A CASE STUDY OF THE IMPLEMENTATION OF LEARNING STYLES IN TWO PRIMARY SCHOOL CLASSROOMS

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Jeannette Frances McCallum

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ABSTRACT

The aim of the National Curriculum is to:

> *Seek to raise the achievement levels of all students and to ensure that the quality of teaching and learning in New Zealand schools is of the highest international standard. (Ministry of Education, 1993)*

However, current assessment of children's achievement in the New Zealand education system suggests that not all children are successful learners, despite restructuring of the education system and recent curriculum reform.

Educational statistics indicate the aim of the National Curriculum is not being achieved. International mathematics results from the Ministry of Education (1997) Third International Maths and Science Study, state that New Zealand has scored below the international average at Year 5 and Year 8 levels. In Ministry of Education (1996) National Education Monitoring Project, non-Maori students performed better than Maori students in all ten Reading and Speaking tasks at Year 4 and six of ten tasks at Year 8 level. Ten years after 'Tomorrow's Schools' Wylie (1999) reports that children from low-income homes and Maori children have gained least from the reforms (p. 7).

It therefore seems reasonable that other options for improved student achievement need to be considered. Although there is extensive literature in the U.S.A. about the effectiveness of the Learning Styles approach, there has been little research conducted in New Zealand primary schools.

This study reports on the experience of three classes of primary school children (a Year 4 and 5 class for term 4 in 1998 and two Year 3 and 4 classes in 1999) where the teachers attempted to match instruction, learning context and children's preferred learning styles. The study focuses on the following questions:

1. Does knowing one's learning style improve students' learning?
2. To what extent is learning improved when instruction and learning context matches students' learning styles?
3. What are the principal difficulties in implementing learning styles in classrooms, as perceived by teachers?

The case study concludes, from the perceptions of children and teachers, that matching learning styles with instruction and learning context does improve learning, especially for those children who underachieve or who learn differently. However, the two teachers report that although they consider the learning style theory is valid and is seen to improve learning and teaching, practicalities of implementation are problematic. Implementing a new teaching methodology is not a simple process.

Effective implementation of learning styles requires a paradigm shift in teachers' ideology from teacher-centred to child-centred learning. Whether this paradigm shift is possible within our current educational system, driven by 'New Right ideology' and the traditional concept of a state primary school, is discussed.

The study focuses on three issues in the implementation of learning styles: the need for a paradigm shift; school culture and management structures; and, understanding how teachers develop expertise.

The study suggests directions for further research, including an action research study to implement a school wide initiative to cater for students learning through their preferred learning styles. Further research could focus on the process of implementing methodological innovations through analysing the institutional setting; its structures, cultures, management styles and practices. Research that focuses on a whole school, as opposed to a single classroom, may provide insight into greater understanding of implementation of changes and achieving a paradigm shift from 'traditional' to 'modern' teaching methodologies.

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CHAPTER ONE

INTRODUCTION

1.0 Rationale

Today there are concerns about increasing educational underachievement and subsequent unemployment; ultimately leading to a wasteful under-utilisation of human potential (Prashnig, 1998). It appears that the New Zealand education system is failing many students, despite recent educational reforms.

> *The reforms were intended to improve the learning outcomes for children from low-income homes, and Maori children. These children are still under-performing others, on average, and the schools, which serve them, have gained least, often losing students (Wylie, 1999, p.7).*

Rawlinson (1996) claims that Maori students are less likely than European students to remain in school to senior form levels and three times as likely as their Non-Maori peers to leave without any formal qualifications. In the Ministry of Education National Educational Monitoring Project (Information Skills 1997, Mathematics 1997, Social Studies 1997, Listening and Viewing 1998, Reading and Speaking 1996) the summaries state that non-Maori outperformed Maori students on most of the tasks.

Further, results in the Third International Maths and Science Study (TIMSS) in 1997, results showed that New Zealand scored below the international average at both Year 5 and Year 8 levels (Biddulph, et al., 1997)

The 'learning style approach' is claimed to provide 'zero failure schools, once educators embrace a new philosophy that advocates everyone can learn' (Prashnig, 1993). This approach, hereafter called learning styles, was developed by Professors R. and K. Dunn and attempts to match instruction with individual children's preferred styles of learning. Some educational researchers, including Dunn, R & K (1978, 1987,1988,1992); Dryden and Vos (1993); Jensen (1988); Buzan (1991) and Prashnig (1993, 1996, 1998) concede there needs to be a revolution in order to successfully implement such an approach across our schools. A revolution that starts in people's minds, with new thoughts about ourselves and our unlimited learning capacity; a culture in which the teacher matches the student's learning needs instead of imposing an expectation that all students learn the same way.

For an educator, a discourse of 'zero failure schools', holds significant appeal. But are learning styles merely a fashionable, new-age fad or are they basic to good teaching practice? Further, if Prashnig's theory is correct, why do educators not more widely embrace learning styles as a teaching methodology?

Overseas research affirms that learning style based programmes statistically increase student achievement. The researcher questions why policy makers and educators are not therefore providing learning style-based programmes in our schools. In literature review undertaken for this study the concept of 'traditional schools' and recent curriculum reforms, driven by 'New Right' ideology are critiqued and contrasted with child-centred ideologies (focusing on the learning style approach). The issue of implementation is seen as the need for a paradigm shift in educators' thinking, supportive management structures and understanding of how teachers learn.

1.1 An Overview of this Study

In this study the researcher explores the extent to which learning and teaching is improved when learning context and instruction matches students' learning styles. It also explores the difficulties of implementing the learning style approach in the current New Zealand education system.

The literature review presents and critiques learning styles based on the Dunn and Prashnig model (1997) and other learning style research literature. 'Learning styles' are classified under the umbrella term 'holistic education,' also known as 'child-centred' or 'brain-based' education.

This study is divided into two phases. In the first study phase Susan, the classroom teacher receives professional development about learning styles and attempts to implement the learning style approach in her classroom of Year 4 and 5 children during term 4, 1998. In the second study phase the researcher joins the research participant in a collaborative study based on Louden (1991). Interviews provided the main method of data collection and the principles of discourse analysis provided the methodological approach that investigated how students, teachers and parents constructed their responses on particular issues. For example, ways are explored in which Susan and Jan categorised themselves and their patterns of emotional meanings and investment in the learning style approach and how students gave meaning to the way they learned.

The data in this study are presented thematically in Chapter Four around three questions:

Question 1:

Does students' knowledge of their own learning styles improve their learning?

Question 2:

To what extent is learning improved when instruction and learning context matches students' learning styles?

Question 3:

What may be some of the principal difficulties in implementing learning styles in classrooms, as perceived by teachers?

Chapter Five discusses the data, selectively organised around these three questions. A brief summary of the major findings follows below.

During the first study phase Susan, the classroom teacher, found her teaching discourses changed considerably, from teacher-controlled to a child-centred learning paradigm. At the end of the first study phase Susan reported that she understood her students' needs more and could cater for them more effectively with the learning styles' approach. However, she claimed it was difficult to measure the effectiveness of the learning styles implementation because of the qualitative nature of the research implementation over a short time span. She was enthusiastic to extend its implementation through out all curriculum areas the following year. During the first study phase the majority of students perceived their learning had improved but less than half the parents noticed changes in their child's learning.

During the first study phase Susan also realised the value of working collaboratively in pursuit of common goals and continuous improvement, rather than individually working in isolation. Susan and Jan, the researcher decided to work together as research participants to make the study more collaborative, following Louden (1991).

In the second study phase, data were gathered from students, teachers and parents during interviews at the beginning, middle and end of the year. Susan

and Jan perceived that the biggest improvement in learning was for those students who did not learn through their auditory or visual sensory modalities. These students were predominantly underachievers and their preferred learning styles were tactile and kinaesthetic. They had appeared to have been previously disadvantaged by not having their learning styles matched with instruction and learning context. After the research study, noticeable changes were evident in students' behaviour and attitudes towards learning, as perceived by parents, teachers and students.

However, students' responses in interviews at the beginning, middle and end of the second study phase indicated that learning styles discourse was not a dominant discourse in their classrooms or in their school. These findings supported the teachers' perceptions that they 'were only at the beginning of the journey' to implement learning styles. They had found catering for the learning context easier than catering for students learning through preferred sensory modalities. They did not fully cater for learning styles in their classrooms. The findings also supported Prashnig's claim (1998) that effective implementation of learning styles may take from three to five years.

Marginalisation of a learning styles discourse was apparent in the school which was undergoing a school-wide drive to assess English by applying 'benchmarks' and 'levels' on students' reading and writing achievement. There were various assessments expected of teachers, as required in an educational policy context driven by 'New Right' ideologies.

It appears that both teachers had made an emotional investment in learning styles. However, although the teachers thought they used the learning styles discourse to categorise learning in daily interactions with students, the students' and parents' responses indicated both teachers had not used them

enough in daily interactions with students and parents to give meaning to how students learn.

The research participants, although working closely together, implemented learning styles in relative isolation from their colleagues. Within the school culture and management structure learning styles was not a dominant discourse, possibly because of lack of time and support for reflective sharing with colleagues. It became obvious during the study, from Susan and Jan's comments, that some colleagues had different constructs of teaching, classroom management and students and these teaching colleagues operated within different paradigms of teaching and learning. From the experiences of the two teachers a collaborative culture and school-wide reflective practice did not exist among colleagues. Therefore the learning styles innovation was more difficult to implement.

Galton's model (1996) of 'three stages of teachers' expertise' provided a useful measure of the teachers' developing competence in the learning styles implementation. At the end of the study Jan and Susan both appeared to be in the second stage (consolidation), moving towards the third stage (reorientation). The study revealed that each teacher had different needs and challenges as they internalised new discourses. Susan was the relatively inexperienced teacher, but committed herself easily to the learning style approach because of her past experience as a kinaesthetic learner. Jan was the relatively experienced teacher, but brought considerable, habitual, prior experience in the old paradigm of teaching and needed to 'flex' her teaching style (predominantly visual and auditory) to effectively cater for all other styles (tactile and kinaesthetic). She needed to 'put aside familiar patterns of teaching built up over years' (Louden 1991, p.x111).

The teachers struggled to incorporate a new methodology into their classroom practice in the school environment. This supports Louden's (1991, p.197) claim that changes in teaching practice are changes to teachers' lives and should be approached with care and humility. The teachers' perceptions of developing expertise in learning style implementation confirm that one's teaching methodology depends on one's construct of students and management (as claimed by MacCaslin and Good, 1992). Learning style implementation necessitates a paradigm shift from teacher-controlled to child-centred learning (Prashnig 1998).

Students were able to accurately describe the predominant sensory modalities their teachers taught in, supporting Prashnig's claim (1998) that teachers usually teach through their preferred learning styles. Comparisons of the students' perceptions about their teacher's teaching style before and after the learning styles implementation verified the shift (or lack of) that both teachers had made in 'flexing' to different students' learning styles.

An unexpected issue arising from this study was that a majority of students perceived noise to be a barrier to learning before the learning styles' implementation in classrooms. After learning styles had been catered for in the classrooms noise was no longer perceived to be a significant problem for the majority of students.

Finally, both teachers found the LSA a valuable and necessary tool for identifying students' learning styles. When the teachers knew how the students learned best they felt they could begin to effectively use the knowledge to match instruction with each student's learning preferences and all students perceived knowing how they learned had improved their learning. The majority of parents found the LSA helpful to understand how their child

learned, however, less than half the parents noticed improvements in their child's learning.

Following the Discussion chapter, conclusions and implications arising from this study are discussed together with recommendations for further study in Chapter Six. It was concluded that all the students and most of the parents perceived that knowledge of the students' own learning styles did improve their learning. Most students and both teachers perceived that matching instruction with learning context and learning styles improved students' learning. However, learning styles discourse was not dominant in either class or in the school. Implementation of the learning style approach was found to be problematic because it necessitated teachers making a paradigm shift from teacher-controlled education to child-centred learning and depended on a supportive school culture and management system. The study also highlighted 'teacher workload' as a central barrier to implementation of the learning style innovation, with little time for collegial reflection. Both teachers perceived the New Right influences as an antithesis to the learning style approach.

It is claimed that a different paradigm from 'traditional education' is emerging (Dryden 1993; Prashnig 1998), yet the driving force behind our current curriculum reform is that of the New Right ideology with its focus on education as a market commodity. A brief, historical review analysing New Zealand's educational curriculum reforms is undertaken, with a critique of 'traditional' and 'modern' constructs of teaching. The case study explores whether the learning style approach is possible in the current political context.

The implementation of a learning style approach as a teaching methodology, also appears to be influenced by many other factors. School culture and management structures, the need for educators to make a paradigm shift and how teachers develop expertise are explored in the literature review.

A suggestion for effective implementation of curriculum innovations was to establish a key person to initiate change, with the Principal as the leader or as an active supporter. This person is then empowered to lead the staff towards a consensus of core values. Using a collaborative approach, the Principal, staff, parents and school community are involved in the implementation of methodological changes, contributing to the consolidation of learning styles as a dominant discourse. Other suggestions included prioritising curriculum, staff development and awareness of effective methods of teacher development as they are also essential for the effective implementation of curriculum innovations.

A recommendation for further research was to undertake a longitudinal study in greater depth on a school-wide basis, focusing on school culture, leadership, school policy and staff development.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This literature review investigates the issues that relate to teachers' attempts to implement learning styles into their classrooms. The learning style approach is a teaching ideology that is considered by its proponents to be more closely aligned to the principle of child-centred education than what is considered to be the 'conventional' or 'traditional' education system currently in place in New Zealand state primary schools.

In this chapter, learning styles are described in the context of 'brain-based education'. The Dunn and Prashnig Learning Style Model (1997) has been used to analyse children's learning styles in this study and it is therefore reviewed in some detail. Brain-based educational research and resulting theories are briefly discussed because of their implications for 'child-centred' learning and their compatibility with the Learning Styles approach.

Finally, issues related to the 'traditional' nature of the New Zealand Education System are discussed. The analysis focuses on recent political and historical influences affecting policy and curriculum reforms. The issue of change, which produces improvements to learning and teaching, is raised.

2.1 Learning Styles

Learning styles can be defined simply as the way people learn best; the way they absorb, process and retain information.

Dunn (1990) claims that learning styles depend on a person's biological make-up but also include emotional, sociological, physiological and psychological characteristics. Supporters of the importance of learning styles assert that all these elements contribute to how we learn something new and difficult (Dryden and Vos, 1993; Dunn and Dunn 1992; Prashnig 1998). It is claimed that learning styles tend to remain stable throughout one's life (Price, 1980).

Dunn (1990, p. 15) states the significance of learning styles to all learning:

> *Students are not failing because of the curriculum. Students can learn almost any subject matter when they are taught with methods and approaches responsive to their learning style strengths.*

Dunn claims further that there would be no underachievement in schools if students' individual learning styles were properly catered for; i.e. everyone learns differently but they can all learn if they are encouraged to learn through their preferences.

Those elements that consistently affect an individual's learning are called 'strong preferences'. Those elements with less influence but still important to the learner are called 'preferences'. When students are taught with approaches that match their preferences and strong preferences, students demonstrate statistically higher achievement and attitude test scores than when they are taught with approaches that mismatch their preferences (Dunn and Griggs, 1989).

The Dunn and Prashnig Learning Style Model (1997) has evolved from one of the earliest models of learning styles, the Dunn, Dunn and Price Learning Style Inventory (1984). It is based on 49 individual elements in six basic areas:
1. Left/Right Brain Dominance (elements: sequential or simultaneous brain processing strategies, reflective or impulsive thinking styles, analytic or holistic/ global learning styles)
2. Sensory Modalities (elements: auditory, visual, tactile, kinaesthetic)
3. Physical needs (elements: mobility, intake, time of day)
4. Environment (elements: sound, light, temperature, work area)
5. Social Groupings (elements: preferences for working alone, in a pair, with peers, in a team and authority to parents and teachers)
6. Attitudes (elements: motivation, persistence, conformity, structure and variety)

The learning style approach is based on the premise that every learner has a unique learning style. Certain learning style characteristics (left right brain dominance, sensory modalities, physical needs, environment) are biological, whereas others are developed through experience (social groupings and attitudes). The learning style approach acknowledges that how a student learns is determined by their individual style and if encouraged to learn through preferences, achievement is improved.

In the learning style approach students' learning styles are identified by a Learning Style Analysis (L.S.A.) and the teacher then teaches through the students' preferences. Emotional, sociological, physiological and psychological characteristics are how students concentrate on, process and remember new and difficult information. The characteristics all contribute to learning style and information intake is greatly enhanced when students can think, work or concentrate in their favoured conditions. For example,

underachievers, at-risk and drop out students almost exclusively are tactual and kinaesthetic learners and it is easier for these students to learn tactually with auditory and visual supplements with tools like flip chutes, pick-a-holes, multi-part task cards, and electroboards (Dunn, 1989, p. 32).

2.2 Learning Style Models

There are a number of different models of learning styles. De Bello (1990) compared eleven major learning style models and analysed the validity of instrumentation and research behind them. The learning style models De Bello reviewed were:

Dunn and Dunn: Learning Style Inventory (Grades 3- 12)
Productivity Environmental Preference Survey (Adult)
NASSP: Learning Style Profile
Hill: Cognitive Style Profile
Letteri: Cognitive Style Delineators
Ramirez: Child Rating Form
Reinert: Edmonds Learning Style Identification Exercise
Schmeck: Inventory of Learning Processes
Kolb Learning Style
Hunt: Paragraph Completion Method
Gregorc: Gregorc Style Delineator
McCarthy: 4 Mat System

De Bello found that there are nearly as many definitions of learning styles as there are theorists. He concluded from his review that the Dunn and Dunn model had one of the highest reliability and validity ratings.

In the 1960s the Professors Dunn and a team of psychologists were invited by the New York Principals' Association to research why some students did not

learn in schools although these students had the intellectual capability to achieve. The Dunn and Dunn model was developed to explain how students learned. Some underachieving students were found to have different learning styles and the learning style approach was developed to help 'educationally disadvantaged' children. The Dunn and Dunn model subsequently developed into 2 versions LSI (Learning Styles Inventory) for children and PEPS (Productivity Environmental Preference Survey) for adults. A Working Style Analysis (Dunn and Prashnig) was also developed from the original to analyse people's working styles (Prashnig, 1996).

2.3 The Dunn and Prashnig Learning Style Analysis (L.S.A.)

In the Dunn and Prashnig Learning Styles approach it is considered necessary to analyse students' learning styles with an instrument called a Learning Style Analysis (L.S.A.). De Bello (1990) claims that this instrument is necessary because teachers cannot independently correctly identify all the characteristics of learning styles. He claims further that although teachers may identify certain learning style characteristics through observation, they often misinterpret many others. He cites other studies which have demonstrated that teachers are able to identify only a few of their students' learning styles through observation and that other elements appear to be identifiable only through personal interviewing or administration of learning style diagnostic assessments (Beaty, 1986; Dunn, Dunn and Price, 1977; Marcus 1977).

A Learning Style Analysis is a diagnostic approach through a self-report instrument (see Appendix A and B).

There are two levels of the L.S.A. The junior version is designed for students from 7-12 and is used in this study. The L.S.A. senior version focuses on students aged between 13 and 17.

The L.S.A. provides a computerised profile and personalised interpretation of each individual's preferred learning style. This profile assesses 49 individual elements in six basic areas that are graphically represented as layers of a pyramid. The first four layers of the pyramid's basic areas are: left / right brain dominance; sensory modalities; environment; physical needs. These are claimed to be biologically or genetically determined elements of learning style characteristics. The last two layers of the pyramid are social groupings and attitudes. These are claimed to be conditioned or learned elements of learning style characteristics.

The L.S.A. allows analysis of the conditions under which students prefer to learn. It identifies 'strong preferences' or 'preferences', 'flexibilities' (flexibilities become preferences if the student is interested or non-preferences if the student is not interested), or 'non-preferences' and 'inconsistencies' (where data are contradictory). From this profile the student's preferred learning style is identified. It is claimed that teachers are able to identify only a few elements of their students' learning style through observation; other elements appear to be identifiable through personal interviewing or administration of learning styles tests (Dunn, 1987).

The L.S.A. is clearly critical to the Learning Styles approach because individual learning styles must be assessed if the learner is going to have the best opportunity to learn and if instructional techniques are to be used that are congruent with each learner's style (De Bello, 1990).

Prashnig (1998, p.83) claims that the L.S.A:

- Allows students to identify their personal strengths and preferences for learning and recognise and control the elements that can enhance their attempts to learn.
- Identifies how students learn in class and at home, how they think, concentrate and solve problems.
- Assists teachers and parents in creating the most appropriate learning or study environment for every student, either at home or school
- Suggests how to improve study skills and enhance learning motivation
- Advises senior students and their parents how to utilise personal preferences for future career planning

2.4 Learning Styles Research

There has been considerable research on the impact of environmental elements of learning styles on learning in the U.S.A. using the Dunn and Dunn L.S.A. Researchers examined student performance under conditions that were either congruent or incongruent with their learning styles. In each of these investigations, students who were matched with environments, methods, or schedules that complemented their individual learning styles achieved significantly higher standardised achievement test scores that students who were taught or tested in a mismatched environment (Carbo, 1980; Carruthers, 1980; Della Valle, 1984; Della Valle et al., 1986; Freeley, 1984; Krectner, 1981; Krimsky, 1982; Kroon, 1985; MacMurren, 1985; Miller, 1985). Furthermore, in many instances, students' attitudes toward learning reportedly improved significantly when they were taught according to their preferences (Bauer, 1987; De Bello, 1990; Dunn and Dunn, 1987, 1988,1989; Griggs, 1989: Griggs and Dunn, 1989).

Dunn (1990) claims that the Dunn and Dunn Learning Style Inventory is the most reliable, most valid and most widely used learning style diagnostic instrument for school-aged children in United States. It has been tested at every grade level (3 –14) and has been incorporated into research studies at more than 60 institutions of higher education. In addition, it has been repeatedly developed, scrutinised, field-tested, redesigned and consistently improved by university researchers for more than 22 years.

Dunn further claims that instruction improved in schools throughout U.S.A. where the Learning Style Inventory was used to identify students' strengths (Dunn, 1978; Dunn, R. and K. 1985; Dunn, R. and K., 1987; Dunn, R. and K., 1988; Dunn, R. and K., 1992). It was also found that where L.S.A. was used, teachers' instruction also became more sensitive to individual needs (Murrain, 1983; Perrin, 1984; Pizzo, 1981; Shea, 1983; Urbschat, 1977; Virostko, 1983; Weinberg, 1983; Wheeler, 1983; White, 1980; White et. al., 1982; Worthington, 1980).

When learners are encouraged to use their preferred learning style to learn new and difficult information, it has been shown that the learners will achieve statistically higher test and attitude scores than when instruction is dissonant with their preferences (Beaty, 1986; Bruno,1982).

Bauer (1987) researched matching learning styles of ninth-graders with instruction. For ninth graders she claimed that nothing helped learning as much as making students aware of their own learning styles. Bauer also repeated the view that children began to enjoy doing their work and liked coming to school:

> *In two semesters children felt better about themselves and each other, studied harder, tried to succeed more, and did. (Bauer, 1987, p. 208)*

Dunn and Griggs (1989) investigated the issue of whether matching learning styles with instruction and learning context improved learning. They concluded that:

> *...Research conducted at more than 40 colleges and universities supports the findings that accommodation of just a single strong preference results in statistically increased academic achievement in all discipline areas and at every grade level. (Dunn and Griggs, 1989, p. 109)*

Dunn et al.(1982) investigated the relationship between learning style characteristics of students and their left / right brain hemispheric preferences. They found that each hemisphere of the brain was associated with certain thinking traits and, therefore, with different learning styles. It was concluded that there was a statistically significant correspondence between individual learning styles and hemispheric preferences. 'Analytic learners' prefer to process information through their left hemisphere. 'Global learners' prefer to process information through their right hemisphere, as measured through the L.S.A..

Left hemispheric processors or analytic learners tend to respond to verbal instruction, depend on words and language for meaning, prefer a step-by-step lesson where details and facts build one upon the other in a logical order and tend to succeed with well-structured assignments. Right hemispheric processors, global learners, tend to respond to visual, kinaesthetic and demonstrative instruction, depend on images and pictures for meaning, prefer

a holistic overview so they know where the lesson is going and then learn by exploration and discovery (Freeley and Perrin, 1987).

Dunn and Dunn (1988) claim that most young children are global learners (right hemispheric processors) and that if teachers taught the same way as children learn, children will achieve higher test scores. The research on which this claim was based, involved 5,000 teachers, of whom 65% proved to be analytic processors. It was found, in contrast, that approximately 75% of younger children tended to be global processors. Although both groups of processors are equally able academically, each group achieves best when taught with instructional approaches that match their individual learning styles.

Fleming (1989) claims that teachers tend to teach in ways that they perceive have helped them and that this is traditionally through auditory and visual sensory modalities and neglecting tactile and kinaesthetic sensory modalities. Because it is not feasible for teachers to match all students with their learning styles, teachers must learn to 'style flex'. Teachers 'style flex' when they vary their teaching style by recognising and catering for all the differing learning styles in their classrooms, in order to become more effective teachers. When learning styles of students are matched with teaching styles, Fleming claims that students become less disruptive and more communicative, interested and competent.

In New Zealand, Gregory (1997), a principal in a small Northland Primary School, implemented and catered for learning styles in her school over three years. Gregory saw the process as "exploring, reflecting and adapting to educational ideas to meet students' needs." Gregory reported that after one year, Year 5 and 6 PAT Reading Comprehension scores reflected the high level of students' achievements and continued over the three years, in

comparison with lower achievements before the implementation of the learning style approach.

2.5 Underachievement

It appears then from some research literature that underachievement in the education system can be partially attributed to students' learning styles not being catered for. There may be a lack of recognition that students prefer to learn in different ways and that underachieving students tend to learn best through kinaesthetic and tactile preferences.

Dunn and Dunn (1987) claim that unless schools address the problem of non-achieving children, society is put at risk by their subsequent behaviour. They assert that students can learn if they are permitted to learn through their preferred learning styles. Dunn and Dunn attempt to dispel 15 beliefs that traditional student learning is based on, extensively researching each issue raised by the fifteen beliefs. The beliefs are:

1. Students learn best when seated upright at a desk or table.
2. Students perform better on tests and learn more from their homework in an absolutely quiet environment.
3. Students learn best in well-illuminated areas and damage their eyes when they read in low light.
4. Students who do not sit still are not ready to learn.
5. Whole group instruction is the best way to learn.
6. Students learn difficult subjects best in the early morning when they are most alert.
7. Students concentrate best when classroom temperature is maintained at a warm temperature.

8. Effective teaching requires clearly stated objectives, followed by detailed, step-by-step, sequential explanations until students understand what is being taught.
9. Most students could achieve well if only they were self-motivated.
10. Eating should not be permitted in classrooms except at snack time.
11. Students learn best in blocks of time at approximately 40 to 55 minutes.
12. Students who cannot remember verbal instruction tend to be less intelligent from those who can.
13. Homework should reinforce what has been taught in class (in the same sensory mode).
14. The older the student the easier it is to adapt to the teacher's style.
15. Truancy is related to poor attitudes, home problems, lack of motivation, and other factors having nothing to do with students' preferred learning times.

They discovered that these 'traditional' beliefs have become 'common sense', largely unquestioned practices that can be detrimental to learning, especially for those students who learn differently.

Prashnig (1998, p. 95) claims that it takes as little as six weeks to turn around students' underachievement when individual learning styles are catered for in the classroom. Understanding that learning style is a biologically and developmentally imposed set of characteristics that every human being possesses, provides insight into the ways students take information in during the learning process.

Traditionally in New Zealand, Maori and Pacific Island students fare poorly when their educational achievements are compared with Pakeha students'. For example, in the 1996 National Education Monitoring Project (NEMP) for Mathematics the conclusion stated that 'non-Maori students outperformed

Maori students on more than two thirds of the tasks at both year levels'of assessments, (1996, p. 66). Similar outcomes were reported in Reading and Speaking, (1996), Social Studies, (1997), Information Skills, (1997) and Listening and Viewing, (1998).

In a recent Green Paper, Assessment for Success in Primary Schools (Ministry of Education, 1998), the Minister of Education, Wyatt Creech stated that Maori and Pacific Island students were particularly over-represented in those groups of students who leave school without any qualifications or with low-levels of qualifications. The Green Paper sought to remedy this underachievement through the development of a national system of assessment. Ironically, the Green Paper attempted to address under-achievement through factors that Whitmore, cited in Moltzen (1996) identified as contributing to underachievement in New Zealand schools.

> Whitmore believes that underachievement is both caused and reinforced in classroom environments where there is:
>
> - Lack of respect for the individual
> - A strongly competitive environment
> - An emphasis on outside evaluation
> - Inflexibility and rigidity
> - Exaggerated attention to errors and failures
> - An unrewarding curriculum. (Moltzen in McAlpine and Moltzen, 1996, p. 414)

Whitmore suggests that underachievement is attributable to inappropriate curriculum and teaching methods and a mismatch of students to curriculum and teaching style (p. 415).

