993; Wubbels & Levy, 1993). Leary and his team devised a series of statements which represented different types of interpersonal behaviour. Leary (1957) believed that there were two main forces driving the behaviour of humans; the reduction of fear and the maintaining and upholding of self-esteem. It is these two forces that control behaviour, whether consciously or unconsciously, people need to feel good about themselves and reduce fear. The way people go about communicating this differs for each person,

depending on other influences they have or communication styles they use. Leary believed that people would keep behaving in a particular way if the behaviour enabled the person to do these two things, maintain their self-esteem and avoid anxiety (Woo-Tan, 2008; Wubbels, Créton, Levy & Hooymayers, 1993).

Leary originally developed sixteen categories which were later reduced to eight. The eight categories can be graphically represented on two-dimensions, Proximity and Influence. The Proximity (Cooperation, C – Opposition, O) dimension is used to measure how much cooperation there is between the two people communicating, whilst the Influence (Dominance, D – Submission, S) dimension indicates who is controlling or in charge of the communication (den Brok, Brekelmans, & Wubbels, 2004; Fisher, den Brok & Rickards, 2006; Khine & Lourdusamy, 2006; Wubbels, Créton, Levy & Hooymayers, 1993).

The Leary Model whilst devised for psychotherapy has transferred well into education (Lee, 2010; Waldrip, Fisher, Reene & Dorman, 2008; Wubbels, Créton, Levy & Hooymayers, 1993). One of the most important features of the Leary model, illustrated in Figure 2.1, is that it allows for the fact that communication is constantly changing. Dialogue between two people can change from the one person communicating and controlling the conversation, to the other person who was listening taking over the control - this can all be recorded using Leary's model (Wubbels, Créton, Levy & Hooymayers, 1993).

In an adaptation of the Leary model, Wubbels, Créton, and Hooymayers (1985) tailored the model to be used to map and measure the interpersonal behaviours of teachers. The teacher's behaviour is placed on the system of axes as seen in Figure 2.2.

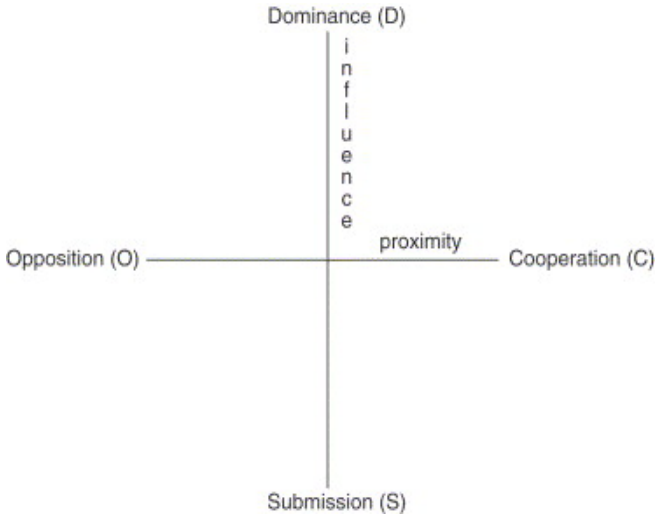


Figure 2.1. The coordinate system of the Leary Model. (Wubbels, Créton, Levy & Hooymayers, 1993).

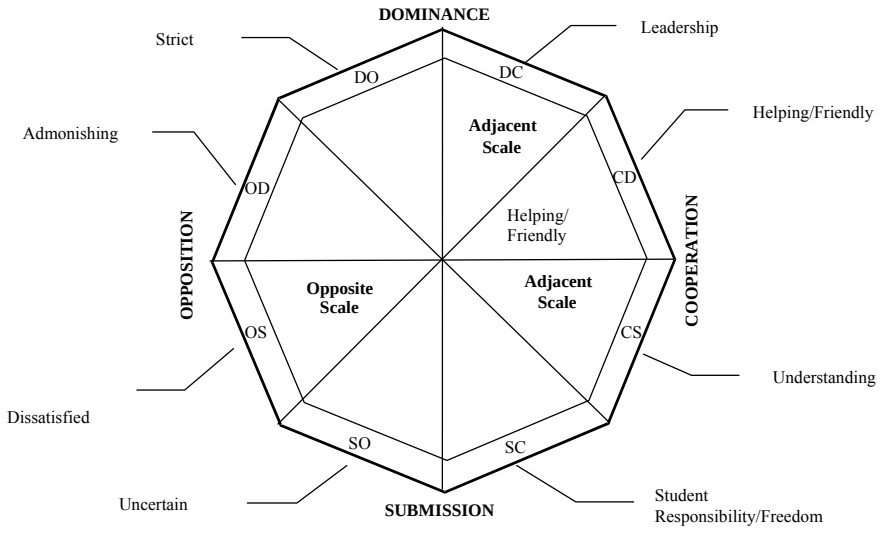


Figure 2.2. The model for interpersonal teacher behaviour (Wubbels & Levy, 1993).

Figure 2.3 shows how the model has been developed for use in the classroom. The model shows the eight types of interpersonal behaviour exhibited by teachers. The model is divided into the eight sectors and these are labelled according to the position they are on the model. This model can be used in a classroom observation

when observing the behaviour of the teacher and the interactions with the students. The sectors are labelled according to the Proximity and Influence dimensions of the axes. A group of coordinates is used to describe the elements of the teacher's behaviour. The coordinates are characterised by the Dominance–Cooperation, Submission-Opposition and are labelled, DC, CD, CS, SC, SO, OS, OD, DO. The DC, and CD sectors are characterised by Dominance and Cooperation and the SO, and OS are characterised by Submission, Opposition and so on. In the sector labelled DC the prevailing aspect is Dominance over Cooperation, whilst in the CD sector the Cooperation predominates over the Dominance aspect (Fisher, den Brok & Rickards, 2006; Wubbels, Créton, Levy & Hooymayers, 1993).

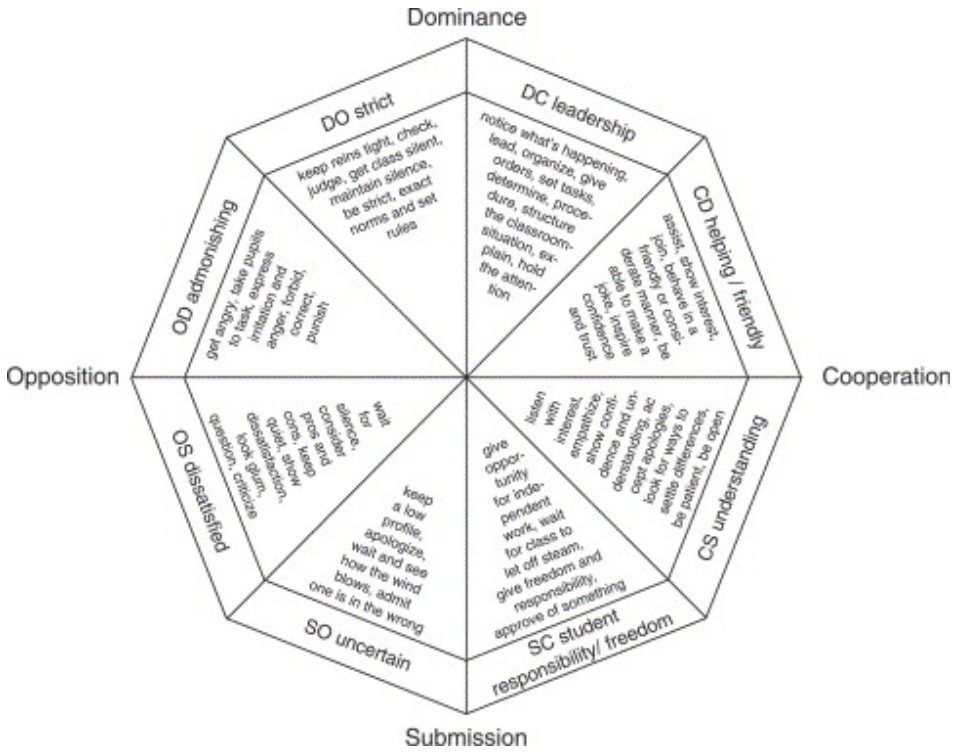


Figure 2.3. Model for interpersonal teacher behaviour (Wubbels, Créton, Levy & Hooymayers, 1993).

The boundaries between these sectors as expected when studying human behaviour are not set in concrete. There is an overlap between adjacent sectors, the closer the sector is to another sector the more closely they represent similar teacher behaviours, while sectors opposite each other reflect opposite behaviours. For example those

teachers who are deemed to be very Strict (DO) are unlikely to allow high levels of Student Responsibility and Freedom (SC) in their class, whereas teachers who are seen to be Helping and Friendly (CD) are likely to also be Understanding (CS) (Wubbels, Créton, Levy & Hooymayers, 1993). The circumplex nature of Leary's model means that each scale should correlate highest with the scale adjacent to it. The further around the circumplex model, the correlations should be lower until the lowest point is reached (highest negative) with the opposite scale.

Whilst Leary's model had been adapted to use in the classroom, the instrument he used to collect the data, the Interpersonal Adjective Checklist (ICL) proved to be difficult to successfully implement with teachers. A group of researchers in the early 1980s developed the Questionnaire on Teacher Interaction (QTI) based on the ICL (Khine & Lourdusamy, 2006; Wubbels, Créton, Levy & Hooymayers, 1993). Originally a Dutch model was developed which was followed by an American model in the late 1980s.

2.3 The Questionnaire on Teacher Interaction (QTI)

Wubbels, Créton, & Hooymayers, (1985) found difficulties using Leary's Interpersonal Adjective Checklist (ICL) with secondary students and teachers. The students found that many of the items Leary used did not apply to teachers, the rating system proved problematic and it consisted of 128 items, which took the students too long to complete. Because of the unique characteristics of the classroom and the relationships between students and teachers Wubbels, Créton, & Hooymayers, decided to adapt Leary's model. They first developed the Dutch Questionnaire on Teacher Interaction (Wubbels & Levy, 1993) in the early 1980s. After four trial runs and some further adaptations to tailor the QTI more specifically for students to answer, the Dutch version was completed.

The QTI is divided into eight sectors which correlate with the eight sectors of Leary's model. The Dutch version has approximately ten items per scale, seventy-seven in total which are answered on a five point Likert scale. The American version

was developed from the Dutch version in the late 1980s and consists of sixty-four items, and uses the same Likert scale (den Brok, Brekelmans, & Wubbels, 2004; Wubbels, Créton, Levy & Hooymayers, 1993).

The Likert scale uses a five point response ranging from 'Never/Not at all' (0) to 'Always/Very' (4). Each items' score within the same sector is added to obtain a total score. The higher the score the more the teacher reflects behaviour from that sector. Scale scores are collected for each student and then compiled to get a mean score for the class, and if required for the school or group of classes being questioned as shown in Table 2.1.

Table 2.1
QTI Mean Scale Score for Teacher 142 (Example)

Scales of QTI	Mean
DC Leadership	3.54
CD Helping/Friendly	3.40
CS Understanding	3.36
SC Student Freedom	1.87
SO Uncertain	0.99
OS Dissatisfied	1.08
OD Admonishing	0.95
DO Strict	1.71

It was important to ensure that the items in a particular scale measured the same aspect of behaviour. These can then be considered homogenous, or to have internal consistency. The internal consistency should generally be above 0.80 at the class level and 0.70 at student level. Another important consideration is that the questionnaire shows student agreement about the behaviour of individual teacher behaviour, to do this Cronbach's alpha (a) is calculated. Brekelmans (1989) determined though testing that the QTI needs to be administered to at least ten students to ensure the data are reliable (Wubbels & Levy, 1993). Intra-class correlations were also conducted to show that there was a difference across the schools compared to the differences within the class.

Once completed each questionnaire gives a set of eight scale scores which are then mapped into a profile. The scale scores equal the sum of all the item scores and are reported between the range of zero and one. If the behaviours in a scale are always or nearly always displayed the scale score will be 'one'. A zero score means that the behaviours in that scale are absent. The profile created is then graphed with the eight sectors shaded based on the scale score. The 'spider web' type graph gives a visual image and comparative tool as illustrated in Figure 2.4. These profiles can then be used with/by teachers to determine how the students perceive the interpersonal interactions/behaviours the teacher has with the students (Fraser 2012; Wubbels, Créton, Levy & Hooymayers, 1993).

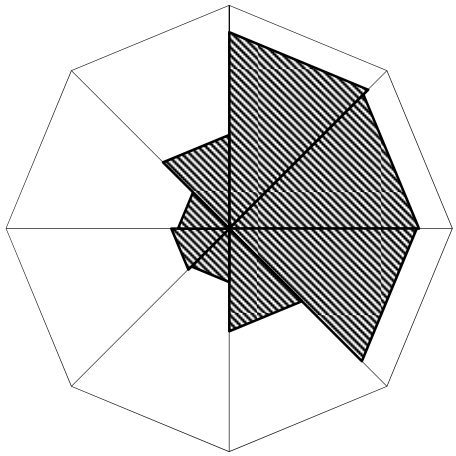


Figure 2.4. Sample teacher profile.

The QTI was developed further in Australia when it was shortened to 48 items and included only six items for each of the eight sectors (Fisher, Fraser & Wubbels, 1993). These were arranged in an easy to use format in blocks of four. In the items numbered one to twenty-four the first item of each block assessed the first sector of the model- Leadership (DC), the second item assessed the second sector Understanding (CS), the third Uncertain (SO), and the fourth Admonishing (OD) behaviours. The second half of the questionnaire, items twenty-five to forty-eight, followed the same pattern. The first item measures Helpful/Friendly (CD), second Student Responsibility/Freedom (SC), third Dissatisfied (OS), and the fourth Strict

(DO) behaviours. This made the questionnaire easy to hand score, the total for a sector being quick to circle and add together (Wubbels, Créton, Levy & Hooymayers, 1993).

2.4 Past Uses of the QTI

Since the QTI was first developed in the Netherlands it has been used in several countries, including the USA, Australia, Singapore, Korea, Brunei Darussalam, Indonesia, and now in New Zealand and has shown both validity and reliability. It has been used in a variety of contexts, whilst first developed for use in secondary schools it has also been used in primary schools, examining a variety of contexts, gender, ethnicities, types of schooling environments and researching the interactions teachers have based on the curriculum that they teach (Fisher, den Brok & Rickards, 2006; Fisher, Fraser & Wubbels, 1993; Fraser, 2012; Khine & Lourdusamy, 2006; Waldrip, Fisher, Reene, & Dorman, 2008).

In 1991 the Dutch and American versions of the QTI were compared by Wubbels and Levy. They found very few differences in the way the students in each country scored the interactions they had with their teachers. Dutch teachers were perceived to give their students more responsibility and freedom whilst the American teachers were perceived to be stricter (Khine & Lourdusamy, 2006; Levy, Créton, & Wubbels, 1993). Wubbels then used the questionnaire in Australia. Perceptions of the teachers' behaviour were compared with the students' best and ideal teacher perceptions. Students think that the best teachers are strong Leaders, more Friendly and Understanding and less Uncertain, Dissatisfied and Admonishing. According to the students perceptions the best teachers also gave them more Responsibility and Freedom. The ideal teacher differs when seen from the students' and the teachers' points of view. Teachers see themselves as more extreme on the scales than the students do. The perceptions of the worst teacher from the students' and teachers' perceptions align more closely to create a similar image (Levy, Créton, & Wubbels, 1993).

2.5 Development of the Typologies of Interpersonal Style of Teachers

Following the research that identified the ideal, best and worst teacher profiles a typology was developed after a study in a large Dutch school (Brekelmans, Levy and Rodriguez, 1993). Using the information collected from the QTI, it was noted that many teacher profiles were characterised by high scores in particular sectors, namely, Leadership (DC), Helpful/Friendly (CD), and Understanding (CS) (Brekelmans, Levy & Rodriguez, 1993). Three further studies were used in the development of the typology, two of these being based in the USA and the third in the Netherlands. Using the data from these studies the Typology of Teacher Communication Style was created (Brekelmans, Levy & Rodriguez, 1993).

The typology identifies eight types of teachers based on the scoring of the different sectors of the QTI and where they lie on the Influence and Proximity axes. These typologies are able to give teachers and researchers pictures of types of teachers and the learning environment they provide in the classroom. Being able to compare teacher profiles with the typologies teachers can use the information for self-reflection and professional development. The typologies are classed from Type One, through to Type Eight and are in order as follows, Directive, Authoritative, Tolerant and Authoritative, Tolerant, Uncertain and Tolerant, Uncertain and Aggressive, Repressive and Drudging, as illustrated in Figure 2.5 (Brekelmans, Levy & Rodriguez, 1993; Khine & Lourdusamy, 2006; Rickards, den Brok & Fisher, 2005). Following the circumplex nature of the model the typologies keep to the rotational pattern, with the characteristics teachers' exhibit being adjacent to each other on the model.

The Directive type is characterised as an organised and efficient teacher. The lessons are structured and task oriented. Usually the Directive teacher dominates most of the discussion in the classroom. These teachers have high standards and are seen as demanding. They call on students who misbehave, can get angry at times and generally have to work hard to keep things running smoothly in the classroom.

Normally the Directive teacher does not get close to the students (Brekelmans, Levy & Rodriguez, 1993).

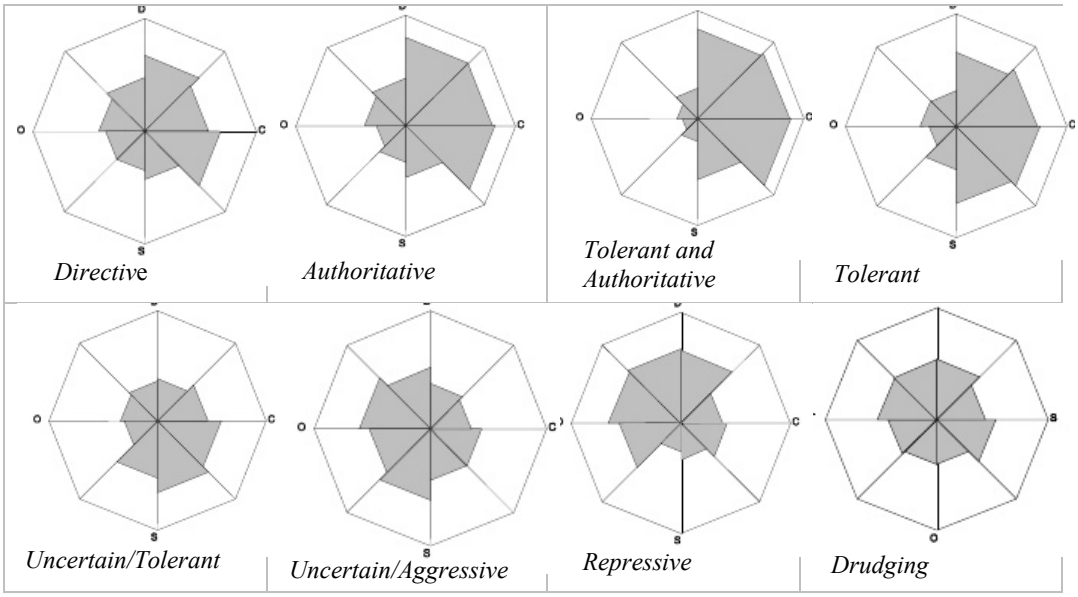


Figure 2.5. Eight typologies of interpersonal styles.

Authoritative teachers have a well-structured and pleasant classroom. They have set rules and procedures and the students in the class are attentive and on task. They produce a higher standard of work than those students in the Directive classroom. Authoritative teachers are enthusiastic, form relationships with the students by being interested in them and taking a pastoral role. They usually teach well planned and structured lessons using a lecture style, though they can use other teaching techniques. The students consider these teachers to be good teachers (Brekelmans, Levy & Rodriguez, 1993).

Type three are the Tolerant and Authoritative teachers. They support student responsibility and freedom in the classroom and use a wide repertoire of teaching methods. Students respond well to the lessons and often work in group situations. The classroom environment is similar to the Authoritative type of teacher; however, the Tolerant and Authoritative teacher develops closer relationships with the

students. The students enjoy being in the classroom and are both highly involved and motivated in their learning. There is little need to enforce rules, and the teacher is able to ignore minor infractions and disruptions, focusing on the learning that is taking place (Brekelmans, Levy & Rodriguez, 1993).

The Tolerant typology, type four differs slightly between the Dutch and the American views. In the Netherlands, the Tolerant teacher is seen as having a pleasant and supportive environment and students enjoy attending the class. They have high levels of freedom and are able to influence the teacher on the curricula in the classroom. The teacher gets personally involved and the students can work at their own pace, according to their preferred learning style, which can lead to the class atmosphere appearing confused at times (Brekelmans, Levy & Rodriguez, 1993).

In the USA, the Tolerant teacher is seen as disorganised. The lessons are unprepared and the students are unchallenged by the teacher. Often the students are left to themselves and spend a lot of time working independently. The teacher expresses an interest in their personal lives but does not inspire the students, and the students do not get feedback about their learning. The American teachers are more dominant than the Dutch of the same typology (Brekelmans, Levy & Rodriguez, 1993).

The fifth typology contains the Uncertain/Tolerant teachers. These teachers are highly cooperative, usually are quite concerned about the class and are willing to explain things repeatedly to students who have not been listening. The teachers show low levels of Leadership and have poorly structured lessons that are not introduced completely. The atmosphere is unstructured, with often only students seated at the front of the room paying attention. The rules and procedures in the classroom are arbitrary, and students don't know what to expect when infractions occur. Sometimes the teacher reacts to certain behaviours and yet at other times ignores them completely (Brekelmans, Levy & Rodriguez, 1993).

The Uncertain Aggressive teacher is typology six. In these classrooms both teachers and students see themselves as opponents and students spend time deliberately

escalating conflict. The teacher often panics to the bad behaviour of the students, which in turn brings about more episodes of inappropriate behaviour in the class. The teacher will often engage in battles with the students and will miss the real culprits of the bad behaviour. The teacher spends most of their time trying to manage the class and learning is the least important aspect in the room (Brekelmans, Levy & Rodriguez, 1993).

The Repressive teacher is type seven. The students in the Repressive teachers' class are uninvolved in the learning. They follow the rules as they are afraid of the teacher being angry. The teacher overreacts to small transgressions and is frequently sarcastic to the students. The lessons are usually structured, but not very well organised. The teacher discourages questions, and the students receive very little help from the teacher. The classroom atmosphere is guarded and unpleasant and the students are apprehensive and fearful of the teacher. The students perceive the teacher as unhappy and impatient (Brekelmans, Levy & Rodriguez, 1993).

The final typology is the Drudging teacher. The Drudging teacher continually struggles to maintain and manage the class, and it takes a large amount of time and energy to get the students to pay attention and be on task. The atmosphere in the classroom varies between the Uncertain/Tolerant and the Uncertain/Aggressive typologies. The students only pay attention when the teacher is actively engaging them. The lessons are oriented to the subject matter and the teacher does most of the talking. The Drudging teacher doesn't experiment with other ways of teaching. The teacher always seems to be going downhill and is often on the brink of burn-out (Brekelmans, Levy & Rodriguez, 1993).

Researchers in Australia then developed an Australian typology which differed slightly from the Dutch typology (Rickards, den Brok, & Fisher, 2005). The Australian typology contained the following types: (1) Tolerant/Authoritative, (2) Authoritative (3) Directive-Authoritative (4) Directive (5) Supportive (6) Flexible (7) Uncertain/Aggressive (Lee, 2010). For the purposes of this study, the Dutch Typology was used to compare the teachers in the New Zealand context.

2.6 Assessment

2.6.1 Changes to New Zealand Education

New Zealand schools are going through a transformational period. A new curriculum was introduced and launched in November 2007, with schools required to bring it into full effect February 2010. Along with the implementation of this new curriculum is the introduction of National Standards. When these factors are combined with shifts in pedagogy, new assessment tools, teaching approaches and digital technology, the way things have traditionally been done in classrooms is changing (Absolum, Flockton, Hattie, Hipkins, & Reid, 2009; Le Fevre, 2010; Levin, 2008; Timperley & Parr, 2010).

National Standards were introduced to schools in 2009 and came into effect in 2010. Schools are now required to report in writing to parents at least twice a year about the progress and level of achievement their child is making in relation to the National Standards. Schools are then required to use the student achievement data to create targets in their school charters from 2011 (Ministry of Education, 2009). This has brought much discussion and debate, not only in the education sector, also in the media and with mums and dads throughout New Zealand.

The National Standards are a means of measuring the progress students are making each year they are at school. They are considered to be reference points that describe the achievement in reading, writing and mathematics that a student in New Zealand needs to meet the demands of the New Zealand Curriculum. They are designed to provide a nationally consistent means for measuring the achievement and progress students have in Years 1 to 8 (Ministry of Education, 2012). The government's belief is that National Standards will improve teacher quality and that teacher quality is the difference in education (Ministry of Education, 2009, Timperley & Parr, 2010; Tolley, 2010).

The New Zealand Curriculum (2007) has placed an emphasis on the method of teaching as a process of inquiry. Schools have had more freedom than ever before to design how and what they teach in New Zealand schools. Schools are charged with designing their own curriculum based on the tenets laid out in the New Zealand Curriculum document. Schools need to consider the context of the particular school and the students within the school. The curriculum needs to be tailored to meet the demands of the students and the quality of teaching needed to address the needs of the students within the school and within the local community (Timperley & Parr, 2010).

A main tenet of the New Zealand Curriculum is the teaching of the key competencies. These are a collection higher order goals that the New Zealand Government sees as being essential capabilities for living and lifelong learning for young New Zealanders. The curriculum document describes the five key competencies; thinking, using language, symbols, and texts, managing self, relating to others, and participating and contributing as the capabilities people need to have, and develop, to live, learn work and contribute as active members of the community both today and in the future (Ministry of Education, 2007). Schools are required to incorporate the key competences into the teaching and learning programmes in the school (Timperley & Parr, 2010). Students are expected to become proficient in these competencies and to be given opportunities for using and learning about these competencies across all areas of the curriculum. The challenge comes for teachers and schools in planning and teaching these and then being able to provide evidence of the effectiveness of the teaching and learning programme (Le Fevre, 2010).

With schools being able to create their own curriculum and with the introduction of National Standards, a few problems arise. The tools used for assessing the Standards are not mandatory. The Ministry of Education (2011) has made no legislative requirements for schools to use any specific assessment tools, therefore, when the standards are compared across schools there is opportunity for a wide range of discrepancy (Hattie, 1998; Timperley & Parr, 2010). Some schools will use standardised assessment tools, whilst others may not. The National Administration Guidelines given by the Ministry of Education require schools to use a range of

assessment practices to collect sufficiently comprehensive information that enable teaching and learning decisions about the achievement and progress of students to be made (Ministry of Education, 2011).

There are six characteristics that the Ministry of Education states effective assessment must follow; it must be beneficial to students, involve the students, support the teaching and learning goals, be planned and communicated, suited to the purpose, and be valid and fair. The wide range of sources that the assessment is gathered from must include at least one norm referenced or externally referenced tool. When these tools are used appropriately, they provide an external reference point that teachers and schools can use to ensure that their judgements and assessment of students are valid and reliable (Dingle & Parr, 2010; Ministry of Education, 2011; Timperley & Parr, 2010).

The Ministry of Education (2007) states that the purpose of assessment is to improve both the teachers' teaching practice, and the students' learning, as a result of that practice. Students and teachers need to use and respond to the information that assessment provides. Assessment for the purpose of improving learning is therefore the driving force of why and how an assessment should be performed within the school and classroom (Absolum, Flockton, Hattie, Hipkins, & Reid, 2009; Dingle & Parr, 2010; Education Review Office, 2007; Timperley & Parr, 2010; Ministry of Education, 2007; Wiliam 2006). The gathering, analysis and interpretation of data and the use of that evidence to provide information about where a student is 'at' in their learning and the progress they have made is considered to be assessment. It is what happens with this information that is important (Absolum, 2009; Ministry of Education, 2007; Robinson, Hohepa & Lloyd, 2009; Lai & McNaughton, 2010; Timperley & Parr, 2010).

"Assessment has become a practice that is fundamental to effective teaching and learning" (Timperley and Parr, 2010, p. 10). For assessment to be truly purposeful the information gathered, analysed and interpreted needs to do more than level a student, the information needs to be used by both the teacher and the student, and in

ideal circumstances the family to determine what the student needs to know and do next to further progress in their learning (Absolum, 2009; Education Review Office, 2007; Ministry of Education, 2007; Robinson, Hohepa & Lloyd, 2009; Timperley, McNaughton, Lai, Hohepa, Parr & Dingle, 2010; Timperley & Parr, 2010; Timperley, Wilson, Barrar & Fung, 2007).

Timperley and Parr (2010) say the other challenge that New Zealand schools are facing is the shift in the understanding, purpose and practice of assessment. The way assessment is used in schools is changing. International and national research has found that the teachers and school leaders who use assessment information to find out what students know and can do, and then use this information to identify what needs to be taught next, show gains in achievement beyond that expected (Absolum 2009; Absolum, Flockton, Hattie, Hipkins, & Reid, 2009; Timperley, McNaughton, Lai, Hohepa, Parr & Dingle, 2010).

Absolum (2009) discusses three key players who have roles in assessment; the student, the teachers, and everyone else. 'Everyone else', includes school leaders, managers, parents, school governors and the Ministry of Education. With assessment information, these key members of the education community can make evidence based decisions about the education of the students in that community. Those decisions need to be made about specific resourcing that needs to occur in the forms of financial, school resources or in assistance that can be provided, to the students, the teachers or to the schools.

Whilst school leaders and teachers are wondering whether the introduction of standards is a good or bad idea, the community are coming to grips with what they are and what the standards mean to them and their children. The complication is that there is no prescribed tool to determine the standards at a particular school. Teachers are making decisions based on their knowledge of the curriculum and the tools of assessment that they are using. There is no guarantee that a child, who is at one particular level for an area of the curriculum at one school, will be assessed to be the same level at another school (Timperley & Parr, 2010).

2.6.2 Standardised Assessments

"Effective assessment is a key component of quality teaching and essential for raising student achievement." (Sewell, 2011. p.2). In order for assessment to be purposeful and impact on the students learning the assessment needs to be valid and reliable (Absolum, Flockton, Hattie, Hipkins, & Reid, 2009; Dingle & Parr, 2010; Gronlund, 2003). For an assessment to be valid, the inferences teachers make need to be appropriate and meaningful, whilst reliability is about the consistency of the assessment results. The assessment needs to reflect accurately what the student can do and what the student needs to be able to do again if given a similar assessment. The assessment results need to be able to be trusted across a range of students; within a class, across a school or across a range of schools. Teachers, students, parents and the government need to be able to trust that the data about that child is comparable to data for another child (Gronlund, 2003; Ministry of Education, 2009; Timperley & Parr, 2010).