> *The school is mentioned much less frequently than the home in the literature on unachievement, yet Whitmore (1980) suggests it is probably the principal cause of underachievement. (Moltzen, 1996, p. 414)*

Smith (in Middleton and Jones, 1992, p. 33), argues that historically Maori have been defined in terms of their differences from their colonisers. Education through Pakeha forms of schooling reinforced dichotomies between the coloniser and the colonised. Maori 'culture' was regarded as antagonistic and in opposition to 'education'. Thus Maori were written out of historical discourses and marginalised.

Pere (1982) supports Smith's claim. She argues that Maori were assimilated into the European education system by the system ignoring the Maori way of life. No consideration was given to the cultural background of the Maori child. Pere also claims that the difference between traditional Maori education and that of 'Pakeha' education is that traditional Maori education encourages the child to participate and get deeply involved with the work she is doing. All, or most of the senses including her feelings and intellect encompass the world she lives in. In 'pakeha' education, rather than being in meaningful tasks, the child is expected to go through the motions of some task in the classroom , regarded as school learning, for example, the study of geometrical shapes. In traditional Maori education the child would observe the shape, size and colour of trees, leaves, stones and wood and experience the sensations of smell and touch while they maybe gathered food. In 'pakeha' learning the practice of children would probably be working with geometrical shapes, usually plastic, with a limited range of colours, size and no variety of texture.

Pere also claims that in traditional Maori education the Maori teacher knows the cultural background and history of the pupil and recognition and respect

are given to what the child already knows. The child constantly observes and works alongside other people who have the expertise in whatever she happens to be learning.

Pere claims that traditional Maori education is about children learning from what they observe and experience. Observing and experiencing, in learning style discourse, is learning mainly through kinaesthetic sensory modalities. In traditional 'pakeha' style of education, kinaesthetic learning styles have been neglected.

King (1994) claimed that:

> *80% of a TOPS student group (by definition 'failures' of the education system) were kinaesthetic learners whereas 80% of sixth formers at a local high school were auditory or visual learners.(p.18)*

He concluded that the 'system' advantages some learning styles and disadvantages others and the tragedy is that the disadvantage has nothing to do with intelligence.

> *Kinaesthetic learners are different, not 'dumb' and given information in the right mode can learn any subject as well as anyone else. (King, 1994, p.18)*

Hannan, a N.Z. Polytechnic tutor, used music, rhythm and rhyme to teach mathematics to a group of kinaesthetic students who were experiencing difficulties with the subject. When she taught these students, who had previously experienced limited success in mathematics, for 10% of the time, she found, on average, their grades increased 9.8 marks when comparing their school marks before and after her classes. She concluded:

> *'I discovered the structure provided by the traditional form of teaching plus creativity improves learning. Rhythm and Rhyme and Rithmetic are fun. Preconceived barriers are broken down, students become aware of how they learn and want to be part of this process...Colin Rose (1985) and Eric Jensen (1988) named it 'musical intelligence' Maori people have been utilising it for centuries to memorise whakapapa. (Hannan, 1994, pp. 32-34)*

Similarly, Latham (1997, pp. 88-89) worked on The Kamachamcha Early Education Project (KEEP), with native Hawaiian elementary students, a cultural group that traditionally has a high risk of academic failure. The project designers adapted the curriculum to the cultural learning styles of the Hawaiian children and found average scores ranged from 2.5 to 3.4 percentile points higher for the KEEP classes than for the control classes.

He gave two reasons as explanation for this success:

> *First, the instruction was predicated on what was called a 'culturally responsive' pedagogy that recognises students' cultural background with respect to how they learn... Equally important, teachers in KEEP's classrooms were responsive to culture while maintaining all the typical elements of more traditional high achieving classrooms – attention to time-on-task, a challenging academic focus, and a structured curriculum. (Latham, 1997, p. 7)*

Finally, at an elementary school in Texas, Hodgin & Wooliscroft, both teachers, introduced learning styles and found significant indicators of success during a three year period from 1993 –1996:

During 1993 –94, the year before we implemented reading styles and inclusion, only 50% of the regular student population passed the test, and none of the special education children passed. We saw dramatic improvements during the next two years as we implemented the reading styles strategies and inclusion practices. All the regular education students passed the test both years, with 25% of special education students passing in 1994-1995 and 20% in 1995-1996. In addition, student mastery of all test objectives increased from 11% in 1994 to 67% in 1995 to 80% in 1996. We saw another indicator of success in the classroom climate. (1997, p.45)

2.6 Brain Research

Extensive educational research about how the brain functions and the implications of this for learning provide further impetus for changing teaching methodologies (Caine, 1991: Hermann, 1989: Morgan, 1987; Ornstein 1984; Restak 1988;Yepson 1987). New research has also begun into integrating these two hemispheres in 'whole brain learning.' Research that is relevant to brain-based education is reviewed in this section.

Dr. Roger Sperry (1986) received a Nobel Peace Prize for his research about how the left and right hemispheres of the brain process information. From this time research was also begun into integrating the two hemispheres into 'whole brain learning.' This research provided valuable insights into how students learn and strategies teachers can use to foster more effective learning.

Gremli, (1996) published findings from the research he completed as a director of music in New York. Gremli implemented adjustments to accommodate both global and analytic learners when teaching music. He concluded:

> *...When students were afforded the opportunity to learn primarily through their preferred learning style and when predominantly right-hemisphere students were taught alternately with both global and analytic lessons, they achieved statistically higher test scores through global rather than through analytic resources. (Gremli, 1996, p. 27)*

Dr. MacLean (1977), a chief of the Laboratory of Brain Evolution and Behaviour at the National Institute of Mental Health in Washington, D. C., described the 'Triune Brain', how three separate brains have evolved inside the human brain: neo-cortex or neo-mammalian; limbic or older mammalian; and reptilian brain. Dr MacLean asserted that higher learning (dealing with ideas, abstractions and intellectual concepts) takes place in the neo-cortex. Reading, writing, logic, mathematics, abstract thought and logical processes are all computed within this brain system. He claimed that this higher learning can be achieved through inner senses, stored memories, visualisation, problem solving, and use of intuition, creativity and 'right brain' activities.

This argument is a basic principle of child-centred learning, i.e. if learners use their neo-mammalian brain for higher learning and effective access to this brain is through alpha brain waves (relaxed alertness), then the task of the teacher should be to ensure the learner is in an optimum state for learning. 'Traditional', teacher-centred education does not necessarily acknowledge this task as part of its methodologies (Dryden and Vos, 1993; Prashnig, 1998).

Howard Gardner (1981, 1982, 1983, 1987) of Harvard University claims that there are many forms of intelligence. Gardner's popular multiple intelligences theory lists seven intelligences: verbal/ linguistic; logical/ mathematical; visual spatial; body Kinesthetic; musical / rhythmic; interpersonal and intrapersonal. Gardner believes that every individual has at least seven intelligences to some

degree. He argues that the Western culture and education systems are dominated by linguistic and logical intelligences and tend to neglect the other intelligences. Gardner claims that these seven intelligences definitely go beyond what traditional IQ tests can measure and argues further that school educators should rethink current instructional and assessment practices because planning, teaching and assessment should be based on learners' individual needs. Educational experiences should reflect an understanding of each learner's culture, especially since a relationship exists between multiple intelligences and culture. Howard's claim appears to support the learning theory approach that education should be catering for individual learners' needs and that there is an evident link with underachievement in certain ethnic groups because of the cultural constructs educationalists have traditionally / historically put on intelligence, thereby excluding some learners from different cultural backgrounds.

Research into learning styles, mainly in the U.S.A., has demonstrated that learning is improved when students' learning styles are analysed and the teacher provides instruction and learning context to match those learning styles.

2.7 Holistic Education

Terms such as 'Learning Styles', 'Accelerated Learning', 'Multiple Intelligences', 'Critical Thinking', 'Creative Problem Solving', 'Educational Kinesiology', 'Brain-based Learning' and 'Music for Learning' are recent innovations in contemporary school education. Their relationship and perceived contribution to effective schooling is discussed below under the umbrella term, 'Holistic Education.'

According to research originating mainly in the U.S.A., acknowledgement of knowing one's learning styles and matching them with instruction and context has become an established part of child-centred learning. A number of writers claim that inclusion of learning styles, multiple intelligences, accelerated learning, music for learning, brain-based education and metacognition is needed to 'move schooling into the twenty first century, with the teacher as a facilitator, focusing on the child's needs to learn (Buzan, 1991; Carbo, et al. 1991; Dhority, 1991; Dunn & Dunn, 1992; Dryden and Vos, 1993; Harman, 1988; Harman and Rheingold, 1985;Jensen, 1988; Lazear, 1991; Mukerjea and Buzan, 1996; Prashnig, 1998; Rheingold, 1985; Rose, 1985; Stockwell, 1992; Vitale, 1982).

Guild (1997) explored the extent to which the different concepts of multiple intelligences, learning styles and accelerated learning overlap and found that although they each have particular theoretical constructs, research bases and applications, the 'outcomes look strikingly similar' (p.30).

Guild (1997, p.31) claims educators who believe in concepts of learning styles, brain-based education and multiple intelligences bring an approach and attitude to their teaching of focusing on how students learn and the unique qualities of each learner. Guild also maintains that effective learning means that:

1. each of the theories is learning and learner-centred;
2. the teacher is a reflective practitioner and decision-maker;
3. the student is also a reflective practitioner;
4. the whole person is educated;
5. the curriculum has substance, depth and quality;
6. each of the theories promotes diversity.

Guild believes that applications of the theories of multiple intelligences, learning styles, and brain-based education offers more students the opportunity to succeed by focusing attention directly on how they learn. This priority is well overdue in schools.

Dana Visser (1996, p 40) claims:

> *Research has shown that children learn the most complex activities by using all their intelligences, sensors, and capacities. Those new learning techniques mimic many of these processes and have shown that adults can learn quicker and have greater retention of material when they incorporate their whole brain and all of their senses.*

Visser's claim emphasises the holistic nature of learning, with its prerequisite of understanding how the brain functions in relation to learning, the student's need to be in a state of readiness (relaxed body and alert mind) before higher learning can take place and teaching methodologies which ensure that optimum learning takes place for each individual.

2.8 Paradigm Shift

Barker (1992) defines a paradigm as a set of rules and regulations that do two things: they establish and define boundaries and tell us how to behave inside these boundaries so as to be successful. He theorised a ten step general cycle of paradigm shifts starting from when the established paradigm begins to be less effective to when turbulence begins to wane as the new paradigm starts solving problems.

There is an extensive research literature claiming an urgent need to change from traditional teaching to new teaching methodologies (Buzan, 1991; Carbo,

et al. 1991; Dhority, 1991; Dunn & Dunn, 1992; Dryden and Vos, 1993; Gardner, 1987; Jensen, 1988; Prashnig, 1996; Rose, 1985; Stockwell, 1992; Vitale, 1982). Modern teaching methodology is concerned with how each child learns, the use of research to understand how to optimise children's learning, and the application of this knowledge in the classroom to help children learn to learn.

Visser (1996) is an advocate for change from traditional to modern teaching methodology. Visser states:

> *The Industrial Age focus on manufacturing, production, uniformity and centralisation fostered the need to use the linguistic and logical parts of the brain. But as we move deeper into the Information Age, we need new skills such as problem solving, creativity and interpersonal skills. They use different parts of the brain and senses than our Industrial Age skills. (1996, p.39)*

Similarly Stoll and Fink (1996) claim that schools and societies, of which they are part, are confronting the most profound changes of which have not been seen since the last great global movement of economic and educational restructuring over a century ago. The current world-wide trend is for high technology, flexible workforces, more diverse school populations, downsized administrations and declining resources. Stoll and Fink (1996) also claim that different directions of change can seem contradictory with decentralised systems of school management, centralised systems of curriculum and assessment control and moves to develop more authentic assessments being paralleled by tightening of standardised tests.

According to McCaslin and Good (1992), traditional classroom management, that emphasises obedience, provides a mismatch with current educational

goals, which are to create self-reliant, independent learners. They argue for the importance of understanding how we construct our knowledge about students and classroom management before lasting educational reforms can be delivered and sustained in the classroom.

It could be claimed that there is currently a paradigm shift in education from traditional styles to a new paradigm. As Prashnig describes some schools in New Zealand:

> *A combination of holistic education, learning styles and creative, accelerated learning methods has become the new standard in schools across the country and serve as a model for successful teaching strategies in other countries. (Prashnig 1997, p. 43)*

If such different directions of change are evident in New Zealand schools, to understand their impact on classroom learning and teaching and how these changes contribute to the problematic implementation of innovations in the classroom, it is necessary to understand the disparate ideologies that affect policy and curriculum. The next section reviews curriculum reform by analysing the ideological changes driving it.

2.9 The Contemporary New Zealand Education System: Curriculum Reform Based on Ideological Change

Prior to 1989, The Curriculum Development Unit carried out curriculum development within the Education Department (Jesson, 1995). The Inspectorate monitored implementation of new curricula in classrooms and a

Teacher's Advisory Section sought to keep teachers up to date through in-service training and advice. As each subject required review, the Curriculum Development Unit set up a Consultative Committee of representatives from parents, employer groups, teacher interest groups. The key point of Jesson's (1995) article is that teachers had a direct influence on the development of the curriculum and decision making. They were actively involved in consultative committees, with outcomes decided by consensus.

In comparison, after the reforms, teachers' direct influence on the development of the curriculum was eroded. Sullivan (1997) claims that the reason teachers have been discouraged from participating in educational development and policy making is because it was claimed that they would pursue self-interest. According to Sullivan, teachers are now expected to follow government directives so their teaching meets market needs (Ibid., p. 262).Traditional teacher autonomy has been replaced by prescribed curriculum and performance appraisal.

Sullivan's analysis describes a New Right view of human nature. 'New Right' ideology emerged from the New Zealand Treasury in 1984 contrasting with a previous welfarism and social corporatist model (Codd, 1993). Deregulating the State, the New Right opened the economy to market forces and completely restructured the system of government. Within the education system a new system of bodies with separate structures and functions was set up in 1990. These included the Ministry of Education, the Education Review Office, the Teacher Registration Board and the New Zealand Qualification Authority. Curriculum development now occurred through contracts, funded by the schools' operations grants, which allegedly gave 'choice' to schools. On this model, schools became 'business units' with devolved financial and curriculum decision making. Codd (1993), for example has discussed the imposition of a managerialist ideology on schools and how educational

administrators are now forced to surrender their traditional commitment to social justice in order to pursue the goals of competition and individual choice.

Lee and Hill (1996) discuss the ideological basis for the new curriculum and cite Irwin, a policy analyst for NZ Business Roundtable, who stated that the assumption 'that education ought to be student-centred was well-intentioned but romantic nonsense.' In 1991 the then Minister of Education, Lockwood Smith stated that the purpose of education was primarily to serve technological and economic ends.
More recently this ideology is still evident in the claim that the purpose of education is to provide:

> *A foundation of knowledge, skills, attitudes and values needed to enable [...students...] to meet the economic and social challenges they will face in the 21st century. (Ministry of Education, 1998, p. 2)*

The New Zealand Curriculum Framework (Ministry of Education, 1993) introduced by Dr. Lockwood Smith, specifies seven essential learning areas, together with essential skills and values, which are intended to be taught and assessed in eight progressive levels. Elley (1993) cites key problems in this model of curriculum reform. One is the New Zealand curriculum framework's structure that is based on eight successive levels in each curriculum area. Elley suggests that these eight curriculum levels presume a similarity across subjects, yet this presumption has no basis in teacher experience or research. Nor is there any educational rationale for dividing any of the curriculum areas into eight evenly spaced levels because there are no 'natural' breaks in development at the selected cut-off points. Indeed, there is debate about the question of whether the sequencing of knowledge and skill constitutes a clear progression at all. Torrance (1993) and Shephard (1991) argue there is little evidence to suggest that instruction is more effective if it is outcome-driven

rather than interest-driven. Indeed they provide evidence to the contrary. Elley argues that key thresholds in student development are reached at different ages, depending on their learning styles and the nature of the subject (Elley, 1993, p. 40).

Another key problem Elley cites with curriculum reforms in New Zealand is the issue of assessment. Elley (1993) claims that the new curriculum is structured in the eight-level framework to provide for easier assessment, following the UK model. In the UK this assessment function was also given high priority. Yet:

> *Almost every edition of the Times Educational Supplement through 1992 and early 1993 reported abuses, anomalies and protests. Teachers coached children for tests, administered them repeatedly, encouraged certain children to absent themselves, and used the lack of standardisation procedures to their advantage. Far from serving any helpful diagnostic purpose, the SATs took on an accountability role which effectively minimised their value for improving children's learning, and distorted the nature of the curriculum. (Elley, 1993, p. 43)*

In New Zealand in the 1990s the effects of the 'New Right' (or schools based on 'the business model') became apparent. Teaching in New Zealand was claimed to be in crisis in the 1990s, evidenced by the 1997 teacher shortage and industrial action in all sectors (Sullivan, 1997).

Sullivan (1997, p. 262) suggests that the two fundamental principles of the New Right are first to perceive education as a commodity (user pays) and second, to value competition. The reform of the curriculum was on this analysis 'a move towards greater control over measurement and

standardisation, e.g. The New Zealand Qualifications Authority's unit standard. Measuring outcomes against benchmarks became a feature of the curriculum reforms (Irwin 1994, p. 13).

In 1998 the Ministry's Green Paper for 'Assessment for Success in Primary Schools' was released. It proposed the introduction of national assessment procedures for primary schools. Its stated intention was to provide the teaching profession with information needed to establish expectations and identify where improvements are needed. The need to 'strengthen the social and economic fabric of NZ' (1998, p.2) is stated. The Green Paper aimed to provide schools with indicators how children in the rest of the country, in similar schools, cope with particular material.

The basic assumptions underlying all these assessment reforms appear to be the need for schools to match achievement outcomes to external benchmarks, and to compare these outcomes with other schools in order for schools to be accountable for providing 'quality' education. These underlying belief systems and assumptions are closely aligned to those of the 'New Right' (Codd, 1993) and have little in common with the 'Post Modern Teacher' (Sullivan 1997) who values a child-centred approach.

Jesson (1995) elaborates the consequences for New Zealand curriculum reform and concludes that conflict exists at all levels, from system to classroom. Similarly Thrupp (1998) claims teachers are working in a culture of blame in the classroom because 'neo-liberal' and managerial agencies such as the Education Review Office attempt to construct school failure as the responsibility of schools and teachers alone.

A New Right ideology of competition, benchmark assessment and economic views of education's purposes appear to be the antithesis of the learning style

approach. The emphasis on education as a commodity and curriculum reform as a means to ensure better accountability through national assessment clashes with the ideology that learning should be student centred and that teachers are relatively autonomous professionals, facilitating learning for their students through an understanding of students' preferred learning styles. However, Poskitt (1994) maintains that:

> *Social and political forces can be too strong for one teacher, or even a group of teachers, to oppose. (p. 207)*

Dixon (1998), a New Zealand Principal, holds New Zealand teachers in high esteem and claims that in the current educational context of accountability and assessment as a form of social control, teachers will continue to facilitate learning in a holistic way. However, she believes that the urgent challenge is to educate parents about national testing, and to put the narrow snapshot / conception of assessments into perspective. Dixon is concerned that the accountability drive will cycle New Zealand back to a traditional model of teaching.

A New Paradigm: The post-modern Teacher

Sullivan (1997) attributes the roots of the contemporary tensions to conflicting ideologies: the New Right and that of the modern teacher. Sullivan examines the ideologies of the New Right and the modern teacher by categorising major assumptions, major goals and educational policies, programmes and practices of each. He believes that a new ideology is emerging: the 'Post-modern Teacher'. This approach is child-centred but teachers retain a sense of responsibility towards society and its children and do not allow self-sacrifice to compromise integrity, i.e. they are focused on child-centred education and are pro-active advocates for their students, despite the New Right ideologies.

Sullivan's theory acknowledges the reality of the changing structure of education, currently within the dominant ideology of the 'New Right'. He supports the idea of teachers regaining their partnership role in education, instead of allowing their foundations (essentially their belief in humanistic education) to be undermined by the ideology of the 'New Right'. He stresses that 'Post Modern' teachers' need ideological awareness and effective strategizing to function as educators.

Sullivan's model of the 'post-modern Teacher' (1997) fits well with Thrupp's recommendation. Thrupp suggests teachers accept responsibility where they clearly should and shed blame where it is inappropriate (Thrupp, 1998). However, there may be differences between policy and ideology on one hand and what actually occurs in classrooms on the other hand.

Wylie's (1999) review of the educational reform ten years on indicates that the reforms have not been effective at the level of classroom learning. She recommends that assumptions behind them are revisited. Wylie also hints at the need for a return of collaborative partnership with all those involved in the education system:

> *The reforms were intended to improve the learning outcomes for children from low-income homes and Maori children. These children are still under-performing others, on average, and the schools, which serve them, have gained least, often losing students...It is probably time to bring together those in schools with those who make policy, to revisit the assumptions behind the reforms, in the light of the costs as well as benefits so far, so that ten years from now, there are more benefits, and fewer costs. (pp. 7 and 8)*

According to McCaslin and Good (1992), for the reforms to succeed we need to consider the understandings of underlying belief systems and assumptions embedded in dominant discourses of management and teaching. In particular we need to look at the various constructions of students in the popular culture and educational community.

McCaslin and Good suggest that how teachers teach and how they manage their classes depends on their construct of students. They argue that in traditional teaching, class management is about encouraging obedience to the detriment of self-understanding, self-evaluation and the internalisation of self-control. In the Learning Styles approach, on the other hand, class management is about encouraging self-understanding, self-evaluation and the internalisation of self-control in order to learn more successfully. Therefore, it appears there is a mismatch between ideologies of the learning style approach and the traditional approach.

McCaslin and Good further argue that while surface features for practice change (curriculum) the underlying structural dimensions of life (concepts of classroom management) remain the same. They claim that, in many schools, classroom management focuses on children's compliance and obedience. However this conflicts with the national curriculum's objective to promote problem solving within a context of behaviour control management.

> *We cannot expect that students will profit from the incongruous messages we send when we manage for obedience and teach for exploration and risk taking. (McCaslin and Good, 1992, p.13)*

This statement highlights the inherent conflict of an ideology, which promotes teacher-controlling management while alleging to be child-centred.

McCaslin and Good also attempt to provide an explanation about why some children fail to learn self-directing skills in traditional schools.

> *The present system of schooling almost guarantees that some students will remain passive and overly dependent upon the teacher for direction. Unfortunately, less academically able students are least likely to learn self-directive skills because they experience competing definitions of appropriate behaviour within a given year, as well as across years. (Ibid. p.14)*

McCaslin and Good's claims lie at the very heart of the problematic implementation of learning styles in classrooms. It is not simply a matter of making surface changes; but of changing teachers' ideologies from traditional to modern; from teacher-centred to child-centred and more interactive learning (Dhority, 1991; Dryden and Vos, 1993; Dunn & Dunn, 1992; Jensen, 1988; Prashnig, 1998; Rose, 1985; Stockwell, 1992; Vitale, 1982). The difficulties of making this 'paradigm shift' are considered in the next section.

2.10 Problematic Implementation of New Ideas/ Curricula/Pedagogy

There are many potential obstacles to implementing changes for improvements to learning and teaching. Poskitt (1994) claims some factors that may prevent individual or group initiatives succeeding within a school are undercurrents among staff and teachers either not interested or not capable of transforming themselves. Most significantly, however, Poskitt claims that:

> *Until a recognition of the need for change is realised, innovation remains a proposal rather than a reality. (Poskitt, 1994, p. 225)*

Furthermore, Kyle and Hovda (1987) argue that motivation, interest and self-direction on the part of teachers to participate in change is often assumed and is not always proven to be accurate. Nor, Poskitt (1994) claims, are research skills taught enough in teacher training.

In this regard Kyle and Hovda's statement may indicate the approach to the management of teaching and curriculum that currently underpins New Right ideology: public education is viewed as inefficient and by implication, the teacher is viewed as ineffective. Teachers are discouraged or prevented from participating in educational development and policy making (according to the New Right view of human nature) because they are self-interested. They are in contrast expected to follow government directives so their teaching meets market needs. Teacher autonomy is thus replaced by prescribed curriculum and performance appraisal (Sullivan, 1997). In short teachers are not trusted to act autonomously.

In this regard Kemmis (1989) argues that the policy makers have become separated from teachers, whose role is to implement policies decided elsewhere:

> *Theorising and practising are separated in the larger social framework by the division and differentiation of function in the institutional structures of contemporary schooling. There are people whose primary tasks are understood to be theorising (such as academic educational researchers) and others (teachers) whose tasks are practice. (Kemmis, 1989, p. 16)*

O'Neill and Kitson (1996) identify other reasons for teachers' problems in implementing new ideas in schools:

> *Lack of time, opportunity, confidence, support and resources conspire to militate against the easy application of neat theoretical models to fragmented primary school realities, and the more instrumental concerns of overloaded teachers. (1996, p.2)*

This observation is supported by Wylie's findings on teacher workload in New Zealand primary schools:

> *Teaching workloads have jumped markedly between 1996 and 1999, to an average week of 51.5 hours a week, with more time needed for assessment and reporting, and planning classroom work. Forty one percent of teachers describe their workload as excessive. (Wylie, 1999, p. 4)*

McCaslin and Good (1992) argue that historically in school reforms, conceptions of problems by policy makers have been narrow and overly fragmented. They refer to simplistic extensions of school boundaries, simplistic changes in curriculum and instruction, a reluctance by policy makers to invest in research because they already 'know' the answer and the trivialising of problems of classroom learning. McCaslin and Good claim that reforming schools is a complex task and requires attention to modern learning and instructional theory, student development issues, motivational considerations, issues of testing, curriculum and technology; home-schooling relations; and much more.

2.11 Change and Culture

As Neville, (1992, p.104) states:

> *...Change cannot be seen as a simple, rational process at a technological level; it is a complex activity operating at the deepest level of the individual, group and organisational psyche.*

The learning style approach is perceived as change to 'traditional' learning. Traditionally school cultures are claimed to have hierarchical management and classroom teachers are autonomous, tending to focus on management through teacher control (Stoll and Fink, 1996; McCaslin and Good, 1992). The learning style approach requires a collaborative and reflective culture in which teachers focus on understanding how the students learn and encouraging them to learn through their preferences. In this section the notion of change is defined and discussed in terms of the concept of school culture.

Deal (1987, p.7) states that culture and change are a basic contradiction. Culture:

> *Is a social invention created to give meaning to human endeavour. It provides stability, certainty and predictability. People fear ambiguity and want assurance they are in control of their surroundings. Culture imbues life with meaning and through symbols creates a sense of efficacy and control. Change creates existential havoc because it introduces no equilibrium, uncertainty, and makes day-to-day life chaotic and unpredictable. People understandably feel threatened and out of control when their existential pillars become shaky or are taken away.*

Poskitt (1994) claims it is important to allow time for a culture conducive to both individual and group reflection to develop. In Poskitt's research into the implementation of co-operative learning in secondary schools, reflective practice was a major component in teachers making the shift from using predominantly practical knowledge in their teaching to developing an interest in becoming researchers. Poskitt found initial levels of teacher-reflection low in her case study school.

> *Time was also required to allow the school culture to change. The culture evolved so that it became acceptable for teachers to 'take time out' individually and in meeting discussions, to consider matters of philosophy rather than more immediate, and practical organisational and day-to-day teaching concerns. (Poskitt, 1994, p.226)*

Stewart and Prebble (1993) also identify a need for 'time-out' or collegial reflection. They maintain that being able to discuss and share ideas and daily practices in a non-threatening climate is seen as an effective way to improve the learning culture of the school. Elliot (1991) argues that pedagogical change in teachers is dependent on their capacities for reflection. Where change is minimal, reflection is limited. Equally, talk is an important component of reflection and theorising about teaching:

> *It is only in articulation that the teacher becomes fully aware of the existence of what has been tacitly there as theory and then is in a position to reflect on their new uncovered theory. (McCutcheon and Jung, 1990, p. 145)*

Similarly, reflection needs to be linked to the identification of strategies for change. West-Burnham (1994) argues that the real mechanism to achieve significant change is the prioritisation of a culture that empowers people to

improve their teaching practices through reflection. This can only come about through the capacity to reflect on existing practice and to identify strategies to bring about change.

To develop reflective skills and a collaborative culture in which open and frank exchange of views is the accepted norm, measures need to be put into place to develop these. Poskitt (1994) argues that the process of reflection appears to be complex and slow to evolve, involving the school culture and development of specific skills that teachers may not necessarily possess.

If encouraged, however, reflective and critical thinking can progress to talk where listening to others ideas authenticates or challenges teachers' own perceptions, thus stimulating reflective thought about ones own ideas. McTaggart (1991) explains that apart from developing reflective skills, open debates and sharing of one's views also encourages a sense of commonality and shared understandings. In a school culture of autonomous classroom units this sense of community is important to the development of a culture of collaboration and collegiality. O'Neill (1996) also endorses the need for a culture of collaboration and collegiality when implementing changes to the curriculum, while Stewart and Prebble (1993) and Merchant (1995) consider Staff Development to be a vital part of improving teaching practices in schools. Other researchers also emphasise the need for collegial development and support to practice the new developments in a safe learning environment. Pajak (1993), McCaslin and Good (1992), Styan (1988) and Wood et al.(1982) all claim that teachers need opportunities for continual professional development during the normal school week, to give time to consider new conceptualisations and time to talk and plan with their peers.

Moreover, Bolman and Deal (1991, p.339) discuss the need to acknowledge the four stages of training, realigning, negotiating and grieving when

'reframing' organisational change. *Training* is needed to develop necessary skills and knowledge because it 'affects individuals' ability to feel effective, valued and in control.' *Realigning* structure to the new initiative to provide clarity, predictability and security is important. Because change inevitably creates conflict and division among competing interest groups, *negotiation* is needed to build coalitions and establish arenas in which disagreements can be forged into workable pacts. When people are on receiving end of change it is possible for them to experience a loss of meaning, *(grieving)*.

Finally is may be important to acknowledge that:

> *Proposals for change in teachers' practice are proposals to change teachers' lives and should be approached with care and humility, not arrogance and certainty. (Louden, 1991, p.197)*

2.12 Conditions for Successful Change

Fullan (1986, pp. 75-78) summarises the conditions for successful change in terms of three important factors. First, it is not the amount of training, which is provided, but the nature of it, which counts. Second, change is more likely to succeed when the Principal is an active supporter of a change effort. Third, a set of values and norms should foster, support and propel the kind of professional development and principal-teacher activism described in the two previous points.

Ponder and Doyle, cited in Galton (1996) observed that teachers proceed through three stages in their thinking in effective change.

> *The first is the Initiation stage. Here, there is a balance between the teacher's estimated costs of innovation as against its perceived benefits. In the second stage (Consolidation), the main objective is to achieve success in ways that satisfy the objectives of the innovation as closely as possible. The Reorientation stage is the last and here teachers cease to think about meeting the objectives of the innovations as closely as possible and instead consider ways which advanced pupils' learning more effectively.(p.15)*

In Poskitt's study (1994), teachers only realised their need for further information after considerable discussion. They did not appreciate their need for teacher development until the third and fourth cycles of her research. Hence, Poskitt claims that the innovation needed a period of settling in before new modifications could be expected. The teachers needed time to deal with the new procedures and approaches before becoming sufficiently detached from the innovation to critique it and reflect.

Experience with the innovation was needed before teachers could reflect effectively. She found that during this experience, teachers experienced a growth of skill and confidence, resulting in growth of self-esteem and self-confidence. This was found to be important because the change itself necessitated a period of de-skilling.

> *Survival was shown to be a predominant aim during this phase, with minimal energy and vision available for viewing the innovation in its entirety. (Poskitt, 1994, p. 224)*

Poskitt maintained that improvement in understanding and practice occurred through a series of stages of observation and data gathering, analysis and reflection, refinement of the problem, then the formulation and

implementation of action plans to address it. Morrish (1976) similarly claims that change leads to a period of insecurity during skilling and de-skilling, and requires considerable motivation and self-confidence. Further, if the status quo is comfortable, there can be insufficient motivation to change one's practice.

2.13 Changes Demanded by Dunn and Prashnig Model

The Dunn and Prashnig model is based on an understanding of how the student learns and then on encouraging the student to learn new and difficult information through their preferred learning styles. The L.S.A. provides the teacher, parents and student with a profile of how the student learns best, according to the Dunn and Prashnig learning style model. The L.S.A. also provides a profile of all the students, highlighting in percentages the numbers of students with each learning preference so the teacher can easily identify trends and cater for them, for example 85% are analytical students, 74% prefer formal seating arrangements.

Teachers need to understand how they teach because teachers tend to teach in their preferred learning style. To cater for all learning styles, the teacher needs to 'flex' their teaching style (Fleming 1989; Prashnig 1998). Students' achievement is dramatically increased if students' learning styles match their teacher's teaching style (Beaty, 1986; Bruno 1988). The teacher's teaching style is analysed in a Teaching Style Analysis (Dunn and Prashnig, 1998).

Classroom pedagogical changes are centred on matching instruction and classroom context with students' learning styles. Students choose to sit where they prefer and with whom they prefer. If they wish to eat and drink and move around, they may. Classroom guidelines for behaviour are formed

collaboratively so the students have ownership and understand why the guidelines are in place. For example, students may learn in their preferred learning style as long as it does not stop anyone else from learning in theirs.

When the teacher teaches new and difficult information to students, an approach is used that caters for both analytical and holistic students and provides learning resources that cater for auditory, visual, tactile and kinaesthetic students. To cater for all learning styles, the teacher needs to 'flex' their teaching style to those of the students. 'Individual', 'choice' and 'difference' are key words: instruction is provided for each individual, students understand how they learn best and make choices to learn in that way and it is acknowledged that everyone learns differently and differences are respected.
The learning style approach is about understanding how one learns and from this self-understanding, optimising life-long learning.

*2.*14 Summary

In this literature review the concept of learning styles has been discussed. Research suggests that matching learning styles with instruction and context does improve learning and teaching.

The differences between 'traditional' and 'learning style' education were discussed. A brief historical analysis of the curriculum reforms of the 1990s in New Zealand provides an understanding of the traditional nature of the education system and its effect on classroom learning, teaching and implementation of new pedagogies. The differences between learning style

philosophy and the nature of curriculum and assessment reforms in New Zealand were identified.

The introduction of pedagogical innovation in classrooms is problematic. It appears that possessing knowledge about a classroom innovation is only the first stage in the process of successful implementation. Equally important factors are the school culture, management of the change process and teachers' responses to the change process.

It can be seen that successful implementation of an innovation such as Learning Styles approach may be difficult to achieve in a classroom. Hence this research study into whether the Learning Styles approach is a valid methodology in the current New Zealand education system. The three questions arising from this literature review are:

1. Does knowing one's learning style improve the students' learning (as perceived by students, parents and teachers)?
2. To what extent is learning improved when instruction and learning context matches students' learning styles (as perceived by students, teachers and parents)?
3. What are the difficulties of implementing the learning style approach in two classrooms (as perceived by the two teachers involved)?

The next chapter elaborates these research questions in the context of an attempted innovation within one New Zealand school. It considers the most appropriate research design to examine the innovation as it unfolds in the school.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

The previous chapter described the main features of the learning style pedagogical approach and discussed aspects of the use of a learning style approach in classrooms to improve learning and teaching. The review highlighted a potential tension between implementing curriculum and pedagogical change, such as the learning style approach, and the ideologies behind New Zealand Curriculum Framework with its associated assessment requirements. A significant feature of New Zealand's current education context is its 'New Right' bias – a value system that can be argued to conflict with the values underlying the learning style approach.

In this section the research questions are identified and the research design discussed.

3.1 Research Questions

The need for a case study approach to this research was determined by the multi-faceted nature of classroom life and the desire to gather data on the implementation of a Learning Style Approach in every day classroom life. The study qualitatively explores the effect of catering for learning styles within classroom programmes and the impact of the innovation on students' learning

as perceived by students, their parents and teachers. The study was conducted in two phases.

In the first phase of the study the setting is a Year 4 and 5 class. The participants are Susan and her class of students. The duration of this phase is one term. As the first phase of the study progressed it became clear that a significant aspect to be studied was the process of implementing change within a classroom. The literature suggests that innovations can be problematic to implement within schools and it was hoped that insights could be found into ways of making similar innovations successful and lasting.

In the following year, in the second phase, the setting is two Year 3 and 4 classrooms. Susan continues to be a research participant with her class and a second class is included. Jan, the researcher, also becomes a participant. Her role is similar to that undertaken by Louden (1991) in his study of one teacher's practice in a Canadian middle school.

A qualitative research design was chosen because it would allow the researcher the flexibility to explore such additional research questions that may arise in the course of the study (Atkinson and Delamont, 1985). The research questions are outlined as follows:

1. **Does knowing one's learning style improve the students' learning (as perceived by students, parents and teachers)?**

1a How does the students' knowledge of their own learning styles influence their learning, based on data gathered at the beginning of the year, mid-year and end-of-year, as perceived by the students themselves?

1b How does parents' knowledge of their child's learning styles influence learning, as perceived by the parents?

2. **To what extent is learning improved when instruction and learning context matches students' learning styles (as perceived by students, teachers and parents)?**

2a How does matching learning context and instruction with learning styles affect students learning, as perceived by students, at mid-year and end-of year, following implementation of learning styles in the classroom?

2b How does matching learning context and instruction with learning styles affect students' learning, as perceived by teachers, after the implementation of attempts to cater for learning styles in the classroom?

2c How does matching learning context and instruction with learning styles affect students learning, as perceived by parents, after the implementation of learning styles in the classroom?

What are the difficulties of implementing the learning style approach in two classrooms (as perceived by the two teachers involved)?

3a To what extent is a 'paradigm shift' needed for the teachers to move from traditional teaching to child-centred teaching?

3b To what extent do the school's culture and management structures support the implementation of Learning Styles pedagogy?

3c How do the teachers perceive the learning process of implementing a new methodology (the Learning Style Approach)?

3.2 A Qualitative Research Approach

The choice of qualitative research design for this study is justified as follows. The qualitative research paradigm has its roots in cultural anthropology and American sociology (Kirk and Miller, 1986), and is a relatively modern research paradigm. The intent of qualitative research is to understand a particular social situation, event, role, group or interaction (Locke, Spirduso and Silverman 1987).

In this study, a qualitative research design was chosen because such approaches allow

> *...Immersion in the every day life of the setting chosen for the study; the researcher enters the informants' world and through ongoing interaction, seeks the informants' perspectives and meanings' (Marshall and Rossman 1989).*

It is the subjects' realities that the researcher attempts to reconstruct i.e. the reality of classroom life in a primary school, in which the teacher is attempting to implement a Learning Style Approach.

Qualitative research is conducted in the natural setting (the classroom) where daily human behaviour and events occur. In this study, the participants are the primary instruments of data collection, the focus is on participants' perceptions and experiences and the process that occurs as well as the outcome. An important part of the research was the need to explore the implementation of the Learning Style Approach through related issues such as teachers' feelings of isolation among colleagues, the process of developing their expertise and perceived lack of management support in case studies. When analysing data the focus remains on particulars as opposed to generalisations. This is particularly pertinent in this study because of the relatively small scale.

> *Objectivity and truth are critical...The researcher seeks believability, based on coherence, insight and instrumental utility and trustworthiness through a process of verification rather than through traditional validity and reliability measures. (Creswell 1994, p. 163)*

However, qualitative research does attract criticism. Creswell (1994) suggests that researchers should reflect on and express their role or experiences that will bias interpretations and bring a unique view to data collection and

analysis. Creswell also maintains that the researcher needs to demonstrate internal validity and reliability.

The process of verification referred to by Creswell is undertaken in this study through triangulation of students', teachers' and parents' interview data rather than testing students, using a quantitative, standardised instrument to ascertain whether their learning improved when instruction and learning context matched their learning styles. The case study comprises both the first and second phases of the research. Qualitative data is collected during the case study, principally through interviews. Interviews are considered by the researcher to be an appropriate form of data collection because it was not possible to directly observe the other teacher in her classroom on a frequent basis. The interview questions also provided a basis for the mutual exploration of issues; identified as implications by either the researcher or the other participant teacher.

3.3 Case Study

A case study involves the study of a 'bounded system.' In this instance it is an attempt to explore an innovative programme in, phase one, one then two classes (phase two) so that an appropriately full understanding of the case and its implementation over the course of a school year and one term is possible.

The case study, as a research method, is very appropriate for exploring whether catering for learning styles benefits learning because it enables descriptive, analytic, particular and small-scale study. Close description is possible and the social context of, in this case, the implementation of a learning style approach is taken into account.

> *Accurate description is the key, with full recognition of the biases that are brought to the situation, both by the insider and outsider. (Schein, 1992, p. 187)*

A limitation of this case study is that it is a relatively small sample of one Year 4 and 5 class in phase one and, in the following year, two Year 3 and 4 classes. However, such small sampling is typical of a case study.

> *Case study research seeks to observe, probe and understand an individual unit...as a whole – what goes on within the unit, and the unit's relationships horizontally with other units and vertically with other orders of units. It is the attempt to understand meaning within units and to understand the individual, unique construction of reality, which places most case studies into the qualitative realm. Case studies do not constitute a discrete methodology, but are a response to the attempt to get at meanings, usually within an institutional context. (Harker, 1997, p.6-3)*

The case study is an approach of exploration and discovery. Atkinson and Delamont (1985) describe it well when they argue that:

> *Rather than investigating the 'official reality' of the promoters of innovation, and confining attention to the stated objectives of the innovation itself, case-study...pays full attention to the unofficial and unforeseen aspects of the innovation and its implementation. The practitioners of case study would be more likely to point out that there always remains a good deal of uncharted territory.(p.28)*

At the beginning of this study, the focus was on whether knowing one's learning styles and matching instruction, learning context and learning styles

did improve learning. However, during the first phase of the case study it became apparent that implementation issues were also important. As Atkinson and Delamont (1985) argued, the case study design allowed the flexibility to explore the process of implementation as well as the changes experienced by the students and their parents, (i.e. the uncharted territory as opposed to the 'official reality').

3.4 Interviews

In this study, interviews were chosen as the preferred instrument to gather data on practice. In the interviews, open questions were asked to encourage frank, honest responses. Stenhouse (1981, p. 26) claims that one of the dilemmas fieldwork practice throws up is the choice of observation versus interview. Stenhouse states that he 'leans towards interview rather than observation' because often conditions of 'condensed fieldwork' preclude classic participant observation and interviews are an opportunity to strengthen and challenge participants' views. He also states:

> *The people I interview are participants and they are observers of themselves and others; my object is to provide, in interviews, the conditions that help them to talk reflectively about their observations and experience. It is their observations I am after, not mine.(p. 26)*

Given that the researcher was also a full-time teacher in the case-study school, these arguments seemed particularly relevant. Frequent observation of the other teacher was not possible. The decision to interview students, parents and teachers was an attempt to both "understand the meaning of the individual's, unique construction of reality" (Harker, 1997), and to establish triangulation. Mathison (1998, p.13) defines triangulation as the use of "multiple methods, data sources, and researchers to enhance the validity of research findings".

Triangulation ensures that the individual's 'unique construction of reality' is weighed against those of other participants. Evidence from different sources is used to crosscheck perceptions.

Research Question 1:

Does knowing one's learning style improve the students' learning (as perceived by students, parents and teachers)?

In the first phase of the study the teacher also commented on her understanding of different learning styles and how she perceived they influenced learning in the classroom. Her responses, made before and after the Learning Styles implementation, were compared.

Students' responses from interviews conducted before and after learning style implementation were compared to explore the extent to which the learning style approach had influenced their learning over time.

Parents' responses were also collated through interviews to explore the extent to which parents perceived their child's learning had improved through knowing their learning style.

Research Question 2

To what extent is learning improved when instruction and learning context matches students' learning styles (as perceived by students, teachers and parents)?

Students, teachers' and parents' responses to the questions, 'To what extent is learning improved when instruction and learning context matches students' learning styles?' were recorded and compared to triangulate perceptions.

It was claimed in the literature that teachers teach through their own learning style. Another claim is that many teachers find it difficult to 'flex' to students different learning styles, hence there may be a mismatch between teaching methods based on teachers' styles and students' learning needs. The biggest mismatch is generally in the areas of kinaesthetic and tactile preferences. It is claimed that students' achievement is enhanced when the teacher's learning style matches that of the child (Prashnig, 1998, p. 189).

To explore Prashnig's claim, students' responses were compared with their teacher's perceptions of how she believes she helps the students to learn. Students responses about how their teacher helps them to learn were collated according to which sensory modalities (auditory, visual, tactile or kinaesthetic) the teacher predominantly used to teach them. Students' perceptions about 'how the teacher helps them to learn' were checked against the students preferred learning styles to determine matches and mismatches between the teacher's and students learning styles. So, for example, if the teacher claimed that she taught students through all the sensory modalities and the students' also claimed this was true, then it would appear the teacher's claim was accurate. However, if the teacher claimed she taught through all sensory modalities and her students claimed she taught through auditory and visual, perhaps the teacher's self-perception of her teaching style is inaccurate.

Research Question 3

What are the difficulties of implementing the learning style approach in two classrooms (as perceived by the two teachers involved)?

In the second phase of this study both teachers discussed at intervals the process of Learning Styles implementation in the classroom. Responses were compared. The implementation centred on teachers making a 'paradigm shift' from 'traditional' to 'child-centred' teaching. The influence of management structures and school culture and the process of developing teacher expertise during the process of learning a new pedagogy were also examined.

3.5 Triangulation

As stated above, Mathison defines triangulation as the use of 'multiple methods, data sources, and researchers to enhance the validity of research findings.' (1998, p.13) Triangulation is a way of ensuring the validity of research findings by demonstrating that independent measurement from a range of data sources is able to support the research (Miles & Huberman, 1984). Campbell & Fiske, (1959) state that triangulation involves multiple methods, for example, questionnaires, interviews and data collection from different people.

3.6 Data Analysis Methods

Data analysis consisted of collecting data in the form of interviews, sorting data into categories and formatting the data into text that provided insights into the issues of whether:

1. Matching learning styles with learning context and instruction improves learning.
2. Knowing one's learning style is perceived to improve learning.
3. Implementing learning styles is problematic and what the difficulties may be.

In the study student data were coded according to initial letters of first names. Classes were named 'Class One' and 'Class Two'. Pseudonyms were used for teachers' names: Susan and Jan.

In both phases of the study, students' interview data were summarised and displayed graphically, for ease of interpretation, in a table to measure and compare the relationship of their self-perceptions of learning before and after the study. Identification of learners' styles is based on the Dunn and Prashnig Learning Style Model, (1997), from which the Learning Style Analysis is derived.

A taped discussion between the teacher-participant and teacher-researcher participant at the end of the second phase of the study provided a further source of data; both about their perceptions relating to the study questions and the process of implementing learning styles in the classroom.

The process of qualitative data analysis is based on data reduction. Data is thematically organised around research questions and selectively arranged in categories based on these questions. Forman and McCormick (1995, p.152) suggest that reduction of qualitative data involves selecting, simplifying, abstracting and transforming the data. The data analysis in this study also draws on Gadamer's argument that there is no neutral foundation for understanding, (in Louden, 1991). Our understanding of events or texts is constructed through preconceptions we bring to them.

To gain an understanding of these preconceptions we need to explore the underlying meanings and assumptions of participants' talk and responses in interviews, in other words, we need to analyse the discourse.

Discourse Analysis

This section discusses the relevance of discourse and discourse analysis.

The Concise Oxford Dictionary (1990) defines discourse, in one sense, as conversation. It could also be said that discourse refers to 'talk' between people. Discourse analysis 'involves looking for patterns and connections in the ways in which we speak, think, feel and act in our social world (MacNaughton, 1995, p. 46).

According to Forman and McCormick (1995), discourse analysis is one of the principal methodologies of socio-cultural research in education. The writers claim discourse analysis is used as a tool for understanding learning and teaching through understanding how cognitive, social, cultural, affective and communicative processes interrelate in instructional settings.

MacNaughton, (1998) describes discourse analysis as the process of taking apart and critically reflecting on our social beliefs and practices, our emotional investments in them and the contribution of social institutions to beliefs, practices and emotions. Although discourse usually refers to talk between people, it also has a more specialist meaning, often used in contemporary sociology to tease out strands of meanings, underlying assumptions and belief systems embedded within a certain discourse of practices. In her paper, McNaughton (1998) used discourse analysis to examine how an early childhood teacher, Fay, could come to understand how and why the liberal

feminist approaches she tried to implement in her classroom were not working. The paper studies the preconception and assumptions Fay brought to her work as a teacher. Similarly, in this study, the teacher interviews have tried partly to explore the two teachers' understandings about implementing a learning style approach.

In this study it has been argued that child-centred education is currently marginalised within the traditional education system's dominant discourse, one which has been reinforced by current curriculum and assessment frameworks (Lee and Hill 1996; Stoll and Fink 1996; Sullivan 1997; Codd 1993; Thrupp 1998; Jesson 1995). According to MacNaughton (1998), for change to occur from traditional to child-centred education, those advocating and practising child-centred education need access to powerful alternative discourses (language, meaning, practice, emotion and social structures).

In phase two new interview questions were chosen to allow two teachers to reflect on the ways in which classroom organisation, relationships with students, the relationship between the two teachers, and with the rest of the school staff, encouraged or destroyed the implementation of the learning style approach.

3.7 The Researcher's Role

The role of the researcher as one of the primary data collection instruments in this study necessitates the identification of personal values, assumptions and biases in order to ensure reliability, hence the following declaration of possible biases.

My teaching career in primary schools spans seventeen years and for the last six years I have been an Assistant Principal at the same school. During my teaching career I have experienced many superficial changes to education, but there appears to be few real changes to classroom teaching, based on knowledge of how students learn; child-centred education; the modern paradigm of learning (Vos and Dryden 1993, Dunn, R. and K. Dunn 1992, Prashnig 1997). I believe that many of the challenges facing schools in New Zealand in the 1990s have been driven by the 'New Right' ideology, often conflicting with child-centred education (Sullivan 1997). I became strongly committed to the use of the learning style approach in my teaching in 1998 when I attended a professional development course about learning styles.

In the original research design for this study I had planned to act as a non-participant observer of two teachers in implementing learning styles in their classrooms. However, the school refused one teacher permission to attend a two-day course about learning styles. The researcher and two intending teacher-researcher participants decided that without that training, it would be too difficult for the second teacher to continue in the study. However, during the first phase of the study it became apparent that Susan preferred to work collaboratively. Because of her relative inexperience she requested that I participate in the study as a supporting colleague. I, therefore, entered the study as a participant in the second phase.

For the duration of the second phase of the study I assumed the role of a teacher-participant, while continuing with Assistant Principal responsibilities within the school. Being a practising teacher I was unable to observe Susan implement the learning style approach in her classroom and had to rely on interviews as the main source of data collection.

Justification of Researcher's Participation in PhaseTwo

Jan (the researcher) and Susan's perceptions were gathered to explore learning styles implementation from a teacher's understanding. This case study became a collaborative venture and took shape through the experiences Susan and Jan shared.

The change in the role of Jan in this study is very similar to that undertaken by Louden (1991) in his study of one teacher's practice in a Canadian middle school. Instead of researching instructional improvement as such, Louden worked from the premise that before proposing a change one should ask, 'How does this change relate to these teachers' understanding of their work?' Louden followed a colleague, Johanna, through cycles of change, always attempting to understand the meaning Johanna made of her work. Initially acting as a classroom observer, Louden soon became a co-teacher with Johanna in her classroom. This role changed from detached observer to co-participant in the research.

In a similar way, Jan followed Susan's journey through implementation of a new methodology in her classroom while working alongside her as a colleague in this study.

Louden argued that from a teacher's perspective, teaching is a struggle to discover and maintain settled practices and routines that resolve problems posed by particular subjects and groups of children. The teacher's biography and professional experience shape these practices, routines and patterns. The meanings of these patterns of actions become clear only when set in the context of a teacher's personal and professional history. When confronted with new challenges, a teacher struggles to resolve them in ways that are consistent

with the understanding she brings to the problem. This leads to an understanding of teaching.

New strategies disturb the carefully established balance between educational goals and issues of classroom management (the 'control-education' dilemma).

In the second phase of this study, both teachers worked closely as colleagues. Both teachers had already developed a close relationship through Jan being a tutor teacher to Susan when she was a beginning teacher. During this study they were both teaching the same level (Year 3 and 4).

3.8 Ethical Considerations

The following protocol was developed to make sure that appropriate ethical standards were addressed:

- The thesis was proposed and developed in 1998 as part of an Educational Research Methods paper at Massey University.
- A supervisor was found for the research project.
- The Primary School's Principal was approached in Term 3 and approval granted.
- The Primary School's Board of Trustees were approached and given a written and oral explanation of the study. Approval was granted.
- The classroom teacher was given a written and oral explanation of the research study and their involvement in it. The teacher had a choice to participate. Confidentiality of data outcome was assured. Any changes were to be discussed and consensus reached about the outcome of these discussions.
- Their class teacher gave explanations about the research to the students. Students could choose whether or not to participate.

- Parents were given written information and the researcher's phone number to contact should they need any further information. Parents were given the choice to allow their child to participate.
- Parents were given the opportunity to attend interviews and L.S.A. with or without their students. The L.S.A. profiles and reports were approximately 12 pages long and may be difficult to interpret without explanation, hence the researcher thought it advisable to provide parents with the opportunity to have L.S.A.s explained before taking them home.
- Parents were asked if they wished to attend an interview at the end of the research to reflect about their perceptions of changes in their child's learning.
- All parents were asked if they wished to give responses about the L.S.A. and classroom innovations before the telephone interviews began.

3.9 Consent

The procedures and instruments used in this study conformed to the requirements of the Code of Conduct of the Massey University Human Ethics Committee (Appendix A).

Informed consent was a major consideration. A research proposal was submitted to the Principal and Board of Trustees of the case study school, with copies of all information and consent forms. When consent was granted, information and consent forms were distributed to caregivers of students in the classes participating in the research. Individual consent was obtained from all caregivers, students and Susan, the other teacher.

3.10 Description of the Instrument Used

In the study all students learning styles were analysed with the Dunn and Prashnig L.S.A. for Junior Students (1997). Each child was asked questions, read from a standard form (L.S.A.), with only standardised responses articulated by the adult.

The L.S.A. for Junior Students is a questionnaire containing 48 questions about brain dominance, sense modalities, physical needs, environmental preferences, social needs and attitudes towards learning.

> *The test used to identify learning styles is a respected and research validated instrument, which provides a suitable framework for capitalising on individual differences in the learning environment. The Learning Styles Inventory for Primary and Secondary students - developed by Drs R. and K. Dunn, has been recognised as the most comprehensive, valid, reliable, and practitioner -oriented model to assess and interpret students' learning styles. (Prashnig, 1993)*

3.11 Description and Justification of the Statistical Techniques Used

The Dunns claim that The Dunn, Dunn & Price L.S.I. (1984) 'is the most reliable, most valid, and most widely used learning style diagnostic instrument for school-aged students in the USA. It assesses multiple characteristics that have been shown to significantly affect individual students' achievement, has been tested at every grade level (3 - 14), has been incorporated into research at more than 60 institutions of higher education in the U.S.A. Dunn and Dunn

also claim that it has the advantage of being developed, scrutinised, field tested, redesigned, and consistently improved by university researchers for more than 22 years.' (Dunn, R. 1990) The Dunn and Prashnig model is a close adaptation of this model as designed by Drs. Dunn and Prashnig.

> *The widespread use, cross-cultural appeal and successful application of the Working Style Analysis world-wide has led to an increased demand for a similar assessment tool for younger students and its use in school settings. Again, Dr. Ken Dunn and I collaborated successfully in creating this new instrument – the Learning Style Analysis. (Prashnig, 1998, p.71)*

3.12 Discussion of Internal Validity

The L.S.A. contains a series of statements about how students would like to learn best. Students respond to those statements that are true for how they would like to learn best. Responses from the questionnaire are entered into a computer programme and the student receives a computer-generated personal profile and report, allowing him or her to identify individual strengths and personal preferences for learning, studying, reading and general information intake. The L.S.A. report gives a detailed explanation of all the individual elements of the L.S.A. model and recommendations on how best to 'utilise personal strengths for learning situations, counteract weaknesses and increase flexibilities (Prashnig, 1998, p. 77).

The L.S.A. was administered according to the manual of standardised instructions.

Phase One (Terms Three and Four, 1998)

This section outlines the development and procedures in the first phase of the study. Like the second phase, it explores the extent to which learning is improved when instruction and learning context matches students' learning styles and related issues of how knowledge of one's learning style influences learning. It also explores some of the difficulties in implementing learning styles in a classroom.

3.13 Setting and Participants

The first part of the study phase was carried out in a decile 9 State Primary School with 290 Year 1 to 6 pupils. The ethnic representation was. The first phase of the study involved Susan, a Year 2 teacher and her class of 26 Year 4 and 5 students. Susan had been teaching for one year and three terms. Her only teaching experience had been at the present school, where she taught in the same syndicate as the researcher. The researcher taught a Year 4 and 5 class and was the Assistant Principal.

3.14 Procedure

In Term Three permission for the research was sought from Principal and Board of Trustees. After an oral submission of the formal proposal, the Board of Trustees gave written permission. Information and consent letters were sent to parents and signed consent forms returned. It was intended that parents were informed as fully as possible. All parents gave permission for their child to take part in the research.

Students were interviewed about their perceptions of how they learned best and how their teacher helps them to learn before L.S.A.(questions in Appendix E).

After one term students were interviewed again to ascertain any changes in their self-perceptions of how they learned and whether they thought knowing how they learned had helped their learning. Susan, the teacher-participant, was interviewed to establish how her perception of the implementation of students' learning styles had influenced learning and teaching in the classroom before the L.S.A. and again one term later.

In Term Four Susan attended a two-day Professional Development course about Learning Styles. The course informed Susan about learning styles and how to analyse, interpret and implement learning styles in the classroom. The researcher analysed the learning styles of the students participating in the study using the L.S.A. instrument. This task was completed in week 5.