There is a vast range of assessment tools and types of assessment available to the classroom teacher in New Zealand. Some are designed specifically by the teacher and the students in the particular classroom or are designed by teachers within the school. Others are classed as standardised achievement tests. For this research standardised achievement tests were used.

Schools have used a range of standardised achievement tests in a formative and summative capacity. Testing is carried out on a school wide basis at the start and end of each year. This information, whilst giving the teacher and the students in the classroom practical information about what the student can do, what they cannot do and the gaps they may have that they should be able to do, also provides the school with data that it can use to analyse and set goals and targets for the students and teachers within the school (Absolum, Flockton, Hattie, Hipkins, & Reid, 2009). The method of interpreting the performance of the students is known as norm referenced interpretation, and can be used to give a ranking of the students, whereas, criterion referenced interpretation is the learning tasks the student can or cannot do, the

understanding of the skills and knowledge that the student can demonstrate (Gronlund, 2003; Timperley & Parr, 2010).

The standardised achievement tests available to use in New Zealand schools have primarily been norm referenced assessments, which enables schools to make a comparison of how students or the school is doing against other schools in New Zealand. The assessments used also include some criterion referenced interpretations as well so that teachers can make judgements about what the students can and cannot do. In a norm referenced assessment the student receives a score which is called the raw score. That score is then converted to a type of derived score. This means that tests that have a different number of items or difficulty can be compared against each other (Gronlund, 2003; Ministry of Education, 2009). The standardised achievement tests; asTTle, STAR and PAT that were used in the research are examined in Chapter Three.

The measuring of the level of achievement of students and how their achievement relates to other students is important. Standardised tests allow teachers to make comparisons to see whether they have accelerated the pace of progress over time. It is important that schools use the same or a parallel measure when comparing progress at two different times of the year; for example, at the start and end of the year. Tests need to be administered appropriately and consistently in order for the information provided from the tests to be considered both valid and reliable (Dingle & Parr, 2010; Gronlund, 2003).

Measuring progress of achievement can be as simple as calculating the difference between the two scores; the start of year, and end of year. Dingle & Parr (2010) warn that for the information to be useful to teachers, teachers need to know how much progress is normally expected. The progress that the student is expected to make normally in the course of the year or through maturation of the student.

Standardised testing allows rates of progress to be tracked in two ways. They provide a raw score that can be calculated to determine if the student has made progress over time and a standardised measure, such as stanines. Stanines are a comparison

between a student's achievement and the achievement of that student's peers. If the student remains in the same stanine band they have continued to have the same achievement progress relative to their peer students. Therefore, if a student progresses to a new stanine level they have made further than expected progress comparative to their peers (Dingle & Parr, 2010; Elley, 2008; Timperley & Parr, 2010).

2.7 Effect Size

To measure the change of achievement over a range of different tests a different type of measure is needed. To compare different subjects; for example maths and reading, schools need to use another tool to measure progress. Effect size is a way to calculate and compare rates of progress across different types of assessment tools and areas of the curriculum (Dingle & Parr, 2010; Hattie, 2009; Schagen, 2011; Schagen & Hogden, 2009; Timperley & Parr, 2010; Timperley, Wilson, Barrar & Fung, 2007). Dingle and Parr (2010) describe effect size "as an index that measures the strength of the association between one variable and another; for example, between student achievement and an intervention." (p. 149). Cohen's *d* is the most commonly used effect size measure and compares the means between two groups. An effect size of *d* = 1.0 means that there has been an increase of one standard deviation on the outcome (Dingle & Parr, 2010; Hattie, 2009; Timperley & Parr, 2010; Timperley, Wilson, Barrar & Fung, 2007). Hattie (2009) states that the increase of one standard achievement is usually associated with two to three years expected advancement of learning. Cohen defines the effect size; small, medium, and large as; 0.20, 0.50 and 0.80, respectively (Dingle & Parr, 2010; Hattie, 2009). Hattie (2009) describes effect sizes as *d* = 0.2 for small, 0.4 for medium and 0.6 as large, when judging educational outcomes.

Hattie (2012) has analysed more than 800 meta-analyses of 50,000 research articles, 150,000 effect sizes, which included 240 million students. Hattie (2009) sets the bar for achievement at 0.40. This is considered to be an average achievement and should be used as a benchmark in education to determine the effect an intervention has on

the learning. Hattie (2009) contends that effect sizes lower than 0.40 need investigation, whilst those higher than 0.40 are definitely worth having. The effect size of 0.40 is described as the hinge-point or h-point and is the indicator for identifying what is and what is not effective (Hattie, 2009, 2012). Teachers typically average an effect size of between 0.20 and 0.40 across the year. The National Assessment of Educational Progress (NAEP, Johnson & Zwick, 1990 cited in Hattie (2009) investigated the progress students made and found the average effect size across six subject areas was $d = 0.24$.

Half of the influences on achievement that Hattie (2012) analysed in his meta-analyses are above the 0.40 hinge-point. In other words half of what teachers do to students has an effect that is greater than 0.40. This average point of 0.40 is an achievable and realistic effect to have, not something that is aspirational or idealistic. There is data to support that students in lower grades achieve a higher effect size than students in higher grades, both here in New Zealand and in the USA where research has been done (Hattie, 2009, 2012).

Once teachers are able to understand the effect they are having on the learning or achievement for their students they are more able to evaluate what they are doing. Is what they are doing making enough of a difference? Opportunities arise for teachers to talk about what works and what doesn't. Professional learning opportunities, modelling and observations of other teachers' teaching who are having greater effect size shifts can be arranged. School leaders can make decisions about what support teachers in their schools might need. Comparing effect sizes for a teacher that show one area of learning having lower effect sizes than others might be an indicator for professional development in that area. Knowing the effect a teacher has enables teachers and schools to intervene in calculated and meaningful ways (Dingle & Parr, 2010; Hattie, 2009, 2012; Timperley, McNaughton, Lai, Hohepa, Parr & Dingle, 2010; Timperley, Wilson, Barrar & Fung, 2007; Schagen & Hogden, 2009). To be an effective teacher, teachers must know the influence they have on the educational outcomes for the student (Hattie, 2012).

2.8 Effective Teachers

> I‘ve come to a frightening conclusion that I am the decisive element in the classroom. It’s my personal approach that creates the climate. It’s my daily mood that makes the weather. As a teacher, I have a tremendous power to make a child’s life miserable or joyous. I can be a tool of torture or an instrument of inspiration. I can humiliate or humour, hurt or heal. In all situations, it is my response that decides whether a crisis will be escalated or de-escalated and a child humanized or de-humanized. (Ginott, 1972, p. 130)

The teacher has a powerful role in the classroom that at times, when caught up with the day-to-day business of teaching, can be forgotten. Learning is driven by what the teacher and the students do in the classroom. Teachers have to manage complicated social, personal and emotional relationships across a group of students in order to help them learn and achieve in their classroom. Deciding what makes a teacher effective or an expert is a complex phenomenon and there is much debate on how to measure teacher effectiveness (Absolum, 2009; Black & Wiliam, 1998; Lewis, Parsad, Carey, Bartfai, Farris, & Smerdon, 1999; Stronge, Ward & Grant, 2011; Timperley, McNaughton, Lai, Hohepa, Parr & Dingle, 2010).

Teachers need to understand how their students are progressing, and what difficulties they face in order to change the teaching in the classroom to meet the needs of the students (Black & Wiliam, 1998; Timperley, McNaughton, Lai, Hohepa, Parr & Dingle, 2010). Often these needs vary from student to student and from day to day. Black & Wiliam (1998) outline several factors they see as important for teachers to do in the classroom. The quality of the student teacher interactions, the stimulus for the learning and the help students receive to take responsibility for their own learning and the development of the capability to become life-long learners. Teachers need to give students opportunities to express their understanding.

Students need to be able to discuss and talk about their understanding. This provides teachers the opportunity to respond and guide the students’ thinking. Discussion and

dialogue between teachers and students needs to be thoughtful and focussed and all students need an opportunity to think about and express their ideas. The learning students do and the assessment tasks they undertake need to be relevant to the learning aims set. Then the feedback that the students receive needs to give them guidance on how they are to improve and the students need an opportunity to work at that improvement (Black & Wiliam, 1998).

The New Zealand Curriculum (2007) states that effective pedagogy is the teacher actions that promote student learning. The teaching approaches recommended that have positive impacts on student learning are when teachers:

- create a supportive learning environment;
- encourage reflective thinking and action;
- make new learning relevant;
- facilitate shared learning;
- make connections for the students to prior learning and experiences;
- provide sufficient opportunities to learn; and
- inquire into the teaching and learning relationship.

The difference between teachers and effective teachers is that effective teachers are aware of the effects they have in the classroom. They understand the day to day things happening in the classroom and make decisions and changes to their practice accordingly (Hattie, 2009, 2012, Gurney, 2007; Parr 2010).

Gurney (2007) outlines five factors for effective teaching. These are: 1) Teacher knowledge, 2) Classroom activities that encourage learning, 3) Assessment activities that encourage learning through experience, 4) Effective feedback that establishes the learning process in the classroom, and, 5) Effective interaction between the teacher and the students which creates an environment that respects, encourages, and stimulates learning through experience (Gurney, 2007, p.91).

To be effective, a teacher needs to engage with the students in a class that provides a culture of mutual respect and acknowledgement and shows that learning is at the forefront. Teaching is a caring exercise and learning is an emotional one (Eisner, 2002). Students get engaged in the learning process when they are engaged emotionally. If the teacher can bring the students a sense of personal involvement, so the students feel that the teacher is sharing a part of themselves, and that they too are a part of the learning in the classroom, the students will feel more involved in the learning process (Gurney 2007).

Effective teaching and the factors that determine effective teaching have been researched for decades (Stronge, Ward, & Grant, 201l). Debate has centred on whether teacher effectiveness should be based on the teaching process, (the how the teaching is done), the product of the learning, (the effects of the learning) or the qualifications and knowledge the teacher has, or a composite of these. Four elements of effective teachers were identified by Stronge et al. (2011). The first two related to the teaching practice and the use of assessment for the student and the last two related to a positive learning environment and the personal qualities of the teacher. Teachers who give direct instruction and can give the students a connection between the curriculum and the student themselves.

Effective teachers use a variety of instructional techniques. They focus on the learning and give students opportunities to use critical thinking skills to be successful. Effective teachers maximise the learning time in the classroom and focus on the teaching rather than classroom management. They can clearly explain to the students the content and the instructions for the tasks of learning. Effective teachers recognise when things are complex and can focus on conceptualisation of knowledge rather than isolated facts. Expectations for student learning, complex and basic skills and the expectation for students to complete work are significant indicators of student achievement (Stronge Ward, & Grant, 201l).

Effective teachers use technology to support both the teaching and the learning in the classroom. Students were found to make greater gains in achievement when students

had access to technology, and when this is used to teach higher order thinking skills. Effective teachers use assessment to monitor student learning both informally and formally and provide students with meaningful feedback. Effective teachers' check in with the students during the learning process for understanding and adjust the instruction accordingly (Absolum, 2009; Black & Wiliam, 1998; Good & Brophy, 2003, Hattie, 2009; Stronge Ward, & Grant, 2011).

The learning environment that the teacher provides is important. Effective teachers maintain a positive and warm learning environment, students know and follow the routines and take ownership for their learning. Classroom management is based on respect, fairness and trust. A positive learning environment is fostered and maintained by the clear setting of expectations, not only at the beginning but throughout the school year. The effective teacher considers the social, personal and academic needs of the students. Effective teachers show that they care about their students, they establish connections with their students and the students feel able to talk to the teacher. Students are encouraged to take responsibility for themselves, and teachers are reflective practitioners (Fraser, 1998, 2012; Stronge, Ward, & Grant, 2011).

Quality teaching and quality learning through the quality of the learning environment generated by the teacher and the students is the key variable in explaining up to 59% or higher of the variance in students' achievement (Alton-Lee, 2003). Alton-Lee (2003) outlines ten characteristics of quality teaching.

1. Quality teaching has a central focus on raising student achievement for diverse learners.
2. Pedagogical practices enable classes and other learning groupings to work as caring, inclusive and cohesive learning communities.
3. Effective links are created between school and other cultural contexts in which students are socialised to facilitate learning.
4. Teaching is responsive to student learning processes.
5. Opportunity to learn is effective and sufficient.

6. Multiple task contexts support learning cycles.
7. Curriculum goals, resources including ICT usage, task design and teaching are effectively aligned.
8. Pedagogy scaffolds and provides appropriate feedback on students' task engagement.
9. Pedagogy promotes thoughtful learning orientations, student self-regulation, metacognitive strategies and thoughtful student discourse.
10. Teachers and students engage constructively in goal-oriented assessment. (Alton-Lee, 2003, p.89-92)

Strong, Silver and Robinson (1995) outline four characteristics of student engagement that Gurney (2007) has adapted to apply to effective teaching more succinctly. They use the acronym SCORE. The four essential goals developed by Strong, Silver and Robinson (1995) that people who are engaged in their work have, are (S) Success- the need for mastery, (C) Curiosity- the need for understanding, (O) Originality- the need for self-expression, (R) Relationships- the need for involvement with others. Under the right classroom conditions and at the right level for each student these build the motivation and (E) Energy-that is essential for a complete and productive life.

Gurney (2007) has adapted this model to apply to teachers. He suggests that it is teachers who first need to bring the passion for teaching to the subject, and take responsibility for the creation of an environment that allows for the sharing and enjoyment of that knowledge, to create an effective learning climate.

S: The Success of mastery of the subject that you teach.

C: The Curiosity that every teacher should have entrenched in their teaching. A teacher who is not curious has lost a critical portion of the passion for learning.

O: Originality – a teacher who is passionate about the teaching process will be creative; will be constantly seeking new ways of engaging and challenging students.

R: Relationships are central to the effective classroom and teachers are crucial in the nurturing of opportunities for students to engage with subjects that at senior levels can lead to a life-long interaction with the subject.

E: To maintain this process the teacher needs Energy. This is something that schools do not always provide, and teachers in general need the time to reflect; to re-energise and to regenerate their focus on the learning process. It is an essential ingredient in the effective classroom that is too often ignored. (adapted SCORE acronym, Gurney 2007, p.19)

When students first enter a classroom, they are making judgements about the teacher. The climate the teacher creates, the learning that takes place, and the way the teacher interacts with the students. As the year progresses the perceptions consolidate in to a 'kind' of teacher they have (Waldrip, Fisher, Reene, & Dorman, 2008).

Other research has focused on two dimensions of teacher effectiveness. The level of knowledge and skills the teacher has and the classroom practices they use (Lewis, Parsad, Carey, Bartfai, Farris & Smerdon 1999).

The Effective Teaching Profile as outlined in Te Kotahitanga consists of six elements for effective teachers. The project was undertaken to investigate how to improve the educational achievement of Māori students in mainstream secondary school classrooms in New Zealand (Bishop, Berryman, Cavanagh, & Teddy, 2007).

1. *Manaakitanga*- teachers care for their students as culturally located human beings above all else.
2. *Mana motuhake*– teachers care for the performance of their students.

3. *Nga whakapiringatanga*– teachers are able to create a secure, well-managed learning environment.
4. *Wananga* –teachers are able to engage in effective teaching interactions with Māori students as Māori.
5. *Ako* –teachers can use strategies that promote effective teaching interactions and relationships with their learners.
6. *Kotahitanga* –teachers promote, monitor and reflect on outcomes that in turn lead to improvements in educational achievement for Māori students. (p. 36)

All these research studies have made lists of principles and qualities of effective teaching easily available. In *Clarity in the Classroom*, Absolum (2009) cites a list of core principles for effective teaching taken from the Department of Education and Skills, (2004). Effective teachers develop:

- high expectations that give learners confidence to succeed;
- establish what learners already know and build on it;
- structure and pace the learning to make it both challenging and enjoyable;
- inspire learning through a passion for the subject;
- make individual learners active partners in their learning; and
- develop learning skills in the learners. (Absolum, 2009, p. 15-20).

Following the research that Absolum (2009) has undertaken he has developed *The Archway of Teaching and Learning Capabilities*. He argues that teaching is about relationship management and teachers need to know how to ensure that the relationships that they have every day in the classroom are conducive to learning. In order for learning to take place, students need to have a quality relationship with the teacher in classroom (Absolum, 2009). He uses a stone archway as a metaphor for six capabilities needed in teaching and learning. These are:

1) Building a learning-focused relationship- the quality of the relationship between the teacher and the students is the foundation to all learning in the classroom. The teacher needs to be a motivator, and be able to foster and build a learning focused relationship with the students.

2) Clarity about what is to be learnt- without this keystone to the arch Absolum states that the arch will collapse. Unless both the teacher and the students are clear about what it is that is to be learnt, why and how it is to be learnt then the teaching and learning will collapse.

3) Assessment for learning- this is about the understandings and strategies both students and teachers need in order to:
    a. involve students in the assessment of their learning;
    b. gathering of information that is dependable about the status of the learning;
    c. share the information and be able to adapt the current learning and co-construct the next steps for the current learning;
    d. interpret and evaluate the information for individuals and the groups of students so that decisions about the next learning steps can be made;
    e. know how to build students' self and peer-assessment strategies; and
    f. contribute evidence to partnerships of learning- (parents, colleagues, boards etc.)

4) Promoting further learning- the strategies and techniques used to close the gap between what the student knows now and the current goal for learning. Absolum lists five strategies that promote further learning;
    a. explanation
    b. feedback
    c. learning conversation
    d. reinforcement
    e. feedforward

5) Active reflection

6) Clarity about the next learning steps (Absolum, 2009, p. 22-24)

Students who rated their learning environment positively had higher shifts in achievement than those students who rated their learning environment poorly. The perceptions the students had about their learning environment affected their performance (Hattie 1987). Hattie (2003) argues that it is what teachers know, do, and care about, which makes them so powerful in the classroom and in the learning that goes on in that classroom. The single most important factor is to improve the effectiveness of teachers if we want to improve the education and achievement of students. Teachers have the second largest amount of variance on student achievement as seen in Figure 2.6. Teachers can and usually do have positive effects, but they must have exceptional effects. Raising student achievement is through having higher quality teaching and higher expectations for students (Hattie, 2003).

Hattie (2009) contends that not all teachers make the difference. Not all teachers are effective, nor are they all experts or able to have powerful effects on students. This is what is meant by the variance of teachers. He further states that all teachers have an effect, but it is important to know what effect they have and how they influence the student achievement.

Hattie (2012) maintains that when both the teaching and the learning in the classroom is visible, there is a greater likelihood of students reaching higher levels of achievement. Teachers who are able to make the learning visible are accomplished as both evaluators and activators. They know and use a range of learning strategies that build the students surface knowledge and deep knowledge and understanding, and conceptual understanding. The teacher is able to use feedback effectively and allows the learning to take place. They know when to step in and out of the learning process, when to give the students time and when to give support. Visible learning provides a challenging learning environment and there is a balance between the challenges given and the amount of feedback required. The more challenging a situation, the more feedback is given.

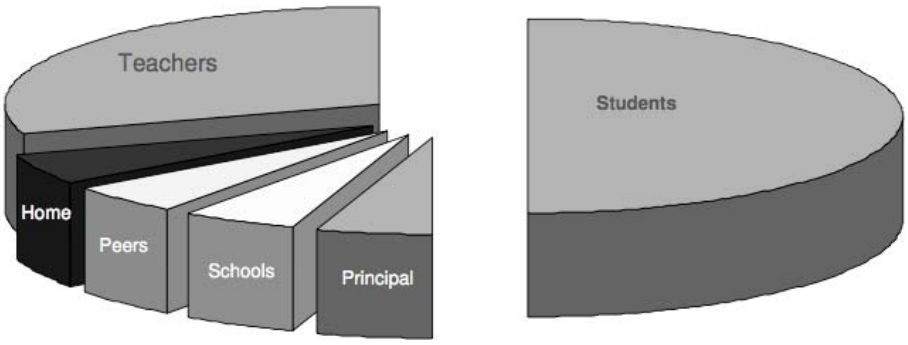


Figure 2.6. Percentage of achievement variance, students, teachers, home, peers, schools, principals. (source, Hattie, 2003, p. 3)

Hattie (2009) claims that not all teachers make the difference, but it is some teachers with certain mind frames that make the difference. Six signposts towards excellence in education were identified in Visible Learning (2009).

1. Teachers are among the most powerful influences in learning.
2. Teachers need to be directive, influential, caring, and actively and passionately engaged in the process of teaching and learning.
3. Teachers need to be aware of what each and every student in their class is thinking, and what they know, be able to construct meaning and meaningful experiences in light of this knowledge, and have proficient knowledge and understanding of their subject content to provide meaningful and appropriate feedback
4. Teachers and students need to know the learning intentions and the criteria for success, know how well they are doing and where they need to go next.
5. Teachers need to be able to move from single ideas to multiple ideas, to relate and extend these ideas so learners can construct, and reconstruct, knowledge and ideas.
6. School leaders and teachers need to create schools, staffrooms, and classroom environments in which error is welcomed as a learning opportunity, incorrect knowledge can be discarded, understanding is

> welcomed, and teachers can feel safe to learn, re-learn, and explore knowledge and understanding. (Hattie, 2012, p.18-19)

Hattie (2012) is not recommending a new way of teaching or a professional development programme for teachers. He challenges teachers to be reflective, about the impact they have on the students that they teach. Teachers need to evaluate what it is they do and how those things affect the achievement and the learning for the students that they teach. Teachers need to know what impact they have, understand that impact, and then act on what they know and understand. Hattie (2012) further outlines seven characteristics for powerful, passionate and accomplished teachers. They are teachers who:

- focus on students' cognitive engagement with the content of what it is that is being taught;
- focus on developing a way of thinking and reasoning that emphasizes problem-solving and teaching strategies relating to the content that they wish students to learn;
- focus on imparting new knowledge and understanding, and then monitor how students gain fluency and appreciation in this new knowledge;
- focus on providing feedback in an appropriate and timely manner to help students to attain the worthwhile goals of the lesson;
- seek feedback about their effect on the progress and proficiency of *all* of their students;
- have deep understanding about how we learn; and
- focus on seeing learning through the eyes of the students, appreciating their fits and starts in learning, and their often non-linear progressions to the goals. Supporting their deliberate practice, providing feedback about their errors and misdirection, and caring that the students get to the goals and that the students share the teachers' passion for the material being learnt (Hattie, 2012, pp. 19-20).

2.9 Conclusions

Ginott (1972) is right: teachers have a powerful ability to make or break the classroom. It is the way they interact with students on a daily basis that affects the learning and the learning environment of the students on whom they have a tremendous influence. Students respond to their environment, if the environment is warm and welcoming the students will feel safe to take risks and try challenges. If the classroom is a place where the students feel able to discuss their learning, the things they do and don't know, then learning will occur. It is up to the teacher to create the learning environment. No one else can do it for them.

The QTI is a tool that teachers and school leaders can use to find out what it is that teachers are doing in the classroom. It is a way of providing a snapshot of the learning environment, the interpersonal relationships the teacher has with the students and gives teachers something to work with. It is a way to measure the characteristics that make a difference to the learning in the classroom.

Assessment is a valuable and essential part of the learning and teaching process. With the changes in curriculum and the introduction of National Standards, assessment needs to be valid and reliable if it is to be used to measure the achievement of the students and in doing so the performance of the teacher. By using standardised assessment, students, teachers, families and school leaders can be assured that the data they are reporting is valid and reliable. It is then what teachers and schools do with this information and how this impacts on the actual day to day teaching and learning in the classroom and the drive to make both the teachers and learning better (Dingle & Parr, 2010; Hattie, 2009).

There are endless lists and research that detail how to make teachers more effective. These cover the characteristics, practices and personality traits of effective teachers. The challenge comes about when teachers put all these factors into practice. Most teachers can cite a list of what they think the most important qualities a teacher needs

to have to effective. I don't believe any teacher sets out to be a bad, poor or even a mediocre teacher. The challenge comes for school leaders; leaders of learning to recognise those teachers that are not making the difference to the learning in the classrooms and make decisions about what to do to enhance the teaching and learning in those classrooms. Leaders also need to be able to recognise in whose classrooms the students are making more than expected shifts in achievement and work out what it is that they do differently.

Teachers need to help teachers. Teachers need to want to do better every day, to evaluate where they are at, how they are doing and how they can improve on those things so that they make the best possible learning experiences and achievements for the students in their classrooms. As Hattie (2012) says 'Teachers need to know thy impact', because it is only by knowing that, that teachers will make the difference.

2.10 Summary

This chapter focused on three main areas of research to assist in answering the questions posed in this research. First, the development and use of the Questionnaire on Teacher interaction was investigated. Secondly, the use of assessment and the changes New Zealand education sector is undergoing, with the introduction of National Standards, followed by the use of standardized assessments and effect size to determine the effects teachers have on the achievement of student learning. Lastly the characteristics of effective teachers were explored.

The following chapter describes the research methods utilised in the study. The QTI was used to collect the perceptions the students had of the interpersonal interactions they had with their teachers. Assessment data were collected from the school-wide testing programme and analysed to see the effect size each teacher had for their students across reading, writing and mathematics.

CHAPTER 3

METHODOLOGY

3.0 Methodology Overview

This study looks at the interpersonal interactions between teachers and their students and relates these to levels of student achievement. For teaching to be seen as effective, and therefore the teacher to be recognised as an effective practitioner, there should be an improvement in the levels of achievement of the students.

This is one of the first studies in a New Zealand primary school that examines teacher-student interactions using the Questionnaire on Teacher Interaction (QTI) and its associations with academic levels of assessment. The Questionnaire on Teacher Interaction was the primary data gathering tool. The researcher is employed at the school and decided that the use of the QTI was the best instrument for this particular research project. This chapter describes the research methods employed in this study. It describes the administration of the QTI, the collection of academic data, the collection of qualitative and quantitative data and ethical issues faced during the study.

The overall aim of the study was to identify the interpersonal interactions that students have with their teachers in a New Zealand primary school, how this relates to the level of student achievement and thus to be able to identify which interpersonal attributes have greatest impact on the students' levels of achievement.

In order to achieve the aim as described, the research sought to answer a number of questions. Since this is the first time that the QTI has been used in a New Zealand primary school the QTI needs to be validated and its reliability checked.

This leads to the first research question.

> Research Question 1:
> Is the Questionnaire on Teacher Interaction (QTI) a reliable and valid instrument for use in a primary classroom in New Zealand?

The QTI has been used in numerous research studies for a number of years. Research that began in the Netherlands focused on the nature and quality of interpersonal relationships between teachers and students (Wubbels & Brekelmans, 1998; Wubbels & Levy, 1993). Since then numerous research studies have been conducted across the world, including Australia, USA and Singapore, using the QTI involving varying levels and ages of students (den Brok, Brekelmans, & Wubbels, 2004; Fisher, den Brok & Rickards, 2006; Fisher, Fraser, & Cresswell, 1995; Khine & Lourdusamy, 2006; Koul, & Fisher, 2006; Rickards, den Brok, & Fisher, 2005; Waldrip & Fisher 2003). These have investigated the associations between the interpersonal interactions of the teachers as perceived by the students. Most of this research has been conducted with high school students, so this study which involves students between the ages of 10-13 years in a New Zealand primary school is significant. Therefore, the next two research questions are:

> Research Question 2:
> What are the students' perceptions of teachers' interpersonal behaviours in a New Zealand primary school?

> Research Question 3:
> What are the Questionnaire on Teacher Interaction (QTI) profiles of different classrooms in a primary school in New Zealand?

Fisher, Fraser, and Cresswell (1995) noted that an important aspect of the learning environment is the interpersonal behaviour of the teacher and student and this has an impact on student outcomes. Hattie (2009) discusses the need for teachers to be challenged in their day-to-day practice. Traditionally, teachers have been left to their

own devices in their classrooms, leaving the teaching, and therefore the learning, to each individual teacher.

In New Zealand there is an increased demand for teachers to be effective. This led the researcher to the main aim of this research; - Do teacher student interactions affect levels of student achievement? Can the way the teacher interacts with the students affect the levels of assessment for those students? Increasingly, academic achievement is becoming more important and more widely reported to the public, parents and Ministry of Education as an essential factor in the rating of schools and the teachers within those schools. Also, in New Zealand with the introduction of National Standards, schools, teachers, parents and students are scrutinising academic achievement more closely. This research looks to see if there is a way that teachers can help their students raise levels of academic achievement by just being better people within the classroom?

These thoughts led to the next questions in the study:

Research Question 4:
Are there any associations between the students' perception of their teachers' interpersonal behaviour and their achievement in reading?

Research Question 5:
Are there any associations between the students' perception of their teachers' interpersonal behaviour and their achievement in writing?

Research Question 6:
Are there any associations between the students' perception of their teachers' interpersonal behaviour and their achievement in mathematics?

Research Question 7:
Are there significant gains in students' levels of reading, writing and

mathematics in Grades 7 & 8, and how are those gains distributed amongst the classes?

3.1 Quantitative Methods

The Questionnaire on Teacher Interaction (QTI) was the primary data gathering tool used to collect the students' perceptions of their teachers. The QTI was designed to assess the interpersonal behaviour of teachers and the interactions they have with the students they are teaching. The QTI was chosen for my study as I wanted to determine how the students perceived the personal interactions that they had with their teachers. One of my roles within the school was to collate and analyse student assessment data. Whilst doing this I noted over a couple of years that certain teachers had little or no significant shift in the academic achievement of their students. These appeared to be the same teachers that students were often heard discussing negatively. Students' perceptions of a teacher do affect the way the students work within a classroom (Waldrip, Fisher, Reene, & Dorman, 2008; Wubbels, & Brekelmans, 1998). I wanted to see if there was a correlation between the negative vibe around particular teachers and the lower achievement gains some classes were having.

The QTI was initially completed by all students within the school during class time in 2009. The QTI was given to the students by the same person to ensure consistency and validity in the information the students were given. A further QTI was given to a class of 31 students in 2010, following the analysis of the sector profiles and the difficulties one teacher was having with the class. The 48-item questionnaire was chosen because it was convenient and is easily presented and administered to students of this age (Khine & Lourdusamy, 2006). The students completed only the actual form of the QTI. It was decided that there already had been numerous studies that have identified the preferred teacher.

Assessing what students can do at the start of the year is an important factor in the setting up of the class. Knowing what students can and cannot do, enables the teacher to plan appropriately for the learning those students need in order to make progress. Consequently, assessing students at the end of the year is an important measure of the progress the students make (Dingle & Parr, 2010; Timperley & Parr, 2010). Assessment data were collected at the beginning and end of year as part of the normal school assessment procedures. Student data were collected from all students in the school. Testing was undertaken at the beginning and end of the school year. The assessments the students did were in both literacy and mathematics. The assessments used were the Assessment Tools for Teaching and Learning (asTTle), which assesses both reading and writing in separate tests, the Supplementary Tests of Achievement in Reading (STAR), assessing reading, and the Progressive Achievement Tests, Mathematics (PAT), which assesses student achievement in mathematics.

3.2 Qualitative Methods

The qualitative data collected involved notes from observations and discussions within the school and in the classrooms. Seven teachers were identified for further study based on the initial analysis of the QTI and of the researcher's knowledge within the school. This included feedback from students and parents about the teachers and the knowledge of the academic progress that the teachers historically had in their classrooms.

Qualitative data were collected from the teachers using individual and small group interviews and discussions. Teachers were interviewed at times that were convenient to them, these included before and after school and during break times within the school day. The formal interviews and discussions were held as soon as possible after the administration of the QTI. Teachers were invited to participate in the study and given the option that they could withdraw from the study or interview at any time. Other discussions were held with the teachers on an informal basis during the year; privately, in groups, and at staff meetings. The information obtained from

teachers that was pertinent to the study was recorded at the time and then transcribed onto a Microsoft Word document. The data collected from teachers formally and informally were collated on a Microsoft Word document. This information was kept until the end of the year and analysed along with the quantitative data.

The final selection of teachers chosen for the cases studies was not made until the year following the administration of the QTI and was dependent on the analysis of quantitative and the qualitative data collected. At the end of the year following the administration of the QTI, the assessment data for the start and end of year were collected and imported from the school's Student Management System into Microsoft Excel. Effect sizes were then calculated and graphed for each assessment type and for each teacher. Once this was completed, the information from all three sources; the quantitative data; the QTI, the assessment data, and the qualitative data; from observations and conversations with teachers were analysed.

Teachers were selected for individual case studies based on this analysis. Initially, the intention was to select four teachers for individual case study with high or low sector profiles to compare them to their effect sizes. However, once the data were analysed an interesting picture emerged, showing teachers with low sector profiles and low effect sizes, high sector profiles and high effect sizes and teachers who had contrasting information. It was decided after close analysis of the information and data available, to select seven teachers for individual case studies that showed a range across the school in both sector profile and effect size.

Through discussions with one of these seven teachers following the implementation of the QTI, a QTI was given a second time to his/her class the following year. This class was proving to be very challenging for the teacher; students were openly complaining about the teacher and behaviour within the classroom was affecting the teaching and learning of the students. Students had approached other staff members and requested to be removed from the class and several meetings had taken place between the teacher and some concerned parents. The researcher was working in the same syndicate as the teacher and the senior teacher was unsure how to help the

teacher. The researcher had a good relationship with the teacher and the teacher was openly complaining about the class. Through discussions between the teacher and the researcher it was decided to gather data on the perceptions of the class. A QTI was administered to the class. The students were then given an evaluation form to complete that identified the positives, minuses and ideas (PMI) for improvement, for the class. Several discussions were held with the class and groups of students following the administration of the QTI and the PMI. This information was collated and recorded in an Excel file and shared with the classroom teacher.

The QTI was administered to the class of 31 students by the researcher, in a separate classroom to their own home room environment. The evaluation chart: Positives, Minus, Ideas, (PMI) was given to the class and students completed this individually and independently. It was important for students to complete this independently so that they could write their own thoughts rather than be influenced by anyone else in the class. The QTI was given to the students prior to the PMI and the students were instructed to use the scales of the QTI to assist them when completing the PMI.

The students were given a briefing prior to responding and informed that the researcher wanted them to be honest with their responses. The students were asked to respond individually. Initially, the students were very concerned about what to put as they expressed concern over the teacher recognising their handwriting. The students were assured anonymity and that any results shared with the teacher would first be collated and typed. The students were encouraged to put positives as well as minuses, and ideas about how to improve on the minuses or to make the class a better place to be.

Most of the students were familiar with the QTI as they had answered it the previous year as Year 7 students. The researcher assured them of anonymity and encouraged them to be as honest as possible. The questions of the QTI were read through with them, explaining any words that they queried. The students were unsure of words like hesitant, mocking, and lenient.

Individual confidential meetings with the students were held and the students were ensured that the data they gave to the researcher would be kept anonymous from the teacher. It was important that the students felt they could be honest without fear of the teacher being able to identify where the comments came from. Several students discussed how their parents had already been in to complain to the teacher, the principal, and the senior teacher.

Students individually recorded their responses on sheets of paper. To reassure the students and encourage them to participate in the study, only classroom groups were recorded and no names of students were taken or kept. The students recorded the 'Positives, Minuses and Ideas' they had about being in that particular class. The individual responses were collected and then transcribed into a Microsoft Excel spread sheet. The comments from the students were then sorted and recorded in a tally chart which allowed for further analysis. The results were analysed to look for patterns and trends and then this information was compared to the quantitative data collected. The data collected were stored on computer while the analyses were completed. The data will be stored for five years and then destroyed.

3.3 Sampling and Distribution

The QTI was administered to 379 students from 16 classrooms that were present on the day of administration in 2009. The Deputy Principal administered the questionnaire to provide impartiality for students when answering the questions. In 2010 a QTI was administered to a class of 31 students. Parental consent was obtained prior to the questionnaire being administered. The students gave consent at the time of the administration of the questionnaire. The questionnaires were then collected and collated by the author of this thesis. The sample covered classes at the intermediate level at a New Zealand Primary School. The sample was co-educational and the classes were either Year 7 or Year 8 students (11-13 years). Students and teachers were given an identifying number so that the information collected maintained anonymity. Each classroom also had a number so that data from students within the class could be kept together. Assessment data collected were also coded,

so that the responses of students from the QTI could be matched specifically to see if there was a correlation between what the students thought about the interactions they had with their teachers, and how they performed academically.

3.4 Participants

There were 379 students who completed the QTI from a roll of 420. The students were from both Year 7 and Year 8 and were distributed across 16 classrooms at an Intermediate School in New Zealand. Data were collected from the students to determine the perceptions they have of their teachers.

The assessment data analysed included 355 students. The assessment data were sorted to include only those students who had sat both the beginning and end of year assessments. This reduced the number of students included in the overall analysis. Like all schools, some students leave part way through the year and others, move to a new school. If students were absent at the time of testing and teachers were unable to, or did not complete a catch up test, then those students were also eliminated from the data. This was to ensure the validity of the analysis of the learning of the students in a particular class.

A case study of one class of 31 students was added in 2010. These students were a Year 8 class and were selected following the initial analysis of the QTI the previous year and the issues the teacher was facing with the students in the class early in 2010.

3.5 Questionnaire on Teacher Interaction (QTI)

The QTI was selected as the primary data gathering tool to ascertain the students' perceptions about the interpersonal interactions they had with their classroom teacher (Wubbels, Créton, & Hooymayers, 1985).

The QTI was developed in the Netherlands, by Wubbels, Créton, and Hooymayers as a model to map interpersonal teacher behaviour following work by Leary (1957). This model was used to gather students' and teachers' perceptions of interpersonal teacher behaviour (Wubbels, Brekelmans, & Hooymayers, 1991; Wubbels & Levy, 1993).

The original version of the QTI consisted of 77 items and was designed to measure secondary teachers' and students' perceptions of teacher interpersonal behaviour. Some items in this were found to not relate specifically to the interpersonal behaviour between the students and their teachers. Wubbels and Levy developed a shorter 64-item version in 1988 and administered this in the USA (Wubbels & Levy, 1991). The 64-item QTI was further developed and shortened into a 48-item questionnaire. This was developed in Australia in 1993 (Fisher, den Brok, & Rickards, 2006; Fisher, Fraser, & Wubbels, 1993; Khine & Lourdusamy, 2006).

The QTI is composed of eight scales that assess the eight dimensions of teacher-student interaction. The scales are named: Leadership, Helping/Friendly, Understanding, Student Freedom, Uncertain, Dissatisfied, Admonishing, and Strict (Wubbels & Levy, 1993). These scales give a comprehensive description of the interactions teachers have with their students. Table 3.1 presents a description and sample item for each scale of the QTI.

Table 3.1
Description of Scales and Sample Items for Each Scale of the QTI

Scale Name	Description of Scale (The extent to which the teacher...)	Sample Item
Leadership	...leads, organises, gives orders, determines procedure and structures the classroom situation.	This teacher knows what is going to happen next in this class.
Helping/Friendly	...shows interest, behaves in a friendly or considerate manner and inspires confidence and trust.	This teacher helps us with our work.
Understanding	...listens with interest, empathises, shows confidence and understanding and is open with students.	This teacher trusts us.
Student Freedom	...gives opportunity for independent work, gives freedom and responsibility to students.	This teacher allows us to take responsibility for what we do.
Uncertain	...behaves in an uncertain manner and keeps a low profile.	This teacher allows us to tell him/her what to do.
Dissatisfied	...expresses dissatisfaction, looks unhappy, criticises and waits for silence.	This teacher thinks that we cheat.
Admonishing	...gets angry, express irritation and anger, forbids and punishes.	This teacher gets angry quickly.
Strict	...checks, maintains silence and strictly enforces the rules.	This teacher is strict.

(Source: adapted from Wubbels, 1993)

The reliability and validity of the QTI has been established in many countries. It has been extensively used with secondary-aged students in Australia, Netherlands, USA, and Singapore. More recently it has been used in both Singapore and Australia with younger primary aged students (Goh & Fraser, 1996, 1998, 2000; Lee, 2010). Its validity and usefulness has been confirmed in Australia (Wubbels, 1993), Singapore (Khine & Lourdusamy, 2005; Lourdusamy & Khine, 2001,) Brunei (Khine & Fisher, 2006), and in the USA (Wubbels & Levy, 1991, 1993).

The QTI was statistically validated to establish its reliability. The circumplex nature of the model, and the ability of the instrument to discriminate between classes in New Zealand primary schools has been confirmed. The reliability, or internal consistency, of the instrument was established using the Cronbach alpha coefficient (Cronbach, 1951). The magnitude of the Cronbach alpha reliability coefficient gives an indication of how consistently the students respond to each item within each scale. An alpha reliability of 0.60 or greater is considered to be acceptable (Nunnally, 1967). A range of 0.74 to 0.95 for the class, and 0.63 to 0.83 for the students in Fisher, Henderson and Fraser's study (1995) showed acceptable alpha reliability coefficients for the eight scales of the QTI. Other researchers have confirmed that the QTI has acceptable levels of internal consistency in grades 7-12 (den Brok, 2001; Goh & Fraser, 1996; Rickards, 1998; Wubbels & Levy, 1993).

It is important for the QTI to be able to determine whether students' perceptions between classes differ. Across the school perceptions should be different, however, within each individual class the students' perceptions should be similar. This variance is established by an analysis of variance (ANOVA). The eta^2 statistic gives an indication of the proportion or percentage of the variance in the dependent measure that is related to the independent variable of class membership (Koul & Fisher, 2006). If the values are statistically significant, it suggests that student perceptions within a class are similar but they differ from class to class indicating that the questionnaire can distinguish between classes.

Inter-scale correlations were used to show the circumplex nature of the model. This is where scales that are adjacent in the model should correlate more highly whereas, opposite scales should show a negative correlation.

3.6 Assessment Data Collection

The assessments used were the Assessment Tools for Teaching and Learning (asTTle), which assesses both reading and writing in separate tests, the Supplementary Tests of Achievement in Reading (STAR), assessing reading, and the

Progressive Achievement Tests, Mathematics (PAT), which assesses student achievement in mathematics.

AsTTle (version 4) is an electronic programme available to all schools in New Zealand that enables them to create tests electronically in reading, writing and mathematics. The achievement data from the asTTle assessments provides information about a student's level of achievement. This achievement can be related to the curriculum achievement outcomes provided in the New Zealand Curriculum. A level can be identified for each student from Level 2 to Level 6, and within those levels three sublevels are determined; these are, Beginning, Proficient and Advanced. Alongside the curriculum levels are numerical scores. More complex questions are awarded a higher weighting, with easier questions receiving less marks. Students can also be assessed against national norms for students in years 4 to 12 (Ministry of Education, 2011; asTTle, 2011).

The asTTle reading tests are used to assess the comprehension and close reading ability of students. Each test constructed can assess up to three deep features of reading comprehension strategies, these are: finding information, knowledge, understanding, connections and inference, as well as the surface features - grammar, punctuation and spelling (Ministry of Education, 2011; asTTle, 2011).

AsTTle Writing tests can be generated using the same electronic programme. A range of genres is available to choose from, Narrate, Recount, Instruct, Describe, Explain, Persuade, Analyse, and Surface Features. Within each genre is a variety of samples that can be selected. Writing tests are assessed using progress indicators that have been developed to help teachers decide where the writing best sits for each of the seven different content areas. Four of these are considered deep features: Audience Awareness and Purpose, Content/Ideas, Structure/Organisation, and Language Resources, and three surface features; Punctuation, Grammar and Spelling (Ministry of Education, 2011; asTTle, 2011).

The Supplementary Tests of Achievement in Reading (STAR) is a test that can be administered twice a year using two parallel forms. The test is available for students from Year 4 to Year 9 (NZCER, 2011). The test is designed to give teachers more information about specific decoding and comprehension strategies a student has. This enables the teacher to plan the learning according to needs of the individual students in the class. It assists in grouping of students for grouped reading instruction. The test is divided into subtests. Students in Years 4 to 6 sit four subtests with students in Years 7 to 9 sitting a further two. The subtests are:

1. Word Recognition: a series of images accompanied by a selection of vocabulary for each image that the student must choose. The words chosen are words that are familiar to students' oral vocabulary. Students need to decode accurately, paying particular attention to the letters and sounds of the words.

2. Sentence Comprehension: This task is designed for students to read for meaning. Students are asked to complete the sentence and are a given a range of words to choose from. This test assesses the students' ability to both decode and to use a range of sources to gain meaning from the text.

3. Paragraph Comprehension: Students are presented with 3 short pieces of text in a cloze format. This subtest assesses reading comprehension. Students have to replace missing words that have been removed from the text. Students need to use the context clues to help them decide what word best fits in the blank space.

4. Vocabulary Range: Students are presented with 12 sentences; in each sentence they must choose a word that is most similar to a selected word from a choice of given words.

5. The Language of Advertising: Students read twelve different advertisements. They are required to circle the words that they think are emotive. This test assesses students' understanding and knowledge of vocabulary.

6. Genre/Writing Styles: Students have four short passages to read, each in a different style or genre. Within each section there are a number of points where students are given a range of options to choose the phrase they think fits best in the text, which best fits the style of genre and purpose of the text.

STAR tests are administered under strict instructions. Each subtest is timed and students are not permitted to go on, or go back to other subtests individually. In years 7 to 9, students have 30 minutes to complete the whole test, with subtests being given either four, six, or eight minutes. Tests are marked by the teacher following a strict marking guide. Marks are awarded for each subtest and a raw score is calculated. A stanine is then calculated for each student (NZCER, 2011).

The Progressive Achievement Tests, Mathematics, (PAT) are tests designed by the New Zealand Council of Educational Research. Students can sit these at any time between February and November. Different tests are available for each year level. The tests assess the students' understanding, skills, and knowledge in mathematics as determined by the New Zealand Curriculum. The mathematics tests assess six different content areas; number knowledge, number strategies, algebra, geometry and measurement, and statistics. Scores are scaled so that they can be compared on a continuum and allow tracking of students from year to year. Students can also be compared across year levels and against curriculum level norms (NZCER, 2011).

Similarly to the STAR tests, the raw score is converted to a stanine. Stanines enable teachers to compare an individual student's achievement with other students across New Zealand. Teachers are able to compare a student's stanine against a nationally referenced sample. Stanines are divided into nine categories, and are numerically scored as 1, 2, 3, 4, 5, 6, 7, 8, or 9. When students are compared with their own year level most students get a stanine of four, five, or six. A stanine of one, two, or three shows low achievement for that year level, whilst a stanine of seven, eight, or nine indicates that the student has higher than expected achievement for that year level (NZCER, 2011).

Assessments were completed by the students at the start and end of the year. All assessments were given in individual classes by the classroom teacher. The STAR and asTTle Writing tests were the same across the school for both Year 7 and 8, whereas the PAT Mathematics and asTTle Reading tests were different for each year level. The teachers were given a three week window to administer the tests, both at the beginning and the end of the year.

The beginning-of-year tests were given to the students once a suitable settling in time had been reached, so as to allow the students to feel comfortable within the new class environment, and a relationship had been established with their new teacher. The end-of-year tests were administered in early November, although the school year does not cease until mid-December, this allowed the same assessment results for the Year 8 students to be forwarded to the secondary college, that the majority of those students would be attending the following year.

Part of the researcher's role within the school was to collect assessment data and collate it for both classroom placement, for the following year when the Year 7 students were placed into Year 8 classes, and the Year 8 students moved onto the local college, and for analysis within the school.

The assessments were marked by individual classroom teachers, asTTle Reading, STAR, and PAT Mathematics were standardised tests, with a set marking criteria. The asTTle Writing assessment although more subjective for the individual teacher was marked following an extensive professional development programme by all staff on marking and moderating of writing using asTTle. This was further moderated by the researcher and Head of English at the local college. The results of these assessments were recorded via school management systems on computer and then uploaded into Excel files by the researcher.

3.7 Ethical Issues

The ethical issues faced in this study included gaining permission from Curtin University, the school and the students to complete all the research designed for this study.

3.7.1 Informed Consent

The Principal and Board of Trustees was the initial point of contact in the school and provided informed consent prior to any research being undertaken in the school. This meant that the nature and type of data collected, the means of collection and the uses to which it was intended was clearly described prior to consent being sought.

The main ethical issue that was addressed in this research was the position of the participating teachers and students, their rights with regard to continuing participation and anonymity in the final thesis and any publications that may result from this study. The teachers were encouraged, by the researcher, to take part in the study; however, it was made explicit that they were free to withdraw from the research at any time. The participating teachers and school were, however, given the choice as to whether they wished to be acknowledged as having taken part in the research at the end of the report. Permission to interview students was sought prior to the interviews taking place.

3.7.2 Anonymity

This was guaranteed to students, teachers and the school as it was coded with numeric values so as to remove identifying features from the data during data preparation and entry. All qualitative data were recorded and transcribed to an Excel spread sheet so that no student could be identified. No student, teacher or school has been identified in the study or in the reporting of the study. Access to data gathered has been secured and it has only been available to the researcher and her supervisors**.**

3.7.3 Consideration

Completion of the QTI was not a lengthy process, it involved about 30 minutes of class time. Interviews held with students were brief and only students who gave consent were interviewed. The completion of the PMI was done in a comfortable classroom setting with the researcher and was completed in 20 minutes.

3.7.4 Feedback

A high priority of this study was to give prompt and useful feedback to all teachers involved. Each participating teacher has received profiles of scores obtained from their students' responses, in addition to overall results for the sample, in the form of an individualised and personally prepared report.

3.7.5 Facilities and Resources

The major facilities and resources required for this research included library facilities, access to a computer and printer, photocopying and printing facilities, stationery and access to Curtin University campus through the Science and Mathematics Education Centre. Access to student data is necessary and approval was granted due to the status of the researcher, as a teacher in the school.

3.7.6 Data Storage

Data collected was both qualitative and quantitative in nature and was stored on computer while analyses were completed. The data files will be maintained electronically for five years after which they will be destroyed. All raw data will be stored in a safe and secure place at Curtin University campus through the Science and Mathematics Education Centre.

3.8 Data Analysis and Interpretation

The data analysis focused on the objectives of this study and was done in order to answer the research questions. Quantitative and qualitative data were collected, analysed, and the results interpreted.

The data from the QTI were collected and collated by the researcher. The assessment data initially was recorded into the school management system by the classroom teachers, and then uploaded into an Excel file. The QTI and assessment data were then coded and entered into an Excel spread-sheet. Students' assessment data were recorded alongside the QTI data. A standardised set of codes was used for classes, gender, and ethnicity. All names were removed from the data and students were given a unique code.

It was important to ensure that the data collected were both valid and reliable. In order to check this, several statistical analyses were completed. Whole school and individual classes were analysed; and means and standard deviations were calculated for each scale of the QTI. Statistics for QTI scale reliability, validity and the ability to differentiate between classes were completed using the individual students as the unit of analysis.

The whole school and individual class means were determined. The internal consistency reliability of each scale in the QTI was calculated by using the Cronbach alpha coefficient on both of these means. The magnitude of the Cronbach alpha reliability coefficient gives an indication of how consistently the students responded to each item within each scale. An alpha reliability of 0.50 or greater is considered to be acceptable (De Vellis, 1991).

As previously discussed, it is expected that within a class the perceptions of the students' should be similar, whilst across the school perceptions should differ. The data was calculated for each scale of the QTI using the one-way ANOVA. The eta^2

statistic gives an indication of the ratio of the variance in the variance of class membership (Koul & Fisher, 2006). The values were shown to be statistically significant and the QTI was able to differ between classes.

Inter-scale correlations were used to show the circumplex nature of the model. The eight scales of the QTI are arranged in a circular order, meaning that each scale should correlate highest with the scale next to it (Wubbels, Créton, & Levy, 1993). This means that the scales with the highest positive correlation would be adjacent to each other, whilst opposite scales would have the greatest negative correlation. The data from the QTI were examined for this inter-scale correlation.

The assessments used in the study were analysed to calculate the difference or progress the students and classes had made from the beginning of year to the end of the year. Each assessment had a total score and either a stanine or curriculum level. The curriculum levels were coded numerically.

Means, standard deviations and correlations were calculated on the assessment data, both at beginning and end of year. Effect sizes were calculated using Cohen's d formula (1977) where the difference in the two group means (beginning of year and end of year), for each assessment is divided by the pooled standard deviation. Effect sizes are interpreted to see if there has been an effect, in this case the teaching- the 'what' that has been done in the intervening time between the first data collection and the second. Cohen defines the effect size as small, medium, and large as; 0.20, 0.50 and 0.80, respectively (Dingle & Parr, 2010; Hattie, 2009, 2012).

Hattie (2008) argues that for educational outcomes a more appropriate scale for effect size would be 0.20, 0.40 and 0.60 as small, medium and large. These figures appear to be commonly accepted in New Zealand as the standard measure of effect size (Hattie, 2008; Timperley, Wilson, Barrar, & Fung, 2007, Schagen, & Hogden, 2009). An effect size is a measure that is independent of the original units of measurement. It enables the comparison of results across different types of

assessment and over a period of time. It also enables comparison when the assessments have different measures of performance (Schagen & Hodgen, 2009). The standard deviation measures the average spread of scores.

Qualitative data collected from students were sorted into categories. Statements from students were grouped and recorded. The number of students making similar comments was added as a tally chart to record the number of students that perceived the class the same way.

3.9 Summary

The purpose of this study was to investigate the interpersonal interactions between teachers' and their students' and compare these to the levels of student assessment. The 48-item QTI was given to all students in the school. Assessment data were collected and collated across the school and this was analysed to see if there were any associations between student levels of achievement and the perceptions of the teacher student interactions at the school. Following the initial analysis of the QTI, data were analysed from classes that had negative sector profiles, poor gains in progress of academic achievement, positive sector profiles and positive gains in academic progress. The following year, one class of students was given the QTI and completed a PMI on the class. Students within the class were interviewed and the results were shared with the teacher. Discussions were held with the teacher about the results of the data collection and steps were formulated to assist the teacher in improving the perceptions of the interactions the teacher had with the students. These methods of data collection were chosen to assist the researcher to answer the research questions.

1. Is the Questionnaire on Teacher Interaction (QTI) a reliable and valid instrument for use in a primary classroom in New Zealand?

2. What are the students' perceptions of teachers' interpersonal behaviours in a New Zealand primary school?

3. What are the Questionnaire on Teacher Interaction (QTI) profiles of the different classrooms in a primary school in New Zealand?

4. Are there any associations between the students' perception of their teachers' interpersonal behaviour and their achievement in reading?

5. Are there any associations between the students' perception of their teachers' interpersonal behaviour and their achievement in writing?

6. Are there any associations between the students' perception of their teachers' interpersonal behaviour and their achievement in maths?

7. Are there significant gains in students' levels of reading, writing and mathematics in Grades 7 & 8, and how are those gains distributed amongst the classes?

The methods have included the administration of the QTI, the collection of academic data, the collection of qualitative data and ethical issues faced during the study.

The next chapter looks at the use of the Questionnaire on Teacher Interaction (QTI) and whether it is a reliable and valid instrument for use in a primary school in New Zealand. It describes what the students' perceptions of teachers' interpersonal behaviours in a New Zealand primary school are and provides a profile for individual classrooms.

CHAPTER 4

QTI RESULTS ANALYSES AND DISCUSSIONS

4.0 Introduction

The previous chapter outlined the research questions and the methods used to collect and analyse the data to answer the research questions. The QTI was chosen to identify the perceptions students had of the personal interactions they encountered with their teachers. Assessment data were collected and analysed to see if there was an association between the perceptions of the student teacher interactions and the academic progress the students made in the classroom. This chapter presents the results from the use of the QTI and information that supports its validity and reliability in a New Zealand primary school and the school-wide assessment data collected at the beginning and end of year.

The aim of the research was to investigate whether there is a link between the relationship the students have with their teacher and the academic progress they make in that classroom. Research that has used the QTI to look at student outcomes has shown that there are generally, higher cognitive outcomes for students when they have teachers who display leadership, helping, friendly, and understanding behaviours. In contrast, students have been shown to make less progress in classes where the interactions with the teacher are perceived to be admonishing, dissatisfied, and uncertain (Waldrip, Fisher, Reene, & Dorman, 2008).

Levy, Créton and Wubbels (1993) found that students think the best teachers are those who show strong leadership. As one would expect, teachers who are more friendly and understanding are going to be perceived better by students. It is being able to identify how teachers are perceived by the students; and then being able to use those perceptions to improve the classroom setting that makes the QTI such a valuable tool. Identifying teachers as ‘good’ or ‘bad’ is a challenging concept for

most teachers. How teachers interact in the classroom in New Zealand is traditionally something that is very private. Only the members of the classroom can really identify what it is like to be in that classroom. Other teachers, students and parents of the school have impressions of teachers and see their interactions outside the classroom, but what goes on in the classroom day-to-day, is between the teacher and the students. The QTI is a tool that changes that, it enables a window into the classroom, which can open the eyes of the teachers and allow them to see how their students actually perceive the interactions that occur.

The validity and reliability for the QTI has been well documented (Fisher, Fraser, & Wubbels, 1993; Khine & Lourdusamy, 2006; Wubbels, Créton, Levy, & Hooymayers, 1993; Wubbels, & Levy, 1993) however, since this was one of the first times the QTI was administered in a New Zealand primary school it needed to be examined for its validity and reliability in New Zealand.

4.1 Validation of the Questionnaire on Teacher Interaction (QTI)

The QTI describes the students' perceptions of teachers' interpersonal behaviours in a New Zealand primary school and provides a profile for the teachers of individual classrooms. The QTI was administered initially to 379 students in 16 classes and then to a further 31 students in one classroom the following year. Thus, the first question asked was: Is the Questionnaire on Teacher Interaction (QTI) a reliable and valid instrument for use in a primary classroom in New Zealand?

To determine the validity of the QTI it is important to establish a consistency in the responses of the students within a class, whereas there should be variance across the classes in a school (Koul, & Fisher, 2006; Kyriakides, 2006). The QTI is a tool that measures the perceptions the students have of the interactions between themselves and the teacher. Therefore, the students within the class should be having a similar experience to the other students in that class, whilst other classes in the school will have a different experience.

The internal consistency measure determines if the students within the class perceive the interactions of the teacher-student interpersonal behaviour the same way, i.e. there is a consistency in their responses (Koul, & Fisher, 2006. p. 282; Rickards, 1998). This is necessary to prove the reliability of the QTI. Do students in a New Zealand school respond to the questionnaire reliably? The Cronbach alpha reliability coefficient measures this (Cronbach, 1951, cited in Koul, & Fisher, 2006. p. 282).

Table 4.1 shows that the alpha reliability for the scales of the QTI is satisfactory and range from 0.54 to 0.82. The highest alpha reliability was for the scale of Helping/Friendly and the lowest for Student Freedom. The reliability results are all above 0.50 which indicates that the QTI can be considered a reliable tool in a New Zealand primary school (DeVellis, 1991).

Table 4.1
Internal Consistency Reliability (Cronbach Alpha Coefficient) and Ability to Differentiate Between Classes (ANOVA results) for the QTI

Scales of QTI	Cronbach Alpha Reliability	ANOVA eta^2
Leadership	0.80	0.25*
Helping/Friendly	0.82	0.21*
Understanding	0.79	0.24*
Student Freedom	0.54	0.12*
Uncertain	0.69	0.23*
Dissatisfied	0.78	0.24*
Admonishing	0.77	0.36*
Strict	0.59	0.17*

*$p<0.001$

N = 379

To be a reliable and effective tool to measure the teacher student interactions the QTI needs to be able to differentiate between classes. A one way analysis of variance (ANOVA), with class membership as the main effect, was used to determine whether the questionnaire is able to differentiate between classes as shown in Table 4.1. The students in different classes should perceive their classrooms differently while

students within the same class should perceive it somewhat similarly. The eta^2 statistic for the QTI shows that the variances attributable to class membership ranged from 0.12 to 0.36 and was statistically significant ($p<0.001$) for all scales. These data indicate that the tool is able to clearly differentiate students' perceptions of their teachers across different classes. The reliability and ANOVA results provide evidence of the validity of the QTI in a New Zealand primary school.

As discussed previously, the QTI is a circumplex model with neighbouring scales more closely related and least related with opposite scales. The circumplex model was investigated by measuring the correlations between the scales. The pattern of inter-scale correlations is shown in Table 4.2. The QTI was analysed to ascertain if the scales adjacent to each other showed a highly positive correlation and the scales opposite each other showed a highly a negative correlation. The Leadership scale, for example, correlates 0.64 with the Helping/Friendly scale, 0.69 with Understanding and -0.33 with the opposite scale Uncertain. Generally, it can be seen that the circumplex nature of the QTI has been supported.