Letters were sent to parents to inform them that the Learning Style Analyses had been completed and to arrange a suitable time to discuss the Learning Style Profiles and Report. Discussions were held with 24 of the 40 parents in the study about the Learning Style Reports and Profiles.

In Week 6 the teacher discussed learning styles with the students participating in the study and began implementation into the classroom programme. In Week 7, 8 and 9 the teacher taught a unit 'Christmas' catering for learning styles. During Week 9 and 10 the teacher and students were interviewed about their perceptions of whether learning styles influenced their learning and teaching.

At the end of Term 2 1999, the parents of students in Susan's classroom were interviewed about their perceptions of changes in their students learning since

the L.S.A. and whether the L.S.A. helped them to understand how their child learns.

3.15 Research Sample

The classroom unit was deemed to be the most suitable for a case study because classes are traditionally recognised as the basic units of a primary school. Initially the case study was intended to comprise two classes. Susan and a syndicate colleague were Year 2 teachers who were interested in implementing learning styles in their classrooms. It was anticipated that they would be able to offer each other professional support during the professional development and classroom innovations. However, one teacher was refused the opportunity to undertake professional development about Learning Styles by the school. The professional development component was considered necessary to provide a theoretical framework in which to understand the implementation of Learning Styles in classrooms. Consensus between the researcher and the two teacher-participants was that it was too difficult for the second teacher to investigate and implement 'Learning Styles' without this initial professional development. The second teacher withdrew from the research. Therefore the time phase of the case study was limited to one class of Year 4 and 5 students in Term 4 1998.

3.16 Interviews

Interviews were conducted with the teacher and with groups of four students at the beginning and end of the first phase of the study. These were carried out in order to explore the extent to which learning was perceived to have improved when instruction and learning context matched students learning styles.

Parents were interviewed after the L.S.A. had been conducted and classroom innovations been attempted.

Powney and Watts (in Haynes, 1996) characterise interviews as either 'respondent interviews' or 'informant interviews'. With respondent interviews the interviewer retains control during the interview. The interview has a structure, imposed by questions that cover issues important to the interviewer. With informant interviews, the interviewee determines the structure. In this study the teacher, students and parents interviews were respondent type interviews, in order to keep the focus on specific issues.

3.17 Teacher's Interview Questions

The teacher was asked the following questions before the L.S.A. to ascertain her understanding of learning styles and how her understanding of them influenced the way she taught.

What do you understand about different learning styles?

How do you perceive these different learning styles to influence learning in the classroom?

At the end of the term, the teacher, Susan was asked the questions below to explore her understanding of learning styles, how this had changed during the term and her analysis of the attempt to implement the new pedagogy into her classroom. The second interview also allowed for follow up of issues raised earlier, for example, in the first interview Susan had commented that students tend to move around as a strategy to avoid work. In the second interview Susan was questioned about her attitude towards mobility because her response may have indicated a 'paradigm shift' having begun to take place,

from teacher controlled learning to that of child-centred learning. In this sense the interview technique was drawing on discourse analysis which was used as a tool to reveal ideological preference and bias in the teacher's responses by exploring meanings, underlying assumptions and belief systems embedded within a certain discourse (MacNaughton 1998).

How has knowledge of your own learning style influenced your teaching?

What was the process of implementation after professional development and the students L.S.A. were completed?

Has your attitude towards mobility changed in the class?

How does matching learning context and instruction with learning styles affect students learning?

3.18 Students' Interview Questions

Student interviews were conducted to give a 'before' view and 'after' view of students' perceptions of their learning. They were interviewed together in fours to provide peer support during the recorded interview. Open questions enabled the students to share their feelings and to elaborate fully if they wished. The researcher conducted these interviews during intervals and lunchtimes in the classroom and lasted approximately ten minutes for each group.

The interview responses were recorded. The interview questions asked before the L.S.A. were the same for each group of students and these were recorded to enable transcribing appropriate sections at a later time, to provide accurate reporting. Students were asked the following questions before the L.S.A. to

explore their self-perceptions of how they learned and how their teacher helped them to learn:

How do you learn best?

How does your teacher help you to learn?

At the end of the term students were asked these same two questions to allow comparisons over time to be made. Students were asked one other question to explore whether they thought knowing their learning styles had improved their learning:

Has knowing how you learn helped you to learn better?

3. 19 Parents' Interview Questions

Parents were asked two questions two terms after the L.S.A. and classroom innovations to examine how parents perceived the helpfulness of L.S.A. in helping their child to learn better and whether they perceived their child had made changes in the way they learn.

Have you noticed any changes in your child's learning since they became aware of their learning styles?

How helpful was the L.S.A. in understanding how your child learns?

3.20 Summary of Phase One's Methodology

In the first phase of the study, the case study design focused on reports of daily life (as reported in interview data) within Susan's classroom, during implementation of learning styles in the fourth term of the school year.

Interviews with parents, students and the teacher provided the mechanism to scrutinise and compare participants' perceptions. Open questions generated answers that raised significant issues for the researcher. These issues are discussed further in Chapter Five.

The students were interviewed, in random groups of four. Group interviewing was intended to give students peer support to make interviewing as non-threatening as possible. However, in hindsight it is acknowledged that students' individual responses may have been influenced by others' in the group and by their dual role relationship with the researcher (Assistant Principal and Syndicate Leader).

Lack of vigilance with the tape recorder used for taping interviews with students, both before and after the LS.A was a major problem. Although all 26 students were interviewed before and after the L.S.A., 12 pre-interviews and 10 post-interviews were accidentally erased. Hence only 14 interview transcripts were used in the first phase of study.

Changes in procedure for the following year's interviews were based on the desire to discover each child's individual, perceptions about how they learn before and after Learning Styles were implemented, in order to compare and form perceptions, i.e. interviewing one student at a time, another person interviewing students (other than their classroom teacher or researcher).

It was decided that a person, other than the researcher, would interview each child separately for the next phase of the case study to alleviate any possibility of a role conflict (as the researcher was an Assistant Principal the child may have potentially viewed her to be a person in power and consequently adjusted her responses). The interviewer selected was a teacher-aide who was known by the students, understood the rigours of research and had no evident role conflict that could influence students' answers.

During the first phase of the research study, the teacher-participant attended a 2 day professional development course on 'Implementing Learning Styles in the Classroom'; had the students Learning Styles analysed; discussed students L.S.A. profiles with the class and began adapting the classroom context and method of instruction to cater for preferred learning styles.

For the following school year there were internal organisational changes (both teachers would be teaching Year 3 / 4 classes in 1999). Both teachers (one as a teacher-participant, and one as a teacher-researcher) and their classes were to be involved in the case study.

Phase Two (Terms One to Four, 1999)

3.21 Setting and Participants

The same school and teacher were used in both phases of the study. In the second phase Jan, the researcher, also becomes a participant. Jan and Susan and their classes of Year 3 and 4 students took part in phase two.

In the first phase of the study, as previously discussed, it was originally intended that two Year 2 teachers participate in the study. They were selected

because of their enthusiasm to learn about a new child-centred methodology and their close professional relationship that would possibly be conducive to reflecting about their teaching practice and sharing new ideas together. However, the school, the opportunity to attend professional development about Learning Styles, did not allow the second teacher and it was decided that without the intensive 2-day course, it would be difficult to continue in the study.

During the first phase of the study, Susan reported feeling isolated and without a colleague to support her implementation and reflection of the new 'Learning Styles' methodology. After discussion with Susan, Jan (the researcher) decided to take part as a teacher-researcher in the study. It was hoped that both teachers would enjoy mutual support for implementation of their new methodology.

In 1999 Susan is now a third year teacher who has been teaching at the same school since graduating from Teachers College. In the fourth term of 1998 Susan attended a two-day course about Learning Styles and was involved in the first phase of the case study to implement learning styles in her classroom of Year Four and Five students.

Jan, the researcher and teacher-participant, has been full-time teaching for seventeen years. She is also Assistant Principal and leader of the Year Three and Four syndicate. Jan's professional development in Learning Styles included a two-day course for Managers to implement Learning Styles in schools and a further Diploma of Holistic Education involving five days and two further weekends. Both Jan and Susan are involved in the case study, attempting to match instruction with learning context and learning styles in their classrooms of Year Three and Four students.

3.22 Class Participants

Susan teaches a Year Three and Four class of twenty-seven students. In February six students were underachieving in Reading and Maths, according to Running Records, Burt Test and Holborn Test. Two students scored above 90 percentile in PATs for Maths, ReadingVocabulary, Reading Comprehension and Listening. There are two special needs students in the class and another child with behavioural problems (suspected ADHD). One special needs child, with a pre-school cognitive developmental age, is not included in the study, at the request of the child's parents. Their reason was that she would not understand the intended questions. The other special needs child, a boy with a form of autism, is included. During the study one child left and two arrived to join the class. One of the students who arrived had severe behavioural problems and was moved to another classroom in Term Two. The students who joined the class after Term One had their Learning Styles analysed but were not included in the research because they had not been involved during the whole case study.

Jan also teaches a class of twenty-seven Year 3 and 4 students. At the beginning of the year students in Jan's class range from a 10-year-old achieving approximately at 5-6 year cognitive level, a boy with a severe behavioural problem and 7 students underachieving in Reading and Maths. Two students have all PAT scores above 90 percentile and a further 8 students achieve well above their chronological age in Reading. During the course of the research the child with the severe behavioural problems was withdrawn for specialist long-term intervention.

Both classes cross group for Maths and Recorder playing. Maths is cross-grouped for one-hour sessions, four days a week. Recorder is cross-grouped for fifteen-minute sessions, three days a week. Susan's class also trialed cross-

grouping for Reading with the adjacent Year 3 and 4 class for one term, hence some students comments about changing class for Reading in the interviews.

Both classes are involved in a school-wide programme for students who underachieve in Reading. This programme is designed to develop confidence in Oral Reading and involves withdrawal from classroom programmes fifteen minutes a day, three days a week with a Child Support Worker.

3.23 Time Frame

The time frame for the case study was the first two terms of the school year.

Term One

- Consent from parents is requested and given for students to participate in research.
- Students are individually interviewed prior to their L.S.A..
- Students learning styles are individually analysed.
- Parents and students are informed by letter, and given individual Learning Style Profiles. A classmeeting is held to share these profiles. Individual meetings are offered if parents are unable to attend class meeting.
- For the remainder of the first term and the second term both teachers begin to change the learning environment and their instruction to cater for learning styles.

Term Two

- At the end of Term Two students are interviewed individually to ascertain their perceptions of how knowledge of their learning styles influences their learning. Their perceptions of whether matching learning context and instruction with learning styles is also explored.

- Parents involved in the first phase are interviewed by telephone to ascertain whether the L.S.A. has affected how their child learns.
- Parents involved in the second part of the study are interviewed by telephone or in-person to ascertain their perceptions of how matching learning context and instruction with learning styles affects students learning.
- Teachers discuss their perceptions of whether matching learning context and instruction with learning styles affects students learning.

Term Four

At the end of Term Four students are interviewed individually to ascertain their perceptions of how knowledge of their learning styles influences their learning. Their perceptions of whether matching learning context and instruction with learning styles is also explored. Also, both teachers reflect on their year of learning styles implementation.

3.24 Interviews

Interviews were conducted with individual students before L.S.A., at mid-year (end of term 2) and at the end of the year (end of term 4) in order to explore their perceptions about how learning was improved when instruction and learning context matched their students learning styles. Parents were interviewed after the L.S.A. and classroom innovations either by phone or in-person. Each parent was asked how he or she would prefer to be interviewed and their preferences were taken into consideration.

Open questions enabled the students to share their feelings and to elaborate fully if they wished. The adult who conducted these interviews was a Child-Support-Worker, employed in the school, whom was known to the students.

The interview responses were recorded on tape before and after the L.S.A. and were the same for the students in the first and second phase of the study, although in the second part several questions were added to provide further insight into how students perceived they learned best. Interviews were recorded to enable transcription at a later time, to provide accurate reporting.

In interviews, core questions were asked to substantiate the views of the respondents. Data was reported in such a way that similarities, differences and a range of responses could be noted. Interviews provided the opportunity to find out what the respondents thought or felt about and how they reacted to various issues and situations. A large amount of data were gathered from interviews, so responses are summarised. Direct quotations are used to 'paint a picture' of thoughts, feelings and responses and they often provide illuminating answers.

3.25 Summary of Phase Two's Methodology

In this research project, in both the first and second phase phases, the case study methodology focused on the reality of every day life in the classroom as reported in interviews. The case study was effective in 'seeking to observe, probe and understand an individual unit' (Harker, 1997, p.6). It enabled 'full attention to (be paid) to the unofficial and unforeseen aspects of the innovation and implementation (of learning styles)' (Atkinson and Delamont, 1985).

In the second part of the study there was evidence of Susan's problematic workload and how this became an obstacle to implementation of learning styles in the classroom. Barriers to the effective implementation of the Learning Style Approach emphasised difficulties for the younger, relatively inexperienced teacher trying to implement major changes to the classroom programme. The traditional nature of the school and its influence on the implementation of the Learning Style Approach in both classes were also explored.

The sampling was from two parallel classes of Year 3 and 4 students. Contrasts and similarities between classes, perceived by teachers, students and parents were noted in interviews. Triangulation using three sources of data produced results to be discussed in Chapter Four, Five and Six.

Interviews formed the main instrument for data collection. Students were interviewed before and after the L.S.A.. Parents and teachers were interviewed after the Learning Style Approach had been implemented in classrooms; at the end of the study.

In the second part of the study a different person interviewed students from the First phase Phase. As stated in the Pilot Phase Summary, the change was based on a genuine desire to discover each child's individual and honest perceptions about how they learn best and to avoid potential role conflict, possibly invalidating students' responses.

The parents had been supplied with the questions they were to be asked prior to the interview, but students were not. This was an attempt to be as unobtrusive as possible and to protect students from possible anxiety. In hindsight, it may have been advantageous to give the students some time to

think about their answers and may have been a more appropriate strategy for the 'reflective' students.

In both the first and second part of the study, teachers were interviewed informally using open questions. This allowed for sharing feelings and provided opportunities for full elaboration about issues. Discourse analysis, based on feminist post-structuralist theme, was used as a tool to analyse interview comments and reported practices in the school.
If parents were unable to attend their interview, the researcher contacted them by telephone. Parents and students were asked standard, short and open questions in an attempt to gather qualitative, reliable and valid data.

In both the first and second parts of the study phase the time frame was too short to fully implement a Learning Style Approach in the classroom. This outcome is justified by research that claims learning styles take approximately five years to fully implement in a school (Prashnig, 1998; Scaddan in Prashnig, 1998; Edwards 1988).

In both the first and second parts of the study, the methodology remains similar, apart from inclusion of the researcher as another teacher-participant, interviewing students separately and using a different interviewer in the second part of the study. These changes became necessary after reflecting on outcomes from the first part of the study.

Similarities in outcomes from the first and second parts of the study become evident, as perceived by teachers, students and parents, and these are discussed further in the following chapters.

CHAPTER FOUR

DATA PRESENTATION

4.0 Introduction

As previously outlined, the case study research design comprised two phases. Data are presented from the first study phase in which a class of Year 4 and 5 students, their teacher, Susan, and the parents and caregivers participated. For the second study phase data are presented from two classes of Year 3 and 4 students, their teachers Susan and Jan, and the students' parents and caregivers. Data from interviews with students, parents and teachers are presented selectively and thematically around three issues:

1. **Does knowing one's learning style improve students' learning?**
Students commented on how they learn best. These responses were compared with the elements of the Dunn and Prashnig Learning Style Model (1997) to ascertain the extent of the students' understanding of how they learn best. This data provided a basis from which to explore the extent to which the Learning Style Approach fostered a better self-perception of how one learns and whether this understanding led to an improvement in learning.

2. **Is learning improved when instruction and learning context matches students' learning styles?**
Students', parents' and teachers' perceptions were triangulated to explore the extent to which learning had reportedly improved. Students' perceptions of

barriers to learning and whether their learning had changed were also explored.

3. **What are the difficulties of implementing the learning style approach in two classrooms, as perceived by the two teachers involved?** This issue was further categorised into: the need for teachers to make a paradigm shift when implementing the Learning Style Approach; the influence of supportive or unsupportive management practices, structures and school culture and the process of developing teacher expertise in the Learning Style Approach.

4.1 Question 1
Does Students' Knowledge of Their Own Learning Styles Improve Their Learning?

Phase One, Class One

Students' Perceptions

Before the L.S.A. was administered in Phase One, Term Four, 1998, 14 students articulated 20 preferences for how they learn best. No child specified elements of brain processing or dominance or attitudes towards motivation, persistence, conformity, responsibility, structure or variety. Nor were any responses made about preferences for sound, light or temperature. 3 responses specified preferences for their work area and three for working in pairs or with peers.

The most frequent responses (N =10) concerned physical preferences for mobility, intake and the best time of day to learn. Although these preferences

had not been openly encouraged in their classroom before the L.S.A., one of the directions in the L.S.A. was 'Describe how you would prefer to do things, not how you have to do them right now.' The students focused on elements of eating and drinking when considering how they learned best. 4 responses were made about sensory modalities' preferences (auditory, visual, tactile, kinaesthetic.)

In total 16 of the 24 elements in the Dunn and Prashnig Learning Style Model were not articulated by any student. This suggests that before the students' teacher implemented learning styles in the classroom, the students showed limited understanding of how they learn best, using the Dunn and Prashnig Learning Style Model's elements.

Teacher's Perceptions

Similarly, before the implementation began, and before her professional development, the teacher, Susan, was aware of her own learning style and knew when 'children are really focused in when you are talking' while others...'need to go away and do activities and then come back and ask more questions.' However, by her own admission she felt she did not have the refined knowledge to identify learning styles in the classroom.

4.2 End of Phase One

Students' Perceptions

Students' interview responses about how they learn best were more detailed one term later after implementation had begun at the end of Phase One (see Fig. 1, pg. 90). The majority of responses described sensory modalities (N=15 compared with 4 before the learning style implementation). This suggested the

students were more aware of their sensory modalities' preferences after the L.S.A. Students described their preferences, using 15 of the 24 elements of the Learning Style Model after the implementation, compared with 8 of the 24 elements in the first interview.

Of the 14 students interviewed after the term's implementation of learning styles, all responded that knowing about how they learned best had helped their learning. Only 2 could not describe specifically why it had helped them to learn better. Figure 1 gives a comparison of students' stated learning style preferences before L.S.A. and one term after L.S.A. to the question; 'How do you learn best?' The verbatim responses were categorised by the researcher into the 24 elements of learning styles, according to the Dunn and Prashnig Learning Style Model.

Figure 1.

Phase One: Table of Comparison of Students' Learning Styles, Before L.S.A. and One Term After L.S.A. 1998

RESPONSES	BEFORE L.S.A.	AFTER L.S.A.
Brain Processing	0	1
Brain Dominance	0	0
Senses: Auditory	1	6
Visual	0	1
Tactile	3	5
Kinaesthetic	0	3
Physical: Time of Day	1	0
Intake	6	6
Mobility	3	2
Environment: Sound	0	3
Light	0	1
Temperature	0	0
Work Area	3	4
Social: Grouping Preferences	3	7
Parent/Teacher Authority	0	1
Attitudes: Motivation	0	0
Conformity	0	0
Responsibility	0	0
Structure	0	1
Variety	0	1

Parents' Perceptions

When parents were asked whether the L.S.A. had helped them to understand how their child learns, 24 parents replied yes, 2 replied no, 2 found the L.S.A. difficult to understand, and 6 didn't know. Of the 24 parents who thought the L.S.A. had helped them to understand how their child learned, 10 referred to their increased understanding of how their child learns; 7 to being able to provide a more effective learning environment at home for their child; 3 parents used the L.S.A. to share with their child's teacher to improve their learning at school. 8 parents did not recall or seem to understand the L.S.A.

Teacher's Perceptions

By the end of the first study phase, Susan, the teacher, could speak more fully about her knowledge of learning styles, as opposed to the students'. Susan revealed how her preferred kinaesthetic style had not been catered for in the classroom when she learned at school. She now wanted to make sure that students had opportunities to find out how they learned best and see if it made a difference.

Susan commented that her education would have been easier if she had been allowed to learn in her preferred learning style (a kinaesthetic learner). Although Susan had completed a double degree with Honours, the profound influences of her own education on her current teaching approach was an important factor in her commitment to catering for different learning styles.

> *I struggled with school for all those years and I lived for my dance lessons. If only I had known about kinaesthetic learning, it would have been so much easier. (Susan, term 4, 1998)*

Susan's memories of her own schooling were a motivating factor for her to continue with the implementation of learning styles in her classroom.

> *It just made me think of my own experiences. I wanted to give the kids an opportunity, because they are all such individuals, to experiment and try out different things according to how they think they learn best and to see if it makes a difference. (Susan, term 4, 1998)*

Susan was introduced to the theoretical basis of Learning Styles at the course she attended in term 4, 1998. Her own learning style had been analysed in a L.S.A. and she had learned to interpret students' L.S.A. graphs, individual profiles for students and group profiles for her class.

4.3 Beginning of Phase Two, Jan's Class (Class One), Term One, 1999

Students' Perceptions

In the interview before the L.S.A. was administered, in term 1, 1999, 27 students described 52 elements of how they learned best, according to the Dunn and Prashnig Learning Style Model (1997). No child specified brain processing, dominance, and attitudes towards motivation, persistence, conformity, responsibility, and task structure or variety preferences. Altogether the students identified twenty responses for learning best through sensory modalities. This suggests they intuitively understood their preferences and need for certain types of activities to ensure optimum learning. 13 students

identified themselves as kinaesthetic or tactile learners and 12 identified they needed to eat, drink and move when learning new and difficult information.11 of the 24 elements of the Dunn and Prashnig Learning Style Model were not identified by any student.

4.4 Middle of Phase Two, Class One, Mid-Year, 1999

Students' Perceptions

By mid year 26 students in class one described 63 elements altogether of how they learned best. This compared with 52 elements before the learning style approach was implemented. No child specified brain dominance or brain processing elements. This suggests that the discourse of reflective, simultaneous thinking, holistic and analytic processing was not a feature of daily teacher-student or student-student discourses in the classroom.

The students identified the same number of responses for sensory modality elements (N = 20) as in the first interview. Only 4 responses were made about physical preferences (time of day, intake and mobility). 24 responses were made about environmental needs, e.g. their preference for the amount of light, sound, temperature and informal or formal seating arrangements, in comparison to 11 in the previous interview. 5 attitudinal elements (motivation, persistence, conformity, responsibility, and variety) were not identified as preferences. This compared to 7 attitudinal elements not identified (parent-teacher authority and structure, being the other two) in the previous interview. When asked what their learning style was, 12 answered and 14 said they did not know. However, all 26 students claimed to know how they learned best.

This suggests that they were not familiar with the term 'learning style', even though they were aware of their preferences for how they learned best.

20 students thought knowing how they learned helped them to learn better at school. 2 students thought knowing had made no difference. 2 students thought knowing how they learned best had not helped them. When asked if knowing how they learned had changed things at home, 12 replied no, 9 replied yes and 3 thought it was the same.

Teacher's Perceptions

In discussion / interview with Susan, class one's teacher, Jan reported that the use of learning styles had become an integral part of the classroom and she expected students to learn according to their learning styles.

> *I think that learning styles are basic to my teaching. Often I'll say to the students, 'what are your learning styles- you've got your spelling words and your timetables to learn.' And they know the ways that they can best learn them. Like the tactile learners will have flip boxes at home, the kinaesthetic learners have been asked to learn their tables while they move around and do things. Visual learners to write them down, in lots of colours if possible, and read them and auditory learners to get someone to test them. Then I expect them to learn according to their learning styles. (Jan, end term 2, 1999)*

Jan claimed that by knowing how children learn, she could cater for their differences and ensure that every child was learning.

> *I think it is the first time in all my career that I know that every child in the classroom is learning. And that is because for the first time I*

understand how every child learns and can cater for their differences. Before, I intuitively did it, but it was a lot of hit and miss. (Jan, end term 2, 1999)

4.5 End of Second Study Phase, Class One, Term 4, 1999

Students' Perceptions

At the end of the second study phase, when the students in class one were asked by the interviewer (Child Support Worker), if knowing how they learned helped them to learn better at school, 20 replied yes; 4 no and 2 replied that it made no difference.

To the question, 'How do you learn best?' 25 students described 51 elements of the Dunn and Prashnig Learning Style Model of how they learned best, compared with 52 at the beginning of the year and 63 at Mid-Year.
No child specified brain dominance or brain processing. The students identified 10 sensory modality preferences compared with 20 in the first and second interview. Two responses were made about physical preferences (time of day) and none for intake or mobility, compared with 12 responses in the first interview and 4 in the second interview. 32 responses were made about environmental preferences (sound, light, temperature and work area) compared with 11 in the first interview and 24 in the second interview. 17 responses were made about social preferences (grouping preferences) compared with 9 in the first interview and 13 in the second interview.

No responses were made about attitudinal preferences (motivation, persistence, conformity, responsibility, structure, and variety).

Figure 2 provides a comparison of Room One's self-perceptions of how they learn best at beginning, middle and end of the year. It compares students' responses in interviews before and after the L.S.A. in the second study phase. The responses have been categorised into the elements of individual learning styles, according to the Dunn and Prashnig Learning Style Model (1997).

In Figure 2 interesting trends in mobility, sound, work area and grouping preferences developed through the year. Preferences for learning through tactile sensory modalities (as reported by students) declined from 10 to 5 responses from the beginning to end of the year. Mobility preferences declined from 11 to 0 responses. Students' responses about sound, work area and grouping preferences increased during the year. These findings confirm Jan's comments in the final interview that emphasis was placed on students taking responsibility for monitoring noise levels, deciding on their own work area and grouping preferences in order to work at their optimum levels. Sensory and physical preferences were not consistently discussed, therefore did not become dominant discourses for students, although Jan reported in the final interview (December 1999) that both sensory and physical preferences were an integral part of the classroom.

Figure 2

Table of Comparison of Students' Self-Perceptions of How They Learn Best at Beginning, Middle and End of 1999, Phase Two (Class One)

ELEMENTS OF LEARNING STYLE MODEL	RESPONSES AT BEGINNING OFYEAR	RESPONSES AT MID-YEAR	RESPONSES AT END OF YEAR
Brain Processing	0	0	0
Brain Dominance	0	0	0
Senses: Auditory	6	6	1
Visual	1	2	2
Tactile	10	8	5
Kinaesthetic	3	4	2
Physical: Time of Day	0	0	2
Intake	1	2	0
Mobility	11	2	0
Environment: Sound	4	7	12
Light	0	3	4
Temperature	1	3	0
Work Area	6	11	16
Social: Grouping Preferences	9	13	17
Parent/Teacher Authority	0	0	0
Attitudes: Motivation	0	0	0
Persistence	0	0	0
Conformity	0	0	0
Responsibility	0	0	0
Structure	0	1	0
Variety	0	1	0
TOTALS 21	52	63	51

Parents' Perceptions

16 of 25 parents (class one) thought that the L.S.A. had been helpful in understanding their child's learning. 3 did not. 4 did not know. 2 could not understand the L.S.A.

16 of the parents commented on their improved awareness of their child's learning preferences through the L.S.A. and on making changes in approaches to homework. Most parents were using information about their child's optimum times for processing information, from the L.S.A., and allowed for their children to do homework at their child's preferred time instead of expecting homework to be completed when parents thought it should. Several parents had changed their expectations of homework being completed in work areas where parents thought it was appropriate, and allowed students to work in areas where students preferred.

Of the other 9 parents, 3 commented on family problems that prioritised their time, 4 parents thought the L.S.A. was not correct or did not describe their child's learning appropriately and 2 parents could not understand the L.S.A.

One of the students' L.S.A. was very unusual, with no preferences, only flexibilities for all the elements. (Flexibilities mean that the child may fluctuate depending on interest and flexibilities may become preferences or non-preferences.) The parent's comment was interesting because the parent related how her child learned at home, describing a 'flexibility.' In fact the analysis had been accurate, describing a 'flexible' learner:

> *Not very helpful because everything came out as flexibilities. It didn't tell me anything. At home I notice she has difficulty staying*

on task if she's not interested. She will drift – same as I do – but I guess that is human nature. (Class one parent, term 4, 1999)

Parents of those students who learn best other than through the traditional auditory and visual sensory modalities noticed the biggest changes in their child's learning. These students, who were boys, were also underachievers in English and Mathematics.

I have noticed he is progressing more quickly. His reading has clicked...In general he's progressing much more quickly than I imagined. (Class one parent, term 4, 1999)

Yes, he's much happier in himself. He's proud of what he's learned each day when he comes home and shows me and tells me. There are huge changes and it's obvious. It's so much better for him. He has a struggle but he's starting to learn and its encouraging him. He's enjoying being able to do things he could never do. ...Has to work hard. (Class one parent, term 4, 1999)

He's more relaxed about doing it. He's not scared. That's the main point – the biggest one. He was stressed before. Now he's got more confidence. He's learning better. (Class one parent, term 4, 1999)

Yes, I have noticed a huge change in his motivation. He's so keen. He doesn't need to be reminded. He is so different. He is reading enthusiastically and wanting to get away from picture books into proper little novels. His writing has improved too. It is so neat now. Yes, everything is really positive. He gets excited when he has homework to do and it worries him when he hasn't done it. He

> *pesters me to test him. He's happy. It's not that he was unhappy before, but he was distracted. Now I find he's focused and motivated and it's great. (Class one parent, term 4, 1999)*

All parents offered unsolicited positive comments about how their child enjoyed school. Parents appeared to have no concerns about the learning style innovation.