Table 4. 2
Inter-scale Correlations for the QTI

Scale		DC	CD	CS	SC	SO	OS	OD	DO
		Lead	H/Fr	Under	St/Fre	Uncert	Dissat	Admon	Strict
DC	Leadership	1.00							
CD	Helping/Friendly	0.64**	1.00						
CS	Understanding	0.69**	0.69**	1.00					
SC	Student Freedom	0.15**	0.35**	0.26**	1.00				
SO	Uncertain	-0.33**	-0.20**	-0.31**	0.11*	1.00			
OS	Dissatisfied	-0.30**	-0.46**	-0.46**	0.03	0.44**	1.00		
OD	Admonishing	-0.31**	-0.36**	-0.47**	-0.03	0.66**	0.56**	1.00	
DO	Strict	-0.05	-0.21*	-0.20**	-0.11*	0.27**	0.47**	0.46**	1.00

*$p< 0.05$, **$p<0.01$, $p<0.001$

The three results presented in Tables 4.1 and 4.2 support the validity for the use of the QTI in New Zealand primary schools and consequently it can be used with confidences to answer the research questions.

Table 4.3 displays the school means and standard deviations for the scales of the QTI. The mean indicates that students perceived the teachers at the school to be the strongest in Helping/Friendly (2.95) and Leadership (2.93). Understanding was also perceived quite highly at (2.85). The lowest scale shows students see teachers as least Dissatisfied (1.09) and Uncertain (1.31).

Table 4.3
Whole School Means and Standard Deviations for Scales of the QTI

Scales of QTI	Mean	Std Dev
Leadership	2.93	0.65
Helping/Friendly	2.95	0.74
Understanding	2.85	0.70
Student Freedom	1.69	0.58
Uncertain	1.31	0.74
Dissatisfied	1.09	0.75
Admonishing	1.68	0.90
Strict	1.82	0.62

N=379

The results were examined to determine if there were differences in the perceptions of students based on gender. There were 215 male students and 164 female students. In the analysis male and female mean scores were computed. Table 4.4 shows the scale item means, male and female differences, standard deviations and t-values for separate samples. The purpose of this test was to determine if whether any significant difference existed in the perceptions of students according to their gender. The perceptions of the male students showed four significant differences from those of the female students.

The male students perceived the teachers to be more dissatisfied, admonishing, strict and uncertain, giving them more student freedom. The female students perceived the teachers to be more understanding, helping and friendly, whereas both genders had similar perceptions about the leadership of the teachers within the school.

Table 4.4
Item Means and Standard Deviations for Gender Differences in Student Perceptions of Teacher Student Interaction Measured by the QTI Scales

Scales Of The QTI	Gender	Item Mean	Mean Difference (m-f)	Standard Deviation	*t*
Leadership	Males	2.92	-0.01	0.65	-0.17
	Females	2.93		0.64	
Helping/Friendly	Males	2.92	-0.06	0.78	-0.85
	Females	2.99		0.68	
Understanding	Males	2.80	-0.12	0.73	-1.61
	Females	2.92		0.67	
Student Freedom	Males	1.73	0.08	0.55	1.37
	Females	1.64		0.61	
Uncertain	Males	1.38	0.15	0.74	2.00*
	Females	1.22		0.74	
Dissatisfied	Males	1.23	0.33	0.80	4.28**
	Females	0.90		0.64	
Admonishing	Males	1.81	0.30	0.95	3.24***
	Females	1.51		0.79	
Strict	Males	1.89	0.17	0.64	2.68**
	Females	1.72		0.59	

*$p < 0.05$, **$p<0.001$, ***$p<0.0001$ males (n=215); females (n= 164)

The QTI means and standard deviations were then calculated for each class within the school. The profiles of the 16 teachers who took part in the study and the perception the students had about their teachers' interpersonal behaviour are shown in Table 4.5. Leadership (DC) was shown to be the strongest interpersonal behaviour noted by the students for a number of teachers. These were Teachers 108, 112, 114, 116, 130, 134, 140 and 142. Teachers; 106, 110, 120, 122, 124, 144, and 146 were perceived to have the strongest characteristic of Helping/Friendly (CD) behaviour.

Table 4.5
Individual Teachers Students' Perceptions of Their Teachers Interpersonal Behaviour

Teacher	No	QTI	Lead	Help/Fr	Under	Freed	Uncert	Dissat	Admon	Strict
106	22	Mean	3.20	3.48	3.36	2.00	0.98	0.75	0.98	1.36
		S Dev	0.47	0.56	0.43	0.51	0.59	0.53	0.62	0.58
108	26	Mean	3.06	2.95	2.72	1.47	1.41	1.54	1.92	1.86
		S Dev	0.58	0.96	0.82	0.69	0.49	0.66	0.68	0.77
110	25	Mean	2.64	3.00	2.71	1.44	1.71	0.95	2.02	1.80
		S Dev	0.60	0.71	0.61	0.64	0.60	0.66	0.57	0.55
112	24	Mean	3.17	3.04	3.12	1.79	1.06	1.22	1.38	1.81
		S Dev	0.36	0.58	0.44	0.40	0.48	0.45	0.55	0.56
114	22	Mean	2.89	2.85	2.80	1.96	1.42	1.49	1.48	1.86
		S Dev	0.71	0.73	0.57	0.70	0.74	0.85	0.84	0.78
116	26	Mean	2.38	2.15	2.15	1.54	1.72	1.63	2.09	1.77
		S Dev	0.70	0.94	0.71	0.49	0.74	0.89	0.90	0.53
120	26	Mean	2.67	2.73	2.62	1.40	1.32	0.97	1.49	1.74
		S Dev	0.52	0.74	0.70	0.48	0.78	0.76	0.90	0.41
122	22	Mean	3.05	3.09	3.24	1.62	0.57	0.35	0.80	1.83
		S Dev	0.49	0.61	0.44	0.49	0.48	0.30	0.49	0.64
124	19	Mean	2.75	2.77	2.57	1.82	1.21	1.16	1.52	1.58
		S Dev	0.80	0.82	0.84	0.43	0.73	0.75	1.00	0.54
130	25	Mean	2.83	2.62	2.40	1.42	1.47	1.43	2.50	2.44
		S Dev	0.54	0.68	0.75	0.49	0.73	0.75	0.85	0.58
132	23	Mean	2.68	2.76	2.63	1.83	2.10	1.30	2.84	2.30
		S Dev	0.87	0.55	0.66	0.59	0.54	0.67	0.44	0.40
134	22	Mean	3.30	3.23	2.72	1.84	1.23	1.22	1.86	2.03
		S Dev	0.46	0.50	0.73	0.56	0.89	0.79	0.85	0.59
140	23	Mean	3.27	3.38	3.17	1.80	1.57	0.61	2.04	1.57
		S Dev	0.46	0.42	0.69	0.39	0.69	0.53	0.66	0.47
142	22	Mean	3.54	3.40	3.36	1.87	0.99	1.08	0.95	1.71
		S Dev	0.31	0.52	0.40	0.73	0.71	0.72	0.50	0.61
144	25	Mean	3.14	3.22	3.05	1.54	1.12	1.15	1.58	1.83
		S Dev	0.48	0.43	0.52	0.47	0.66	0.61	0.85	0.67
146	27	Mean	2.46	2.78	3.06	1.84	0.99	0.51	1.25	1.59
		S Dev	0.54	0.61	0.47	0.61	0.60	0.52	0.69	0.40
Total	379	Mean	2.93	2.95	2.85	1.69	1.31	1.09	1.68	1.82
School		S Dev	0.65	0.74	0.70	0.58	0.74	0.75	0.90	0.62

Teacher 122's highest mean was for Understanding (CS), although this teacher also had high means for the behaviours of Leadership (DC) and Helping/Friendly (CD). Nine teachers had the lowest means for Dissatisfied, Teachers; 106, 110, 122, 124, 132, 134, 140, and 146 whilst Teachers 108, 112, 114 and 124 had the lowest means

for Uncertain behaviours. It is interesting to note that Teacher 132 had a high mean for Uncertain behaviour of (2.10). Teachers 116 and 130 received their lowest means for Student Responsibility/Freedom (SC) and Teacher 142 had their lowest mean in Admonishing (OD).

It is significant to note that Teacher 116 scored the lowest for all the teachers in Leadership (DC), Helpful/Friendly (CD), and Understanding (CS). This teacher had the fourth lowest mean in Student Responsibility/Freedom (SC) and was the second highest in Uncertainty (SO), and Dissatisfied (OS). The teacher also scored poorly in Admonishing (OD) being the third highest of all the teachers. Teachers 130 and 132 showed a similar pattern to Teacher 116 scoring low in the positive behaviour characteristics and high in the more negative perceptions of students. Teachers 130, 132 and 134 were perceived to be the most Strict (DO) of all the teachers.

4.2 Teacher Typologies

Brekelmans, Levy, and Rodriguez, (1993) developed a typology of eight interpersonal teaching styles that were developed from a study in the Netherlands. The teachers' eight scale scores were converted into vectors to produce one point on the model for interpersonal teacher behaviour. This categorised teachers into eight types; Directive, Authoritative, Tolerant and Authoritative, Tolerant, Uncertain/Tolerant, Uncertain/Aggressive, Repressive and Drudging, see Figure 4.1. The typologies were discussed in Chapter 2 and are summarised here.

The Directive teacher is well organised and efficient. The relationship with the students is not usually close and the teacher tends to dominate class discussions. The teacher has high standards and can be seen as demanding. The teacher needs to work at keeping the class in line and on task. The Authoritative teacher runs a well-structured and pleasant classroom. The work is task oriented. Students know the rules and are attentive and produce a good level of work. The Authoritative teacher takes an interest in the students and appears enthusiastic.

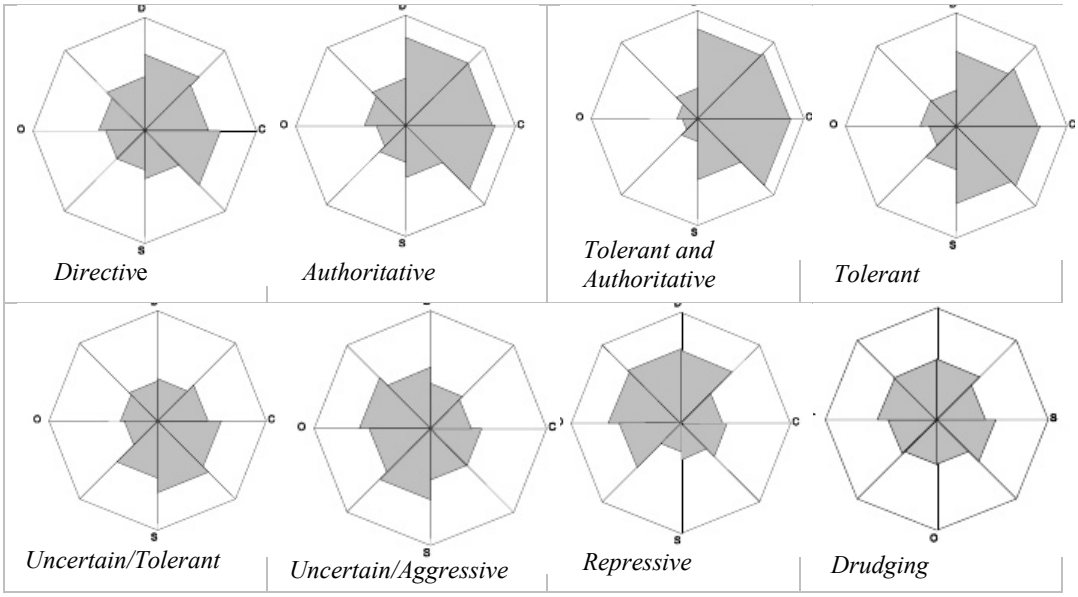


Figure 4.1. Eight typologies of interpersonal styles.

The Tolerant and Authoritative teacher supports student responsibility and freedom and uses teaching methods to which the students respond positively. Lessons are organised and the class is usually structured into small groups. The students are usually on task and the teacher is there to support and guide, able to ignore minor disruptions and concentrate on the learning within the class.

Tolerant teacher create a pleasant classroom and support the students. Students enjoy being in the classroom and the students are able to influence the curriculum, Students enjoy the teacher's personal involvement.

The Uncertain/Tolerant teacher shows little leadership within the classroom but is seen as cooperative. The unstructured nature of the classroom means that generally only the students at the front of the class pay attention and stay on task. There is little discipline in the class and the teacher does not follow through with behaviour management strategies.

The Uncertain/Aggressive teacher and students work at opposing ends of the spectrum. They see each other as opponents and the students take every opportunity to disrupt the class and the learning. The teachers usually over reacts to the students behaviour, which in turn brings about further negative behaviour by the students.

The students in the Repressive teacher's class are usually afraid of the teacher who is often angry and has outbursts of anger. Often remarks made by the teacher are sarcastic. The work in the classroom is structured but unorganised. The atmosphere within the class in unpleasant and the students see the teacher as unhappy.

The Drudging teacher varies between the Uncertain/Tolerant teacher and the Uncertain/Aggressive teacher. The teacher continually struggles to manage the class. The teacher does most of the talking and the class is unenthusiastic.

4.3 QTI Profiles

The perceptions of the students about the interpersonal interactions they have with their teachers can be displayed as a profile for each teacher. Figure 4.2 shows the profile of the school based on the mean scores for each scale of the QTI.

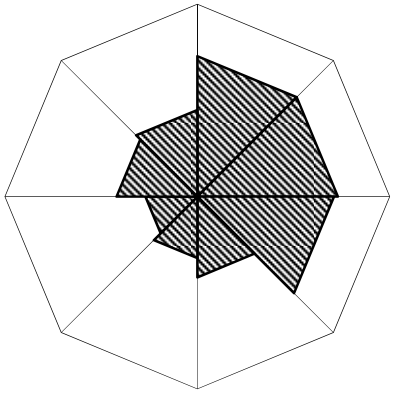
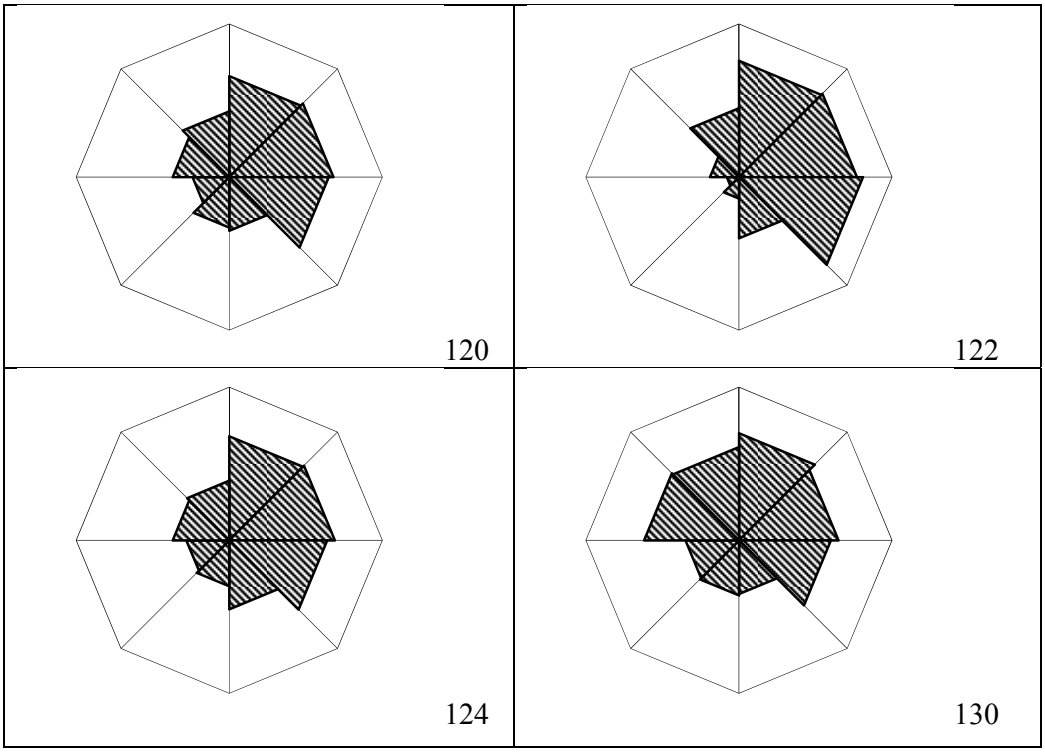


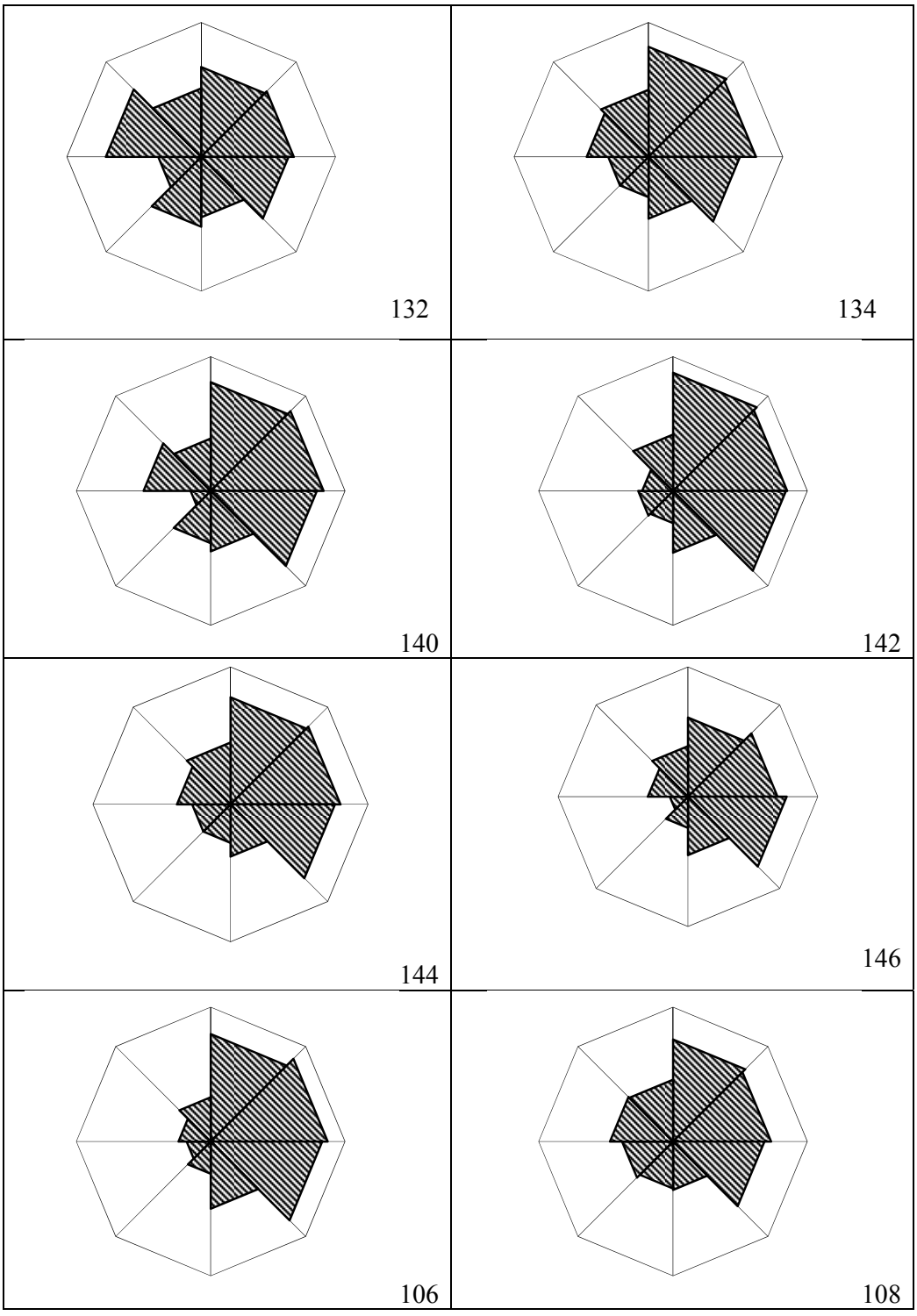
Figure 4.2. School profile.

This shows the school has a higher than expected level of Admonishing (OD) behaviour against the Ideal profiles displayed in other studies (Levy, Créton, Wubbels, 1993, Wubbels, Brekelmans, Hooymayers, 1993, Brekelmans, Wubbels and den Brok, 2002) and is most like the Authoritative typology.

Profiles for each teacher within the school were created and are displayed in Figure 4.3. Each of these can then be compared against the typologies of Brekelmans, Wubbels and den Brok (2002).

The typologies of the teachers at the school show a mix of behaviour/teaching styles within the school. The most prevalent style is the Tolerant Authoritative. The teachers that match closest to this typology are; 106, 112, 114, 122, 142 with Teacher 140 being a slight variation on this. Teacher 140 is a combination of Tolerant/Authoritative and Directive. Teachers 108 and 134 show an Authoritative style and Teachers 120, 124, and 144 have a Directive teaching style.




132
134
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146
106
108

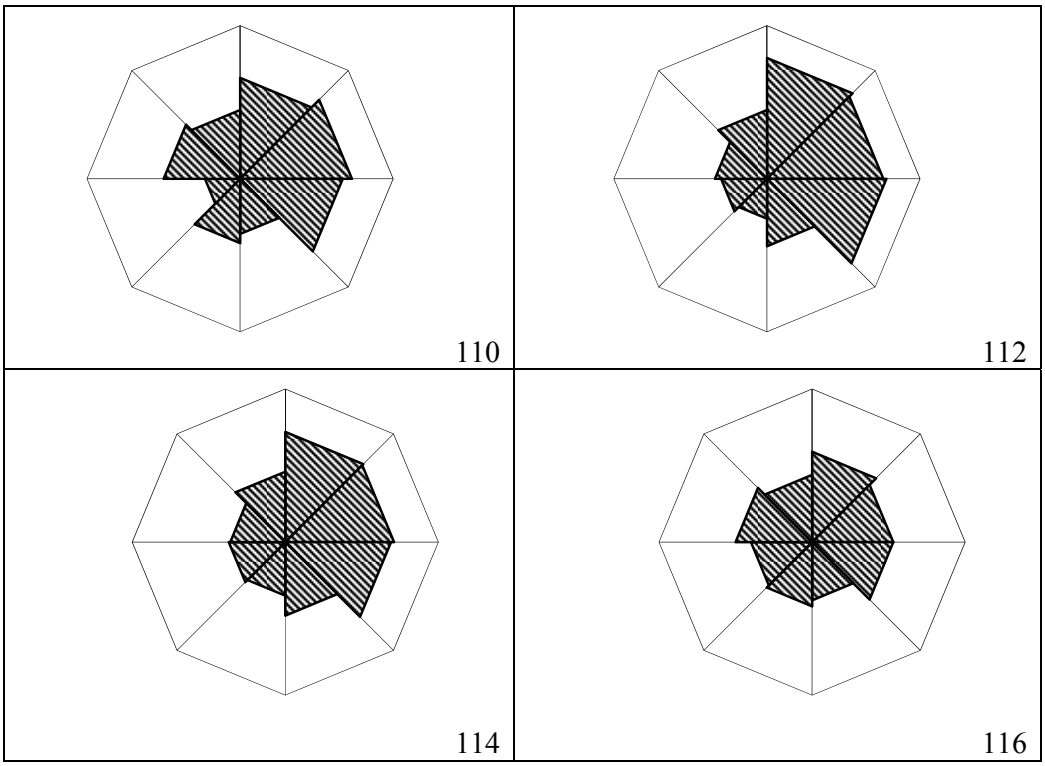


Figure 4.3. Teacher profiles.

Teachers 110 and 146 are Uncertain/Tolerant and Teacher 130 shows a Repressive teaching style. Teacher 132 shows a combination of two styles, Directive and Uncertain/Aggressive. Whilst the teacher shows a high level of Leadership, Helping/Friendly and Understanding Behaviour they also show a much higher level of Admonishing, Uncertain and Strict behaviour. Teacher 116 fits into the Drudging profile.

4.4 Assessment Data

The students at the school sit standardised tests at the start and end of the year. The start of year tests are used formatively. The information from the tests is analysed and used to plan the learning for the students in the classroom. The assessment data give the teachers information about what the students can and cannot do. The teachers plan the teaching programme based on this information. At the end of the

year, the students are tested again and the information is used for summative purposes. These data are analysed and the information is used for reporting purposes and for the next years placement, both within the school if they are Year 7 students and forwarded to the local college if they are Year 8 students. The data from the end of year tests are then analysed to see the progress of the learning. For the purposes of this study the school assessment data were analysed and the mean and standard deviation was calculated for each standardised assessment for both the start and end of the year. These are shown in Table 4.6.

Table 4.6
T-Test Analysis of Means and Standard Deviations on Assessment Data

Pairs	Assessments	N	Mean	Std Dev
Pair 1	Total score STAR SOY	334	52.41	29.50
	Total score STAR EOY	334	57.87	14.08
Pair 2	Scale Score PAT SOY	329	50.72	10.50
	Scale Score PAT EOY	329	56.25	12.75
Pair 3	Score aRs SOY	331	509.47	54.41
	Score aRs EOY	331	562.69	97.79
Pair 4	Score aWs SOY	319	519.29	117.76
	Score aWs EOY	319	551.86	110.88

The t values for paired samples were calculated to determine the significance of the differences between the SOY and EOY scores. The results of these calculations are reported in Table 4.7. The data show that there was a significant difference in the assessment results from the start to the end of the year.

Table 4.7

t - Values for Paired Examples of Assessment Data

Pairs	Assessments	*t*
Pair 1	Total score STAR SOY	3.88***
	Total score STAR EOY	
Pair 2	Scale Score PAT SOY	14.34***
	Scale Score PAT EOY	
Pair 3	Score aRs SOY	14.48***
	Score aRs EOY	
Pair 4	Score aWs SOY	7.27***
	Score aWs EOY	

*$p < 0.05$, **$p<0.01$, ***$p<0.001$

The assessment data were collected and collated from school-wide data that were used as part of the researcher's role within the school. The STAR test and PAT test use a different measurement scale than the aRs and aWs assessments. Effect size was chosen as the best way to show actual shift in achievement. In order to analyse how the students performed in the different assessments, the effect size was chosen as a standard measure that could be used against all the assessments. The effect size was calculated for each student, teacher and assessment. Table 4.8 and Figure 4.4 display the effect size for each assessment across the school. Figure 4.4 shows that while some teachers had an effect size shift of 0.40 or greater for all assessments used, some teachers had a negative effect size for particular assessments and some teachers did not achieve an effect size shift of 0.40 for any of the assessments.

In Figure 4.5 the effect size for the STAR test is shown. This graph clearly indicates that Teachers 142, 112, 146 and 114 had the greatest effect size shift. Teachers 132, 134, 140 and 110 had the lowest effect size. Figure 4.6 shows the effect size for the PAT maths test. This graph shows that Teacher 106, 108, 110, 112, 116, 122, 130, 132, 134, 142 and 144 all had an effect size shift of 0.40 or greater. Whereas, Teachers 114, 120, 124, 140 and 146 had lower than 0.40 effect sizes.

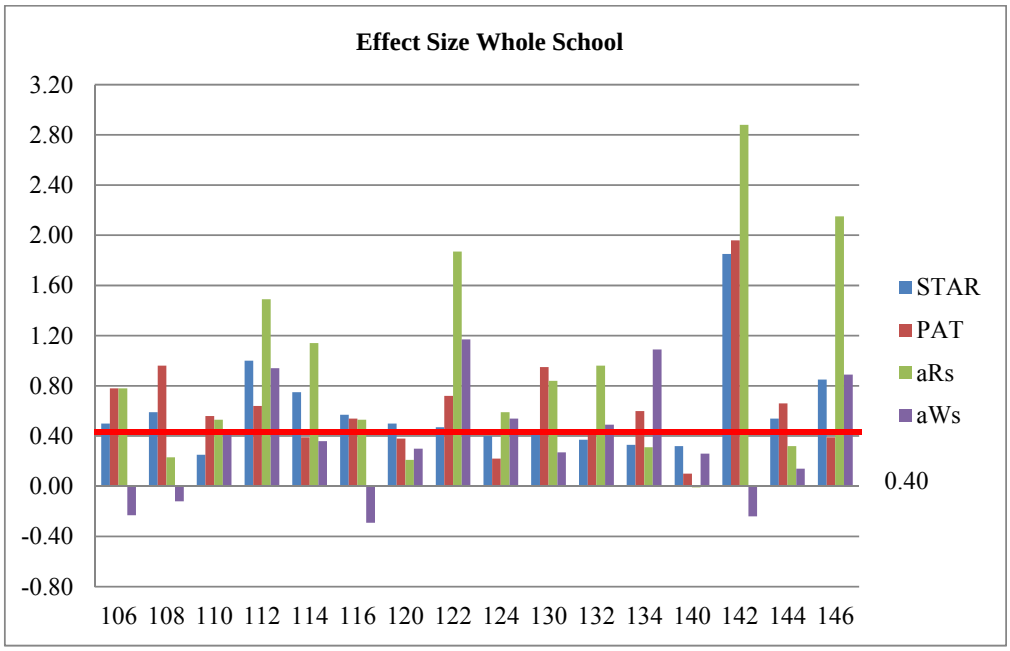


Figure 4.4. Effect size whole school

Table 4.8
Effect Size Data for Each Assessment and Teacher Within the School

Teacher	STAR	PAT	aRs	aWs
106	0.50	0.78	0.78	-0.23
108	0.59	0.96	0.23	-0.12
110	0.25	0.56	0.53	0.42
112	1.00	0.64	1.49	0.94
114	0.75	0.39	1.14	0.36
116	0.57	0.54	0.53	-0.29
120	0.50	0.38	0.21	0.30
122	0.47	0.72	1.87	1.17
124	0.40	0.22	0.59	0.54
130	0.43	0.95	0.84	0.27
132	0.37	0.45	0.96	0.49
134	0.33	0.60	0.31	1.09
140	0.32	0.10	-0.01	0.26
142	1.85	1.96	2.88	-0.24
144	0.54	0.66	0.32	0.14
146	0.85	0.39	2.15	0.89

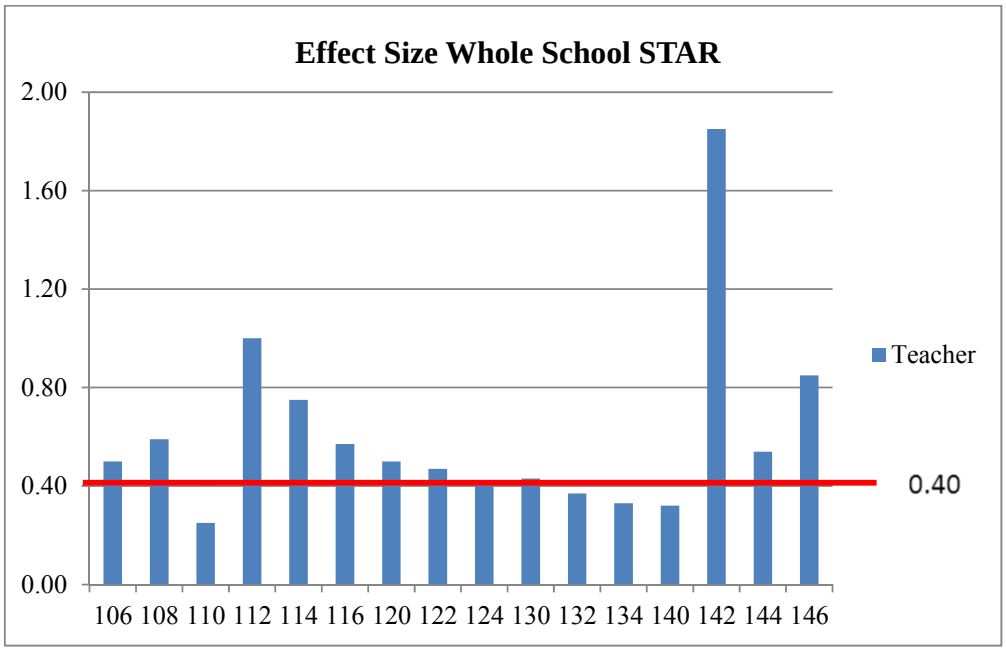


Figure 4.5. Effect size whole school STAR.

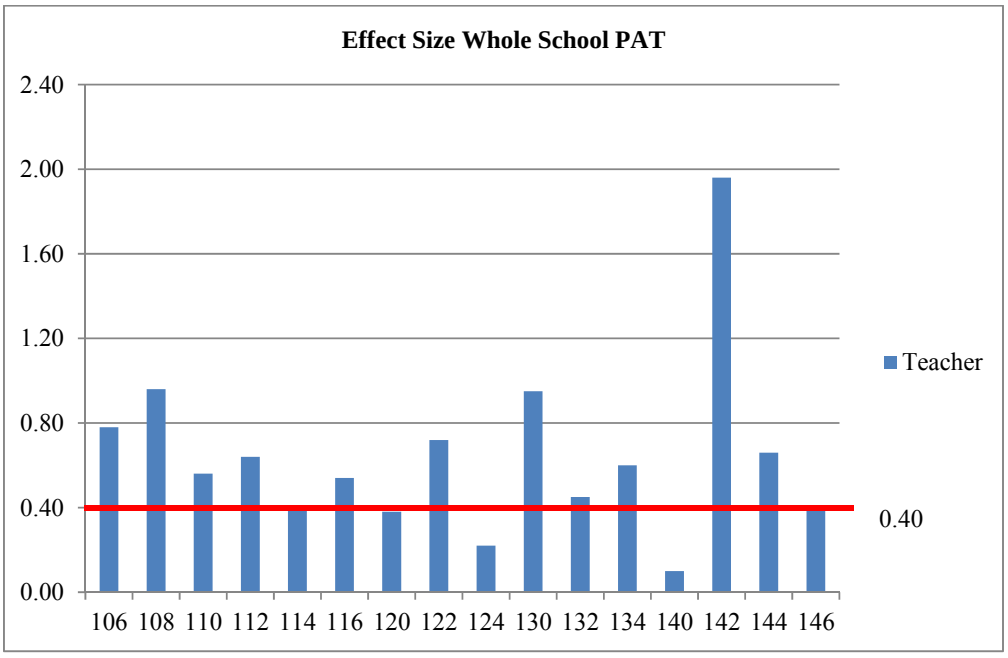


Figure 4.6. Effect size whole school PAT.

In Figure 4.7 the effect size for the asTTle Reading score is shown. Teachers 106, 110, 112, 114, 116, 122, 124, 130, 132 142, and 146 show a greater than 0.40 effect

size shift, while Teachers 108, 120, 134, 140, and 144 show a less than 0.40 effect size , with Teacher 140 showing a negative effect size of -0.01.

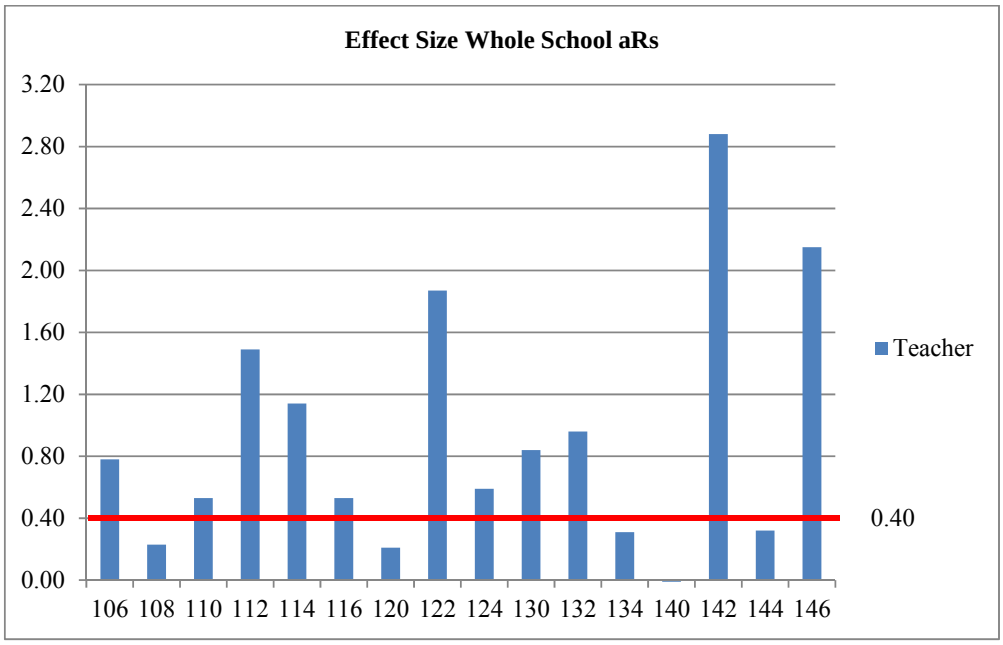


Figure 4.7. Effect size whole school aRs reading.

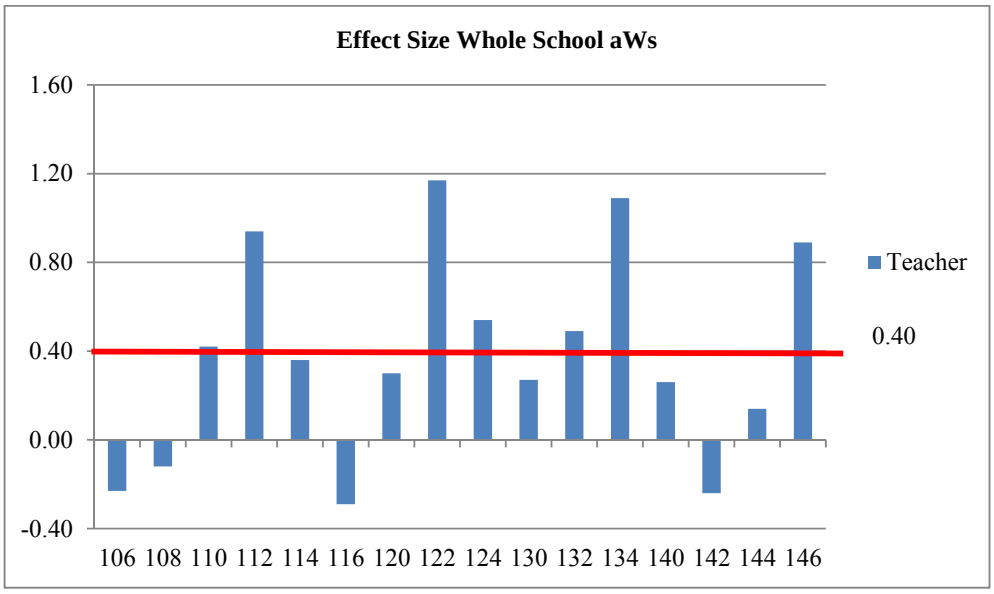


Figure 4.8. Effect size whole school asTTle writing.

The asTTle writing shows an interesting picture. More teachers in this assessment had less of an effect size in their class than in any of the other types of assessment. In this graph Teachers 106, 108, 114, 120, 130, 140, 142, 144 all show an effect size shift of less than 0.40. Teachers 106, 108, 116 and 142 all had a negative effect size shift. Teachers 110, 112, 122, 124 132 134 and 146 showed an effect size shift of 0.40 or higher.

The figures show that while some teachers showed large effect sizes in certain areas, they also showed low effect size shifts in other curriculum areas. The data were then analysed for each teacher to get a picture of how each teacher performed individually in shifting the students academically within their class. The following graphs show the effect size each teacher had for their students across the year.

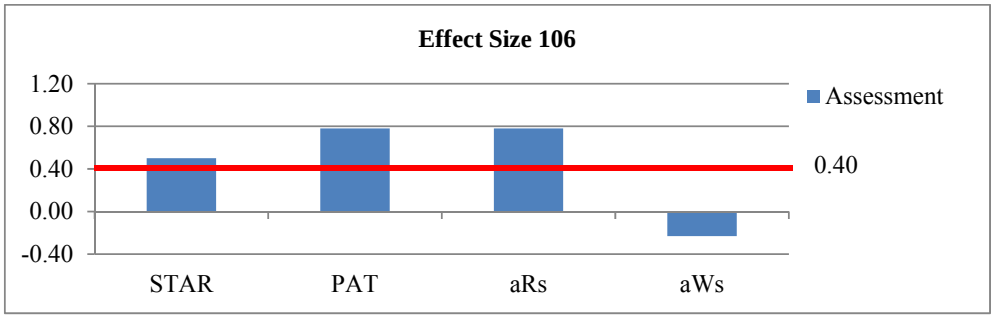


Figure 4.9. Effect size Teacher 106.

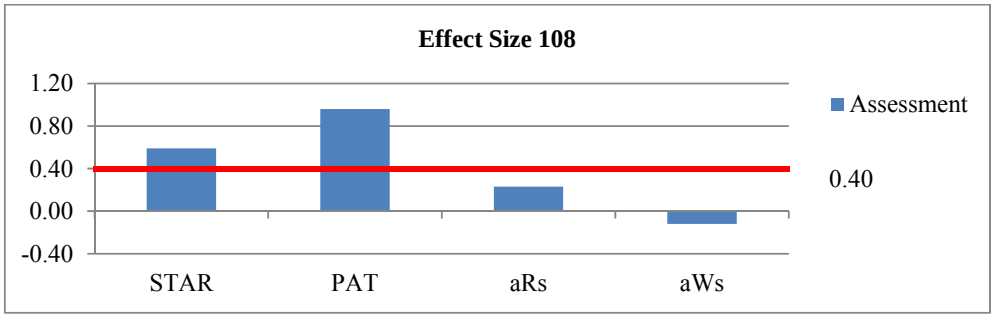


Figure 4.10. Effect size Teacher 108.

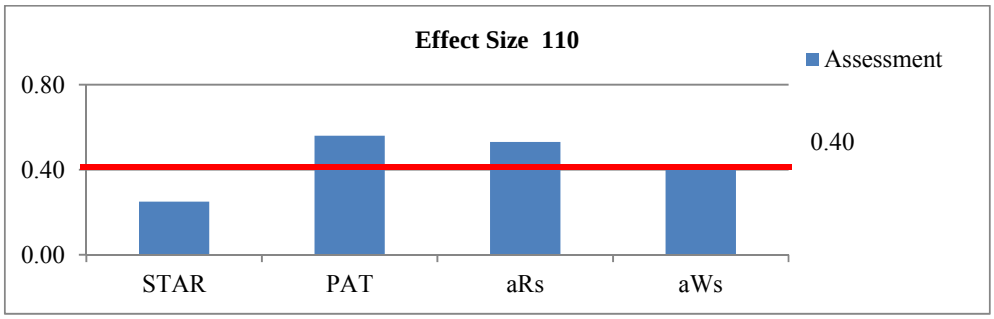


Figure 4.11. Effect size Teacher 110.

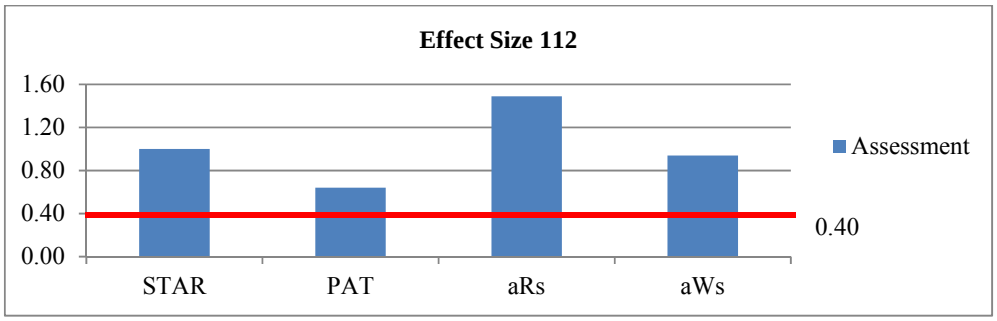


Figure 4.12. Effect size Teacher 112.

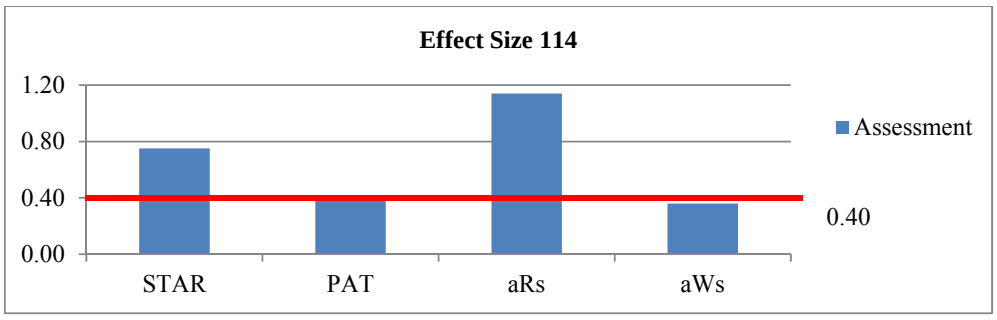


Figure 4.13. Effect size Teacher 114.

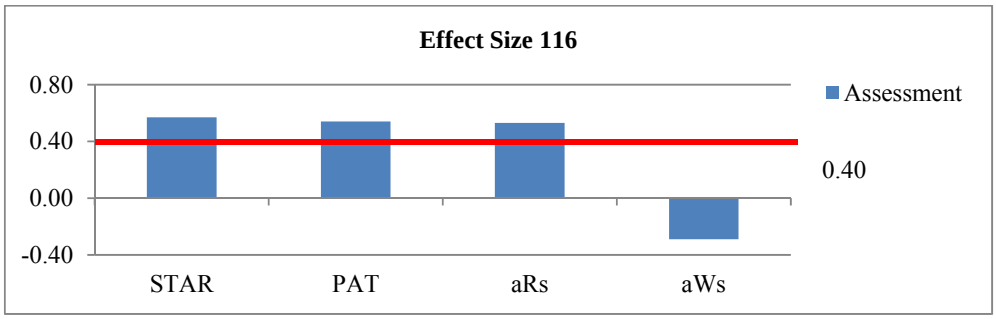


Figure 4.14. Effect size Teacher 116.

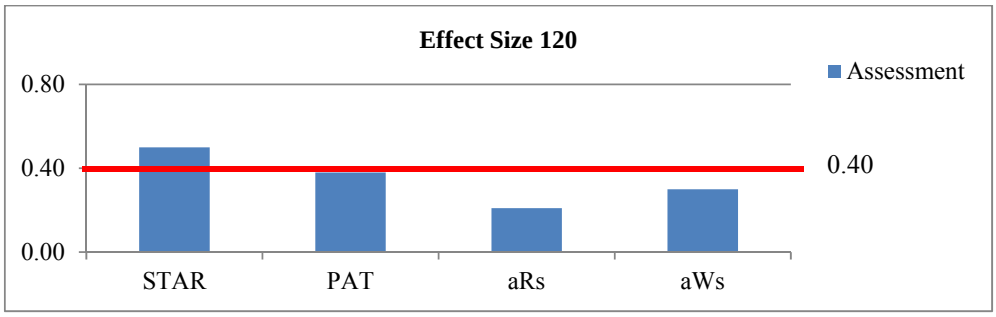


Figure 4.15. Effect size Teacher 120.

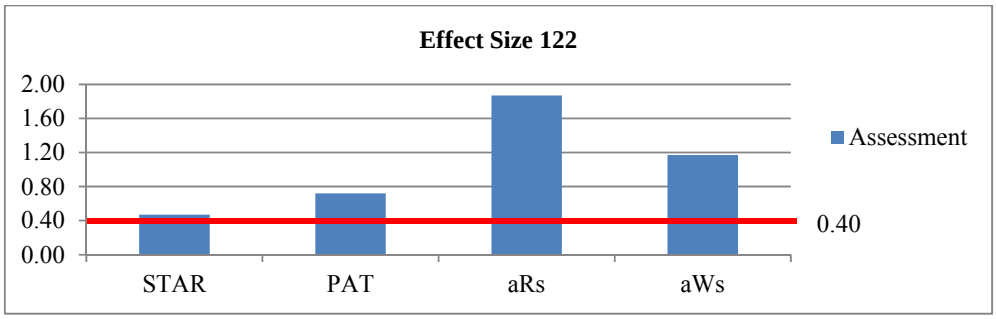


Figure 4.16. Effect size Teacher 122.

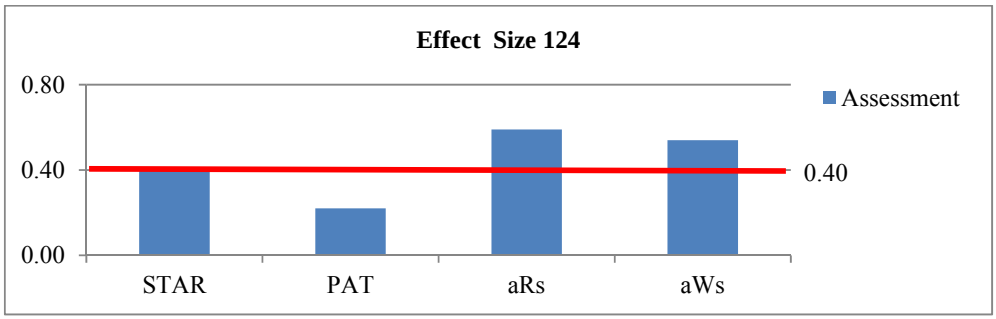


Figure 4.17. Effect size Teacher 124.

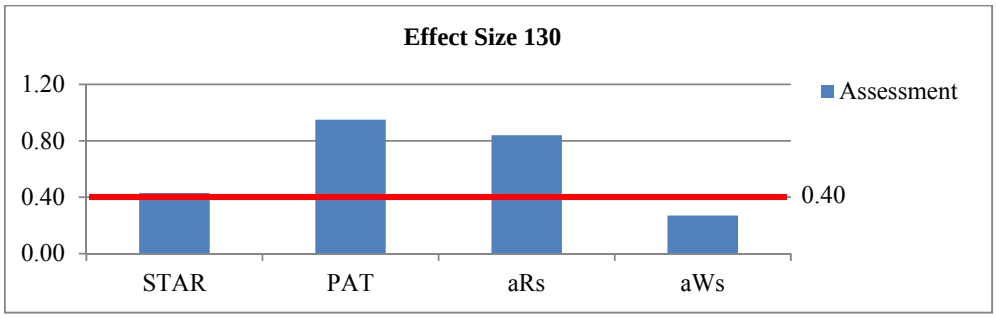


Figure 4.18. Effect size Teacher 130.

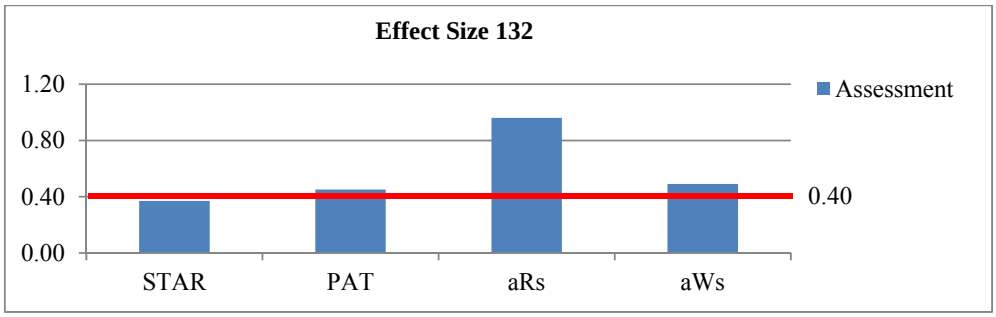


Figure 4.19. Effect size Teacher 132.

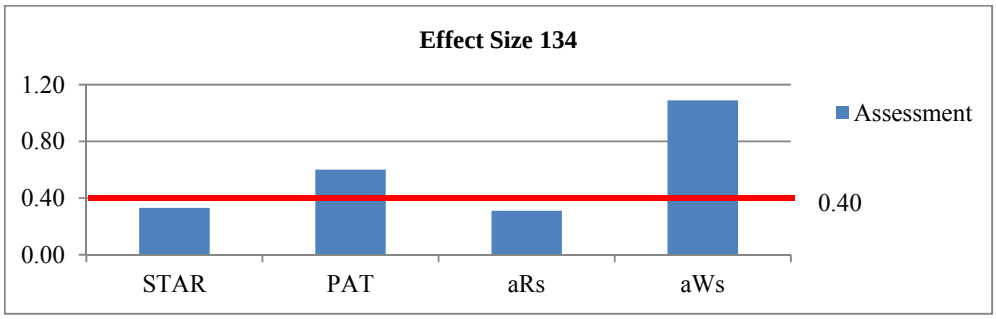


Figure 4.20. Effect size Teacher 134.

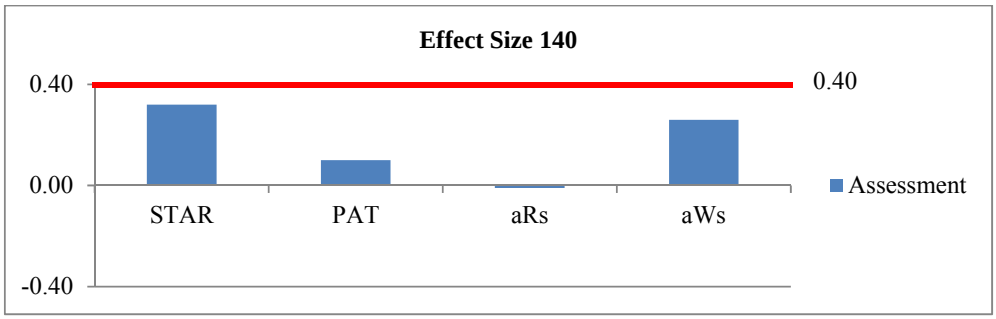


Figure 4.21. Effect size Teacher 140.

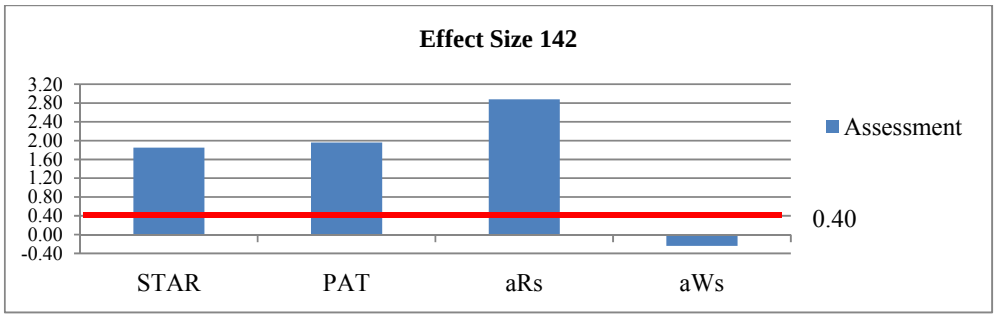


Figure 4.22. Effect size Teacher 142.

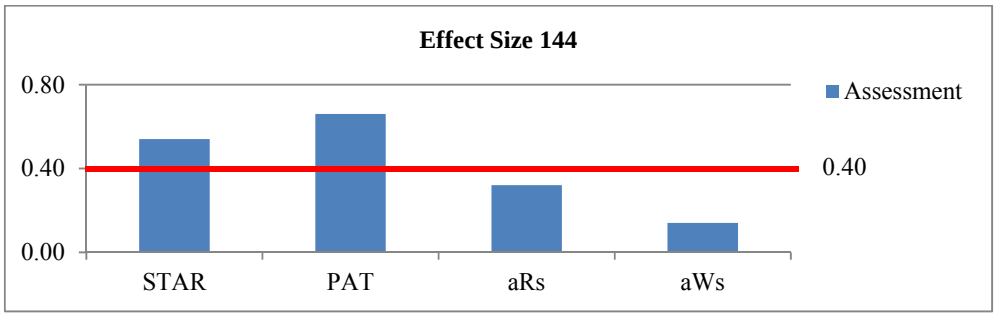


Figure 4.23. Effect size Teacher 144.

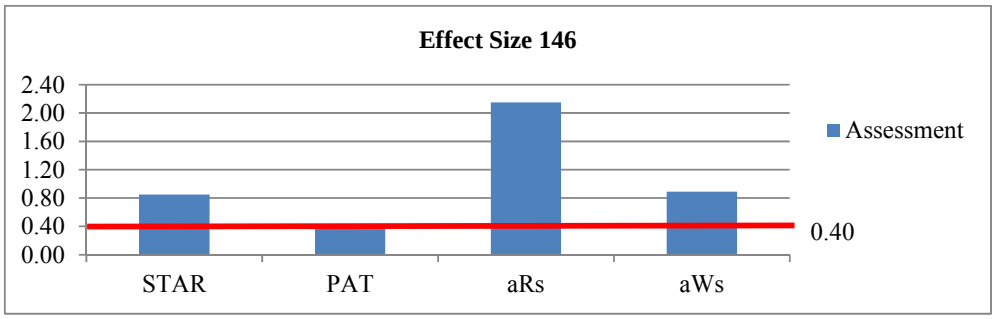


Figure 4.24. Effect size Teacher 146.

4.5 Summary

This chapter has provided a presentation of the results from the application of the QTI in a New Zealand primary school. It has shown that data collected in a New Zealand primary school are valid and reliable and can be used for research purposes. The QTI has provided profiles of the school and of each teacher within the school. Also presented are the assessment data collected at the beginning and end of the year that the school uses to determine the academic progress the students are making in the school.

In Chapter Five, individual teacher profiles are compared to the academic progress that the students made in that teacher's class. Teachers whose students have shown positive academic progress are compared with those teachers whose students have

performed less favourably. A comparison is also made against the individual profiles of the teachers and the academic progress the class has made.

CHAPTER 5

CASE STUDY COMPARISON OF PROFILE AND ASSESSMENT DATA

5.0 Introduction

This chapter is a presentation of the comparison between the results of the QTI and the Assessment Data and progress that the students have made. Case studies of seven teachers have been used to highlight the relationship between perceptions student have of their teachers and the progress they make academically.

Chapter Four presented the results of the QTI and showed that it was a valid and reliable tool to use in a New Zealand Primary School. Individual profiles were presented and analysed for each teacher. The Assessment Data that were collected at the beginning and end of the year were presented via a series of graphs, showing the effect size for each type of assessment, for the whole school and for each individual teacher. The aim of the research can now be examined. Do students have higher academic outcomes or do they make more progress academically when they have teachers that they feel are more friendly and understanding towards them? Does the teacher make a difference in the classroom? Does the relationship the students have with their teacher have an effect on the academic progress that they make?

Common sense would tell us it must. If a child is happy at school, then surely they will learn better. Previous research has corroborated this theory, although there is much debate about what actually makes the difference in a classroom (Brekelmans, Wubbels & Levy, 1993; Hattie, 2009, 2012; Levy, Créton & Wubbels, 1993; Waldrip, Fisher, Reene, & Dorman, 2008). John Hattie, a prominent researcher in New Zealand has sparked much of this debate in New Zealand schools, and in the public domain. In recent times, the news media have more openly scrutinised the

education system in New Zealand and the effect teachers have in New Zealand schools.

With the introduction of National Standards in New Zealand Primary Schools, the public are more concerned with how their school and the teacher of their child compares with other teachers and schools across New Zealand. Teachers are concerned that with the introduction of National Standards teaching quality may suffer as teachers may teach to the test.

The QTI was administered to all students at the school and the assessment data were analysed as part of the process of regular school wide data analysis within the school. The assessment data covered a range of curriculum areas, Reading, Writing and Mathematics. The rest of this chapter compares specific teacher profiles with the academic progress of the students in that teacher's class. The specific teachers were chosen for further analysis because of the effect on student achievement they had across the academic year or because of the individual QTI profile they scored.

The individual teacher's graphs show that only two teachers, 112 and 122 had an effect size shift of 0.40 or greater in all areas of the curriculum. Whilst Teacher 142 had very high effect size shifts in areas of reading, aRs and STAR, and mathematics, PAT, the effect size in writing, aWs, was negative. Teacher 140 had the least effect size shift across all the classes. All curriculum areas for Teacher 140 were well below the hinge-point of 0.40, with the reading aRs effect size showing a negative result. Teachers 140, 108, 132 and 120 showed the least impressive effect size across all four assessments.

5.1 Case Study Effect Size Teacher 140

The students' perceptions of Teacher 140's interpersonal behaviour are presented in Table 5.1. He/she has reasonable mean scores for Leadership, Helping/Friendly and

Understanding, which are above the mean scores for the total school. However, the scores for Uncertain and Admonishing behaviour are higher than the overall school mean.