Teachers' Perceptions

At the end of 1999, in discussion / interview with Susan, class one's teacher, Jan spoke of all students achieving well and their positive attitudes towards themselves and their learning. Most of the students already had a positive attitude towards themselves and their learning but the biggest change was those who were 'underachievers.'

> *...The children are all achieving well and feel happy about their work. They feel in control of themselves and their self-esteem is improved.. Another highlight is that all children have caught up to their chronological age in Reading except for one Special Needs boy. (Jan, term 4, 1999)*

4.6 Beginning of Phase Two, Susan's Class (Class Two),Term 1, 1999

Class Two Students' Perceptions

Before the L.S.A., during interviews, 23 students of class 2 described 42 elements contributing to how they thought they learned best, categorised according to the Dunn and Prashnig Learning Style Model. No child identified preferences for type of brain processing, brain dominance, or attitudes (motivation, persistence, conformity, responsibility, structure or variety). 17 responses were made about learning through sensory modalities, which suggests these students intuitively knew what activities suited their learning styles best. (Dunn, 1988) 17 responses were also made about their preferences for the environment they prefer to work in sound, light, and temperature and work area.

4.7 Middle of Phase Two, Class Two, Mid-Year, 1999

Students' Perceptions

In interviews with the support worker, undertaken at the end of Term 2, 1999 19 of 23 students in class two thought knowing how they learned helped them to learn better at school. 1 child thought things were the same, 1 did not know and 2 students thought it had not helped. When asked if knowing how they learned had changed things at home, 5 replied no, 3 replied yes and 3 were confused. 23 students described 64 elements of how they learned best, compared with describing 42 elements before the L.S.A.

No child stated their preferences for learning through brain dominance (i.e. the students knowing how they process information, according to whether they have a 'right' or 'left' brain); or sensory modalities, (i.e. preferences for learning through auditory, visual, tactile or kinaesthetic sensory modalities). This suggests the discourse of reflective, simultaneous thinking, holistic and analytic processing was not a dominant discourse in the classroom.

6 responses were made about physical preferences (intake) compared to none in the earlier interview. This suggests certain students had become aware of their need for intake. 35 responses were made about environmental preferences, in comparison to 17 environmental preferences in the previous interview; 23 about social preferences (20 for grouping preferences and 3 for parent/ teacher authority) compared to 7 in the first interview (5 for grouping preferences and 2 for parent/ teacher authority). 1 attitudinal element (structure preference) was identified, compared to 0 in the previous interview. When asked what their learning style was 1 child asked, 'What do you mean?' 7 did not know. 11 were able to identify their preferred learning style.

Teacher's Perceptions

In interview / discussion with Jan, Susan reported that the students loved coming to school and considered what they learned at school to be fun, rather than learning. Susan's reference to 'games', are activities that are designed for 'hands on' (tactile learners).

> *The benefits are huge when you see the outcome or piece of work that a child is so proud of and it is great to see kids enjoying coming to school. You know when the kids aren't ... are dragging their heels. It's*

great to hear from the parents that the kids love school and they really enjoy learning what we do. They don't say learning, they say these games are fun. (Susan, end of term 2, 1999)

Susan used the knowledge of the students' learning styles to help parents who were having difficulty helping their children with homework.

The most benefit is mainly the children with learning difficulties. I am finding this. Especially when parents come in and say they are having such problems learning timetables and spelling words at home and I can look up their profile and see their learning style and say perhaps they need to get plastic numbers or putting letters together to make words with their hands. (Susan, end of term 2, 1999)

Susan noticed the students were more motivated because they had an awareness of how they learned best and were allowed to learn in that way.

They pack themselves off to areas of the class they feel happy and comfortable in and they have become more focused, I believe. Since they have become more aware of their learning styles they come and ask me if they can sit outside in the sunlight where it's quieter, or sit on the floor or do plays or activities that are still part of the learning but give choice. I feel they have become more motivated.(Susan, end of term 2, 1999)

4.8 End of Phase Two, Class Two, Term 4, 1999

Students' Perceptions

At the end of second study phase 23 students in class two described 45 elements of how they learned best, compared with 42 at the beginning of the year and 64 at Mid-Year. 3 students identified tactile preferences, (0 preferences were stated for sensory modalities at Mid-Year and 17 at the beginning of the year). No child specified physical preferences (time of day, intake, mobility), or attitude preferences (motivation, persistence, conformity, responsibility, structure, variety) or brain dominance and processing. This result remained the same for the beginning and mid-year interviews, (except for one stated preference for structure at Mid-Year).

36 students specified environmental preferences (sound, light, and work area), compared with 35 at Mid-Year and 17 at the beginning of the year. 16 students specified social preferences (group preferences), compared with 20 at Mid-Year and 5 at the beginning of the year. Figure 3 compares Room 2 students' responses in interviews before and after the L.S.A. in the second study phase. The responses have been categorised according to elements of the Dunn and Prashnig Learning Style Model (1997).

Figure 3

Table of Comparison of Students' Self-Perceptions of How They Learn Best at Beginning, Middle and End of 1999, Phase Two (Class Two)

RESPONSES	BEGINNING OF YEAR	MID-YEAR	END OF YEAR
Brain Processing	0	0	0
Brain Dominance	0	0	0
Senses: Auditory	5	0	1
Visual	4	0	2
Tactile	5	0	5
Kinaesthetic	3	0	2
Physical: Time of Day	0	0	2
Intake	1	6	0
Mobility	0	0	0
Environment: Sound	6	14	12
Light	6	12	4
Temperature	0	2	0
Work Area	5	7	16
Social: Grouping Preferences	5	20	17
Parent/Teacher Authority	2	3	0
Attitudes: Motivation	0	0	0
Persistence	0	0	0
Conformity	0	0	0
Responsibility	0	0	0
Structure	0	1	0
Variety	0	0	0

Parents' Perceptions

19 of the 23 parents from class two thought that the L.S.A. had been helpful in understanding their child's learning. 4 stated that they did not know

> *I put it aside and didn't think about it again. (Parent, Class 2, end of term 2, 1999)*

The 19 parents who thought the L.S.A. was helpful, commented positively:

> *Good. Brilliant. To understand the way he goes about things. (Parent, Class 2, end of term 2, 1999)*

> *It has given him permission to be who he is. (Parent, Class 2, end of term 2, 1999)*

> *Yes, especially the food intake. I had no idea how important it was for him. (Parent, Class 2, end of term 2, 1999)*

Teacher's Perceptions

In interview / discussion with Jan at the end of term 4, 1999, Susan reported that students had choices to individually follow how they learned best because she understood their needs.

> *The children have been really getting into their learning because I believe they know how they learn best now and have a lot more choices and also it has been good for me knowing that a child sitting fiddling*

> *isn't necessarily being naughty, or a child who gets up and wanders around, still is listening. (Susan, end of term 4, 1999)*

Susan was excited about her year's teaching. She spoke of students' self-awareness, individual choices and empowerment for learning.

> *I have had a really, really good year, this year and I think a lot of that is to do with the classroom environment – just the feeling we have in the classroom. There is an awareness amongst the children of how they learn best and they enjoy being able to take charge of how they set themselves up for their activities and choosing where they go and knowing who they work best with. It has been quite empowering for them and I think they have enjoyed it. A lot of things have gelled. The class works well and is considerate of each other's needs. A lot of children need quiet to work They care about each other's learning and about each other emotionally too, I think. We have a warm classroom environment. It's been really neat and that has been a major highlight – especially with my special needs children – how they have paired up with responsible good role models in the classroom and that has worked out very well. (Susan, end of term 4, 1999)*

4.9 Question 2: To What Extent Is Learning Improved When Instruction and Learning Context Matches Students' Learning Styles?

End of Phase One: Students' Perceptions

All 14 children responded that knowing about how they learn best had helped their learning. 5 commented that the teacher could help them more because they understood how they learned.

> *Yes. Well now the teacher knows what I need to learn easiest and she's made my work a lot clearer to me. (student, end of term 4,1998)*

7 thought they were able to learn better because they understood themselves more.

> *Yes it has helped my learning to have it analysed so sometimes I can just look at the sheet and see what I should be doing so I don't do something that doesn't help me learn best. (student, end of term 4, 1998)*

> *Sort of. Now I can sit with a friend and work faster and I can not stare most of the time. (student, end of term 4, 1998)*

> *Yes, by sitting at a desk and not on cushions or on the floor. (student, end of term 4,1998)*

2 could not explain why it had helped them to learn better.

Parents' Perceptions

In the first study phase 11 parents thought there had been changes in their child's learning but some were not sure if knowing their learning styles was the reason for the change. 12 parents did not know if there had been any changes in their child's learning following the L.S.A.

Teacher's Perceptions

At the end of the first study phase Susan found it difficult to quantify the extent to which matching learning context with instruction and learning styles had improved students' learning in her classroom.

> *Well basically it is a qualitative study. You can't really quantify it. Otherwise it would become quite meaningless having a whole bunch of statistics. It's not something you can test either and that perhaps students don't perform well in tests...(Susan, end of term 4, 1998)*

4.10 Beginning of Phase Two, Class One, Term 1, 1999

Students' Perceptions

When asked, 'How does your teacher help you to learn?' the students from class one (Jan's class) gave answers that were analysed and classified by the researcher into each sensory modality according to the Dunn and Prashnig Learning Style Model (1997).

12 responses indicated that their teacher, Jan, taught predominantly through auditory sensory modalities, e.g. giving verbal instructions and information.
8 indicated the teacher taught through visual modalities, e.g. drawing or writing instructions for students to read.
0 indicated the teacher taught through tactile modalities, e.g. manipulating resources and providing hands-on materials for students to learn new information.
2 indicated the teacher taught through kinaesthetic modalities, e.g. role-modelling activities for students; showing them how to do something.

Their perceptions indicate a strongly auditory and visual teaching style, with a perceived lack of coverage for tactile and kinaesthetic learners. The students' responses confirm the preferred learning style of their teacher, according to the Dunn and Prashnig Learning Style Analysis (1997).

4.11 Middle of Second Study Phase, Class One, Mid-Year, 1999

Students' Perceptions

In the middle of the second study phase 20 students of Class One thought knowing how they learned had helped them to learn better at school. Two students thought things were the same as before and two students thought it had not helped. When asked if knowing how they learned had changed things at home, 12 replied no, 9 yes and 3 that it was the same for them.

When Class One students were asked if their learning had changed since the classroom had been set up differently, 21 students responded that it was better, 2 responded it was the same and 2 responded it was worse.

I've been allowed to work on the floor and last year I couldn't, and we've been allowed to eat and drink in class. We've been allowed to move around and don't just have to stay at the desk. (student, class 1, end of term 2, 1999)

When the students were asked how their teacher helped them to learn, 19 responses indicated the teacher helped them through auditory sensory modalities, (compared with 12 at the beginning of the year)
4 responses indicated the teacher helped them through kinaesthetic sensory modalities, (compared with 2 at the beginning of the year)
7 responses indicated the teacher helped them through visual sensory modalities, (compared with 8 at the beginning of the year). These results suggest that Jan continued to teach predominantly through auditory sensory modalities and had made only minor changes in catering for kinaesthetic learners, as perceived by her students.

When asked, 'What makes it difficult to learn at school?' 7 students responded that other students talked and asked for things, 1 thought there was too much light, 5 thought it too noisy, 5 said nothing stopped them from learning, 1 thought his desk was too high and 1 thought it was too hot. These results suggest the noise problem (identified at the beginning of the year) was no longer a significant barrier to learning for the students.

Teacher's Perceptions

In interview with Susan in term 2, 1999 Jan noticed that the biggest change was for those children who were not traditional learners (not visual or auditory learners). She also claimed that students were beginning to take responsibility

for their own learning. However, she commented throughout the interview that she was still learning the Learning Style Approach.

> *The hardest part is matching instruction with learning styles... I don't really feel that I have fully implemented it yet. I am at the beginning of it... But I am still learning and I have got a lot to learn yet. (Jan, end of term 2, 1999)*

Parents' Perceptions

In interviews with the researcher 16 of 25 parents thought that the L.S.A. had been helpful in understanding their child's learning; 3 did not; 3 did not know and 2 reported they did not understand the L.S.A.

13 parents commented they had become more aware of their child's learning preferences after reading the LSA and had changed their approach to their child's homework. Most acknowledged their child's preferred times for processing information and made allowances for homework to be done at that time instead of when parents thought it should be completed. Several parents changed their expectations of where homework should be completed and allowed children to work in areas of their preference, i.e. lying on the floor surrounded by the family, perhaps listening to music, instead of working silently at a desk in their bedroom.

3 of 9 parents who did not find the L.S.A. helpful commented on family problems that prioritised their time, leaving little time to delve into the L.S.A. 4 parents thought the LSA was not correct or did not describe their child's learning appropriately and 2 parents could not understand the LSA.

One of the children's L.S.A. profile contained no preferences; only flexibilities for all the elements (flexibilities mean that the child is flexible about needing those elements when learning something new and difficult. The flexibilities may change depending on the child's interest in the information being learned and may develop into preferences or non-preferences.)
The parent commented that the LS.A. was not very helpful, yet when the parent explained how the child learned at home, she described the characteristics of a 'flexible' learner. In fact the analysis had been accurate.

> *Not very helpful because everything came out as flexibilities. It didn't tell me anything. At home I notice she has difficulty staying on task if she's not interested. She will drift – same as I do – but I guess that is human nature.(parent, end of term 2, 1999)*

It appeared that parents of the children who learned other than through the traditional auditory and visual sensory modalities noticed the biggest changes in their child's learning. The children who learned differently were also underachievers in English and Mathematics.

> *I have noticed he is progressing more quickly. His reading has clicked...In general he's progressing much more quickly than I imagined. (parent, end of term 2, 1999)*

> *Yes, he's much happier in himself. He's proud of what he's learned each day when he comes home and shows me and tells me. There are huge changes and it's obvious. It's so much better for him. He has a struggle but he's starting to learn and its encouraging him. He's enjoying be able to do things he could never do. ...Has to work hard. (parent, end of term 2, 1999)*

He's more relaxed about doing it. He's not scared. That's the main point – the biggest one. He was stressed before. Now he's got more confidence. He's learning better.(parent, end of term 2, 1999)

Yes, I have noticed a huge change in his motivation. He's so keen. He doesn't need to be reminded. He is so different. He is reading enthusiastically and wanting to get away from picture books into proper little novels. His writing has improved too. It is so neat now. Yes, everything is really positive. He gets excited when he has homework to do and it worries him when he hasn't done it. He pesters me to test him. He's happy. It's not that he was unhappy before, but he was distracted. Now I find he's focused and motivated and it's great. (parent, end of term 2, 1999)

The parents of children who learned through multi -sensory modalities and already had good learning skills appeared to notice less about learning changes, probably because the children were already effective learners. All parents offered unprompted positive comments about how their child enjoys school. Parents offered no negative comments about learning styles implementation.

Several parents made general comments about learning and teaching in the classroom. These were two parents who helped regularly in the class and obviously felt qualified to comment.

It's a hell of a lot better than the conventional way of teaching at schools. (parent, end of term 2, 1999)

I'm amazed at how the children get through so much work and are so responsible for their own planning. They are only 7 and 8 year olds

and they are sorting out their time and working out what they want to do. (parent, end of term 2, 1999)

Of the 7 parents who did not notice change in their child's learning, 4 commented that they did not go into the classroom regularly to observe and did not feel qualified to answer.

No, probably not because I don't see what is going on at school. (parent, end of term 2, 1999)

I'm not really in a position to say. (parent, end of term 2, 1999)

Well no, because I don't really know how he is actually learning in the classroom. I'm not in the classroom to see what he is actually learning. (parent, end of term 2, 1999)

To answer it, I should have been in the class more before the study and after. (parent, end of term 2, 1999)

4.12 End of Phase Two, Class One, Term 4, 1999

Students' Perceptions

In interviews with the child support worker, when asked if knowing how you learned has helped you to learn better at school, 20 students replied yes, 4 replied no and 2 thought it was the same. When asked if knowing how they learned had changed the way they learned at home, 9 replied yes, 12 replied no and 3 replied the same.

In an attempt to triangulate the teacher's claims about matching instruction with learning styles, the students were asked how their teacher helps them to learn. 17 responses indicated the teacher taught mainly through auditory modalities, 7 thought the teacher taught mainly through visual modalities, 4 thought the teacher taught mainly through kinaesthetic modalities and 5 thought the teacher gave choice and teaches strategies to learn. The students' responses indicated that Jan still taught mainly through auditory sensory modalities but they now perceived that the teacher allowed more choice.

> *By giving me help when I ask for it...When I want to move desk groups she just lets me. (student, class 1, term 4, 1999)*
> *She puts on some music and lets us go outside if we like the light. (student, class 1, term 4, 1999)*
>
> *She helps me by making the words sound right and look right. She tells us to do it in syllables. (student, class 1, term 4, 1999)*
>
> *She puts on music and tells everybody to be quiet. (student, class 1, term 4, 1999)*
>
> *She lets me work on the floor and last year I couldn't and we've been allowed to eat and drink in class. We've been allowed to move around and don't just have to stay at a desk. (student, term 4, 1999)*

Indeed, the biggest change in students' perceptions about how the teacher helps them to learn from the beginning of the year interviews to the end of the year interviews is the students' awareness of being allowed this choice.

She lets me work on the floor and last year I couldn't and we've been allowed to eat and drink in class. We've been allowed to move around and don't just have to stay at a desk. (student, term 4, 1999)

Indeed, the biggest change in students' perceptions about how the teacher helps them to learn from the beginning of the year interviews to the end of the year interviews is the students' awareness of being allowed this choice.

She lets me work on the floor when I want to, she lets me work at a desk and she lets me work with a partner. (student, class 1, term 4, 1999)

In Class One, 20 students thought their learning had improved since the class had been set up differently and the teacher had catered for their learning styles. 4 thought not and 2 thought their learning was the same.
When asked if their learning had improved outside school, 12 thought not; 9 thought yes and 3 thought it was the same.

Teacher's Perceptions

In interview with Susan in term 4, 1999, Jan thought the students with non-traditional (lack of preference for learning through auditory and visual learning styles) had their learning improved the most by the Learning Style Approach.

The biggest change is for those students who are not traditional learners, I mean they are not visual or auditory learners. They are the ones who started the year off with real problems. The students who are

traditional learners probably don't notice any differences in their learning but the emphasis of my class is for them to know how they learn best and then for them to take responsibility to make sure they learn in that way...I think the main support is given to those with different learning styles. The students with tactile, kinaesthetic learning styles. Those are the students that seem to suffer the most...The major changes are that the students are all on task and working. They are learning. They are happy and relaxed. The atmosphere is probably the biggest change. I love coming into the classroom and enjoy teaching them. I think it is the first time in my entire career that I know that every child in the classroom is learning. And that is because for the first time I understand how every child learns and can cater for their differences...Another highlight is that all children have caught up to their chronological age in Reading except for one boy with special needs and he feels really happy about what he has done.(Jan, term 4, 1999)

4.13 Beginning of Second Study Phase, Class Two, Term 1, 1999

Students' Perceptions

In interviews with the child support worker at the beginning of the year when asked, 'How does the teacher help you to learn?' 12 class two students thought the teacher taught through auditory sensory modalities; 7 through visual sensory modalities; 3 through tactile sensory modalities and 4 through kinaesthetic sensory modalities.

The students' responses differed slightly from the preferred learning style of their teacher, Susan, who according to the Dunn and Prashnig Learning Style Analysis (1997) and Susan's self-perception had strong kinaesthetic preferences. The students' responses indicated that they perceived their teacher's teaching style to cover all students' preferred sensory modalities.

4.14 Middle of the Second Study Phase, Class 2, Mid-Year, 1999

Students' Perceptions

19 students thought that knowing how they learned helped them to learn better at school. 1 student thought it was the same, 1 did not know and 2 students thought it had not helped.

When asked if knowing how they learned had helped their learning at home, 5 replied no, 3 replied yes and 3 did not know.

19 students thought their learning had changed since the classroom had been set up differently. 1 thought it was more difficult, 3 thought it had not changed their learning.

When asked, 'How does the teacher help you to learn?'
12 responses indicated the teacher helped through auditory sensory modalities, (the same as at the beginning of the year); 15 through visual sensory modalities (compared with 7 at the beginning of the year); 10 through tactile and kinaesthetic sensory modalities (compared with 7 at the beginning of the year).

The students' responses, from Susan's class (Class Two), concerning how they perceive their teacher helps them to learn, indicate their teacher has flexed her style and caters for all students' sensory preferences in the classroom programme. In comparison, students' responses, from Jan's class (Class One), indicated that the students perceived their teacher still taught predominantly through auditory sensory modalities and had slightly improved 'flexing' towards students' kinaesthetic and tactile learning preferences.

Parents' Perceptions

In interviews with the researcher at the end of term 2, 1999, 19 of the 23 parents thought that the L.S.A. had been helpful in understanding their child's learning, 4 did not know.

> *It reinforced a few things about what I know about his thinking and things I didn't know.(parent, class 2, end of term 2, 1999)*

> *We can see where he is coming from.(parent, class 2, end of term 2, 1999)*

> *Yes, because it concerns things we probably didn't realise.(parent, class 2, end of term 2, 1999)*

> *Good. Brilliant. To understand the way he goes about things.(parent, class 2, end of term 2, 1999)*

> *It has given him permission to be who he is.(parent, class 2, end of term 2, 1999)*

Yes, especially the food intake. I had no idea how important it was for him.(parent, class 2, end of term 2, 1999)

11 parents noticed a change in their child's learning. Some parents noticed their children taking more responsibility for their learning and enjoying learning more.

Is getting into writing more. Something he has always hated. He'll go off by himself upstairs. He's taking pride in his writing skills.(parent, class 2, end of term 2, 1999)

It has made him more confident. That it's OK to be different – all the children – it's made them look at different learning styles and the differences are respected by children and make them more responsible for their learning.(parent, class 2, end of term 2, 1999)

5 parents did not know whether their child's learning had changed. Comments suggested they did not feel qualified to answer because they did not go into the classroom regularly to observe.

Can't comment because I don't know too much about the class programme.(parent, class 2, term 2, 1999)

Not really informed about what happens in the classroom.(parent, class 2, term 2, 1999)

I don't go into the classroom to see that side. (parent, class 2, term 2, 1999)

Teacher's Perceptions

Susan claimed that students' knowledge of their learning styles did improve their learning.

> *I think so. They pack themselves off to areas of the class they feel happy and comfortable in and they have become more focused, I believe. Since they have become more aware of their learning styles they come and ask me if they can sit outside in the sunlight where it's quieter, or sit on the floor or do plays or activities that are still part of the learning but give choice. I feel they have become more motivated. Not all the time, but in those situations when I have been organised and able to give them the choice of where they went to do that.(Susan, end of term 2, 1999)*

Susan spoke about learning styles being an integral part of her teaching. She now assumed that students knew how they learned and they were given the choice to learn individually through their preferred learning styles.

> *When they are concentrating hard on an activity, I give them the choice of whether they want to sit or go when they do that. When I started this I referred back to the chart (L.S.A.profile), so they all understood that and they knew it was a task that required quite a bit of concentration so they could go where they needed to.(Susan, term 2, 1999)*

4.15 End of Phase Two, Class 2, Term 4, 1999

Students' Perceptions

16 of the 23 students thought their learning had improved since learning styles had been matched with instruction and learning context and cited a variety of reasons why. The other seven either thought things were the same or harder or gave answers which were difficult to categorise.

At the end of the year Class Two students indicated their teacher, Susan, taught across all sensory modalities. The greatest change in students' perceptions was that Susan allowed choice, independence and catered for both analytic and holistic thinking skills (analytic thinkers prefer small, logical learning stages with clear objectives whereas holistic or global thinkers like to be given the 'big picture' and encouraged to explore the topic with peers, asking questions when they are ready to learn).

> *She explains it on the board and she asks the people who don't understand to go to her and she will explain it.(student, Room 2,term 4, 1999)*

> *She writes stuff up on the board and we have to copy it and she makes it real easy for us. She lets me go outside.(student, Room 2, term 4, 1999)*

> *She tells me what to do and draws plans up on the board. (student, Room 2, term 4, 1999)*

In Class Two, 19 students thought their learning had improved since the teacher had catered for learning styles in their classroom, 2 thought not; 1 didn't know and 1 thought it was the same.
When asked if they thought their learning had changed outside school 3 thought it had, 5 thought it had not and 11 students gave answers which were difficult to categorise.

Teacher's Perceptions

In interview with Jan, term 4, 1999, Susan believed that students were now applying knowledge of their learning styles to how they learn in the classroom and that there was a big improvement in their learning.

> *The children have been really getting into their learning because I believe they know how they learn best now and have a lot more choices and also it has been good for me knowing that a child sitting fiddling isn't necessarily being naughty, or a child who gets up and wanders around still is listening –I checked this a few times too – a child who is wandering around can still follow instructions and tell me what is going on and can still carry out an activity really well. So for me, this has been a highlight and it has given me a greater insight into children's behaviour and how they learn... (Susan, end of term 4, 1999)*

> *The benefits are huge when you see the outcome or piece of work that a child is so proud of and it is great to see kids enjoying coming to school. You know when the kids aren't ... are dragging their heels. It's great to hear from the parents that the kids love school and they really enjoy learning what we do. They don't say learning, they say these games are fun. That is the real emotional benefit to me.(Susan, end of term 4, 1999)*

Susan was asked whether she thought learning was improved when instruction and learning context matched learning styles.

> *I do think that the children seem happier and more responsive and when they are given the choices and opportunities they know that from my expectations they have to perform- if they are still to have that choice and those opportunities and they take that quite seriously and they respect that and they do work harder as a result because it is helping their learning and also behaviour problems tend to go away when they are happy and they are learning, so they do tend to perform. If they are given the choice, then they do their work so they can continue being given that choice.(Susan, term 4, 1999)*

Noise as a Barrier to Learning

In the second study phase, at the beginning of the year 44 of 49 students in both classes identified noise and interruptions in the classroom as something that made it hard for them to learn. One of 44 students identified noise and lights being turned on, making it too bright. One of the 44 students identified the noise as being rain on the roof but all others described students talking, shouting, pushing, kicking and moving around as being the cause of the noise. Noise, interruptions and distractions were perceived by most students to be a barrier for learning in classrooms.

At mid year when asked 'What makes it difficult to learn at school?' 20 of the 49 students responded that other students talked and asked for things, making it too noisy. 2 students thought it was too light, 5 said nothing stopped them learning, 1 thought his desk was too high, 1 thought it was too hot, 1 did not like thought it was too dark and 1 thought the Special Needs child interfered

with his learning (the Special Needs child thought it stopped his learning if no one was close to him). The other students thought it was not difficult to learn at school.

It appears that at the beginning of the year students in both classes perceived noise, interruptions and distractions to be a barrier for learning. At the end of term 2 less than half the students in both classes perceived noise, interruptions and distractions to be a barrier for learning.

4.16 Question 3: What May be Some of the Difficulties in Implementing Learning Styles in Classrooms, as Perceived by Teachers

In this section three issues are discussed. The data come from interviews / discussions between Susan and Jan during the first study phase in term 4, 1998 and during phase two in terms 1, 2 and 4 in 1999. The data are presented selectively around the three research questions:

To what extent is a 'paradigm shift' needed for the teachers to move from traditional teaching to child-centred teaching?

To what extent does the school's culture and management structures support the implementation of learning styles pedagogy?

How do the teachers perceive the process of implementing a new methodology (the learning style approach)?

4.17 A Paradigm Shift

At the beginning of term 4, 1998 in phase 1 Susan initially found students' eating in the classroom culturally offensive. Susan identified with Ngai Tahu closely and according to Maori custom, eating is an activity that should be separate from work and play. From the second interview at the end of term 4, 1998, it was obvious that Susan had reflected on her understandings and discussed the issue with her class to reach a consensus.

> *We also had a big talk about intake because that was an area that I originally had a problem with. So we decided that water was OK and fruit, but not potato chips or other things. They would make a bit of noise and distraction to others anyway, so we all agreed to that.(Susan, term 4, 1998)*

Before Susan attended professional development about learning styles Susan assumed that students wandered around to avoid schoolwork.

> *So when it comes to catering for them I know you are supposed to let children wander, if they have to and eat and those sorts of things. Sometimes they just do it because they don't really want to sit down and focus either. Sometimes the kids in my room just do what they want to do as opposed to their learning styles and what they need to make it easier to learn.(Susan, beginning of term 4, 1998)*

At the end of the first study phase, after professional development and a term of beginning to implement learning styles Susan commented that kinaesthetic students needed to move in order to learn effectively.