Table 5.1

Students' Perceptions of Teacher 140's Interpersonal Behaviour

Teacher	No	QTI	Lead	Help/Fr	Under	Freed	Uncert	Dissat	Admon	Strict
140	23	Mean	3.27	3.38	3.17	1.80	1.57	0.61	2.04	1.57
		S Dev	0.46	0.42	0.69	0.39	0.69	0.53	0.66	0.47
Total	379	Mean	2.93	2.95	2.85	1.69	1.31	1.09	1.68	1.82
School		S Dev	0.65	0.74	0.70	0.58	0.74	0.75	0.90	0.62

Teacher 140's profile in Figure 5.1 shows a combination of Tolerant/Authoritative and Directive typologies, based on the typical typologies discussed by Brekelmans, Levy, and Rodriguez (1993), as shown in Figure 5.2 This teacher appears to be organised and to run a structured learning environment. The teacher is not overly close to his/her students and the students are used to outbursts of aggression. The teacher dominates class discussion and tends to shout at the students to get their attention. The teacher often expresses irritation and the students are aware when the teacher is upset or angry. This teacher is also higher in Uncertain behaviour. According to Brekelmans, Levy, and Rodriguez (1993), Directive teachers are least cooperative. When this is combined with the higher levels of Uncertain and Admonishing Behaviour the teacher exhibits a less organised and structured environment than perhaps an Authoritative/Tolerant teacher would.

Probably only the students at the front of the class are actually paying attention and stay on task. Instructions are often repeated and when the teacher is not listened to, the teacher resorts to shouting at the students. The teacher does not follow through with behaviour management strategies. The higher levels of uncertainty and tolerance presented by this teacher, along with the higher levels of admonishment suggest that the levels of leadership and uncertainty were at conflict with each other in the classroom. Teacher 140 is confident and assured that he/she is a good teacher.

The teacher works hard to make the classroom a pleasant and interesting environment, though a lot of the wall display is teacher made material.

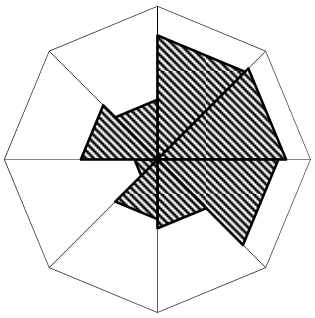
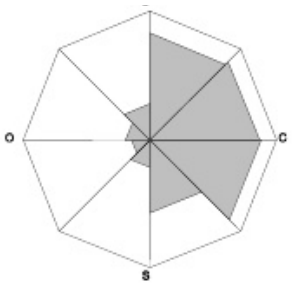
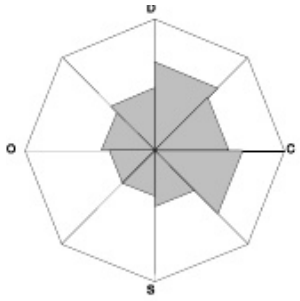


Figure 5.1. QTI Profile for Teacher 140.





Tolerant and Authoritative *Directive*

Figure 5.2. Typologies of Tolerant/Authoritative and Directive interpersonal styles.

The most interesting factor about Teacher 140 is that he/she had the least impressive effect sizes across all the assessments for all the teachers within the school. Table 5.2 presents the effect size for Teacher 140 and it is clear that all the scores were well below the hinge-point of 0.40.

Table 5.2
Teacher 140's Assessment Effect Size

Assessment	STAR	PAT	aRs	aWs
Effect Size	0.32	0.10	-0.01	0.26

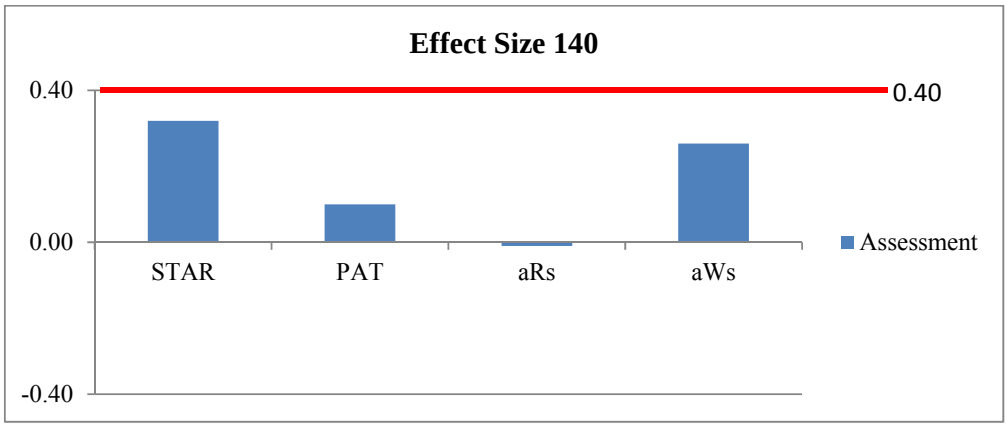


Figure 5.3. Effect size for Teacher 140.

The highest effect size the teacher had was 0.32 for the STAR assessment which measures six different reading strategies. The next best score was for asTTle Writing, at a score of 0.26. In the PAT mathematics assessment the effect the teacher had on the learning of the students was 0.10, whilst the least impressive effect size for Teacher 140 was for asTTle Reading where a negative effect of -0.01 was achieved. This means that the students in the class went backwards in their overall scores for the asTTle Reading assessment from the beginning of the year to the end of the year. Whilst some individual students may have performed more positively, the mean for the class shows a negative result.

According to research undertaken by Hattie (2012), normal expected progress within a classroom should be above the 0.40 mark. Progress higher than this is better than expected progress and progress lower than this means we should be asking questions about that teacher's practice. Of course, there can be extenuating circumstances, and other reasons for a class performing poorly, however, when combined with a range of assessments that have all shown lower than expected improvement, questions about what is going on in this classroom need to be asked.

5.2 Case Study Effect Size Teacher 120

Teacher 120 presents some interesting information. From the QTI data given in Table 5.3 it is clear that the teacher had lower scores for Leadership, Helping/Friendly, Understanding and Student Responsibility and Freedom than the school means. In fact, 120 had the lowest mean score for Student Responsibility and Freedom of all the teachers in the study. Apart from Uncertain behaviour, 1.32, which was near the school mean of 1.31, the other dimensions, Dissatisfied, Admonishing and Strict behaviour were also below the school means.

Figure 5.4 displays Teacher 120's QTI profile. When comparing the eight typologies of teacher interpersonal communication with Teacher 120's profile the best fit is the Directive interpersonal style as shown in Figure 5.5. One can see from these profiles that although Teacher 120 has a slightly higher mean score for Helping/Friendly and a lower score for Dissatisfied behaviour than the Directive typology, it is still the best fit for this teacher.

Table 5.3
Students' Perceptions of Teacher 120's Interpersonal Behaviour

Teacher	No	QTI	Lead	Help/Fr	Under	Freed	Uncert	Dissat	Admon	Strict
120	26	Mean	2.67	2.73	2.62	1.40	1.32	0.97	1.49	1.74
		S Dev	0.52	0.74	0.70	0.48	0.78	0.76	0.90	0.41
Total	379	Mean	2.93	2.95	2.85	1.69	1.31	1.09	1.68	1.82
School		S Dev	0.65	0.74	0.70	0.58	0.74	0.75	0.90	0.62

The Directive teacher is organised and planned for the lessons. Lessons run according to time. Generally, the conversation in the classroom is done by the teacher; the students sit and listen as the teacher give a series of instructions. Usually the teacher in a Directive classroom keeps their distance from the students and does not form strong relationships. On the surface things appear to run smoothly, though this requires constant attention and effort from the teacher. The Directive teacher gets

angry with the students and calls students who are misbehaving to order (Brekelmans, Levy & Rodriguez, 1993).

Teacher 120 finds teaching challenging and struggles with any students who are not able to sit quietly and get on with the task at hand. The teacher has little faith in the students and is afraid to try new things or ways of teaching, believing that the students in their class would not cope. Often there is an excuse as to why something cannot be done, and usually it has to do with the lack of faith and trust the teacher has in the ability of the students.

The assessment data for Teacher 120 portray an interesting picture. The data for the effect size is given in Table 5.4. Only in one of the assessments, STAR reading did the teacher achieve a higher than 0.40 effect size shift. In the other three assessments the teacher made a less than expected shift in achievement. The scores ranged from 0.38 for PAT mathematics, 0.30 for aWs writing and 0.21 for aRs reading.

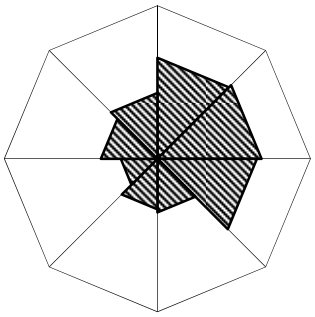


Figure 5.4. QTI Profile for Teacher 120.

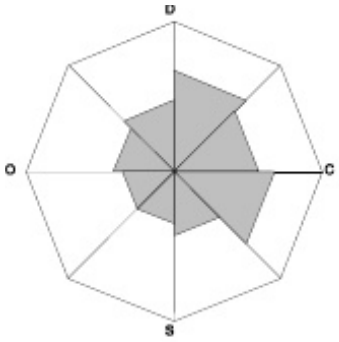


Figure 5.5. Typology of Directive Interpersonal Style.

When looking at the graph in Figure 5.6, it is clear to see that this teacher performed below what is considered to be an average shift in one year of teaching (Hattie, 2009, 2012). The students in this class did not achieve as well as they could have. The question is why. The teacher is obviously teaching as the students have performed well in the STAR reading assessment, however, is the lack of trust and ability to be flexible in the type and style of learning in the classroom affecting the progress the class is making in other areas.

Table 5.4
Teacher 120's Assessment Effect Size

Assessment	STAR	PAT	aRs	aWs
Effect Size	0.50	0.38	0.21	0.30

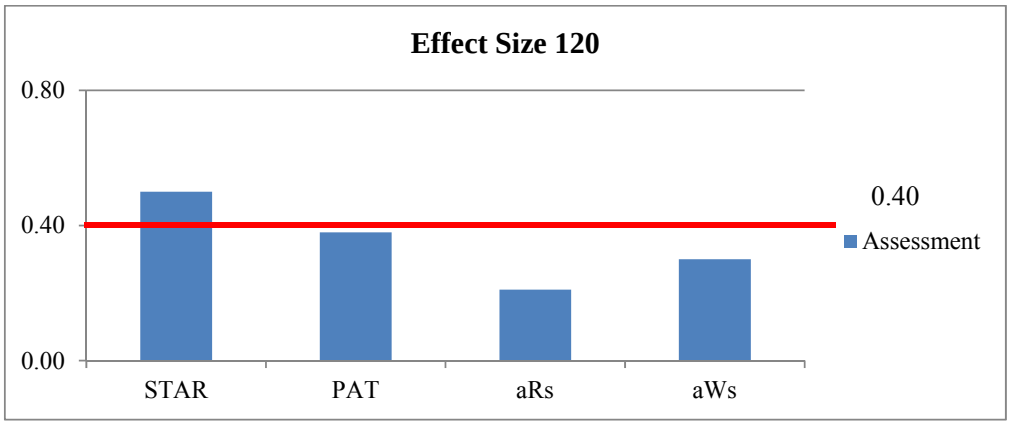


Figure 5.6. Effect Size for Teacher 120.

5.3 Case Study Effect Size Teacher 116

Teacher 116 has the most dissimilar profile compared to the rest of the teachers within the school. This profile can be likened to the Drudging typology. The students' perceptions of this teacher are presented in Table 5.5 and the profile is shown in Figure 5.7. This teacher scored lower than the school mean for all of the sectors in the Dominance and Cooperation segments. The mean score was the lowest for Leadership, Helping/Friendly and Understanding across the whole school. In contrast, the mean score was the highest for Dissatisfied, the second highest for Uncertain and third highest for Admonishing.

Table 5.5

Students' Perceptions of Teacher 116's Interpersonal Behaviour

Teacher	No	QTI	Lead	Help/Fr	Under	Freed	Uncert	Dissat	Admon	Strict
116	26	Mean	2.38	2.15	2.15	1.54	1.72	1.63	2.09	1.77
		S Dev	0.70	0.94	0.71	0.49	0.74	0.89	0.90	0.53
Total	379	Mean	2.93	2.95	2.85	1.69	1.31	1.09	1.68	1.82
School		S Dev	0.65	0.74	0.70	0.58	0.74	0.75	0.90	0.62

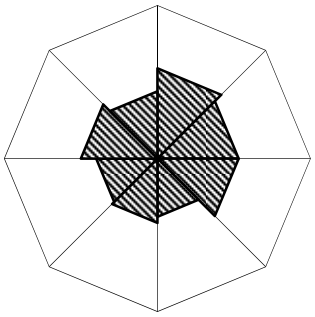


Figure 5.7. QTI profile for Teacher 116.

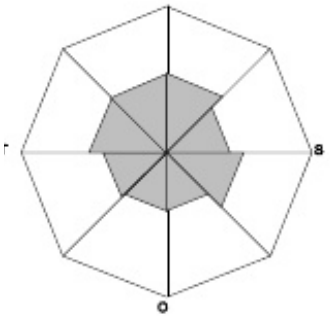


Figure 5.8. Typology of Drudging Interpersonal Style.

Teacher 116's profile when compared to the Drudging typology as shown in Figure 5.8 has clear similarities. The Drudging teacher struggles to maintain discipline and structure in the classroom (Brekelmans, Levy & Rodriguez, 1993). Combined with this struggle, the negativity expressed by the teacher means that the students in the class struggle to feel included or valued. They complain about the teacher's lack of happiness and feel as though the teacher never smiles. The students in this classroom openly discuss that the teacher is always angry and they find it difficult to gain approval either for their work or individually as people.

The classroom is often messy and the work the students do is not displayed or presented in the class. The quality of work accepted is of a lower standard and students don't feel that their efforts are rewarded. The Drudging teacher profile fits this teacher well. The lessons in the classroom are usually teacher directed, and the

teacher does most of the talking. This is in part due to the teacher's lack of motivation and high level of dissatisfaction. The teacher feels that the students won't cope with more student interaction, conversation or group work. The teacher follows set routines and though the teacher is well organised and structured there is little variance to the routine. Lessons are repetitive and often seen as boring by the students.

Interestingly, although the students have rated the interpersonal interactions they have with Teacher 116 as Drudging, the effect size the teacher has had is much greater than Teacher 140. In Table 5.6 the teacher's effect size data is displayed. Teacher 116 achieved an effect size greater than 0.40 for three of the school wide assessments. For the STAR reading assessment, Teacher 116 achieved an effect size of 0.57, and for PAT mathematics the effect size was 0.54. Similarly, the effect size was 0.53 for the asTTle Reading assessment. Only in the asTTle Writing assessment did the teacher not achieve an effect size of above 0.40, but showed a negative effect of -0.29 as shown in Figure 5.10.

Table 5.6
Teacher 116's Assessment Effect Size

Assessment	STAR	PAT	aRs	aWs
Effect Size	0.57	0.54	0.53	-0.29

Obviously, the teacher is doing some things right in this classroom. The students are learning and have made better than expected progress in three of the assessments. Writing is the exception to this. There are some explanations within the school as to why writing has generally achieved a lower effect in the majority of the classes. In fact, nine of the teachers did not achieve an effect of 0.40 or greater.

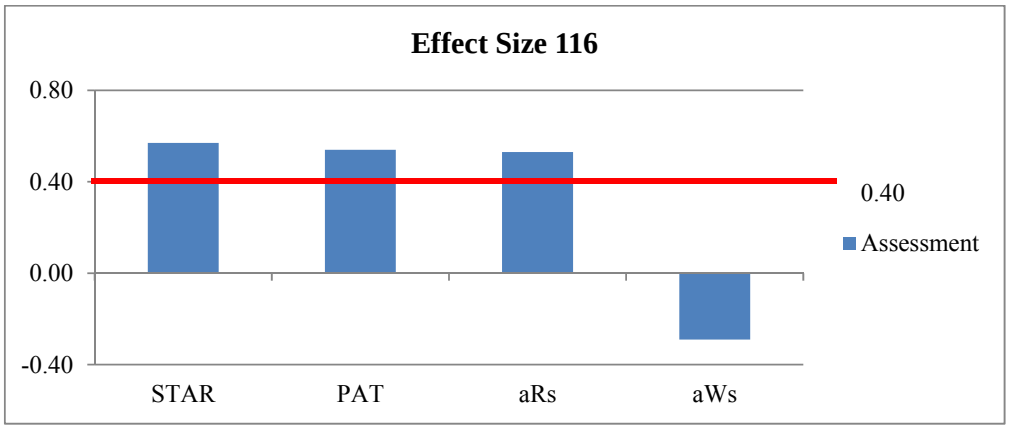


Figure 5.9. Effect size for Teacher 116.

The marking of asTTle Writing is a long and involved process and required new learning for a lot of the teachers within the school. The writing is marked using seven indicators and is quite challenging for a lot of teachers. The writing needs to be analysed and marked against the rubric and them moderated across the school. The school has spent a considerable amount of time up skilling teachers' knowledge and understanding of the writing process, the marking of students' writing, followed by working together to moderate the writing to ensure that students are being marked consistently across the school. Along with this professional development for teachers has come an increased knowledge and understanding. In part, this has meant that the marking at the end of the year has been more consistent and moderated more carefully. Hence, some of the lower levels of achievement can be attributed to the higher standard of marking and expectation the teachers had for the student to achieve at a certain level.

Teacher 116 although achieving good results academically in the classroom is considered to be a negative influence within the school. Changing the interpersonal interactions the teacher has with the students is important. The teacher can clearly teach, therefore, needs help to ensure that the learning environment and the interactions the students are having in the classroom and with the teacher are more positive.

5.4 Case Study Effect Size Teacher 132

The data collected from the QTI for Teacher 132 is presented in Table 5.7. The first three interpersonal behaviours, Leadership, Helping/Friendly and Understanding perceived by the students are lower than the school means. The teacher has the highest score in the school for both Uncertain and Admonishing behaviour and the second highest score for Strict behaviour.

Table 5.7
Students' Perceptions of Teacher 132's Interpersonal Behaviour

Teacher	No	QTI	Lead	Help/Fr	Under	Freed	Uncert	Dissat	Admon	Strict
132	23	Mean	2.68	2.76	2.63	1.83	2.10	1.30	2.84	2.30
		S Dev	0.87	0.55	0.66	0.59	0.54	0.67	0.44	0.40
Total	379	Mean	2.93	2.95	2.85	1.69	1.31	1.09	1.68	1.82
School		S Dev	0.65	0.74	0.70	0.58	0.74	0.75	0.90	0.62

Teacher 132's profile as presented in Figure 5.10 shows an interesting picture with a much higher level for Admonishing behaviour and gives a more fractured circumplex profile. The typology profiles that Teacher 132 matches best are a mixture of the Directive and Uncertain/Aggressive teacher are shown in Figure 5.11.

Teacher 132 runs a well-structured and task oriented learning environment. The teacher appears friendly and understanding and has high standards for the work and the behaviour in the classroom. The teacher in the Directive classroom can get angry unexpectedly; combine this with the Uncertain/Aggressive teacher and the high level of Admonishing and Uncertain behaviour that Teacher 132 exhibits means that this classroom can be a volatile environment. In this classroom, the students and the teacher see each other as opposing forces and students spend their time trying to be disruptive. The teacher then overreacts to the behaviour, which in turn brings about a greater level of misbehaviour. Teacher 132 disciplines the students for minor infractions and spends a lot of time and energy managing the class (Brekelmans,

Levy & Rodriguez, 1993). Teacher 132 often appears disgruntled and unhappy and can be heard moaning about the school and the behaviour of the students. The teacher expects the students to work silently and remain on task. Rules are set and expected to be adhered to.

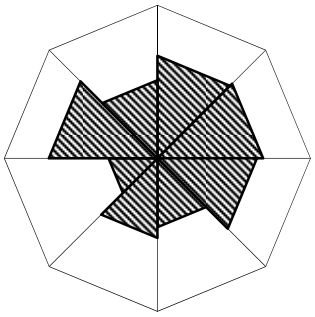
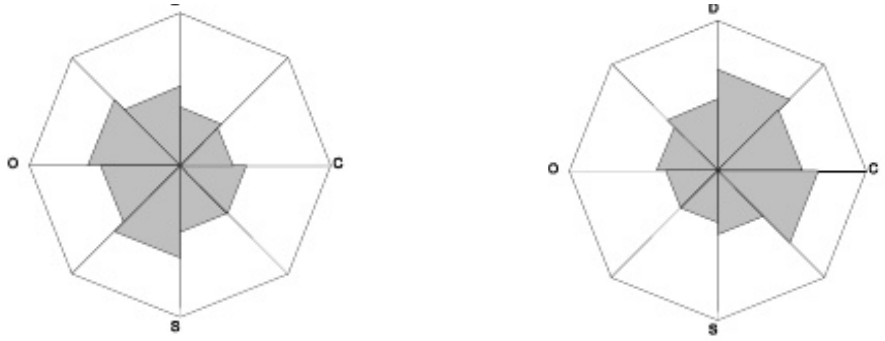


Figure 5.10. QTI profile for Teacher 132.



Uncertain/Aggressive *Directive*

Figure 5.11. Typologies of Uncertain/Aggressive and Directive interpersonal styles.

The effect sizes for Teacher 132 are presented in Table 5.8 and Figure 5.12 displays the data in graph form. This shows that the teacher had an effect size shift of greater than 0.40 for three of the four assessments. This teacher was considered by senior management to be an expert in literacy and had previous experience teaching reading to low achieving students. This is reflected in the high effect shift in asTTle Reading of 0.96. This teacher was a very thorough marker and worked long hours organising,

planning and marking the students' work. This can be seen in the high effect size the teacher had in the writing assessment of 0.49. Given the issues some of the other teachers faced in the administration, teaching and marking of the writing within the school, this teacher had the sixth highest effect size shift in aWs writing.

Table 5.8
Teacher 132's Assessment Effect Size

Assessment	STAR	PAT	aRs	aWs
Effect Size	0.37	0.45	0.96	0.49

Due to the teacher's strong curriculum knowledge and high level of planning and assessment the students have achieved well within the classroom. The perceptions of the quality of interpersonal interaction the students have with their teacher make the learning in the classroom a less pleasant experience, however, no one can deny that the students are learning. The teacher is unhappy and does not enjoy teaching. He/she often talks about leaving the profession and since this research was conducted has left the teaching profession altogether.

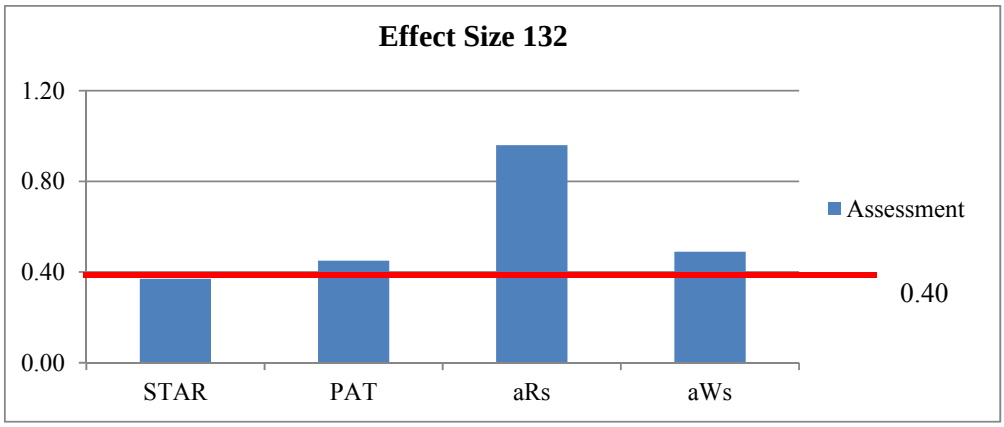


Figure 5.12. Effect size for Teacher 132.

The students' perceptions of Teacher 132, like Teacher 116 are generally negative, though the assessment data shows that they can both clearly teach. It would be a worthwhile investment by the senior leadership team to build team morale and

positive attitudes amongst these staff. If these teachers were more positive in the classroom and able to interact with the students more effectively it would contribute to even greater results and shifts in achievement.

5.5 Case Study Effect Size Teacher 142

Teacher 142's profile presented in Table 5.9 and Figure 5.13 shows that the teacher scored well in all areas of Dominance and Cooperation. The teacher's means for Leadership, Helping/Friendly and Understanding were well above the school means, and the teacher had the second lowest mean score across the school for Admonishing behaviour.

Table 5.9

Students' Perceptions of Teacher 142's Interpersonal Behaviour

Teacher	No	QTI	Lead	Help/Fr	Under	Freed	Uncert	Dissat	Admon	Strict
142	22	Mean	3.54	3.40	3.36	1.87	0.99	1.08	0.95	1.71
		S Dev	0.31	0.52	0.40	0.73	0.71	0.72	0.50	0.61
Total	379	Mean	2.93	2.95	2.85	1.69	1.31	1.09	1.68	1.82
School		S Dev	0.65	0.74	0.70	0.58	0.74	0.75	0.90	0.62

The Tolerant and Authoritative profile illustrated in Figure 5.15 fits Teacher 142's profile the best. The Tolerant and Authoritative teacher is well organised and flexible in their style of teaching. They change the style of teaching to fit the learning, mixing group work and class work seamlessly in the day. Tolerant and Authoritative teachers have a large basket of strategies that they employ depending on the learning taking place and the response the students are having. Teachers who are Tolerant and Authoritative know when to tighten up and when to relax. They can read the class, and know when it is important to call the class back or offer assistance to the whole or to individuals. The atmosphere in the Tolerant and Authoritative teachers' classroom is similar to the Authoritative teachers (Brekelmans, Levy, and Rodriguez, 1993). The classroom is warm and welcoming, and the students enjoy being in the class. They feel valued and part of a group.

Teacher 142 is a well organised and enthusiastic teacher and the Tolerant and Authoritative profile fits this teacher well. Students enjoy being in the class and the teacher works hard to make strong relationships with the students and their families. Teacher 142 has strong behaviour management strategies and is able to ignore minor disruptions, preferring to concentrate on the learning in the classroom.

The question then is, if this teacher is seen by the students to be high in Leadership, Understanding, and Helping/Friendly behaviour and low in Uncertain, Admonishing and Dissatisfied behaviour, do the academic shifts in progress reflect this? The assessment effect data are presented in Table 5.10 and Figure 5.15. Looking at this data illustrates that there appears to be a correlation. The effect shift this teacher has had is impressive. For three of the assessments, STAR reading, PAT mathematics and aRs reading the shift was well above the hinge point of 0.40, with shifts beginning at 1.85 for STAR reading, 1.96 for PAT mathematics and a huge shift of 2.88 for aRs reading. The only distractor in the data is the negative shift in aWs writing of -0.24.

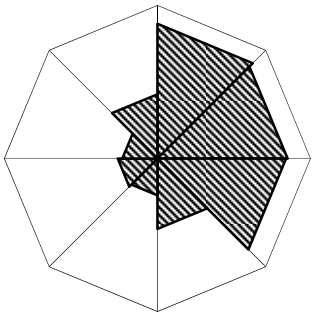


Figure 5.13. QTI profile for Teacher 142.

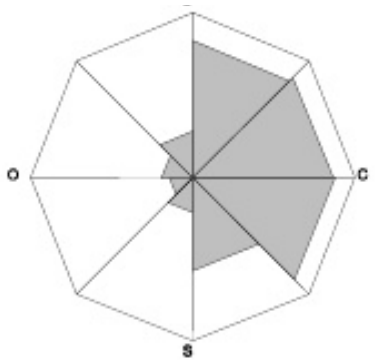


Figure 5.14. Typology of Tolerant/Authoritative interpersonal style.

Clearly this teacher is teaching these students well. The questions rise about the negative shift in writing, and would need further investigation. As discussed earlier in the chapter, writing was undergoing a shift in teacher practice and the marking of writing was more accurate at the end of the year than the beginning. Another question to be addressed is the amount of time the teacher spent teaching writing. Did Teacher 142 concentrate on teaching the basics; reading and mathematics, to the detriment of teaching other curriculum areas? More data would need to be collected to see if there is a trend in the data and perhaps the teaching in the classroom, or does this teacher need more professional development in the teaching of writing?

Table 5.10
Teacher 142's Assessment Effect Size

Assessment	STAR	PAT	aRs	aWs
Effect Size	1.85	1.96	2.88	-0.24

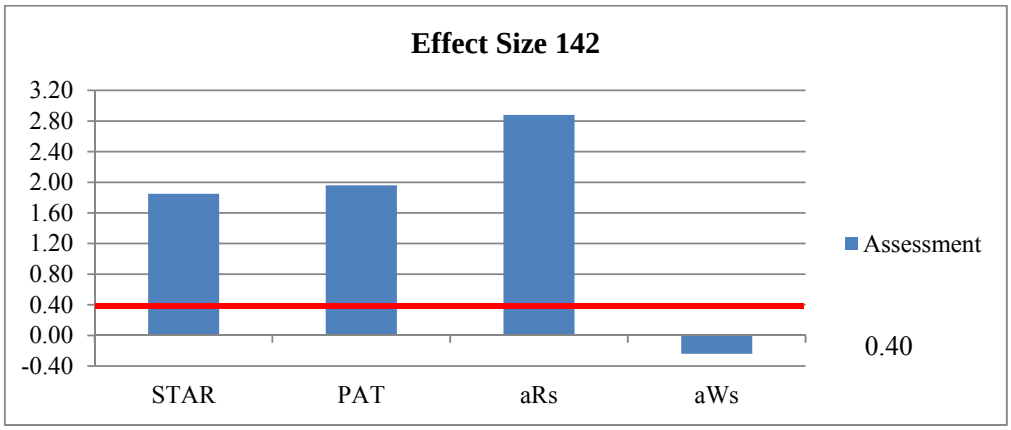


Figure 5.15. Effect size for Teacher 142.

The students in this class were highly motivated, and had been selected specifically for this class. The class was set up to encourage students with academic potential, who had a sporting interest. The students then worked together with other students, all with common goals and interests to achieve at a higher level. The concept has certainly worked for these students. The combination of; being specifically selected, increases parental and teacher expectations because of the selection process, the teacher's ability to get the best out of the students, and to forge strong relationships, all result in creating a classroom in which the students felt valued and a part of this classroom. Alongside the teachers clear ability to teach has meant that these students have had a successful year at the school.

5.6 Case Study Effect Size Teachers 112 and 122

Teachers 112 and 122 were the only two teachers to achieve an effect size shift of greater than 0.40 for all four assessments. The QTI data for these teachers are presented in Table 5.11 and the profiles are displayed in Figure 5.16. Both of these teachers scored higher than the school mean for Leadership, Helping/Friendly, and Understanding behaviours. Teacher 122 scored a lower mean for Student Responsibility and Freedom and scored the lowest overall means for Uncertain, Dissatisfied and Admonishing behaviour. Teacher 112 scored a higher mean for

Dissatisfied behaviour but lower for Admonishing behaviour and both teachers were close to the school mean for Strict behaviour.

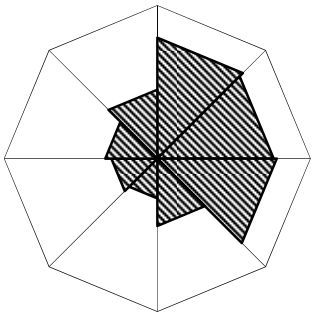
Teacher 112, although seen as stricter than Teacher 122, gave more in student freedom and responsibility. The QTI profiles in Figure 5.16 of each teacher present a similar picture. Both teachers can be matched to the Tolerant and Authoritative typology shown in Figure 5.17. As previously discussed, the Tolerant and Authoritative teacher uses a variety of teaching strategies to teach the students. They make decisions based on what is best for the students. They are adaptable and respond to the learning needs of the students day to day in the class.

Table 5.11

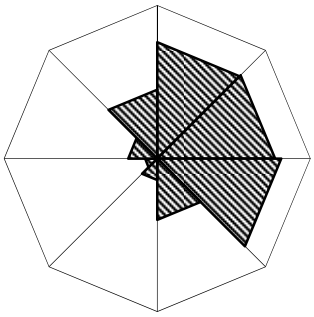
Students' Perceptions of Teacher 112's & 122's Interpersonal Behaviour

Teacher	No	QTI	Lead	Help/Fr	Under	Freed	Uncert	Dissat	Admon	Strict
112	24	Mean	3.17	3.04	3.12	1.79	1.06	1.22	1.38	1.81
		S Dev	0.36	0.58	0.44	0.40	0.48	0.45	0.55	0.56
122	22	Mean	3.05	3.09	3.24	1.62	0.57	0.35	0.80	1.83
		S Dev	0.49	0.61	0.44	0.49	0.48	0.30	0.49	0.64
Total	379	Mean	2.93	2.95	2.85	1.69	1.31	1.09	1.68	1.82
School		S Dev	0.65	0.74	0.70	0.58	0.74	0.75	0.90	0.62

They are organised and planned and frequently use group instruction methods to engage the students in their learning. Teachers 112 and 122 have strong behaviour management techniques and get on with the learning, ignoring minor infractions and disruptions created by the students. Close relationships are developed with the students and the students feel valued and supported (Brekelmans, Levy, & Rodriguez, 1993).



Teacher 112



Teacher 122

Figure 5.16. QTI profiles for Teachers 112 and 122.

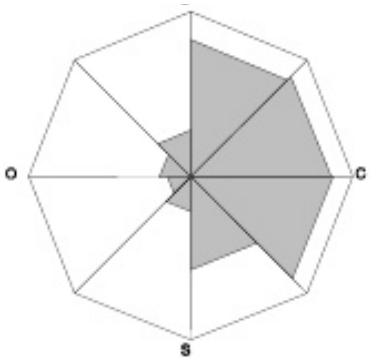


Figure 5.17. Typology of Tolerant/Authoritative interpersonal style.

The effect size that both these teachers achieved for all four of the assessments are above the hinge-point of 0.40 as displayed in Table 5.12. The lowest effect size was for Teacher 122 of 0.47 for the STAR reading assessment and 0.64 for the PAT mathematics assessment for Teacher 112. The highest score both teachers achieved was for the aRs reading assessment, 1.87 for Teacher 122 and 1.49 for Teacher 112.

Table 5.12
Teachers 112 and 122's Assessment Effect Size

Teacher	Assessment	STAR	PAT	aRs	aWs
112	Effect Size	1.00	0.64	1.49	0.94
122		0.47	0.72	1.87	1.17

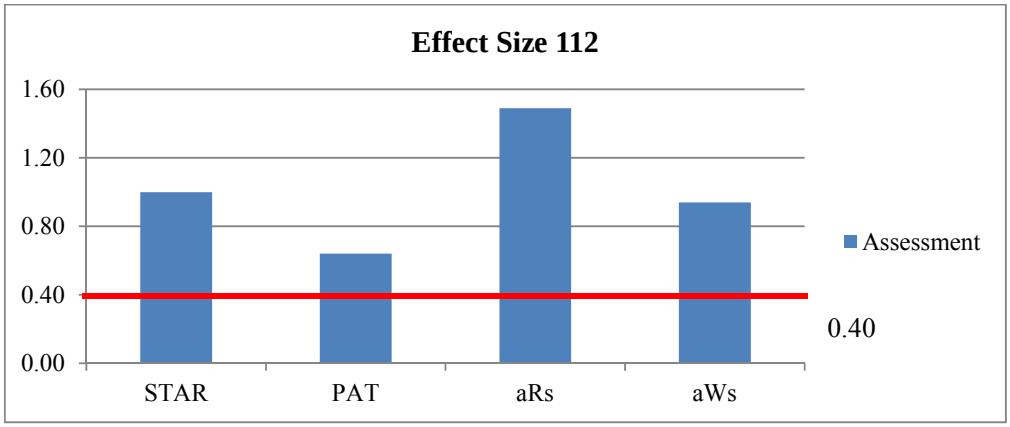


Figure 5.18. Effect size for Teacher 112.

Like Teacher 142, Teacher 122's class was also a selected class, where students and families applied to enter the class. Ultimately, although the class is called the Gifted and Talented Education (GATE) class the students are selected on academic ability. These students were Year 7 and were the top achieving students in the cohort. The students in this class already have a clear understanding of the curriculum and are keen participants in learning and in the classroom. Generally, there are less behaviour management concerns in this classroom and most of the students come from a higher socio-economic background. The parents have a high interest in the program being delivered in the classroom and are often communicating with the teacher.

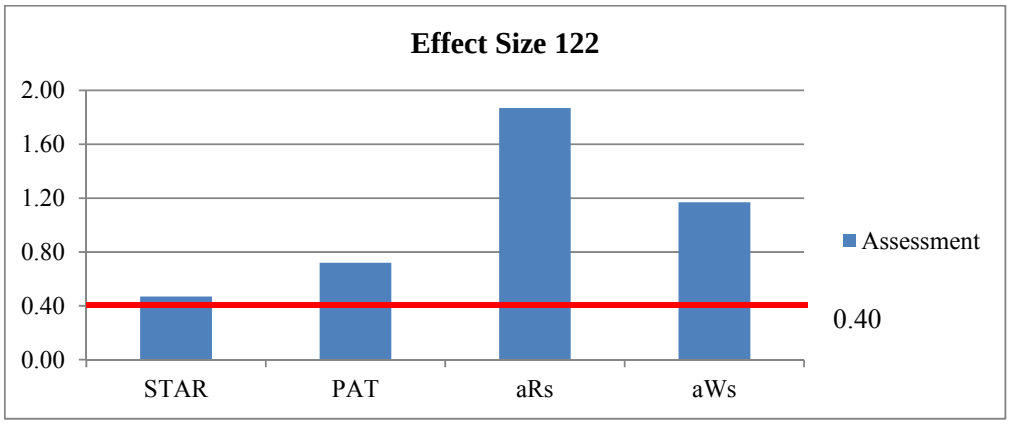


Figure 5.19. Effect size for Teacher 122.

In Figures 5.18 and 5.19, the effect sizes of these teachers are clearly displayed. They had the best overall and most consistent scores across all the areas of the curriculum. Clearly, both these teachers were effective practitioners in the classroom. The students were in an environment where not only did they learn, they also felt valued and supported, which is reflected in the data obtained from the QTI. The QTI profiles place both these teachers into the Tolerant and Authoritative typology.

5.7 Conclusions

From the data presented in this chapter, some general conclusions can be drawn. The questions posed by the researcher were to establish if it was the teacher that makes the difference in the classroom? If the students get along well with the teacher and the teacher forms good relationships with the students does that have an impact on the quality of learning in the classroom? From this research, teachers who match the Tolerant and Authoritative Teacher typology achieve higher shifts in academic achievement than those teachers who have a Directive typology or a Directive influence in their teaching behaviour.

The research has also shown that teachers need to be able to teach first, even if the interactions with the students are not as positive. If the teacher has the skills and knowledge of how to teach then they are able to achieve better than average shifts in

achievement as seen with Teacher 116 and 132. Whereas, Teachers 140 and 120, whose students rated the interpersonal interactions they had with their teachers fairly well, had the poorest shifts in academic achievement across the whole school. As seen with Teachers 140 and 122, happiness is not necessary the key to being able to shift student achievement, one has to also be able to teach, engage the students and shift them forward in their learning. However, if you have some teachers that can teach despite their ability to have positive student teacher interpersonal interactions what could they do if they were given some assistance in this area?

5.8 Summary

In this chapter both the QTI and Effect Size assessment data for seven of the teachers at the school are presented in the form of case studies. Teachers were selected to be included in the chapter either because of the interesting QTI profile they had or because of the picture the assessment data gave.

The first two case studies were for Teachers 140 and 120 and were chosen because they had lower than expected shifts in academic achievement- effect size for the students in their class. The next two teachers, 116 and 132, were chosen because of their interesting QTI profiles. Whilst they both had negative looking profiles, the assessment data for these teachers was more positive and generally showed good shifts in the academic assessments. The last three teachers were selected as they had both positive QTI profiles and positive shifts in achievement. Teacher 142 had the highest effect size for three of the assessments and a positive profile. Teachers 112 and 122 are presented together as they both had the most consistent shift in achievement of all the teachers. They were the only two teachers in the school to have a higher than 0.40 effect shift in all of the assessments.

The next chapter is the concluding chapter. Chapter Six summarises the findings from this study, presents the final conclusions and answers the questions that were posed by the research. Lastly, some recommendations are made for further development within the school.

CHAPTER 6

CONCLUSION

6.0 Introduction

The main aim of this research study was to investigate the correlation between the teacher-student interactions and shift in cognitive achievement in a New Zealand primary school. This final chapter concludes the thesis. An overview of the structure of the thesis is presented, followed by the major findings of the study and answers to the questions posed at the beginning of the study. The significance and implications of the study are considered next, followed by the limitations of the study and directions for further research. The chapter is concluded with a summary.

6.1 Overview of Thesis

Human beings are extremely complex. The way we learn is intricate and complex and teaching is multifaceted and complicated. Teaching and learning are complex and the learning environment and relationships formed in the classroom affect what happens within the classroom. When researching learning and teaching it becomes difficult to ascertain exactly what it is that works. This thesis looks at the correlations between effective teaching: the ability to raise student achievement and the interpersonal interactions students have with their teachers.

The interactions students have with their teachers in a New Zealand primary school, effective teaching practices and the effect size that the teachers had for a range of academic standardised assessments are described in this thesis. This study used the Questionnaire on Teacher Interaction (QTI) to determine the perceptions of teacher student interactions and data from standardised achievement tests to determine the effect size each teacher had for their students.

The outline of the study, the background of the school and the aims of the research are presented in Chapter One. The purposes of the study as outlined in Chapter One are:

1. to study the interpersonal interactions between teachers and students in a primary school in New Zealand.

2. to determine to the levels of achievement of the students.

3. to determine whether there are any associations between the teacher student interpersonal interactions and the levels of academic achievement of the students in a primary school in New Zealand.

Chapter Two reviews the literature from research already undertaken on the areas pertaining to the study. The use and development of the QTI is investigated, followed by the use of assessment and standardised assessment tools used in New Zealand schools. The use of effect size as a measurement tool and the research on effective teaching conclude the chapter.

Chapter Three explains the methodology used in the research. The quantitative and qualitative methods used for the collection of data about the perceptions of the interactions the students had with their teachers are described. The participation and sampling of students who participated in the study is given. 379 students completed the Questionnaire on Teacher Interaction (QTI) from 16 classrooms across the school. The students were in Year 7 or Year 8. A further 31 students completed the questionnaire the following year, after the first QTI established that a teacher was having difficulties with the relationships of the students in the classroom. The collection of the assessment data and an explanation and background of the types of assessment is provided. The assessments used were the STAR reading, PAT Mathematics, and the asTTle Reading and asTTle Writing tests. The data analysis and interpretation of data is included along with the ethical issues faced in the research.

Chapter Four presents the QTI results and profiles generated from the QTI for teachers within the school. The validation of the QTI is presented and the QTI is shown to be a valid and reliable tool for use in a New Zealand primary school. The typologies developed by Brekelmans, Levy and Rodriguez, (1993) are explained and the QTI profiles for the school and the individual teachers are illustrated. The assessment data is offered for each assessment and teacher. The effect size has been calculated and is presented as a series of graphs.

Chapter Five is a comparison between the QTI profiles and the assessment data and academic shifts the students made in seven classrooms. The teachers were chosen for the case study based on the relationship between their QTI profile and the effect size they had with their students. The first two teachers studied have a lower effect size but reasonable QTI profiles, the next two teachers were selected because although they had less desirable QTI profiles they had reasonable effect sizes, whilst the last three teachers chosen had both positive QTI profiles and positive effect sizes.

The QTI was completed by 379 students in 2009 and a further 31 students in 2010 in a New Zealand primary school. The students were between the ages of 10 and 13 years and in Years 7 and 8. The perceptions of the student-teachers interpersonal behaviour was recorded and analysed. The QTI was validated and found to be a reliable tool for use in a New Zealand primary school. The school- wide assessment data from both the start and end of the year was collected and analysed to determine the shifts in student achievement. Effect size was determined to be the best way to show the changes that occurred, as it is able to distinguish between different types of assessment and across different types of curricula.

Associations were able to be made about the perceptions the students have of their teachers and the shifts in academic achievement. The research has been effective in answering the questions posed by the researcher at the beginning of the study. The school was facing a number of issues and a poor community perception. There were difficulties with leadership and teachers were left to themselves. Through her role within the school, the researcher noted some teachers were not making changes in

academic achievement, whilst others were making consistent and at times exceptional gains. Looking ahead at school development raised the question, was there an association between the way the teachers and students interacted and the academic shifts the students were making? If so, could teachers be given professional development to assist them in improving these relationships and in turn raise students' levels of achievement?

This study gives teachers an insight as to how students perceive the interactions they have with their students. It gives teachers information that they can use to improve those interactions and when the interactions between the teacher and students are better, learning in the classroom can improve. If teachers understand the impact the relationships they form and how the learning environments they establish affect learning, they can work to develop the necessary classroom skills that enhance learning.

The study has shown that there is a correlation between the two. The way the teacher interacts in the classroom matters. The study also shows that other factors matter too. It is not good enough to just be a nice teacher, and have good interactions with the students. Specific behaviour characteristics make a bigger difference than others. Teaching is complex and effective teaching practices are many and varied, however, the research on effective teaching all include one key factor, relationships. Relationships that the teacher establishes with the students are fundamental to the learning and to the attitude the students have about both learning and school.

To make the most of the learning opportunities students need to feel welcome and valued in the classroom. The teacher is pivotal in creating a climate where students can come to learn. What the study does establish is that some teachers scored better than others on the QTI and had higher effect sizes than others. It also gave the teachers information about the way they interacted with the students and the impact they had on the learning of the students. From this teachers were able to determine what the students preferred and work on ways to modify their interactions with the

students and the learning environment in their classes in order to gain higher levels of achievement.

6.2 Major Findings of the Study and Answers to the Research Questions

The specific purpose of this research was to see if the way the teachers interacted with the students impacted on the learning of those students. The questions posed in the study are answered in the following section.

6.2.1 Research Question One

Is the Questionnaire on Teacher Interaction (QTI) a reliable and valid instrument for use in a primary classroom in New Zealand?

This study was one of the first times that the QTI was used in a New Zealand primary school. The QTI proved to be both valid and reliable in the primary school setting in New Zealand. The QTI was an effective tool and able to differentiate between and within classrooms across the school. The students responded to the questionnaire reliably. The circumplex nature of the QTI was supported and adjacent scales had high correlations, whilst opposite scales had low correlations. The QTI was easy to administer and proved to be an effective tool. The profiles created for each teacher have proven to be useful for the teachers within the school and assisted in the development of teacher practice.

6.2.2 Research Question Two

What are the students' perceptions of teachers' interpersonal behaviours in a New Zealand primary school?

The students perceived the teachers at the school to be the strongest in Helping/Friendly (2.95) and Leadership (2.93). Understanding was also perceived highly at (2.85). The lowest scales show students see teachers as least Dissatisfied (1.09) and Uncertain (1.31). Male students perceived the teachers to more Dissatisfied, Admonishing, Strict and Uncertain, than did the female students, although the males also saw the teachers as giving them more Student Freedom and Responsibility. The female students perceived the teachers to be more Helping/Friendly, while both male and female students had similar perceptions about the Leadership of the teachers within the school.

6.2.3 Research Question Three

What are the Questionnaire on Teacher Interaction (QTI) profiles of the different classrooms in a primary school in New Zealand?

The QTI allowed profiles to be created for each teacher and these are presented in Figure 4.3. These profiles when compared to the Dutch typologies of Brekelmans, Levy and Rodriguez, (1993) show a mix of behaviour/teaching styles within the school. The most prevalent style in the school is the Tolerant Authoritative. Three teachers followed the Directive typology. Two teachers were considered to be Uncertain Tolerant, two teachers showed an Authoritative style and one teacher was considered to be a combination of Authoritative and Directive, one was considered to be Repressive. One teacher was a combination of the Directive and Uncertain/Aggressive styles, and one was considered to most fit the Drudging profile.

6.2.4 Research Question Four

Are there any associations between the students' perception of their teachers' interpersonal behaviour and their achievement in reading?

Two different achievement assessments measured the progress the students made in reading. These were the Supplementary Tests of Achievement in Reading (STAR) and the Assessment Tools for Teaching and Learning (asTTle) in Reading. The effect sizes for reading assessments show that twelve out of sixteen teachers were above the hinge-point of 0.40 and had higher than expected shifts in progress when the effect size was calculated for the STAR test, and eleven teachers were above 0.40 for the asTTle Reading test. Teachers who matched the Tolerant Authoritative typology had higher gains than the other teachers. Teachers who matched the Directive and the Authoritative typology had lower scores than other teachers for teaching reading.

6.2.5 Research Question Five

Are there any associations between the students' perception of their teachers' interpersonal behaviour and their achievement in writing?

The writing data gave an interesting picture. This assessment showed the least consistent across the school. Nine teachers achieved a lower effect size than the hinge-point of 0.40, four of these teachers had a negative effect size and three teachers had effect sizes of between 0.0 and 0.30. Only seven teachers achieved a higher than 0.40 effect size, with four of these teachers having impressive gains of 0.89, 0.94, 1.09 and 1.17.

It is more difficult to match typologies with the achievement in writing. The school was undergoing a professional development programme in writing and the marking of writing became more robust throughout the year, resulting in teachers marking the writing more thoroughly by the end of year assessment. This could account for some of the discrepancy in the scores the students received. The teachers who achieved better results in writing match the Tolerant Authoritative (two teachers), Authoritative and Uncertain/Tolerant typologies.

Two of these classes were considered to be Gifted and Talented Education (GATE) classes, with streamed academic students from Year 7 in one class and Year 8 in the other. The writing abilities of these students and their propensity to learn could account for the data being better than the other classes. One of the other teachers in this group of four was the Literacy Leader of the school and led the writing development within the school.

6.2.6 Research Question Six

Are there any associations between the students' perception of their teachers' interpersonal behaviour and their achievement in mathematics?

The PAT mathematics data shows that eleven teachers achieved an effect size of above 0.40 with five teachers below. While there were no negative shifts the lowest effect size was 0.10, followed by 0.22. The other three teachers were only just below the hinge-point and had 0.38, 0.39 and 0.39. The two teachers with the lowest effect size matched the Directive teaching typology. Of the five teachers with the highest effect sizes, three of them matched the Tolerant Authoritative, one the Authoritative, and one the Repressive typologies.

6.2.7 Research Question Seven

Are there significant gains in students' levels of reading, writing and mathematics in Grades 7 & 8, and how are those gains distributed amongst the classes?

Comparing the teachers QTI profiles and their typologies against the assessment data illustrates an interesting picture across the school. The teachers, who seem to have less favourable relationships with their students, don't have the worst effect size for the academic achievement in their classes. Whilst only two teachers, 112 and 122, achieved an effect size shift of greater than 0.40 for all four assessments, some other

teachers had some effective gains in achievement. Teachers 142 had impressive results of: 1.85 (STAR), 2.88 (aRs), and 1.96 (PAT), however, they had a negative effect size of -0.24 (aWs) for asTTle Writing. These three teachers; 112, 122 and 142, all match the Tolerant/Authoritative typology.

The teachers with the least impressive shifts in achievement overall were Teacher 120 and 140. Teacher 120's effect sizes were: 0.50 (STAR), 0.21 (aRs), 0.38 (PAT) and 0.30 (aWs). Teacher 140's effect sizes were: 0.32 (STAR), -0.01 (aRs), 0.10 (PAT) and 0.26 (aWs). Both of these teachers fit the Directive typology. Interestingly the teachers who matched the Drudging typology (116) and the combination of Uncertain/Aggressive and Directive typology (132) had reasonable effect sizes.

6.3 Significance and Implications of the Study

This study has been significant for a number of reasons. First, this is one of the original research studies in which the Questionnaire on Teacher Interaction (QTI) was used to identify the interpersonal interactions between teachers and students in a New Zealand primary school. This has enabled teachers to identify the characteristics of the interpersonal interactions that the teachers have with students. Secondly, the study has looked at the academic gains students have made in four assessments across reading, writing and mathematics. It has presented the shifts in academic assessment as effect size and has correlated the effect size with the interpersonal interactions students have with their teachers. Thirdly, the study has used the information from the QTI and the assessment data to assist teachers in improving their interpersonal interactions they have with their students. The effect size data has assisted teachers to examine their practice and led to professional development in effective teaching practice. By examining the effect size, teachers at the school and school leaders have been able to examine the learning for the students in the school. Finally, this has enabled targeted and specific professional development and discussions with not only other teachers, but also with the students and the parents about the learning that is happening in the classroom.

This study has shown that the variance within schools is vast. The QTI has demonstrated that the teachers within the school have different interpersonal interactions and the students are able to make determinations about these interactions. The QTI was an effective and easy to administer tool in a New Zealand primary school and provides valuable and useful information for the teachers and leaders within the school.

The analysis of the assessment data is also valuable and using effect size to measure the shifts in academic achievement is a valid and reliable way to show the impact the teacher has on the learning within the classroom. This gives teachers and leaders an opportunity to examine what it is they do in the classroom and establish which teachers are making a more positive effect than others. From this, discussions can be had about the learning, and effective teaching practices within the class.

When the two types of data are combined, teachers have a powerful insight into their own practice and the way that the students in their class perceive the interactions the teacher has with them. This opens the door to powerful conversations and gives teachers and school leaders opportunities to improve both the learning of the students and the learning environment in the school. If the learning environment is more positive, that is beneficial to all involved. Teachers may feel greater job satisfaction, and are more likely to stay in the profession longer. The students will be learning and feel valued and respected, and parents and the community will most likely have better perceptions of the school.

The data gathered in this study highlights that the perceptions of the interpersonal interactions students have with their teachers matter. The learning in the classrooms where teachers show high levels of leadership, are helping, friendly and understanding have higher gains in academic achievement. Students in New Zealand appear to prefer teachers who match the Tolerant Authoritative typology, and these teachers had the best gains in achievement overall. Teachers who match the Directive typology have the least effective shifts in achievement. The study also shows that

whilst some teachers have less than favourable profiles from the QTI they are still able to achieve good shifts in academic achievement.

The study highlights the difficulties when determining the traits of effective teachers. Regardless of how nice the teacher appears to be, they have to be able to teach. What this study does do, is give teachers and schools a way of determining the effect the teachers have on the learning in the classroom and the perceptions the students have of the interpersonal interactions with the teacher.

6.4 Limitations

One of the limitations of this study was that the QTI was administered to the students by the Deputy Principal. Although his was done to ensure validity, in that the same person administered the QTI to all the students, this also caused some limitations. The students did not have an established relationship with the Deputy Principal and may have felt more nervous answering the questionnaire; they may have also felt unable to ask for clarification of words or to seek assistance if they felt unsure.

Another limitation of the study is that three of the classes consisted of students that had been specifically selected for those classrooms and for those teachers. Two of the classes were Gifted and Talented Education classes (GATE), one in Year 7 and one in Year 8 and one class was a sports performance class in Year 8. The students and parents in these classes may have had higher expectations for the learning, and the behaviour and attitude of these students about learning and school could have impacted on the data collected for both the QTI and the academic assessments. This may have given these teachers a more favourable profile than if they had a class that had not been specifically selected.

A further limitation is that this was one of the first times that the QTI had been completed in a New Zealand primary school. The fact that the school was undergoing professional development in the area of writing is another limitation. The

teachers were coming to terms with the use of a new writing assessment tool that examined the writing more deeply than had been used previously. The end of year writing was marked by teachers who had more knowledge about the writing process and the assessment tool that was being used. This may have led to the teachers marking the writing more carefully and giving lower marks for the writing than they did at the start of the year.

6.5 Suggestions for further research

This study has paved the way for further research using the QTI in New Zealand primary schools. The QTI would be useful to use in this school again and others in New Zealand to help determine the interactions the students have with their teachers. This information can then be used to help with the professional development in the school that can improve the quality of teaching and learning in the school.

Further research can also be carried out on establishing the effect sizes that teachers have on academic achievement. With the introduction of National Standards in New Zealand the proof of academic progress is more and more important. Measuring the effect size is an effective way for schools and teachers to monitor the impact they are having on the learning of the students in their charge (Dingle & Parr, 2010; Hattie, 2009, 2010; Parr, 2010; Timperley, McNaughton, Lai, Hohepa, Parr & Dingle, 2010).

Other areas of research to follow on from this would be to use other tools to determine what is happening in the classroom. Identifying which teachers are effective in raising student achievement and the establishing of effective learning and teaching relationships would be beneficial. Those teachers could be used as mentors for other teachers to assist them in improving the relationships they have with their students and the teaching and learning environments they create.

6.6 Final comments

The purposes of this study were to determine the associations between the teacher student interpersonal interactions and the levels of academic achievement of the students in a primary school in New Zealand. The students' perceptions were gathered using the Questionnaire on Teacher Interaction (QTI). The assessment data used was from the standardised achievement tests used in the school and consisted of the Assessment Tools for Teaching and Learning (asTTle), assessing reading and writing, the Supplementary Tests of Achievement in Reading (STAR), assessing reading, and the Progressive Achievement Tests, Mathematics (PAT), assessing mathematics.

The associations found in the study have confirmed for the researcher that teaching and learning are complex and multifaceted. Some teachers do make a difference in their classrooms, they are able to form positive relationships with their students, create welcoming and secure learning environments and help their students to learn. They are able to make higher than expected shifts in levels of progress. Teachers have the ability to change the lives of students. This can and should be a positive change. Teachers have a responsibility to do the best they can, and to do that they need to know what it is they are doing. The tools used in this research give teachers those tools. They can determine if they are making a positive difference in the learning and the lives of the students that they teach.

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APPENDICES

APPENDIX A

Questionnaire on Teacher Interaction

Student Questionnaire

This questionnaire asks you to describe the behaviour of your teacher.

This is NOT a test.

Your opinion is what is wanted.

This questionnaire has 48 sentences about the teacher. For each sentence, circle the number corresponding to your response. For example:

	Never				Always
This teacher expresses himself/herself clearly.	0	1	2	3	4

If you think that your teacher always expresses himself/herself clearly, circle the 4. If you think your teacher never expresses himself/herself clearly, circle the 0. You also can choose the numbers 1, 2 and 3 which are in-between.

If you want to change your answer, cross it out and circle a new number.

Please answer all questions.

Thank you for your cooperation.

Name _____ Room_____	Never				Always
1. My teacher talks enthusiastically about her/his subject.	0	1	2	3	4
2. My teacher trusts us.	0	1	2	3	4
3. My teacher seems uncertain.	0	1	2	3	4
4. My teacher gets angry unexpectedly.	0	1	2	3	4
5. My teacher explains things clearly.	0	1	2	3	4
6. If we don't agree with my teacher, we can talk about it.	0	1	2	3	4
7. My teacher is hesitant.	0	1	2	3	4
8. My teacher gets angry quickly.	0	1	2	3	4
9. My teacher holds our attention.	0	1	2	3	4
10. My teacher is willing to explain things again.	0	1	2	3	4
11. My teacher acts as if she/he does not know what to do.	0	1	2	3	4
12. My teacher is too quick to correct us when we break a rule.	0	1	2	3	4
13. My teacher knows everything that goes on in the classroom.	0	1	2	3	4
14. If we have something to say, my teacher will listen.	0	1	2	3	4
15. My teacher lets us boss her/him around.	0	1	2	3	4
16. My teacher is impatient.	0	1	2	3	4
17. My teacher is a good leader.	0	1	2	3	4

18.	My teacher realises when we don't understand.	0 1 2 3 4
19.	My teacher is not sure what to do when we fool around.	0 1 2 3 4
20.	It is easy to pick a fight with my teacher.	0 1 2 3 4
21.	My teacher acts confidently.	0 1 2 3 4
22.	My teacher is patient.	0 1 2 3 4
23.	It's easy to make my teacher appear unsure.	0 1 2 3 4
24.	My teacher makes mocking remarks.	0 1 2 3 4
25.	My teacher helps us with our work.	0 1 2 3 4
26.	We can decide some things in my teacher's class.	0 1 2 3 4
27.	My teacher thinks that we cheat.	0 1 2 3 4
28.	My teacher is strict.	0 1 2 3 4
29.	My teacher is friendly.	0 1 2 3 4
30.	We can influence my teacher.	0 1 2 3 4
31.	My teacher thinks that we don't know anything.	0 1 2 3 4
32.	We have to be silent in my teacher's class.	0 1 2 3 4
33.	My teacher is someone we can depend on.	0 1 2 3 4
34.	My teacher lets decide when we will do the work in class.	0 1 2 3 4
35.	My teacher puts us down.	0 1 2 3 4
36.	My teacher's tests are hard.	0 1 2 3 4

37.	My teacher has a sense of humour.	0 1 2 3 4
38.	My teacher lets us get away with a lot in class.	0 1 2 3 4
39.	My teacher thinks that we can't do things well.	0 1 2 3 4
40.	My teacher's standards are very high.	0 1 2 3 4

41.	My teacher can take a joke.	0 1 2 3 4
42.	My teacher gives us a lot of free time in class.	0 1 2 3 4
43.	My teacher seems dissatisfied.	0 1 2 3 4
44.	My teacher is severe when marking papers.	0 1 2 3 4

45.	My teacher's class is pleasant.	0 1 2 3 4
46.	My teacher is lenient.	0 1 2 3 4
47.	My teacher is suspicious.	0 1 2 3 4
48.	We are afraid of my teacher.	0 1 2 3 4

APPENDIX B

Informed Consent Form- Children

- I know that I don't have to help with the project, but I would like to,
- I know I will be answering some questions and may be invited to join a group of children my age as part of the project.
- I know I can stop whenever I want.
- I understand that the researchers have to contact my parent and school principal if I report or my questionnaire responses indicate that I am feeling very sad or have been hurt.
- I know that I need to write my name in the space below, before I can help with the project.