Yes because the old sit down and sit still is really employed to make life easier for the teacher but it doesn't really help the child at all. Those who needed to get up and wander around, as long as they were quiet and didn't distract others; they could because they should. I'm like that.(Susan, term 4, 1998)

Susan reflected that forcing students 'to sit down and sit still' may make it easier for the teacher to control the class, but could obstruct learning for kinaesthetic learners.

...You know how I'm in the open-plan classroom with Sam. It would have been quite good to actually have you in the other class because Sam and I do quite a bit of co-operative teaching and crossgrouping and his teaching style is the complete opposite of mine...And also I found it quite difficult because he would see the kids in my room being given the choice, moving around and eating and that sort of thing and think they are being quite naughty. To me I felt like he thought that was a reflection on my teaching. That for me being a young teacher I didn't have control of my kids but I actually knew they were learning, they were happy and enjoyed coming to school. I remember at school I concentrated so hard on sitting still with my legs crossed and arms folded that I didn't listen to the teacher very much. I was concentrating so hard on what my body was doing.(Susan, end of term 2, 1999)

N.B. By the end of the year Susan noticed a change in Sam's attitude towards the learning style innovation in Class Two. At the end of the year Sam expressed positive comments to Susan about Class Two's on-task behaviour, standard of work and individual students' progress.

Susan's memories of her own education had influenced her perceptions of how students learn best. She felt strongly about kinaesthetic students being forced to sit still (as she had to do) and the negative effect it had on their learning. Susan spoke of her empathy for students who were still forced to endure this form of 'classroom management' because their teachers were not aware of the learning style theory.

> *I know in my heart that learning styles are basic to good teaching and often I'll see unhappy children and the unhappy children then turn to behaviour problems. Perhaps its because they don't fit in with the teacher's style of teaching and I feel very sorry for them. But I'm not in a position of criticising teachers because perhaps those teachers aren't aware of learning styles theory.(Susan, end of term 2, 1999)*

Susan felt constrained by colleagues' different pedagogical and philosophical paradigms in an environment where colleagues interacted especially when students cross-grouped for Mathematics and Music.

> *When we have cross grouping for Recorder and Maths, the children have to learn what the teachers like and allow. Other teachers may not permit food and drink in the classroom and when children come into my classroom they make a mad dash for the couch and easy chair and the Koosh balls go missing.(Susan, end of term 2, 1999)*

Jan also found colleagues' different pedagogical paradigms difficult when she spoke of the Special Needs teacher invalidating the L.S.A. profile for a student with severe behavioural problems.

> *It's really hard when colleagues are working against what you believe in. (Jan, end of term 2, 1999)*

Both teachers felt strained by the traditional, covert expectation that a 'good teacher has a quiet class'. This was perceived as a demanding pressure for both teachers when they attempted to change their teaching paradigm.

> *I have had lots of years teaching and had it instilled in me that a sign of a good class is a quiet class and when the Principal walks past your window, everything is under control and orderly. And now it shows to me that that is not true learning and not a happy class.(Jan, term 2, 1999)*

> *I still feel like that myself when I have parents in my class helping. The other day I went, 'Oh, I 'm sorry it is so noisy today. '*
> *She turned around and said,' But look at them, they are all learning, all busy, if they were talking they were discussing what they were doing. (Susan, term 2, 1999)*

In the middle of 1999, in the second study phase, Susan and Jan summarised their theories of teaching. The notion of control was addressed in both teachers' comments.

> *I would like to think of myself as a facilitator as well and that I don't think I like to control the kids. I like to ...make them become independent thinkers and learners and in those respects I like to think of myself as a facilitator and not a controller. I am there for their benefit, not for my benefit.(Susan, end of term 2, 1999)*

> *I think learning styles are important because I know how children learn and the theory that categorise me as an educator is that I try to get them to take responsibility for their learning. I am a facilitator and hopefully will pass on the love of learning. That every child can learn*

> *and is successful and everyone learns differently and the teachers are here to teach for all those differences and as teachers, we need to reflect on what we do, is it to control – is it beneficial to children's learning.(Jan, end of term 2, 1999)*

When Jan theorised about her role, her comments referred to 'my classroom' and 'my philosophy'. This appeared to conflict with the statements, 'They (students) feel in control themselves and their self-esteem is improved.' Jan conceded that 'implementing learning styles isn't as easy as it sounds because it is all to do with teacher attitudes, all tied up with support systems in the school...'(Jan, end of term 2, 1999).

At the end of the second study phase, term 4 1999, Susan claimed that by understanding how students learn and letting them learn through their preferences, their learning had improved. Her thinking had changed in terms of her approach to classroom management.

> *The children have been really getting into their learning because I believe they know how they learn best now and have a lot more choices and also it has been good for me knowing that a child sitting fiddling isn't necessarily being naughty, or a child who gets up and wanders around still is listening –I checked this a few times too – a child who is wandering around can still follow instructions and tell me what is going on and can still carry out an activity really well. So for me, this has been a highlight and it has given me a greater insight into children's behaviour and how they learn.(Susan, term 4, 1999)*

Jan's paradigm shift was different. Jan's thinking had changed in terms of realising she needed to change (to flex) her teaching style (auditory and visual) to cater for all learning styles (auditory, visual, tactile and kinaesthetic). She

reflected about her self-learning and how she needed to flex to other learning styles.

> *How important it is to understand how I learn – now I know how I learn, I can really understand myself and how I teach and learn to flex to other styles – I am an auditory and visual learner and tend to teach in the same way. I need to be more aware of teaching all the time through children's preferences, not my own.(Jan, end of term 4, 1999)*

At the end of the year Jan commented again about her need to cater for other learning styles:

> *And I think the major change is being aware of it and my teaching style is mainly auditory and visual but I have to make a real effort to cater for the other learning styles. That is the main change. (Jan, end of term 4, 1999)*

4.18 School Culture and Management Structures

In both mid-year and end of year interviews, Susan commented on the lack of awareness of the Board of Trustees about the research.

> *I found it quite ironic that in the Board of Trustees annual report that they cater for learning styles in the classroom yet there has been little support for your research or for us.(Susan, term 4, 1999)*

> *There isn't much institutional support. There is tokenism given to learning styles. It is written in the school philosophy but is not followed up with professional development or support for it. There is*

no plan of action in the school to give professional development to increase teachers' awareness. No resources given to the study and no time for meetings.(Susan, term 2, 1999)

Susan and Jan felt a lack of support from the Principal.

I would have appreciated time at staff meetings to talk about learning styles and I feel there has been a total lack of support from the principal. Number one, he has stopped Rob from getting professional development I wasn't allowed to interview any students during class time. I have only been allowed five minutes to talk about my research at a staff meeting although the special needs teacher has spoken at length at four staff meetings.
There's lack of resources. I have bought all the cushions and Koosh balls with my own money. It's far too low key in the school – for such valuable research. (Jan, term 2, 1999)

In the end of year interviews, Jan noted that a highlight of her year had been sharing some knowledge about learning styles with her colleagues, in a staff meeting in December for one hour, and how they had received it enthusiastically and asked for more information.

I talked to the P.T.A. last year about what I wanted to research and explained about learning styles and they were really interested and kept asking questions. They asked what was happening at another two meetings. At the end of the year I asked the Chairperson for some time at a meeting but she was resigning and it was never put on the agenda. Next year I hope to talk to them because the parents are so interested. (Jan, end of term 4, 1999)

Another highlight was sharing learning styles with the staff. Seeing their faces light up with some of the activities and having positive feedback. I appreciated that. I have also shared with three other schools and the same positivity was great and I enjoyed sharing this with other people. (Jan, term 4, 1999)

Both teachers claimed that there has been little institutional support for the learning style approach.

The costs are trying to do it when there is only two of you involved.(Susan, end of term 4, 1999)

Both teachers alluded to a culture of separation in the school: a sense of 'aloneness' and alienation from the staff.

There's been no discussion with colleagues and you're such a busy person. Before school you are preparing for the day. After school you have got dancing or meetings and morning interval and lunchtimes you are on duty or in the staff room relaxing... Also your classroom is so busy with your special needs students. (Jan, term 2, 1999)

Jan and Susan both believed the lack of institutional support was evident.

And I think that comes from the Principal not giving your research a high profile in the school. I think that support from him has been quite negative. I had the comment from him once when all my kids were outside and sprawled on the grass in the sunshine and on the veranda and ***he*** *said, 'Oh your class isn't that small.' Implying that my kids were spilling outside because there wasn't enough room in the classroom. But I was just trying to cater for their learning styles and*

get through the activity. Also when it has come to the special needs kids and looked at their profiles and he said, 'Oh yeah, I'd take that information with a grain of salt.'- implying that the learning style analyses weren't that worthwhile or accurate.(Susan, term 2, 1999)

However, both teachers reflected that there was a school-wide focus in 1999. This was to establish assessment benchmarks for Reading and Writing imposed on teachers by the Principal who needed the assessment system in place to satisfy Education Review Office's requirements. Both teachers perceived that their colleagues were dissatisfied with the assessments and found little relevance for improvement of students' learning. Categorising students into levels and part-levels and refining a new system (with little support from the Ministry) to establish consistency required a lot of teachers' time in staff meetings, syndicate meetings.

I get so frustrated with all this garbage. Who cares whether a child is 2a or 2b – it's not making their learning any better. More time assessing is less time teaching. (Jan, end of year, 1999)

Sam put down 4a for reading and then got told it's not right for a Year 4 because it's too high to make it look like there is progress in Year 5 and 6. (Susan, end of year, 1999)

Jan was anxious when completing a Statement of Performance in 1999, required by Education Review Office, for Reading Comprehension. The Statement of Performance required data showing the percentage of students who achieved at or above their expected levels, using PAT results). 32% of students' P.A.T. results in Year 4,5 and 6 decreased or remained at the same level as their results in the previous year, yet this was not seen as unusual by

the Principal, nor did ERO comment on it in their effectiveness report that year.

> *I can't believe that this is acceptable. All those children who could be achieving so much better. It's like we collected the data because we had to and who cares what happens to it.(Jan, end of year, 1999)*

Differences in pedagogy between the Special Needs teacher and key people in a support agency also caused difficulties for Susan (and Jan) when dealing with some students.

> *What came through in one boy's in particular – he's got a space in the classroom set up – a dark corner – a desk with walls up the side – and walls around and its away from other children. His learning style analysis said that he works best with other children. So basically his preferred learning style was totally different from the workspace we'd set up for him. He refuses to work in his workspace. He won't go there. He doesn't get his work done there anyway. He does need to be in a space away from the other kids because of his aggressive behaviours and he can't leave them alone. He tends to get his work done when he's' sitting on a floor or at a desk with others. What we should be looking at is teaching him to keep his hands to himself, rather than isolating him from other kids. Because then you're trying to do two things. You're trying to take him away from his preferred learning style and take him away from other kids. But he needs to learn to work with other kids and work where he learns best.*
> *I think I am just about ready to abandon the workspace idea and work on him to keep his hands to himself but his special needs teacher sees him needing to be isolated. He learns well with her on a one to one but*

in the classroom he needs to work with other kids.(Susan, term 2, 1999)

Susan had been teaching for less than three years during phase two, yet her teaching commitments included catering for three Special Needs students in her class and a new arrival to her class with behavioural problems who proved very disruptive. Furthermore, in the corporate life of the school Susan was a Board of Trustee Teachers' Representative, taught Dance to groups of students outside school hours; attended Dance lessons and was completing a Diploma of Dance.

I was feeling quite swamped because of the number of kids I had in my class and also because of the amount of space needed for my special needs kids who need certain equipment and resources that I have to fit into my classroom as well as all the bodies.
This year a lot of my energy has gone into teaching special needs students. To me a lot of my energies have gone into adjusting my teaching around them. (Susan, term 2, 1999)

Susan reported that her teaching commitments and workload made it difficult to find the energy and time to implement a different teaching pedagogy in her classroom.

I found that after talking to (the Special Needs Teacher) and checking in with her most days about the special needs kids in my class and then the teacher aids – there's one two three teacher aids coming into my class and working there. It was quite nightmarish – especially Term 2. I was on overload basically and once or twice I had to step back and re-evaluate things because I was getting a bit snowed under,

> *I found I wasn't really coping at times so that went to the top of my priorities. Things have been resolved again. One boy has been shifted out of my class, which altered the dynamics of the class.(Susan, term 2, 1999)*

Susan's comments about how she dealt with her difficulties suggested that the school did not have a supportive school culture in which teachers shared and reflected on their problems in a collaborative manner.

> *But I guess I wasn't good at asking for more support when I found things quite difficult. Cause I was trying to cope with things and I wasn't coping very well at one stage and I found it hard to ask for help then, from you. I took a day off and re-evaluated things. I needed a shift in attitude. So I just needed time to step back and look at things.(Susan, term 2,1999)*

The boy with a behavioural problem, who arrived in Susan's classroom half way through the year, changed the dynamics of the classroom culture.

> *The class that had already been working on their learning styles for a term, working on how they learned best and how to understand that, having him come in and given the choice and opportunities was quite difficult for him because he didn't fully understand what was going on in the class so he'd take all the cushions, be naughty and roll around on the floor, whereas, the other kids were on the floor if that's where they work best, he saw the choices and opportunities and played up because he didn't understand about the learning styles and how it was working in my classroom. (Susan, term 2, 1999)*

Susan also found the physical size of her classroom a challenge when trying to implement a learning style approach to classroom management.

> *I found the physical size of our classrooms not big enough to have light and dark areas, kids working on their own, ones who need to work on floors. Classrooms need to be bigger. (Susan, term 2, 1999)*

In this section some difficulties of implementing learning styles in the two classrooms, as perceived by Susan and Jan, have been discussed. The need for a paradigm shift and the influence of management practices, structures and school culture was also discussed. Now we move on to the issue of how the teachers developed expertise in teaching using learning styles.

4.19 Developing Expertise of Teaching Using Learning Styles

In the first study phase, term 4 1998, Susan discussed with Jan, her implementation of learning styles. Susan spoke of implementing changes collaboratively with her class. The first implementation step was to collate all the information from the L.S.A.s and record it on a class chart. Susan then held discussions and changes in the classroom's environment were made to cater for learning styles.

Susan chose environmental (sound, light, temperature and work area) changes as her first priority and approached the process as a class activity. Susan discussed and interpreted the class's individual L.S.A. as a shared reading activity and discussed how they could change their classroom environment to suit individual preferences. Susan commented that when she taught through her preferred kinaesthetic sensory modality (and Susan's preference happened

to match students' preferences for kinaesthetic learning activities), Susan felt her teaching became very effective.

> *...Because I am quite a kinaesthetic person and I find that's an area of strength being able to lead activities that are kinaesthetically based.(Susan, term 4, 1999)*

Susan found that learning centres, (different activities set up for students to work on independently) were an effective strategy with which to cater for different learning styles (especially in social and attitude preferences of the Learning Style Model).

> *The learning centres offered a variety of activities that catered for the students that were really tactile learners, who learned by making models and charts and activities...I had some students who liked structure better. We planned out together what they would achieve. Others who liked variety went along and chose their activities. (Susan, term 4, 1998)*

Although most students found learning centres worthwhile, some students preferred more structure. Susan commented in term 4, 1998 that she had not yet begun teaching the curriculum through the sensory modalities. This comment was substantiated by students' responses in an interview when no child indicated that they were learning through preferred sensory modalities (auditory, visual, tactile or kinaesthetic) or their preferred style of brain processing (analytic or holistic).

> *I believe I am just beginning to use different categories of learning styles. I didn't really get into sensory modalities. That is the next step for me.*

> *When they are concentrating hard on an activity, I give them the choice of whether they want to sit or go when they do that. When I started this I referred back to the chart so they all understood that and they knew it was a task that required quite a bit of concentration so they could go where they needed to. (Susan, term 4, 1998)*

In term 2 1999, the teachers reflected on what stage of the journey they were at in the implementation of learning styles in their classrooms. Although Jan had attended a 2-day course and another 5-day course and had been implementing learning styles in the classroom for the year, she accepted she was only at the beginning of properly catering for learning styles.

> *I know I am just at the beginning of the journey and should have a lot more tactile learning tools. My planning should reflect learning styles a lot more.(Jan, term 2, 1999)*

> *I believe I am just beginning to use different categories of learning styles...I didn't really get into sensory modalities. That is the next step for me. (Susan, term 2, 1999)*

Both Jan and Susan found that making environmental changes was the easiest adaptation. Susan claimed that the most difficult was flexing to other learning styles and catering for different learning styles (visual, auditory, tactile and kinaesthetic) through planning, teaching and evaluating (teachers tend to teach through their preferred learning styles and traditionally schools' preferred learning styles have been auditory and visual.

Both teachers also commented on the value of knowing one's own learning style when implementing a learning style approach. Jan and Susan reported the need to have others to talk to, share ideas and reflect with:

> *And another piece of advice is to keep trying and don't try to go it alone. Make sure there is a few of you to work as a team to make it successful.(Susan, term 4, 1999)*

Mid-year comments by the two teachers were negative about support they received.

> *There's been no discussion with colleagues...It's been quite hard in some ways. Because sometimes I felt really lonely and I felt you were so busy and didn't want to annoy you. I felt as though I haven't had any one to talk to for a lot of the time.(Jan, term 2, 1999)*

> *There is no plan of action in the school to give professional development to increase teachers' awareness [about learning styles]. There is no priority given to sharing of ideas. (Susan, term 2, 1999)*

At the beginning of the study Susan was a relatively inexperienced teacher and her comments reflected the stage she was at. Susan seemed unsure of how to cater for learning styles in the classroom and 'tried lots of different approaches.' Although Susan wished to cater for different ways of learning, she felt unable to do so. As a novice teacher she experimented and was constantly reflecting on her practices to improve her teaching.

> *If a child is not understanding it seems a natural thing to approach it from another direction. But at the moment I don't have the refined knowledge to identify learning styles of students in the classroom. I have just been trying lots and lots of different approaches.(Susan, beginning of term 4, 1998)*

Susan acknowledged concern about having lack of control when giving students freedom to choose how they learn best. Susan suspected, for example, that students' wandering around and eating was a way for them to avoid learning.

> *Its really hard to cater for them because they all have different needs in my class and so many quite strong personalities. So when it comes to catering for them I know you are supposed to let students wander, if they have to and eat and those sorts of things. Sometimes they just do it because they don't really want to sit down and focus either. Sometimes the kids in my room just do what they want to do as opposed to their learning styles and what they need to make it easier to learn. (Susan, beginning of term 4, 1998)*

At mid-year in the second study phase Susan recollected that the College of Education she attended did encourage students to look at different learning styles, but Susan felt she was still coming to terms to putting her ideals into practice.

> *And I feel its too early in my career to notice a dramatic difference cause when I was at college we were taught to include lots of different activities that, now I look back, were making sure you had a mixture of tactile, kinaesthetic, auditory and visual activities and that's the way we learnt through teachers college. And even though I didn't know it at the time, I feel like I have come into teaching with this new way of thinking. Instead of having the students sitting down listening to you all of the time, its important to have lots of different activities that cover all those things. So for me it is too early to say – because I feel that I am still coming to terms with putting into place my ideals of teaching. You*

know, how you have this ideal of teaching - of what you would like teaching to be. I feel like I am still getting there.(Susan, term 2, 1999)

Susan commented how difficult it is for novice teachers to cater for learning styles when they are still coming to grips with basic planning and classroom organisation. It appears that Susan was at the stage of 'putting ideals of teaching into place'

The most difficult thing was getting organised enough to have activities to cater for those four sensory modalities. To me it is still a hit and miss thing because I am still getting my planning underway. It still takes me quite a long time in the weekends to get my planning done. I found that I wasn't getting around to listing all my kinaesthetic, visual, auditory and tactile activities and that sort of thing. That's still a bit hit and miss for me. (Susan, term 2, 1999)

In contrast, Jan was a relatively experienced teacher and had a different set of issues to resolve from Susan. Jan's comments indicated that her challenge was to cater practically for all the learning styles in the classroom and 'flex' her teaching style to them. However, at mid-year in the second study phase Jan also felt she had not fully implemented learning styles.

I should have a lot more tactile learning tools. My planning should reflect learning styles a lot more. If I were in a team, learning about learning styles it would be better for me because I am a team player. I don't really feel that I have fully implemented it yet. I am at the beginning of it. The easiest part was to set up the classroom so they could choose between sitting at desks or on the floor or at a low table or lights off or sitting by the window, having Koosh balls, being able to

eat or drink and that sort of thing. The hardest part is matching instruction with learning styles. And I think the major change is being aware of it and my teaching style is mainly auditory and visual but I have to make a real effort to cater for the other learning styles. That is the main change. (Jan term 2, 1999)

Whereas Susan was learning in the early stages of her career, Jan perceived her task to 'relearn' and 'unlearn' her teaching practice after 17 years of working in a traditional teaching paradigm.

I have had lots of years teaching and had it instilled in me that a sign of a good class is a quiet class and when the Principal sneaks past your window, everything is under control and orderly.(Jan, term 2, 1999)

From the beginning of the study Susan was empathetic towards kinaesthetic students because of her own experiences as a student:

When I was at school I noticed that I didn't work very well when it was too quiet. I needed noise around me. I still got my work done, but it was the environment that I preferred. I loved doing dance and those sort of things and found it was very difficult for me to sit still at all and that piano practice and that was not for me at all. It didn't suit my learning style. I had to learn by doing and by moving. So that is something I learned quite early on and also in my classroom I feel you can tell the children that are really focused in when you are talking and they learn a lot through listening and others – they need to go away and do activities and then come back and ask more questions. They learn that way. Yeah, that's about the extent of it. (Susan, term 2, 1999)

Although Susan commented that she did not know how to identify learning styles or cater for them, she was committed to learning about how to do so.

> *But at the moment I don't have the refined knowledge to identify learning styles of children in the classroom.(Susan, beginning of term 4, 1998)*

Again in the second study phase at mid-year, Susan spoke of her commitment to the Learning Style Approach, once she had begun to see the effect of students' work and self-esteem.

> *The benefits are huge when you see the outcome of a piece of work that a child is so proud of and it is great to see kids enjoying coming to school.(Susan, term 2, 1999)*

At this stage of the study, Jan was enthusiastic about her developing expertise to be able to cater for every child's learning needs in the classroom.

> *For the first time in all my career I know that every child in the classroom is learning...hopefully I will pass on the love of learning...that every child can learn and is successful and everyone learns differently.(Jan, term 2, 1999)*

In comparison with two terms earlier, Susan was now more confident about how to cater for learning styles.

> *My actions in learning styles are benefiting underachievers, because I have the key to help them learn and can try lots of different things that maybe I haven't tried before.(Susan, term 2, 1999)*

However, when asked if matching instruction with learning styles improved children's learning, Susan found it difficult to judge.

> *I find this quite difficult to say because it is subjective to observe and so qualitative. And I feel its too early in my career to notice a dramatic difference cause when I was at college we were taught to include lots of different activities that, now I look back, were making sure you had a mixture of tactile, kinaesthetic, auditory and visual activities and that's the way we learnt through teachers college. And even though I didn't know it at the time, I feel like I have come into teaching with this new way of thinking.(Susan, term 2,1999)*

At the final interview in term 4, 1999, Susan was very positive about the development of her expertise, when reflecting on her implementation of the learning style approach in the classroom during the year.

> *I have had a really, really good year, this year and I think a lot of that is to do with the classroom environment – just the feeling we have in the classroom. There is an awareness amongst the children of how they learn best and they enjoy being able to take charge of how they set themselves up for their activities and choosing where they go and knowing who they work best with. It has been quite empowering for them and I think they have enjoyed it. A lot of things have gelled. The class works well and is considerate of each other's needs. A lot of children need quiet to work They care about each other's learning and about each other emotionally too, I think. We have a warm classroom environment. It's been really neat and that has been a major highlight – especially with my special needs children – how they have paired up with responsible good role models in the classroom and that has*

> *worked out very well...Children have enjoyed taking on the role as role model and have appreciated being appreciated.(Susan, term 4, 1999)*

Finally, Susan and Jan discussed the need to reflect and discuss during this stage.

> *Last term when I first set it up and interviewed the children. They said it was really noisy and it was because I was forgetting my expectations. I was forgetting the good things about my other teaching. Yeah, so I've really raised the expectations and it has helped.(Jan, term 2, 1999)*

> *I think that last year when we did it, if you let them get away with it they just became quite noisy and disruptive towards each other and naughty. I think I learnt a lot about implementing it last year and could do things differently this year to make it more successful.(Susan, term 2, 1999)*

Susan and Jan's comments suggest that the teachers had gone through stages of developing expertise in the learning style approach. During the process the students' behaviour had regressed, perhaps because the teachers were focussing on the new pedagogy, rather than on the students' needs. The teachers had reflected on the students' change of behaviour and had implemented changes to rectify the problems, for example, raising expectations of students' behaviour.

4.20 Summary

In this chapter, teachers', students and parents' perceptions have been presented as three sources of interview data. The elements of the learning style model (Dunn and Prashnig 1997) have been used to categorise students' responses and as a framework for considering changes in teachers' pedagogies and classroom management approaches. All data were presented thematically and selectively in order to address three questions:

1. Does students' knowledge of their own learning styles improve their learning, as perceived by students, teachers and parents?

2. To what extent is learning improved when instruction and learning context matches students' learning styles, as perceived by students, teachers and parents?

3. What may be some of the difficulties in implementing Learning Styles in classrooms, as perceived by the two teachers?

Students, teachers and parents provided a range of responses about these three questions at various stages of the two phases of the study. During the study, implementation became a bigger issue than anticipated at the outset and prompts were used to probe these issues in the teacher interviews.

The teachers' data about learning styles implementation were presented with regard to the issues of: making a paradigm shift to the Learning Style Approach, the influence of the school culture and management structures on the learning styles implementation and development of teacher expertise in this new methodology. The two teachers' perceptions about students' learning

acknowledged changes had been made. Comparisons made before, during and at the completion of the second study phase were discussed.

Parents' perceptions provided triangulation and rich data from another source, about the effects of the learning style approach on their child's learning, both in school and at home.

In the next chapter these data are analysed further and compared with the existing literature based on learning styles and teachers' learning.

CHAPTER FIVE

DISCUSSION

5.0 Introduction

Students, teachers and parents' interview responses revealed their experiences of the introduction of a novel approach to learning and teaching in two primary school classrooms. This chapter discusses results from this study in the light of students, teachers and parents' perceptions, organised thematically and selectively around the principle research questions from the study:

1. Does knowing one's learning style improve the students' learning (as perceived by students, parents and teachers)?
2. To what extent is learning improved when instruction and learning context matches students' learning styles (as perceived by students, teachers and parents)?
3. What are the difficulties of implementing the learning style approach in two classrooms (as perceived by the two teachers involved)?

The questions are discussed in the context of the data from this study and the existing literature base. In phase two the inclusion of the researcher, as another teacher-participant also provided a further source of perceptual comparisons, for example, of the difference in length of teaching experience and its effect on implementing a new teaching methodology. The process of implementing a learning style approach in the classrooms addressed three issues: the need to make a paradigm shift; the effect of management structures and school

culture; and the process of developing teacher expertise. These three issues are also discussed in this chapter.

5.1 Does Knowing One's Learning Style Improve the Students' Learning?

Students' Perceptions

At the end of the first study phase all 14 students responded that knowing how they learned best had helped their learning. In the second study phase, term 2 1999, 20 of 24 students in Class One and 19 of 23 students in Class Two thought that knowing how they learned best had helped their learning. Students' affirmative responses appeared to substantiate the researchers' claims that by knowing how they learn best, students are then empowered to make choices in their learning environment to help them learn better (Dunn, 1988; Bauer, 1987).

Before the first study phase of the learning styles implementation began, 14 students described 20 elements of the Dunn and Prashnig Learning Style Model (1997) to explain how they learned best. In the second study phase 50 students described 94 elements. Overall in both study phases students used approximately two elements each to describe their learning style preferences before learning styles were implemented. The students' responses indicated that most appeared to know intuitively how they learned best, although their knowledge of specific preferences was extremely limited, in comparison with the studies in Dunn's research (1988).

Dunn used responses from more than a million learners in the USA, in Grades 3-12, to find whether students could identify their own learning styles. It was

discovered that most students could describe ways they found it easiest to learn. Some could not. Others could only describe preferences for those learning style elements that were important to them. No one articulated preferences for all 23 elements of learning style, as identified by the Learning Styles Inventory (Dunn, Dunn and Price 1981). Most students responded strongly to between 6 and 14 elements. When an element was important to students, most could verbalise their preferences and dislikes. In comparison, in this study, before learning styles were implemented in classrooms, students in both the first and second study phases described how they learned best, using on average, less than 2 elements each of the Dunn and Prashnig Learning Style Model, compared with 6 and 14 elements each in the Dunn research (1988). In interviews conducted before learning styles were implemented in classrooms in the first and second study phases, no students specified preferences for learning through brain processing or brain dominance, motivation, persistence, conformity, responsibility, structure or variety when describing how they learned best. After learning styles were implemented in classrooms, 4 students' responses were assigned to these elements.

In the final student interviews, in both the first and second study phases, students were able to specify on average, 3 elements each of the Dunn and Prashnig Learning Style Model. This increase, although small, suggested that when discourses used in daily interactions by teachers and students, self-awareness about how students' learning was developed. In these final interviews, it appeared that students' perceptions of how they learned best had been extended through the use of classroom discourses used to describe the elements in the L.S.A.

The slight improvement in numbers of elements reported by students in interviews at the end of the study, about how they learned best, suggested that students were beginning to use the elements of the Dunn and Prashnig model

to give meaning to how they learned best. However the small size of the increase indicated they had not yet fully internalised their self-knowledge of learning preferences.

In phase two, Jan, the Classroom One teacher, believed she had used learning styles as a discourse in daily interactions with the students in her class, yet after two terms 14 of 26 students responded they did not know what their 'learning style' was. In Susan's class 8 of 23 students responded they did not know their 'learning style'. When the question was reworded to: 'How do you learn best?' all students could answer the question. The students' responses suggested that the learning styles discourse was not dominant in their classrooms. Arguably, if the learning styles discourse had been dominant in their classrooms, the students would have been able to articulate more specifically how they learned best, using a greater number of preferences to describe their learning. They may also have been more familiar with the term 'learning style' when discussing their learning. Students' lack of understanding about the term 'learning style' suggests that Jan and Susan did not articulate the discourse of learning styles often enough in daily interactions to give students meaning to how they categorised their learning.

Teachers' Perceptions

In interviews at the end of phase one, Susan saw the need to match students' learning styles with instruction but felt she needed more time to achieve this in the classroom. In phase two, in term 2 and 4 interviews 1999, Susan and Jan thought that knowing how their pupils learned best helped them to teach better and enabled their students to learn more effectively. They had both used the L.S.A. profiles as a classroom tool to understand how their students learned and had attempted to match students' preferred learning styles with

instruction. Both teachers reported that they needed more time to fully implement the learning styles approach in their classrooms.

Parents' Perceptions

Parents were interviewed in term 2, 1999 to explore their perceptions of whether the L.S.A. profile and report had been helpful in understanding how their child learns. Overall, in both phases of the Study 59 / 82 parents thought that the learning Style Analysis was helpful in understanding how their child learns. Many different and positive reasons were offered. Some parents were extremely interested in the Learning Style Analysis and had used this knowledge to provide optimum learning contexts for their child (especially for homework). A minority of parents was not interested in either receiving the profile or discussing it (6) but the majority (76) showed much interest. There appeared to be lack of parental knowledge about classroom practices, (one third of parents' responded that they did not know how their child learns in the classroom). They reported that they did not visit the classroom often enough, therefore they could not make a qualified judgement about changes in their child's learning. The number of parents responding that they did not notice a difference in their child's learning remained constant in each class for the first study phase and second study phase.

5.2 Does Matching Learning Styles with Instruction and Learning Context Improve Learning?

Teachers tend to teach through their own preferred learning styles

Fleming (1989) and Prashnig (1998) claim that teachers tend to teach through their preferred learning styles. This is cited as a cause of student underachievement in our traditional educational system because teachers tend to have learned successfully in school through preferred auditory and visual sensory modalities. They then teach in those same modalities, neglecting other students' needs for learning through tactile and kinaesthetic preferences. King (1994) claims that 80% of a TOPS group (by definition 'failures' of the education system) were kinaesthetic learners, whereas 80% of sixth formers at a local high school were auditory or visual learners.

In phase two, before learning styles were implemented, Class One students identified that their teacher, Jan, taught predominantly through visual and auditory sensory modalities. Their perceptions supported Jan's own Working Style Analysis profile and report. Class Two students perceived that their teacher's style was predominantly auditory but also covered visual, tactile and kinaesthetic sensory modalities. Their perception was also correct according to Susan's own Working Style Analysis.

At the end of term 4, although Jan's students still perceived her to teach predominantly through visual and auditory sensory modalities, the tactile and kinaesthetic students and the parents of these students reported the most improvement in learning after the learning styles implementation. Therefore, it

appears that although Jan still taught mainly through auditory and visual modalities, she did 'flex' to students' kinaesthetic and tactile sensory preferences, as evidenced in students' and parents' perceptions. Jan reported in the end-of-year interview that she thought she had been flexing to all learning styles and was disappointed to learn her students perceived little change in her teaching style.

In student interviews at the beginning of phase two before the implementation of the learning style approach, students did not comment on their teacher allowing them to choose how they learned. In interviews in term 2 and 4 1999 students in both classes commented positively on their teacher allowing students choice in how they learned, for example, working outside if they preferred to be on their own or in bright sunshine, or choosing whether they moved around or ate and drank while working.

In the first study phase, sensory modalities, physical, environmental and social elements were described often by students, suggesting that these elements had been made highly visible to the students by their teacher. Susan had encouraged the students to think about their learning preferences for sensory modalities, physical, environmental and social elements, hence the students were more aware of their preferences and able to articulate them in the interview. At the end of phase one Susan verified that she had focused on students awareness of their preferences for learning through sensory modalities, physical, environmental and social preferences.

Figure 2 (pg. 97) shows the number of students' responses in Class One indicating each of the elements of the Dunn and Prashnig Learning Style Model (1997), as articulated during student interviews at the beginning, middle and end of phase two in 1999. At the beginning of the year a comparatively high number of students in Class One articulated learning

preferences for tactile and kinaesthetic (N= 13); mobility (N= 11); and grouping (N=9) elements. In the middle of the year, a comparatively high number of students in Class One again articulated learning preferences for tactile and kinaesthetic modalities (N= 12); work area (N= 11); group preferences (N=13) and sound (N= 7). Mobility was no longer articulated as a common preference, arguably because it had become an accepted practice and was not regularly referred to by the teacher. At the end of the year a comparatively high number of students in Class One articulated learning preferences for learning through tactile and kinaesthetic modalities (N=7), sound (N=12), work area (N=16) and grouping preferences (N=17).

Figure 3 (pg. 105) shows the number of students' responses in Class Two indicating each of the elements of the Dunn and Prashnig Learning Style Model (1997), as articulated during student interviews at the beginning, middle and end of phase two in 1999. At the beginning of the year Class Two students' comparatively high number of responses indicate sensory modality preferences: auditory (N= 5); visual (N=4); tactile and kinaesthetic (N=8); environmental preferences: sound (N=6); light (N=6); work area (N=5); and social grouping (N=5) preferences. At mid-year a comparatively high number of students' responses included intake (N=6); sound (N=14); light (N=12); work area (N=7); and grouping (N=20) preferences. At the end of the year students' responses remained comparatively high for sound (N=12); work area (N=16); and grouping (N=17) preferences.

These results appear to verify both teachers' claims that physical, social and environmental preferences were easiest to provide for in their classrooms. The students' responses also supported teachers' interview comments reporting that they had encouraged students to focus more on physical, environmental and social learning preferences during implementation of the learning styles approach in their classes. It seems that when the teacher focused on certain

elements of the Dunn and Prashnig Learning Style Model (1997) those elements also became highly visible to the students and became classroom discourses, hence students were more articulate about these elements when interviewed.

Students' perceptions of improved learning

16 of the 26 students in Class One and 19 of the 23 students in Class Two thought that their learning had improved after the teacher began to match learning context and instruction with learning styles. Ten students in Class One and four students in Class Two reported their learning had not improved through matching learning styles with instruction and learning context. The students' responses suggest that the Learning Styles implementation was more visible to the students in Class Two. In both classes the students who learned differently (through tactile and kinaesthetic preferences) were the most enthusiastic about how their learning had improved. They appeared to enjoy the opportunities to learn how they could choose to learn, instead of conforming to the teachers' expectations of how they should learn. This finding supports the claims in research literature that student achievement is improved when their learning styles are matched with instruction and learning context (Dunn and Dunn, 1987, 1988, 1989; De Bello, 1990; Bauer, 1987; Griggs and Dunn, 1988; Griggs, 1989).

Results from students', teachers' and parents' interviews suggest that both classroom teachers had not fully implemented learning styles into their instruction by the end of phase two but 'were at the beginning of the journey'. Scaddan (in Prashnig 1998) claims that to fully implement learning styles may take between three and five years. Susan and Jan reported that adapting the classroom context for different learning styles was easier than matching instruction with visual, auditory, tactile and kinaesthetic preferences. Their

claim also supports Prashnig's statement (1998), that routinely catering for sensory modalities is more difficult than catering for environmental, social and physical preferences.

Although full implementation of learning styles had not occurred in either classroom, changes to classrooms to cater for physical, environmental and social preferences had been made, as evidenced in students and teachers' interview responses. These changes had made a difference to learning, as perceived by teachers and students in both study phases. In teacher interviews, Susan reported "the children seem happier and more responsive...their behaviour problems tend to go away when they are happy and they are learning..." (Susan, term 4, 1999). Jan reported "the major changes are that the students are all on task and working. They are learning. They are happy and relaxed. The atmosphere is probably the biggest change..." (Jan, term 4, 1999). These comments verify Orsak's finding (1990) that it takes as little as six weeks to see increased achievement and a decrease in discipline problems when instruction is matched to learning styles.

Both teachers claimed that matching learning styles with instruction and learning context did improve learning, especially for those students who learn differently, although neither teacher had fully implemented learning styles into the classroom. Jan claimed that "all children have caught up to their chronological age in Reading except for one boy with special needs and he feels really happy about what he has done" (Jan, term 4, 1999). Susan reported that "the benefits are huge..." (Susan, term 4, 1999). These findings support Dunn and Griggs (1989) claim that by accommodating a single strong preference, academic achievement was statistically increased. Both Susan and Jan's perceptions that the learning style approach influenced those students who learn differently from the traditionally taught visual and auditory sensory modalities, also substantiates previous research (Beaty, 1986; Bruno, 1982;

Carbo, 1980; Cholakis, 1986; Cody, 1983; Curry, 1987; DeBello, 1985; DellaValle, 1984; Dunn, 1987, 1988).

Parents' perceptions of improvements in student learning

The parents of those students who were underachieving prior to the study or who learned differently commented that they thought matching instruction to learning styles improved learning. Parents' comments typically referred to an improvement in the student's self-esteem since the learning styles' implementation in the classroom. Although this study did not analyse perceptions quantitatively, both teachers reported that the students were more caring, happy and relaxed than before the learning style implementation. Bauer's research (1987) also found the students began to feel better about themselves and each other and studied harder and tried to succeed more, and did.

However, it is important to note that less than half of the parents in both the first and second phase of the study noticed changes in their child's learning. Approximately one third of parents claimed they did not know how their child learned in the classroom often responding that they did not visit the classroom often enough to make a qualified judgement. The number of parents responding that they did not notice a difference in their child's learning remained constant in each class for the first study phase and second study phase.

From parents' perceptions it appeared that they gauged how their child learned more from observable learning outcomes (finished work that students bring home) and the way their child approached their homework, than specifically observing how their child learned in the classroom. Several parents commented that they would need to ask their child's teacher if there had been

any changes in their learning. It is understandable, therefore, that more than half of the parents did not notice a significant change in their child's learning during that time.

Parents of students with different learning styles (kinaesthetic and tactile) did notice positive changes in their child's learning. These parents' perceptions reinforced the teachers' observations that catering for learning styles greatly benefits those students who are underachieving or learn differently from traditional methods. This claim is corroborated in extensive research (Dunn and Dunn, 1981; 1997; Hannan, 1994; King, 1994; Latham, 1991; Villegas, 1991; Hodgin and Wooliscroft, 1997).

Noise perceived as barrier to learning

Before the learning style implementation in the second study phase 1999, in students' initial interviews, noise, interruptions and distractions were perceived to be a barrier for learning in classrooms by 44 of the 49 students. This level of response suggests that noise was a significant barrier to learning before the learning style approach was introduced, as perceived by the students in both classrooms.

In students' interviews in term 2, 1999, 8 of the 49 students identified noise as a barrier to learning. Both teachers had worked proactively on the noise problem with their students by encouraging them to learn through their social and environmental preferences and to be respectful of others' needs when learning. Students' responses in the term 2 interviews suggested that matching learning styles with environment did remove noise as a significant barrier to learning, as perceived by both students and teachers. Removal of noise as a barrier to learning, was therefore an indirect bonus to the students' learning arising from the learning style approach.

5.3 The process of implementing learning styles into the classroom

During interviews in the second study phase, in terms 2 and 4, 1999, Jan and Susan reflected on implementing the learning style approach in their classrooms. A form of discourse analysis (McNaughton, 1998) was the methodological tool used to critically reflect on Jan and Susan's social beliefs and practices, their emotional investments in them and the contribution of their beliefs, practices and emotions to the implementation of the learning styles approach.

Initially Susan equated catering for learning styles with lack of control and she was unsure of how to implement learning styles in the classroom. At the end of the second study phase both Susan and Jan's interview data revealed their confidence in the new methodology and a shared commitment to continuing to match learning styles with instruction and learning context.

Paradigm shift of attitudes

Prashnig (1998) claims that for underlying structural dimensions of education to change from 'traditional' to 'modern', a paradigm shift of attitudes is needed. Both teachers' interview responses indicated that they had experienced a paradigm shift from teacher-controlled to child-centred teaching, albeit on an individual level.

Barker (1992) defines a paradigm as a set of rules and regulations that do two things: they establish and define boundaries and tell us how to behave inside these boundaries so as to be successful. Barker theorised a ten step general

cycle of paradigm shifts. The cycle begins when the established paradigm becomes less effective. Turbulence begins to wane as the new paradigm starts solving problems. Both teachers' interview comments suggested that the beginning of a paradigm shift took place with a new awareness that challenged their existing beliefs and values. Susan's comments before the study indicated that she believed students needed teacher-controlled learning to learn effectively. At the end of phase two, Susan's interview comments indicated she had undergone a paradigm shift from teacher-controlled learning to becoming committed to child-centred learning.

Jan's paradigm shift began when she attended a two-day professional development course about learning styles in 1998. From the course she experienced a new awareness of a different paradigm of teaching and began to question her 'traditional' attitudes towards learning and teaching. Her self-reflections also co-incided with the research study's requirement for extensive reading of research literature about learning styles and trialling, reflecting and discussing the learning style approach in the classroom during the study. In summary, it appears that Susan and Jan appear to have both made a paradigm shift from 'traditional teaching' to the learning styles approach but this paradigm shift was not visible at a school-wide level.

Managerial support

Both teachers felt school management offered limited support for their introduction of the teaching methodology. Equally, the teachers' work on learning styles had to take place alongside the school-wide focus on establishing benchmarks for Reading and Writing and Mathematics in 1999. Whiteside (1996, p. 40) claims that two key factors appear to be present in the wider role of effective curriculum leadership in the primary school: the existence of at least some non-contact time and support whether from the

head, or a deputy or someone who recognised the potential for more active involvement and took action to facilitate it. From the teachers' comments, it appears that neither of these factors was available to either Susan or Jan. During the study limited time (5 minutes) at one staff meeting was permitted to share the learning styles research with colleagues. Time was not permitted for data collection with students during school hours, nor allowances for release time for participating teachers to reflect discuss and plan with each other or with colleagues. The Principal's apparent lack of interest, both informally and formally, and negative comments during the study were interpreted by Susan as lack of support. Both teachers claimed the research study had a low profile in the school, although colleagues showed considerable informal interest in the study. For much of the study, Jan and Susan were working within a 'balkanised culture':

> *In balkanised cultures, co-ordinators are likely to work only with groups of like-minded colleagues and to create pockets of common practice rather than whole school practices (O'Neill,1996, p.24).*

In the final interview / discussion between Susan and Jan, it appeared that there had been movement in the school culture towards comfortable collaboration.

> *Where comfortable collaboration exists, co-ordinators undertake a limited role by offering advice and suggestions on request. Their support for colleagues is non-threatening, avoids the open questioning of existing practice and is a supportive rather than a true leadership role. Comfortable collaboration, in many senses, offers a veneer of professional co-operation without challenging colleagues to move beyond merely adequate levels of classroom management. (Ibid.)*

After the staff meeting at which Jan spoke about learning styles, colleagues openly showed interest and began asking questions about learning styles. This may have happened because Susan and Jan had been given the opportunity to share the learning styles approach with their colleagues and from this sharing, a degree of collegial interest had developed. However, both teachers reported that lack of active institutional support had made the innovations more difficult to implement effectively. Research literature claims this is not unusual and is often the reason why innovations fail (Schein 1992; Barth 1990; Bolman 1991).

Teacher overload as an obstacle

O'Neill (1996) claims that there are many obstacles in the way of implementing changes for improvements to learning and teaching. He argues that the reality in schools is one of overloaded teachers, lack of time, opportunity, confidence, support and resources, making innovations difficult. In this study, both Susan and Jan experienced this 'reality' and experienced feelings of being overloaded in different ways.

Susan was a relatively inexperienced teacher and found her workload in the second term of the second study phase almost overwhelming, particularly when another student with severe behavioural problems arrived and upset the class dynamics. Susan reported that she found the number of students in her class (N=27) and the needs of some students very demanding. Her class included a student with autism; a student with delayed cognitive development and a student with a behavioural problem. The responsibilities of attending after school syndicate, curriculum and staff meetings and playground duties also had to be met. Susan was the teacher representative on the Board of Trustees and involved in various sub-committees, was studying towards a Diploma of Dance and teaching dance to students outside school hours.

Jan also found her workload in 1999 an obstacle to having time to implement learning styles effectively in her classroom. Jan's management duties included leading a syndicate of 3 other teachers and a curriculum group of English, Art, Music, Maori and AV equipment; being Cultural Co-ordinator for the school, leading school assemblies, school bus controller, organising P.A.T. materials and timetables, producing the school magazine and co-ordinating the Cool School peer-mediation programme. Jan taught a Year 3 and 4 classroom with one and a half hour's management release a week. Jan was completing a thesis and studying one other post-graduate paper. Both teachers' comments revealed that they struggled to implement the new teaching pedagogy while coping with other responsibilities.

Issues for novice teachers

Susan suggested that her relative inexperience as a teacher was a contributing factor to the difficulties she faced when implementing the learning styles approach. She reported that she was still putting her ideals into practice and spending a lot of time in weekends planning and found it difficult to implement a new teaching methodology when she was still coming to terms with planning, teaching and classroom organisation.

Benner (in Galton, 1996, p. 18) claims that it is better for the teacher involved in mentoring not to be too far ahead in her development from that of a trainee when a modelling strategy is used. Applying Benner's claim to the research study, working collaboratively should have been an advantage because both teachers were at similar stages of development, however other factors, for example, perceived lack of supportive management and a perceived stressful workload, appeared to reduce benefits of collegial mentoring.

Berliner (in Galton, 1996) notes that the transition from novice to experienced teacher has been the subject of extensive research in recent years. Building on his work, Galton (1996) notes that novice teachers rely heavily on predetermined planning and this tends to make them inflexible in their approach. Novice teachers, it is claimed, find it difficult to focus on several elements of classroom activity at the same time. Susan's comments in interviews with Jan, term 2, 1999, revealed how inexperience contributed to the difficulties she experienced in implementing learning styles. However, by focusing on one aspect of the learning style model at a time, the students in Susan's classroom were given opportunities to achieve more success in learning. These successes encouraged Susan to proceed.

> *'To me it is still hit and miss thing because I am still getting my planning underway. It still takes me quite a long time in the weekends to get my planning done...I feel I am still coming to terms with putting into place my ideals of teaching.'*

In hindsight, Susan and Jan reflected that knowledge of Berliner's (in Galton, 1996) accounts of the difficulties novice teachers experiences would have provided a more thorough understanding of Susan's experiences during the study, while developing expertise in the learning styles methodology. Galton's comments on novice teachers are relevant here:

> *'Novice teachers are self-focused and concerned to deal with their own personal problems and to judge situations in terms of the practicality ethic. Competent teachers are more task-orientated ...(Galton, 1996, p.18).*

Similarly, Galton refers to three stages of cognitive development as teachers move through stages of developing expertise. The three stages are novice,

competent and expert stages. Doyle and Ponder (in Galton, 1996, p. 15) also claim that when teachers adopt a new curriculum they pass through a series of interrelated stages: the initiation, consolidation and reorientation stages.

To explore the stages of teacher expertise in developing the classroom innovation in this study, Galton's arguments and models were used. For example, the first stage was the 'initiation stage' in which the teacher would proceed only if benefits were perceived to outweigh the personal costs. Susan's discourse during the interview in the first study phase, before the learning style implementation, indicated that she did perceive that benefits outweighed personal costs (Susan recalled her experiences as a kinaesthetic learner and vowed to acknowledge students in her class who learned differently). At the end of the second study phase Susan was even more committed to continue catering for students who learn differently, having seen the effects of the learning styles implementation on her students' learning. Susan planned to match instruction with students' sensory preferences in the following year.

Jan had been teaching for 17 years and had different learning needs to Susan, for example, Jan's paradigm change necessitated unlearning years of unchallenged, teacher-controlled values, such as "a good class is a quiet class" (Jan, term 4, 1999). Although Jan had many more years of experience, she expressed lack of confidence in the actual implementation, reporting that she should be doing so much more to cater for students' learning styles by making more tactile learning style resources and flexing her teaching style to tactile and kinaesthetic learners. Jan and Susan's comments suggest that their emphasis is on "learning to use the new materials and procedures and evaluating their effectiveness"(Galton, 1996, p. 16). Both teachers appear to have moved into the second stage; the consolidation stage.

> *Here the main objective is to achieve success in ways that satisfy the objectives of the innovation as closely as possible. At this stage, teachers require specific expertise in those parts of the curriculum which are undergoing change...Teachers need to know how to procure the necessary resources. They need advice on how to use these materials. The emphasis will be on learning to use new materials and procedures and evaluating their effectiveness (Ibid.).*

Similarly, Poskitt (1994, p.195) claims that innovations require a period of settling in before modifications can be expected:

> *...Teachers seemed to need exposure to a range of experiences before developing in self-direction and independence. Change leads to insecurity during a period of de-skilling and re-skilling, which requires considerable motivation and self-confidence.*

Both teachers in this study supported Poskitt's claim of needing to de-skill. Jan, for example, commented that the class was noisy because she forgot her expectations and other good things about her teaching when she focused on learning styles. Susan commented that the children had become noisy, disruptive towards each other and were naughty. These lapses in classroom behaviour happened while the teachers focused on 'satisfying the objectives of the innovation as closely as possible '(Galton 1996, p.16).

According to Galton (1996, p.16) the third stage, the 'reorientation stage' involves the teacher ceasing to think about meeting the objectives of the innovations so closely and begins to consider adapting the innovations to advance pupils' learning more effectively. Susan and Jan did not appear to

reach this stage during the period covered by the research because of several factors.

1. The study's limited time frame.
2. Limited resources were available in the form of release time and teaching materials to enhance the implementation of learning styles in the classroom.
3. Limited formal support. Although an informal support system was available for the teachers, this was not pursued formally or collaboratively within the school.

Poskitt's research (1994) claims that for meaningful change to occur, a culture of collegial reflection is needed among teachers. This involves being able to reflect on existing practice and discussing and sharing ideas in a non-threatening climate, in order to bring about improvements to learning and teaching (see also McCutcheon and Jung, 1990; West-Burnham, 1996; Poskitt 1994; Stewart and Prebble, 1993). There did not appear to be a whole school culture of collegial reflection in this study, as evidenced in the reported experiences of the two teachers.

Both teachers' reflections highlighted how working alongside colleagues with different pedagogies has the potential to cause conflict through lack of understanding. Working with colleagues who had different teaching philosophies and constructs of students and classroom management proved difficult, especially when classes cross-grouped for mathematics and recorder playing. McCaslin and Good (1992) claim that teachers having different constructs of teaching, management and students are a major barrier to effective reform. They claim that for significant reforms for schools to materialise, various constructions of students in the popular culture and educational community and their implication for school management policies need to be considered and a consensus reached. For school reform it is

necessary to make an alliance of management and instructional goals because in the past surface features have changed but the underlying structural dimensions remain the same.

In this study, parallels can be drawn with McCaslin and Good's claim that when teachers have different constructs of teaching, management and students, these different constructs are a major barrier to effective reform. For example, the participating school's philosophy states that all learning styles are catered for, although in classroom practice most teachers do not cater for all learning styles effectively. Another example is when introducing the learning style approach in a school-wide culture of balkanisation, it means that students have to adjust to different teaching and learning paradigms within the same school.

Poskitt (1994) claims that time is needed to build a culture of collaboration and until teachers feel they can reflect on their teaching practice and discuss openly with their colleagues, real change is minimal. The two teachers in the case study did reflect on their practice, but Jan and Susan did so in isolation from colleagues. Poskitt also maintains a need to understand the school's culture first and then to manage the culture collaboratively. In this way teachers and students can value learning collaboratively through reflective practice. Moreover, when the Principal is an active supporter of the change, it is more likely to succeed (Bush and West-Burnham 1994; Caldwell and Spinks 1992).

Despite the problematic and incomplete implementation of the learning style approach, Susan and Jan's reflections at the end of the study indicate a transition from Sullivan's 'modern teacher' to that of 'post-modern teacher' (1997). Both teachers emerged with a child-centred discourse of learning. At the end of the study, by persisting with a learning style methodology that they

both believed in, they appeared to have greater understanding about the system they worked in and had become empowered through this knowledge and through their experience. In this regard, Poskitt (1994) claims that teachers experience a growth of skill and confidence, resulting in growth of self-esteem and self-confidence when they become action researchers.

How difficult is it to implement learning styles in the current education system?

Jan and Susan discovered that although the school philosophy stated that children's learning styles would be catered for, there was no consensus around teachers' methodologies to promote the learning styles approach. In fact, Susan and Jan found colleagues' traditional concepts of teaching a barrier when trying to implement learning styles approach. For example, the expectation that all students be working quietly when the Principal walked past and ensuring all students be sitting still while spoken to showed the two teachers how different their teaching pedagogies were to some of their colleagues. The traditional discourse of teacher control (in which the students' motivation and achievement is the responsibility of the teacher) appeared to be the dominant discourse in the school and the learning styles discourse (in which students are expected to internalise the rationale that underlies classroom rules and to operate within the rules on their own initiative; learning how to learn) was marginalised. As McNaughton argues:

> *This is not because some discourses are 'more truthful' or 'right' but they have more political strength than others, derived from their institutional location. (MacNaughton, 1998, p.43)*

According to MacNaughton (1998) only certain discourses are in circulation at a given point of time and contradictory discourses compete with each other.

Some discourses dominate through having more political strength than others. The students' lack of discourse about their specific learning styles indicated the learning styles discourse was not dominant in the school or classroom, although its visibility improved marginally at the end of the study. In the school it appeared that the dominant discourse was that of traditional education with teacher-controlled learning.

It appears that MacNaughton's concept of 'political strength' and 'institutional location' contributing to the dominant discourse has parallels in the current New Right thinking in our education system as evidenced in curriculum and assessment reform. Sullivan (1997) claims that within the New Right ideology, child-centred learning is marginalised; one of its goals is to have greater control over measurement and standardisation of student achievement, guided by the need to have greater teacher accountability, as opposed to constructing a more child-centred education system.

Indeed, within the school in the study, evidence suggests that the Principal's major drive in 1999 was to develop a levelling system for Reading, Writing and Mathematics. Students' achievements could then be compared against benchmarks to indicate whether students are achieving below, at or above their expected achievement level for their chronological ages.

Teachers' interviews / discussions at the end of term 2 and 4, 1999, suggested that there was lack of active support for the learning style approach from the Board of Trustees and Principal. Both teachers felt isolated from their colleagues, not because their colleagues were disinterested in the learning style approach, but because the school's systems did not allow for collaborative sharing and support among colleagues. Lack of collaboration with colleagues, instead of colleagues having opportunities to discuss, share

and understand the learning style approach, may have contributed to the minimising of the learning styles discourse in the two classrooms.

Hence, in response to the question: "What are the difficulties of implementing the learning style approach in two classrooms?", it appears that the New Right ideology of highly structured curriculum and assessment reform, linked to greater teacher accountability is an antithesis of a child-centred learning style approach. The teachers in the study showed evidence of a stressful workload and few opportunities for collegial collaboration and reflective study. It appeared that they worked mainly in isolation. Once they had made a paradigm shift from teacher-controlled learning to child-centred learning, this isolation from their colleagues proved to be an added pressure.

5.4 Summary of Discussion

Perceptions of parents, students and teachers contributed to an explanation of the extent to which learning and teaching is improved when learning context and instruction are matched with students' learning styles.

Interviewing students and teachers before, during and after the implementation of learning styles in the classroom provided comparisons and overviews of the experienced of understanding one's learning style and its influence on teaching and learning. It became apparent to the researcher that before the L.S.A., the majority of students could not articulate well how they learned, despite having attended school for between two and a half and four years. Even after the implementation of learning styles, most students still did not verbalise fluently about their learning style, although when the question was rephrased, most could describe some elements of how they learned best.

Their comparative lack of articulation indicated that learning styles was not the dominant discourse in the classroom. The two teachers' negative comments about school support for learning styles suggests that it is not a dominant discourse in the school either.

It was found that the teachers did not clarify the discourse of learning styles or use it enough in the classroom's daily interactions for students to give meaning and confidence to use naturally in conversation when describing how they learn best. Students' lack of articulation about their learning preferences may have indicated a minimal internalisation of the learning process and that learning styles discourse was not dominant in their classrooms or school.