Child's Name: _____

Date: _____

APPENDIX C

Informed Consent Form- Primary Carers

- I understand the purpose, procedures, and risks of this project, as described within it
- I have discussed this project with my child.
- I am willing for my child to become involved in the project, as described.
- I understand that both my child and I are free to withdraw participation at any time,
- I understand that no personal identifying information, like names or addresses, will be published in the researcher's thesis and journal articles.
- I understand that my and my child's responses and details will be stored separately and securely at the School of Psychology in Curtin University of Technology for a minimum period of 5 years, after which it will be destroyed confidentially.
- I understand that the school principal and I will be contacted if my child's questionnaire indicates that he/she is distressed/in danger or my child reports any distress/danger during the group sessions.
- I have been given the opportunity to ask questions.

Parent's Name: _____

Signature:_____Date: _____

Child's Name: _____

My child is a (please circle) : Boy / Girl

APPENDIX D

Teacher Consent Form

Associations between Student Levels of Achievement and the Perception of the Teacher Student Interactions

I _____ have read the information on the attached letter.

Any questions I have asked have been answered to our/my satisfaction. I agree to participate in this research but understand that I can change my mind or stop at any time.

I understand that all information provided is treated as confidential. I agree for this interview to be taped/recorded.

I agree that research gathered for this study may be published provided names or any other Information that may identify me/us is not used.

Name _____

Signature _____

Date _____

Investigator _____

Signature_____

APPENDIX E

Consent Form

- I understand the purpose and procedures of the study.
- I have been provided with the participant information sheet.
- I understand that the procedure itself may not benefit me.
- I understand that my involvement is voluntary and I can withdraw at any time without problem.
- I understand that no personal identifying information like my name and address will be used and that all information will be securely stored for 7 years before being destroyed.
- I have been given the opportunity to ask questions.
- I agree to participate in the study outlined to me

Signature _____ Date

Witness Signature _____ Date

APPENDIX F

Participant Information Sheet
Curtin University of Technology
School of Science and Mathematics Education

My name is Lynley Schofield I am currently completing a piece of research for my Masters of Philosophy at Curtin University of Technology.

Purpose of Research

I am investigating Associations between student levels of achievement and the perception of the teacher student interactions.

Your Role

I would like to clarify information you have completed in the QTI
I will ask you questions directly from the survey.
The interview process will take approximately 20 minutes.

Consent to Participate

Your involvement in the research is entirely voluntary. You have the right to withdraw at any stage without it affecting your rights or my responsibilities. When you have signed the consent form I will assume that you have agreed to participate and allow me to use your data in this research.

Confidentiality

The information you provide will be kept separate from your personal details, and I will only have access to this. The interview transcript will not have your name or any other identifying information on it and in adherence to university policy, the interview tapes and transcribed information will be kept in a locked cabinet for five years, before it is destroyed.

Further Information

This research has been reviewed and given approval by Curtin University of Technology Human Research Ethics Committee (Approval number SMEC 20080063). If you would like further information about the study, please feel free to contact me on 5755512 or by email: l.schofield@mtint.school.co.nz. Alternatively, you can contact my supervisor Paul Kayes on 5423913 or kayes@eol.co.nz

Thank you very much for your involvement in this research, your participation is greatly appreciated.

APPENDIX G

Effect Size Data for Each Assessment and Teacher Within the School

Teacher	STAR	PAT	aRs	aWs
106	0.50	0.78	0.78	-0.23
108	0.59	0.96	0.23	-0.12
110	0.25	0.56	0.53	0.42
112	1.00	0.64	1.49	0.94
114	0.75	0.39	1.14	0.36
116	0.57	0.54	0.53	-0.29
120	0.50	0.38	0.21	0.30
122	0.47	0.72	1.87	1.17
124	0.40	0.22	0.59	0.54
130	0.43	0.95	0.84	0.27
132	0.37	0.45	0.96	0.49
134	0.33	0.60	0.31	1.09
140	0.32	0.10	-0.01	0.26
142	1.85	1.96	2.88	-0.24
144	0.54	0.66	0.32	0.14
146	0.85	0.39	2.15	0.89

APPENDIX H

Assessment Data for Each Student and Teacher

Teacher	stud_id	total_score STAR SOY	total_score STAR EOY	scale_score PAT SOY	scale_scoreP AT EOY	ScoreARS SOY	ScoreARS EOY	ScoreAWS SOY	ScoreAWS EOY
106	ST1234	34	38	37.6	53			422	346
106	ST1235	67	70	50.7	61.9	536	653	530	430
106	ST1236	51	60	58.5	64.2	501	542	462	613
106	ST1237	47	57	59.6	63	420	478	556	462
106	ST1238	67	70	65.4	84.5	554	684	543	517
106	ST1239	58	64	58.5	65.4	492	561	430	455
106	ST1240	68	76	53	55.2	563	629	569	477
106	ST1241	42	39	41.3	57.4	443	425	263	359
106	ST1242	61	62	53	60.7	536	571	625	708
106	ST1243	50	60	47.1	58.5	527	571	662	594
106	ST1244	62	70	54.1	61.9	536	561	625	477
106	ST1245	62	66	59.6	60.7	464	581	667	679
106	ST1246	36	41	35.4	42.9	443	436	413	403
106	ST1247	51	44	37.6	41.3	492	518	575	556
106	ST1248	60	70	54.1	56.3	554	552	562	498
106	ST1249	61	66	49.6	44.4	536	518	517	504
106	ST1250	31	29	48.4	45.8			504	413
106	ST1251	52	62	55.2	66.7	501	524	613	543
106	ST1252	46	57	45.8	50.7	420	505	382	382
106	ST1253	33	46	58.5	51.9	432	468	346	393
106	ST1254	54	60	51.9	56.3	519	542	588	625
106	ST1255	54	73	47.1	74.4	536	571	588	491
AV		52.14	58.18	51.00	58.05	500.25	544.50	520.09	496.59
SD		11.39	13.03	7.97	10.19	47.42	65.75	106.68	100.72
AS			12.21		9.08		56.58		103.70
ES			0.50		0.78		0.78		-0.23
108	ST1256	63	63	48.8	54.3	575	726	625	594
108	ST1257	14	31	53.2	70.1	349	425	470	562
108	ST1258	64	65	44	52.1	474	505		
108	ST1259	49	56	49.9	49.9			588	556
108	ST1260	54	61	53.2	55.4	534	581	667	619
108	ST1261	26	41	49.9	49.9	456	413	455	504
108	ST1262	52	62	41.4	57.6				
108	ST1263	25	42	35.2	45.3			504	530
108	ST1264	47	56					575	491

108	ST1265					456	528	491	498
108	ST1266	38	51	41.4	47.6			550	530
108	ST1267					534	454	594	569
108	ST1268	45	46	40	44	506	447	371	455
108	ST1269			38.5	48.8	544	552		
108	ST1270	38	50	51	65.2	467	488	562	462
108	ST1271	61	58	35.2		515	561	569	619
108	ST1272	50	59	44	46.5	506	465	543	477
108	ST1273	39	45	36.9	46.5	496	486	511	498
108	ST1274	19	31	36.9	38.5	467	478	393	240
108	ST1275	59	61	62.5	80.1	586	664	673	631
108	ST1276			47.6	54.3	487	548		
108	ST1277			33.2	49.9	423	388	393	403
108	ST1278	26	40	38.50	42.80	496	401	403	484
108	ST1279	63	63	54.30	66.70	612	726		
AV		43.79	51.63	44.55	53.28	499.11	517.68	523.00	511.68
SD		15.81	10.86	7.84	10.28	60.44	100.48	91.48	90.26
AS			13.34		9.06		80.46		90.87
ES			0.59		0.96		0.23		-0.12
110	ST1280	70	70	51	60	626	684	782	745
110	ST1281	51	54	46.5	53.2	487	542	543	600
110	ST1282	57	65	54.3	68.3	586	715	600	719
110	ST1283	62	64	42.8	53.2	586	674	581	594
110	ST1284	61	62	60	60	544	603	588	613
110	ST1285	53	56	54.3	58.8	525	552	393	575
110	ST1286	21	30	35.2	49.9	446	436	240	332
110	ST1287	48	54	51	58.8			498	562
110	ST1288	51	50	44	45.3	525	552	524	491
110	ST1289	60	53	48.8	53.2	506	603	562	550
110	ST1290	36	41	46.5	49.9	410	458	371	484
110	ST1291	62	58	44	52.1	506	552	498	517
110	ST1292	56	59	49.9	52.1	534	603	543	600
110	ST1293			42.8	44	525	505	524	556
110	ST1294	14	18	35.2	31			212	176
110	ST1295	54	57	55.4	56.5			543	613
110	ST1296	48	58	49.9	49.9	534	552	283	301
110	ST1297	45	52	42.8	42.8	525	476	498	562
110	ST1298	32	31	36.9	40	487	425	317	504
110	ST1299	54	58	38.5	44	456	533	382	484
110	ST1300	41	47	45.3	51	525	505	470	498
110	ST1301	28	39	38.5	35.2			484	562
AV		47.81	51.24	46.07	50.42	518.50	553.89	474.36	529.00
SD		14.48	12.91	6.83	8.71	51.59	82.49	133.49	127.31

AS			13.69		7.77		67.04		130.40
ES			0.25		0.56		0.53		0.42
112	ST1302	46	48	39.6	48.4	432	496	382	403
112	ST1303	49	68	47.1	45.8	519	561	430	569
112	ST1304	68	75	63	71	554	715	613	685
112	ST1305	64	72			483	616	491	569
112	ST1306	66	67	58.5	55.2	501	629	504	685
112	ST1307	49	63	50.7	57.4	483	542	477	543
112	ST1308	62	67	59.6	76.3	510	705	537	575
112	ST1309	17	48			443	488	413	491
112	ST1310	49	63	35.4	44.4	501	581	491	524
112	ST1311	58	60	49.6	58.5	454	505	422	569
112	ST1312	49	58	53	50.7	492	524	359	511
112	ST1313	37	59	47.1	49.6	464	518	332	371
112	ST1314	66	72	55.2	60.7	501	581	550	524
112	ST1315	34	41	45.8	45.8	432	458	332	470
112	ST1316	41	63	39.6	44.4	464	505	301	556
112	ST1317	58	58	47.1	54.1	483	542	317	484
112	ST1318	68	69	58.5	61.9	501	592	504	662
112	ST1319	44	59			510	748	625	679
112	ST1320	56	68	50.7	63	483	533	504	484
112	ST1321	48	61	51.9	55.2	510	542	517	447
112	ST1322	28	49	48.4	51.9	492	514	517	498
112	ST1323	48	62	42.9	53	501	552	332	530
112	ST1324			52	50				
AV		50.23	61.36	49.78	54.85	486.95	565.77	452.27	537.68
SD		13.46	8.70	7.16	8.58	29.54	76.26	96.01	85.33
AS			11.08		7.87		52.90		90.67
ES			1.00		0.64		1.49		0.94
114	ST1325	55	62	54.1	55.2	510	603	462	606
114	ST1326	77	78	61.9	69.5	554	748	619	702
114	ST1327	47	58	39.6	50.7	501	571	575	511
114	ST1328	36	51	50.7	47.1	454	486	491	422
114	ST1329	61	71	54.1	61.9	510	616	504	679
114	ST1330	54	67	57.4	56.3	519	552	543	530
114	ST1331	41	60	51.9	58.5	443	476		
114	ST1332	52	55	42.9	50.7	483	533	524	556
114	ST1333	69	78	65.4	69.5	492	629	524	581
114	ST1334	33	41	50.7	44.4	454	538	382	470
114	ST1335	29	43	54.1	56.3	432	498	447	524
114	ST1336	28	46	39.6	44.4				
114	ST1337	44	51	44.4	45.8	454	528	301	462

114	ST1338	35	52	48.4	39.6	443	458	504	332
114	ST1339	69	72	63	63	545	616	650	685
114	ST1340	58	71	48.4	60.7	501	616	504	569
114	ST1341			54.1	63	545	524	719	662
114	ST1342	63	71	58.5	64.2	536	629	517	637
114	ST1343	51	56	39.6	44.4	527	542		
114	ST1344	59	65	61.9	66.7	536	561	524	462
114	ST1345	47	49	37.6	39.6	501	465	491	524
AV		50.40	59.85	51.35	54.83	497.00	559.45	515.61	550.78
SD		13.95	11.40	8.41	9.65	38.73	71.07	93.22	100.48
AS			12.68		9.03		54.90		96.85
ES			0.75		0.39		1.14		0.36
116	ST1346	60	69	48.8	56.5	525	561	524	491
116	ST1347	44	54	52.1	58.8	477	498	346	403
116	ST1348	50	55	35.2	38.5	496	447	382	422
116	ST1349	41	49	40	40	456	478	498	422
116	ST1350	48	54	42.8	54.3	487	533	537	511
116	ST1351	39	50	36.9	33.2	435	478	422	470
116	ST1352	53	54	49.9	53.2	534	505	569	543
116	ST1353	63	64	46.5	56.5	575	552	600	511
116	ST1354	50	66	55.4	58.8	467	465	511	470
116	ST1355	30	40	38.5	38.5	410	442	537	359
116	ST1356	70	69	72	84.6	586	737	504	346
116	ST1357	49	60	42.8	44	525	571	575	511
116	ST1358	45	57	47.6	49.9	506	496	504	511
116	ST1359	50	52	45.3	55.4	496	542	517	491
116	ST1360	53	55	42.8	47.6	525	505	524	511
116	ST1361	60	65	57.6	61.2	534	571	550	562
116	ST1362	35	50	44	47.6	467	478	447	413
116	ST1363	53	58	60	62.5	487	533	498	524
116	ST1364	51	66	52.1	58.8	515	581	517	569
116	ST1365	62	63	51	54.3	525	581	477	517
116	ST1366	55	54	44	47.6	487	524	517	594
116	ST1367	62	65	54.3	63.8	544	616	556	537
116	ST1368	49	60	51	58	534	571		
116	ST1369	26	42	40	49	506	528	484	462
116	ST1370	56	63	60	68	554	542	524	537
116	ST1371	8	12						
AV		48.54	55.62	48.42	53.61	506.12	533.40	505.00	486.96
SD		13.15	11.73	8.49	10.86	41.18	62.05	58.32	64.46
AS			12.44		9.68		51.62		61.39
ES			0.57		0.54		0.53		-0.29

120	ST1372	61	73	54.3	63.8	554	533	430	556
120	ST1373	44	51	48.8	53.2	515	542	524	537
120	ST1374	48	62	60	70.1	525	476	550	550
120	ST1375	45	51	42.8	41.4	515	524	530	447
120	ST1376	33	45	38.5	49.9	544	465	393	393
120	ST1377	64	72	42.8	48.8				
120	ST1378	47	54	44	46.5	525	524	240	422
120	ST1379	47	47	60	62.5	506	514	245	359
120	ST1380	41	45	48.8	56.5	554	476	332	382
120	ST1381	68	70	61.2	68.3	575	737	524	530
120	ST1382	59	63	56.5	60	506	644	491	455
120	ST1383	20	27	45.3	45.3	435	401	121	176
120	ST1384	14	19	44	33.2	397	290	100	100
120	ST1385	56	68	51	58.8	599	653	530	575
120	ST1386	53	52	48.8	49.9	554	552	491	581
120	ST1387	54	61	44	46.5	534	571	517	625
120	ST1388	36	48	36.9	45.3	487	476	393	511
120	ST1389	28	33	40	36.9	423	468	517	543
120	ST1390	49	58	56.5	61.2	467	542	462	543
120	ST1391	60	57	42.8	45.3	544	533	455	439
120	ST1392	51	60	46.5	48.8	534	552		
120	ST1393	61	67	48.8	51	564	581	511	332
120	ST1394	53	57	45	37	564	542	550	581
120	ST1395	56	60			515	603		
120	ST1396	53	70	60	67	544	629	439	594
AV		48.04	54.80	48.65	51.95	520.00	534.50	424.77	465.05
SD		13.37	13.71	7.27	10.26	48.86	89.13	135.19	134.72
AS			13.54		8.77		68.99		134.95
ES			0.50		0.38		0.21		0.30
122	ST1397	74	78	72	80.1	643	759	631	708
122	ST1398	68	73	61.2	58.8	575	705	588	755
122	ST1399	78	76	76.9	80.1	643	772	619	760
122	ST1400	79	80	84.6	102	599	772	631	755
122	ST1401	58	58	57.6	63.8	575	644	569	631
122	ST1402	61	70					619	619
122	ST1403	64	71	58.8	66.7	534	603	543	619
122	ST1404	55	72	61.2	63.8	575	715	600	613
122	ST1405	69	76	80.1	102	599	800	619	679
122	ST1406	70	74	76.9	91.9	612	759	625	729
122	ST1407	33	36	55.4	76.9	446	528	491	530
122	ST1408	66	75			626	772	625	719
122	ST1409	54	57			544	592	613	740
122	ST1410	61	69	62.5	63.8	586	715	575	702

122	ST1411	75	79	51	56.5	564	705	625	691
122	ST1412	73	75	57.6	68.3	626	759	613	606
122	ST1413	77	78	84.6	102	662	800	750	773
122	ST1414	66	77	70.1	80.1			575	575
AV		65.61	70.78	67.37	77.12	588.06	712.50	606.17	678.00
SD		11.18	10.76	11.15	15.99	52.49	80.74	51.17	72.14
AS			10.97		13.57		66.62		61.66
ES			0.47		0.72		1.87		1.17
124	ST1415	55	51	45.8	50.7	492	505	524	581
124	ST1416	64	67	49.6	51.9	545	592	517	470
124	ST1417	28	33	37.6	44.4	454	425	301	430
124	ST1418	63	74	56.3	59.6	519	561		
124	ST1419	21	42	32.8	37.6	340	425		
124	ST1420	48	56	48.4	41.3	432	514		
124	ST1421	67	70	74.4	72.6	527	571	470	477
124	ST1422			59.6	57.4	572	684		
124	ST1423			35.4	42.9	432	505	477	511
124	ST1424	76	78	59.6	60.7	572	715		
124	ST1425			47.1	44.4	443	496	550	550
124	ST1426	57	63			545	571		
124	ST1427	46	53	51.9	49.6	510	542	517	543
124	ST1428	62	72			492	514		
124	ST1429	64	71	45.8	53	545	581	575	588
124	ST1430	62	74	50.7	51.9	527	542	517	667
124	ST1431	23	39	49.6	59.6			447	430
124	ST1432	21	22			432	374	301	447
AV		50.47	57.67	49.64	51.84	492.88	536.29	472.36	517.64
SD		18.52	17.20	10.46	9.15	62.48	85.74	91.98	75.68
AS			17.86		9.81		74.11		83.83
ES			0.40		0.22		0.59		0.54
130	ST1433	33	44	47.1	44.4	474	468	447	422
130	ST1434	55	62			510	552	745	750
130	ST1435	57	63	51.9	61.9	545	571	656	755
130	ST1436	28	35	41.3	42.9	534	360	619	613
130	ST1437	53	59	39.6	53	501	552	511	613
130	ST1438	59	67	44.4	53	483	603	517	511
130	ST1439	56	66	47.1	57.4	501	581		
130	ST1440	36	48	39.6	54.1	443	478	511	477
130	ST1441	69	68	63	65.4	554	603	667	740
130	ST1442	62	70	42.9	55.2	501	561	679	650
130	ST1443	18	21	45.8	42.9	407	388		
130	ST1444					474	486		

130	ST1445	50	60	51.9	50.7	483	552	530	594
130	ST1446	52	58	41.3	47.1	443	486	537	530
130	ST1447	60	65			510	644	594	588
130	ST1448	60	64	49.6	51.9	443	542		
130	ST1449	53	58	50.7	59.6	454	542	619	625
130	ST1450	58	65	44.4	55.2	501	616	439	498
130	ST1451	21	25	42.9	39.6	443	388	100	422
130	ST1452	59	62	47.1	55.2	483	616	667	713
130	ST1453	47	43	44.4	50.7	492	498	606	511
130	ST1454	62	65	55.2	60.7	492	592		
130	ST1455	41	47			420	447	301	439
130	ST1456	59	66	50	55	510	616	600	667
130	ST1457	34	43	50	55	443	508	575	498
AV		49.25	55.17	47.11	52.92	481.76	530.00	546.00	580.80
SD		13.92	13.77	5.63	6.65	37.55	77.65	145.60	108.97
AS			13.84		6.14		57.60		127.29
ES			0.43		0.95		0.84		0.27
132	ST1458	64	71	53	68	563	748	556	650
132	ST1459	40	41	37.6	45.8	420	413	422	550
132	ST1460	59	62	48.4	54.1	432	533	530	511
132	ST1461	55	64	56.3	65.4	510	505	556	606
132	ST1462	65	68	54.1	60.7	527	661	613	650
132	ST1463	47	61	56.3	63	483	552	484	517
132	ST1464	52	57	51.9	56.3	464	559	562	491
132	ST1465	34	26	51.9	53	464	533	455	393
132	ST1466	79	72	63	71	593	695	575	625
132	ST1467	56	57	42.9	44.4	501	542	332	346
132	ST1468	56	56	76.3	69.5	492	561	543	524
132	ST1469	50	54	41.3	45.8	474	552	430	517
132	ST1470	54	61	45.8	44.4	501	592	562	656
132	ST1471	60	70	66.7	76.3	527	603	613	643
132	ST1472	48	55	44.4	47.1	527	496	511	393
132	ST1473	61	56	47.1	53	536	592	498	594
132	ST1474	50	54	48.4	51.9	536	581	550	656
132	ST1475	48	58	47.1	41.3	443	518	317	462
132	ST1476	29	39	42.9	47.1	432	374	317	530
132	ST1477	60	65	59.6	63	527	581	498	537
132	ST1478	65	73	49.6	54.1	501	542	393	430
AV		53.90	58.10	51.65	55.96	497.76	558.71	491.29	537.19
SD		11.18	11.57	9.19	10.16	45.08	82.41	91.88	94.83
AS			11.38		9.68		63.75		93.35
ES			0.37		0.45		0.96		0.49

134	ST1479	45	36	51	62.5	467	508	317	422
134	ST1480	28	36	33.2	38.5	446	425	491	484
134	ST1481	36	46	48.8	58.8	515	542	537	575
134	ST1482	54	64	47.6	48.8	515	603	477	550
134	ST1483	63	65	60	74.2	575	542	403	504
134	ST1484	52	57	49.9	47.6	506	542	524	504
134	ST1485	15	11	38.5	41.4	435	310	240	301
134	ST1486	60	64	48.8	53.2	515	592	470	498
134	ST1487	51	55	36.9	38.5	487	592	422	600
134	ST1488			31	74.2	446	458	393	455
134	ST1489	40	53	45.3	56.5	506	581	498	562
134	ST1490	23	19	35.2	31	456	468	263	491
134	ST1491	43	56	46.5	49.9	506	552	550	477
134	ST1492	28	28	42.8	35.2	446	425	240	569
134	ST1493	66	69	57.6	72	612	726	504	625
134	ST1494	33	48	45.3	47.6	506	514	301	517
134	ST1495	60	68	47.6	46.5	575	524	382	575
134	ST1496	29	42	40	42.8	496	486	447	491
AV		42.71	48.06	44.78	51.07	500.56	521.67	414.39	511.11
SD		15.34	17.32	7.88	13.10	48.98	89.41	103.52	74.65
AS			16.33		10.49		69.20		89.09
ES			0.33		0.60		0.31		1.09
140	ST1497	37	40	41	43	496	442	517	517
140	ST1498			35	35	397	344		
140	ST1499	39	40			467	458		
140	ST1500	24	40	44	48	496	524	504	530
140	ST1501	51	69	63	64	575	555		
140	ST1502	16	15	40	28	446	413	359	470
140	ST1503	36	46	50	59	410	344	447	581
140	ST1504	49	69	58	45	515	561	619	637
140	ST1505	33	36	35	33	456	436	594	562
140	ST1506	54	59	43	55	554	486	613	643
140	ST1507	62	62	48	52	564	505	556	600
140	ST1508	48	61	51	53	525	561	637	696
140	ST1509	23	21	51	50	467	413	498	504
140	ST1510	47	55	44	47	515	514	713	625
140	ST1511			49	52	544	643		
140	ST1512	70	65	61	68	564	653	755	755
140	ST1513	43	52	50	47	487	524	569	588
140	ST1514					477	528		
140	ST1515	61	69	57	64	586	629	656	673
140	ST1516	25	14	40	31	410	413		
140	ST1517	70	70	49	49	599	571	702	685

140	ST1518	42	49					511	543
140	ST1519			40	43	477	498	511	550
AV		43.68	49.05	47.37	48.28	501.23	500.68	574.18	597.59
SD		15.66	18.17	7.91	10.93	58.56	87.00	102.37	77.11
AS			16.91		9.42		72.78		89.74
ES			0.32		0.10		-0.01		0.26
142	ST1520	70	78	71	76.3	616	800	765	782
142	ST1521	45	67	45.8	69.5	483	644	613	613
142	ST1522	55	65	45.8	65.4	510	681	562	562
142	ST1523	39	69	47.1	66.7	454	629		
142	ST1524	43	57	44.4	48.4	360	571	504	530
142	ST1525	57	70	55.2	78.6	464	681	613	631
142	ST1526	66	68	55.2	72.6	492	629	530	613
142	ST1527	50	66	42.9	69.5	519	629	750	619
142	ST1528	52	64	41.3	53	519	661	569	562
142	ST1529	47	61	53	66.7	501	616	569	606
142	ST1530	43	67	39.6	69.5	474	661	562	594
142	ST1531	44	57	56.3	65.4	474	603	765	600
142	ST1532	52	64	42.9	66.7	527	629	550	600
142	ST1533	58	61	41.3	54.1	501	571	588	594
142	ST1534	61	68	60.7	76.3	545	644	745	619
142	ST1535	52	66	51.9	71	483	644	750	643
142	ST1536	50	56	61.9	71	501	629	625	613
AV		52.00	64.94	50.37	67.10	495.47	642.47	628.75	611.31
SD		8.47	5.48	8.79	8.30	51.05	51.15	93.02	53.55
AS			6.98		8.55		51.10		73.28
ES			1.85		1.96		2.88		-0.24
144	ST1537	50	50						
144	ST1538	36	61	47.6	49.9	496	514	517	543
144	ST1539	52	64	46.5	51	554	542	524	580
144	ST1540	57	67	44	42.8	515	524	550	600
144	ST1541	63	67	58.8	76.9	575	603	556	600
144	ST1542	49	51	38.5	44	456	442	359	422
144	ST1543	12	12	35.2	44	349	388	317	430
144	ST1544	34	53	49.9	46.5	477	447	575	543
144	ST1545	50	59	49.9	46.5	515	552	569	511
144	ST1546			46.5	53.2	554	533	511	491
144	ST1547	61	68	45.3	54.3	534	603	569	581
144	ST1548	47	55	36.9	41.4	506	561	543	491
144	ST1549	64	67	53.2	57.6	554	695	594	696
144	ST1550	69	70	52.1	57.6	467	632	462	667
144	ST1551	58	63	47.6	49.9	554	524	543	537

144	ST1552	16	33	28.4	38.5	367	328	371	359
144	ST1553	40	57	48.8	51	506	505	530	382
144	ST1554	42	49	36.9	45.3	487	561	511	537
144	ST1555	44	55	40	48.8	477	468	504	537
144	ST1556	51	62	52.1	55.4	525	561	498	410
144	ST1557	21	30	36.9	49.9	496	413	439	477
144	ST1558	67	60	47.6	49.9	554	603	650	550
144	ST1559	34	42	39	39				
AV		46.23	54.32	44.60	49.68	500.86	523.76	509.14	521.14
SD		15.89	14.31	7.31	8.19	57.99	86.72	81.01	87.72
AS			15.10		7.75		72.36		84.37
ES			0.54		0.66		0.32		0.14
146	ST1560	73	73	66.7	66.7	536	581	625	679
146	ST1561			71	71	616	759	755	755
146	ST1562	61	68	61.9	55.2	572	629	702	735
146	ST1563	74	79	78.6	84.5	593	695	735	755
146	ST1564	79	80	69.5	55.2	616	835	729	755
146	ST1565	59	73	66.7	69.5	519	561	616	735
146	ST1566	64	72	76.3	76.3	604	737	637	667
146	ST1567	72	76	58.5	68	630	748	702	713
146	ST1568	75	76	69.5	78.6	527	603	575	650
146	ST1569	55	67	53	58.5	545	581	673	679
146	ST1570	69	73	78.6	96.3	554	737	637	643
146	ST1571	74	79	69.5	81.2	572	759	679	740
146	ST1572	71	69	66.7	76.3	593	726	662	750
146	ST1573	74	74	68	71	593	737	581	650
146	ST1574	70	76	71	66.7	545	684	667	713
146	ST1575	68	79	60.7	61.9	545	632	600	637
146	ST1576	68	69	65.4	74.4	545	629	619	619
146	ST1577	63	66	68	68	510	603	656	656
146	ST1578	61	65	68	68	563	684	643	643
146	ST1579	70	74	71	76.3	572	737	619	656
146	ST1580	74	76	76.3	84.5	645	772	735	773
146	ST1581	63	67	66.7	63	545	653	656	696
146	ST1582	74	78	85	89	616	816	606	729
146	ST1583	74	78	68	73	563	737	588	656
146	ST1584	64	70	50	51	501	629	650	679
146	ST1585	71	75	76	96	545	664	625	708
AV		68.80	73.28	68.46	72.30	567.88	689.54	652.77	695.04
SD		6.01	4.56	7.72	11.77	38.10	75.11	49.87	45.53
AS			5.29		9.75		56.61		47.70
ES			0.85		0.39		2.15		0.89