Noise and interference from other students was noted as a barrier to learning in the majority of students' responses before learning styles were introduced. Students' perceptions of noise being a noticeable barrier to learning decreased after the implementation of learning styles.

Parents' perceptions differed widely but most thought that knowing their child's learning styles was helpful. Less than half the parents noticed a change in their child's learning during the study and many parents reported that they did not know how their child learned at school.

Although both teachers remained committed to the learning style implementation and claimed to have made a paradigm shift in their thinking from teacher-controlled to child-centred learning, their discourses revealed the professional frustration of working in a culture that does not fully endorse collaboration. It may be that until the culture of the school changes, it is unlikely that the dominant discourse of learning will be that of the learning style approach, because to achieve a school-wide consensus there needs to be a culture of collaboration.

Understanding Galton's model of the three stages that teachers pass through when learning new expertise provided Susan and Jan with greater self-understanding. Similarly, using literature as a theoretical basis to analyse obstacles that made implementation problematic proved helpful to both teachers.

The next chapter draws some conclusions from the study, discusses its implications and makes recommendations for further research on the implementation of learning styles in schools.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

The purpose of this study was to explore the extent to which students' learning improves when instruction and learning context matches their learning styles and how far the learning style approach is possible to implement in our current education system. A body of overseas research validates the assertion that learning improves when learning context and instruction match students' learning styles but little research has been completed in New Zealand schools, hence this case study.

A case study was chosen as the methodological design because it enabled descriptive, analytic, particular and small-scale study (Harker, 1997). The study was conducted in two phases. In the first phase the teacher attempted to implement the learning style approach in her classroom of Year 4 and 5 primary school students during term 4, 1998. In the second phase the researcher joined the research participant in a collaborative study, drawing on Louden (1991). Both phases focused on the process of implementing the learning style approach in their classrooms. Students', parents' and teachers' perceptions towards learning before, during and after the implementation of changes were explored during interviews to determine the extent to which learning had improved during the year.

6.1 Conclusions

Although the case study methodology used for this research study meant that results were not generalisable for all primary school teachers, commonalties of teacher's, students' and parents' perceptions in both the first and second phase led to the following conclusions for this study:

- Before the LSA, students' articulation of how they learn best was limited. After the LSA, students' articulation of how they learned best improved slightly. However, it appears that learning styles discourse was not dominant in either class or in the school.

- All students perceived that knowledge of their own learning styles did improve their learning.

- Most students perceived that matching instruction with learning context and learning styles improved their learning.

- Both teachers perceived that matching learning context and instruction with learning styles did improve learning, especially for underachievers and those who learned differently. However, the time frames for both first and second study phases were too short to fully implement learning styles in the classroom. Social, physical and environmental preferences, however, had been catered for in both classrooms.

- The majority of parents perceived the LSA had helped them to understand how their child learned.

- Less than half the parents perceived that their students' learning had improved after the teacher had matched instruction and learning context with learning styles.

- Implementing the learning style approach did necessitate an educator making a paradigm shift from teacher-controlled learning to child-centred learning.

- The two teachers involved found that knowing and understanding Galton's model of how teachers develop expertise (1996) was helpful when learning the new learning style pedagogy.

- The teachers found the management structure and school culture relatively unsupportive when implementing the learning style approach. This was cited as a reason why the learning style approach was not and did not become a dominant discourse in the school.

6.2 Implications arising from the Study

Workload

This study highlighted how lack of teacher time for planning, evaluating, observing other teachers, discussing, finding new resources and reflecting on methodological changes, was a central barrier to implementation of innovation in the school. Lack of time to liase was identified as a major obstacle in the study and without release time, real change was seen as difficult to achieve. Susan's teaching inexperience, the need to cater for special needs students in her classroom and her personal extra-curricular activities compounded the overwhelming workload pressures during the study. Jan faced a different workload, with many management tasks as well as full classroom

responsibilities. This is consistent with Wylie's reports on educational reform in primary schools in New Zealand.

> *Workload and paperwork associated with the administrative and reporting work that accompanied decentralisation are the main sources of dissatisfaction for people in schools. (1999,p.3)*

> *Teaching workloads have jumped markedly between 1996 and 1999, to an average workweek of 51.5 hours a week, with more time needed for assessment and reporting, and planning classroom work. Forty-one percent of teachers describe their workload as excessive. (Ibid., p.4)*

Time for collegial reflection

In the current education system primary schoolteachers have no non-contact time provided in their employment contract. It has been observed that a New Zealand culture has developed in which teachers are pragmatists, with few research skills (Poskitt, 1994). Primary school teachers working context maybe described as one with a:

> *'Lack of time, opportunity, confidence, support and resources [which] conspire to militate against the easy application of neat theoretical models to fragmented primary school realities, and the more instrumental concerns of overloaded teachers' (O'Neill, 1996, p.2).*

Both teachers agreed that non-contact release time would have been beneficial in which to share ideas and discuss daily practices. Reflective practice is a major contributing factor in making improvements to classroom teaching and is extensively promoted in the research literature (Prebble and Stewart 1993; Poskitt 1994; Elliot 1991; McCutcheon and Jung 1990). However, there was

no provision of non-contact time nor were there opportunities to alleviate pressure of either teachers' workloads, in order for them to have more opportunities to develop reflective skills and to share, discuss and support their implementation of the learning style approach in their classrooms.

When teaching in a culture of collegiality and collaboration, listening to new ideas authenticates and challenges teachers' own perceptions, thus stimulating reflective thought about one's own ideas, eventually leading to a sense of commonality and shared understandings. However, the teachers in this study did not believe the research study was highly visible in the school. It appeared that it was difficult for the teachers to share their new pedagogy with other staff members, thus limiting the possibility of it becoming a dominant discourse in the classrooms. It also made it impossible for all teachers to work towards a paradigm change in attitudes that would have made the learning style approach a school wide initiative and dominant discourse in the school. Neither shared understandings nor a sense of commonality were achieved in this study.

Whiteside (1996) claims that the headteacher plays a critical role in shaping the culture and determining the framework within which innovators work (p. 35). In this study the teachers found that the headteacher neither actively supported, nor provided a supportive framework in which the learning style approach could be developed collaboratively.

New Right Influences

The two teachers felt they were working in a hierarchical management structure in which changes were 'imposed' on them. Benchmarking of Mathematics, Reading and Writing in levels corresponding to the new curriculum was expected throughout the school. This new requirement was

seen by the teachers in the study to be an antithesis to the learning style approach. On one hand, benchmarking assumed that all students should achieve the same level at the same age. On the other hand, the learning style approach asserts that every student learns differently. Elley (1993) claims that 'levelling' presumes a clear progression in student learning but that this presumption has no basis in research.

The two teachers also worried about the issue of benchmarking classes' achievement and relating them to teachers for accountability. Thrupp (1998) identified this culture of blame as a product of the New Right ideology. Codd (1993,1995) also condemns the New Right ideology, as implemented in the curriculum and assessment reforms in New Zealand, as harmful to effective schooling.

Thus although the learning style approach was seen to be successful by the two teachers, a majority of students and some parents in both classes, it was difficult to implement across the school because of several factors, including the influence of the New Right ideology on teaching and assessment practices.

Suggestions for Effective Implementation of Curriculum Innovations

This study provides several points for reflection and discussion based on the experiences of the teachers in this study. Suggestions for effective implementation of curriculum innovations include:

- The key person to initiate change is the Principal, who either leads or delegates, but is an 'active supporter of the change effort' (Fullan 1986. p. 75). To establish the learning style approach as a dominant discourse in the school, it would be necessary for staff to have a consensus of core values,

or as McCaslin and Good suggest; the 'same construct of students' (1992, p. 13). However, the researcher claims that this paradigm shift in attitudes from teacher-controlled learning to child-centred learning needs effective leadership, a culture of collegiality, time to develop and a prioritising of teacher development.

- The development of a school culture in which parents and school community are involved in discourses of students' learning and implementing methodological change in order to make learning a more routine part of students' lives (so that learning is not only perceived as occurring at school). Wider inclusion of parents may also positively contribute to making learning styles a dominant discourse for students at home and at school. Homework may then become a more natural extension of school, and a means for students to practise skills they have learned at school in their preferred learning styles, which are understood and supported by parents, thereby consolidating learning styles as a dominant discourse.

- An effective method of teacher development that demonstrates awareness of how teachers learn and matches training approaches to the cognitive state of the learner (Galton, 1996, p. 18). Providing teacher development and support for teachers to improve classroom practice through management structures (for example, mentoring) is also essential.

- Time for reflection, discussion and observations among teachers. Guidance for teachers and how to become action researchers may be necessary to develop skills and expertise for improving teaching practice (Poskitt, 1994).

- The collaborative production of a school policy for learning that creates an agenda for staff development linked directly to classroom practice. This policy would be a public statement of core values held by staff. By reaching a consensus about core values it is more likely that colleagues would develop the same teaching and learning discourses within the school. The challenge is to make the shift from promoting surface change (resulting in no real change in classroom practice) to one of changing the underlying structural dimensions of practice to encourage a paradigm shift in teacher attitudes (McCaslin and Good, 1992).

- The establishment of priorities for curriculum and staff development in the form of the Strategic and Annual Plan (planned collaboratively) and using resources to fund whole school areas of development that have been prioritised. In this way funds are targeted effectively, encouraging teachers to learn together and support each other's learning.

- The empowerment of a co-ordinator to have non-contact time to encourage colleagues to improve learning and teaching in prioritised areas (O'Neill, 1996).

6.2 Recommendations for Further Research

This study explored perceptions only and the teachers found that students were happier, more relaxed and motivated when their learning preferences were matched with instruction and learning context. However, it would be useful to combine qualitative with quantitative data.

To overcome the limitation of a restricted time frame, a longitudinal study that explores links between students being able to articulate awareness of how they

learn best with quantitative measurement of learning achievement outcomes over three to five years could provide useful insights.

Future study could explore how knowing one's preferred learning style, using the Dunn and Prashnig Learning Style Analysis, influences learning and quantitatively assess the learning outcome by comparing PAT test scores at the beginning and end of the study.

In this study most parents responded that they did not know how their child learned in the classroom. In the interviews these parents based their perceptions on what the child, teacher and school reporting system reported to them and from observing their child completing homework. Few visited classrooms regularly. Therefore, many were not able to comment about whether their child's learning had improved. Further research into parental participation in the classroom and its influence on students' learning would be of use for further research.

Although this study focused on classroom level change, school-wide issues influenced the effectiveness of the learning style innovation. It would be helpful to explore the influence of these issues in greater depth on a school-wide basis, monitoring key areas before, during and after the innovation and involving the school's staff, students and parents.

The following key issues could provide a focus for effective curriculum innovations:

- School culture
- Leadership
- School policy
- Staff development

6.4 Concluding Statement

In this study students' learning was improved when learning context and instruction were matched with learning styles, especially for underachieving students and those students whose learning styles were different from the norm (students with tactile and kinaesthetic preferences).

Although the New Right ideology is an antithesis to the learning style approach, the school has some discretion in how it delivers the curriculum. The learning style approach does seem possible in our current education system, as evidenced in this study, although its implementation is problematic. It appears that internal management structures and the school culture have considerable influence on the success of the new teaching methodology.

Although changes can be successfully implemented in individual classrooms, for the learning style discourse to become dominant across the school as a whole, a more collaborative approach to the implementation of learning styles methodology, involving students, teachers, Principal and parents would be beneficial.

Effective leadership is needed to ensure a supportive management structure that encourages a collaborative culture. For school wide implementation, involving key values based on consensus, some teachers may need to undergo a paradigm shift in their thinking. Moreover, to facilitate change, all teachers need to understand how teachers learn, in order to be able to support their colleagues' learning collaboratively. The teachers in this study discovered that leading colleagues to make paradigm shifts in their thinking and being able to support teachers' learning collaboratively emerged as a key issue in the

successful implementation of a learning style approach across more than one classroom.

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APPENDIX A

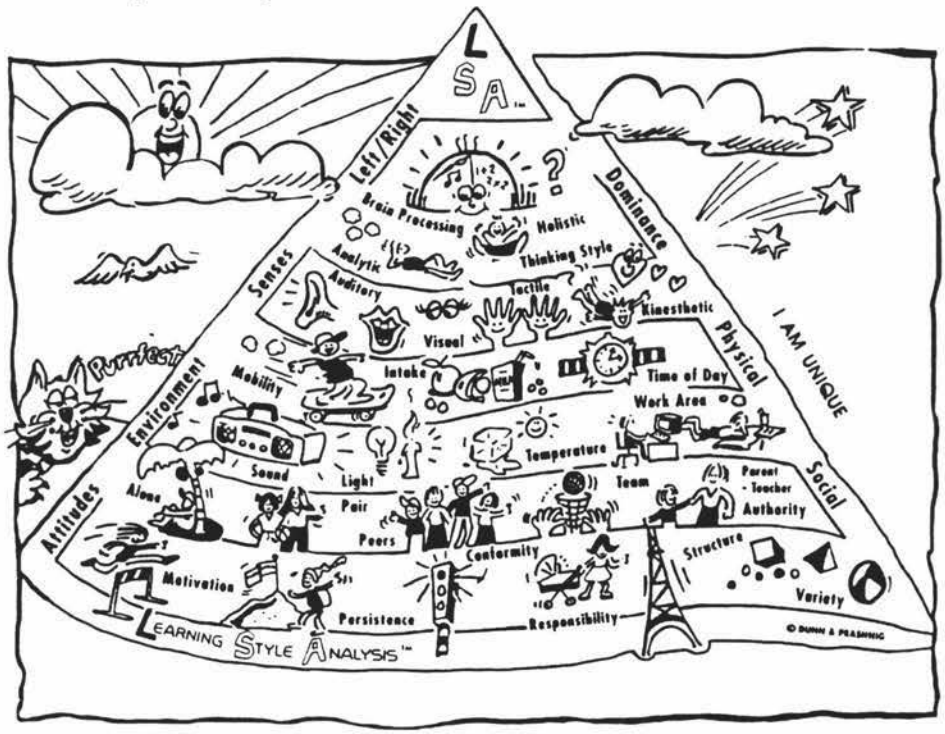
LEARNING STYLE ANALYSIS™

for Junior Students

7 - 12 yrs

International Version 2.00

How you study, process information, think and solve problems is your key to success in school and in life.



The statements on the following pages will help you to recognise your personal Learning Style. By answering as accurately as you can you will get the most useful results, and you will understand how you learn best.

Please follow these instructions carefully:

1. Read through all statements and think about yourself when you are learning or studying something new and/or difficult, when you have to concentrate or work on a topic or project/assignment that is difficult for you.
2. Describe how you would prefer to do things, not how you have to do them right now.
3. **Choose only statements that are really true for you** (when your reaction is something like: "Yes, that's me!"). **Mark them with a tick (✓). Leave the others blank!**
4. Add up the number of your ticks ✓✓✓ (your TOTALS) in each section.
5. Enter these **TOTALS** in the provided boxes underneath the question numbers or transfer them on to the LSA Response Sheet.

Name:_____ **Class:** _____

Please note:
There are NO trick questions, no 'right' or 'wrong' answers. If you work through the questionnaire as quickly and honestly as you can, you will get the results most useful to you.

Tick only statements that are really true for you!

1A ☐ I can't concentrate with traffic noise, music, the TV, or people talking around me.
1B ☐ When I study or read I need it quiet.

1B ☐ I like background music when I read or study.
1A ☐ When the classroom is very quiet I can't concentrate.

2A ☐ When I read or study I like to sit by the window or have all the lights on.
2B ☐ When the light is dim I can't concentrate and I get sleepy.

2B ☐ I can read and learn in dark corners, with very little light.
2A ☐ I like classrooms or study areas with most of the lights switched off.

3A ☐ I learn best in a warm room.
3B ☐ I can't study or read when I am cold.

3B ☐ I really like cool temperatures in classrooms or study areas.
3A ☐ When it's too warm, I can't concentrate.

4A ☐ I like to sit up straight when I write or study.
4B ☐ I prefer to do my homework at a table or desk.

4B ☐ I prefer to sit on a soft chair, cushion or couch when I study.
4A ☐ I just can't concentrate when I sit at a desk or table.

5A ☐ I feel good when I do well at school.
5B ☐ I always want to learn more.

5B ☐ School is very boring for me.
5A ☐ Nobody really cares if I do well in school.

Tick only statements that are really true for you!

6A ___ No one needs to remind me to get my school work done.
☐ ___ I like to complete what I begin.

6B ___ Someone always has to remind me to finish my schoolwork.
☐ ___ When I study I like to take breaks often and do something else.

6C ___ I always have trouble finishing my school work.
☐ ___ When I study I like to take breaks and often forget to go back to my task.

7A ___ I like rules, then I know what to do.
☐ ___ I respect my teachers and listen to their instructions.

7B ___ I always like to do things my way.
☐ ___ There are too many rules at my school.

7C ___ I like to do what's right and usually keep my promises.
☐ ___ School is important to me and I take learning seriously.

7D ___ Doing fun things outside school is much more important than learning.
☐ ___ Most of the time I don't keep my promises or do what teachers expect.

8A ___ I like to be told exactly how to do something.
☐ ___ Learning is easier for me when I can follow instructions.

8B ___ I don't like to be told how to get things done.
☐ ___ I prefer to work things out for myself, without instructions from a teacher.

8C ___ When I work on something difficult, I follow the same pattern.
☐ ___ I don't like to change my work or study habits.

8D ___ I always like to find new ways of doing things.
☐ ___ I think it's boring to do things the same way all the time.

9A ___ I really like to work by myself.
☐ ___ When I study I don't want someone trying to help me.

Tick only statements that are really true for you!

9B ___ I really prefer to learn with someone else.
❑ ___ I get more done when I work with a friend.

9C ___ It's fun to do school or homework with three or four friends.
❑ ___ I like to work or study in a team with a leader.

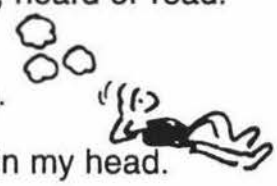
9D ___ We all help each other when we work or study as a group.
❑ ___ I really like studying with a group of friends where no-one is the leader.

9E ___ I really need a teacher to explain <u>how</u> to do things.
❑ ___ I like it when the teacher checks my school and homework regularly.

9F ___ I like it when a grown-up in my family helps me with my homework.
❑ ___ I feel good when my parents/family are proud of my school successes.

10A ___ I learn really well when I listen to the teacher explaining something.
❑ ___ I like to listen to audio tapes, the radio or when someone reads to me.
___ It's easy for me to remember what I hear.

10B ___ To really understand what I have learned, I need to talk to someone.
❑ ___ Talking out loud helps me to think more clearly.
___ I remember best when I can explain what I have seen, heard or read.



10C ___ I usually say the words in my head when I am reading.
❑ ___ Talking to myself helps me solve problems.
___ When I worry I always have a lot of self-talk going on in my head.

10D ___ I like computer programmes with lots of words.
❑ ___ I remember best when I can read about it.
___ I prefer books and learning tasks with clear written instructions.

10E ___ I really enjoy computer programmes with lots of pictures in colour.
❑ ___ Doodling helps me to remember what the teacher says.
___ I remember well what I see on TV, in a movie, video or in a magazine.

Tick only statements that are really true for you!

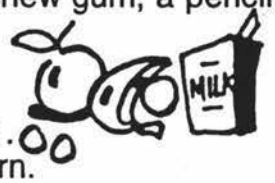
10F __ I often daydream in class.
❑ __ When I worry I create pictures in my mind.
__ I remember better when I can imagine what I have seen, heard or read.

10G __ I really like to learn with hands-on activities, puzzles and games.
❑ __ I prefer to have things for learning that I can touch, move and manipulate.
__ When I am bored or have to listen to the teacher I fiddle a lot and don't remember much .

10H __ I like study projects where I have to do things away from school.
❑ __ I prefer learning by doing, by role-playing and getting really involved.
__ Field trips help me to understand what I have learned at school.

10 I __ I learn much better when I feel good about the task and the teacher.
❑ __ Feeling good about what I have to learn is very important for me.
__ Usually I understand new material when I feel positive about what I'm learning.

11A __ I need to snack, eat, nibble or drink while I'm studying.
❑ __ When I'm bored or have to concentrate hard, I often chew gum, a pencil, my fingernails, even my knuckles.



11B __ I usually eat before or after I study or do school work .
❑ __ I hardly ever think about eating or drinking when I learn.

12A __ My concentration is best in the early morning hours.
❑ __ I like to get up between 6.00 and 8.00 a.m. or earlier - even when there is no school.

12B __ I wish I could have the most difficult subjects just before lunch.
❑ __ I can concentrate best in classes just before the middle of the day.

12C __ I wish school would begin after lunch.
❑ __ I like to do my homework right after I get home from school.

RESPONSE SHEET
for
LEARNING STYLE ANALYSIS™

for Junior Students
7 - 12 yrs

International Version 2.00

Please print in BLOCK letters

NAME: _____ M/F _____ DATE: _____

SCHOOL: _____ FORM/CLASS: _____

CITY: _____ COUNTRY: _____

AGE: _____ years NATIONALITY: _____

(for statistical data only)

Please keep the questionnaire and return this page only for entering scores into the LSA computer programme

SCORING TOTALS

1A	1B	9D	9E
2A	2B	9F	10A
3A	3B	10B	10C
4A	4B	10D	10E
5A	5B	10F	10G
6A	6B	10H	10I
6C	7A	11A	11B
7B	7C	12A	12B
7D	8A	12C	12D
8B	8C	13A	13B
8D	9A	14A	14B
9B	9C	15A	15B

Office Use Only:	Date rec.	Group	Date proc.	paid/inv.

Available through: Creative Learning Company, PO Box 106 239, Downtown, Auckland, New Zealand
Ph: 64.9.309 3701, Fax: 64.9.309 3708, Email: info@clc.co.nz, Internet: www.clc.co.nz

APPENDIX B

Learning Style Analysis™ - *Junior*

Dunn & Prashnig

Junior Student Version 2.3

Serial no. 2011786M

™ *Jnr - Personal Profile*

prepared for

[redacted]

The following profile shows your particular style elements using this key and indicating under which conditions you perform best:

■ = strong preference (always needed)
▨ = preference (needed most of the time)
——— = non-preference (avoid if possible/not applicable)
☐ = flexibility (adjustable to situations)
?????????? = inconsistency

This profile allows you to discover your strengths in the 21 basic areas of the Learning Style Model. You will recognise elements which can help you solve problems, concentrate, learn, do your home work and study effectively. You will also discover what does not help you in the learning process.

Factors that determine your success are not only influenced by your unique personality, but also by the physical space where you study and concentrate, the time of day, your biological needs, the environment, and your frame of mind.

When your personal preferences are matched in the environment where you study, and the overall learning conditions in class and at home match your style, they become your strengths and will improve your academic performance. If, however, you learn and study through your non-preferences over longer periods of time, they will become your weaknesses. The result can be concentration problems and learning difficulties. True style matches always lead to true learning success!

For more information contact:
Creative Learning Company, PO Box 106239, Auckland City, New Zealand.
Ph 64.9.309-3701, Fax 64.9.309-3708, Email: wsa@clc.co.nz

Jnr - Personal Profile

[redacted]

Biologically Based Elements

ANALYTIC ("Left") HOLISTIC("Right")

BRAIN DOMINANCE

BRAIN PROCESSING

sequential ▨ ▨ simultaneous

THINKING STYLE

reflective ▨ □ impulsive

SENSORY MODALITIES

AUDITORY (hearing)	■	listening
Auditory (external)	■	talking/discussing
Auditory (internal)	■	self-talk/inner dialogue
VISUAL (words)	■	reading
Visual (external)	▨	seeing/watching
Visual (internal)	■	visualising/imagination
TACTILE (touching)	▨	manipulating/handling
KINESTHETIC (external)	▨	experiencing/doing
Kinesthetic (internal)	■	feeling/intuition

PHYSICAL NEEDS

MOBILITY

stationary ?????????? ?????????? movement needed

INTAKE

not needed □ ▨ needed

TIME OF DAY

early morning ▨ ▨ late morning

□ afternoon

□ evening

ENVIRONMENT

SOUND

quiet ▨ —— sound/noise/music

LIGHT

bright light —— □ low light

TEMPERATURE

cool □ □ warm

WORK AREA

formal □ □ informal/comfortable

■ = strong preference ▨ = preference □ = flexibility —— = non-preference ???? = inconsistency

Learning Style Analysis™ - Junior

Dunn & Prashnig

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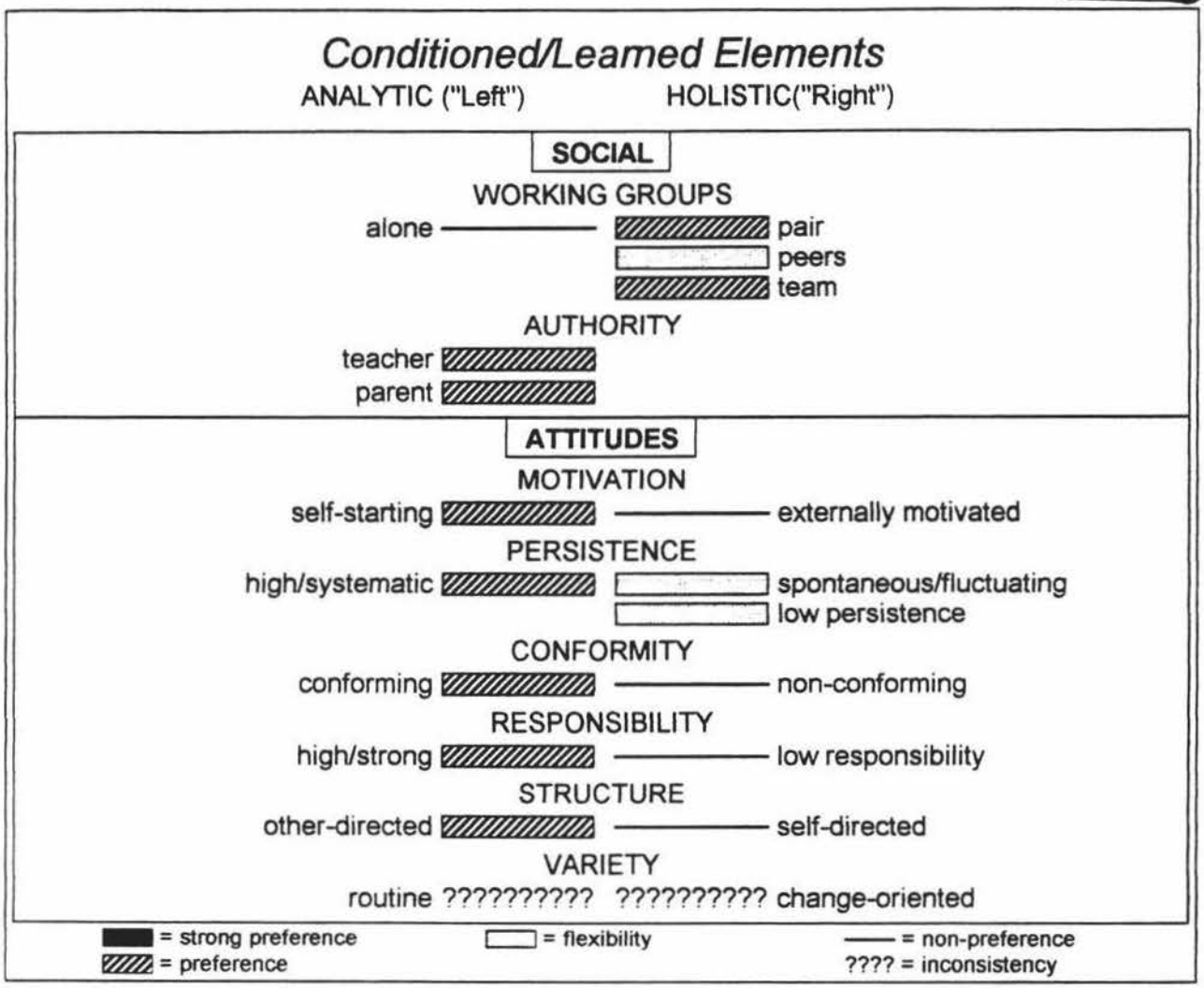

DIFFERENCES BETWEEN BIOLOGICAL & LEARNED ELEMENTS:

The results on page 2 represent your biological needs when concentrating, reading a study text or learning something new and difficult. Preferences and non-preferences in these areas are usually hard to change and remain mostly stable over a life time. When they are mismatched over a longer period of time they will influence learning motivation, persistence and responsibility in a negative way. For lasting learning success, make sure that your strong preferences are being matched most of the time.

The results on page 3 reveal your conditioning, and show with whom you learn best and what your attitudes are when it comes to learning something new and difficult. These elements are not stable in your profile and can change quite rapidly. This usually happens when there are changes going on inside you or in the world around you. To be successful at school it is very important that you develop positive attitudes and always attempt the best you can do because your preferences become your strengths when you use them wisely.

Learning Style Analysis™ - Junior

Dunn & Prashnig

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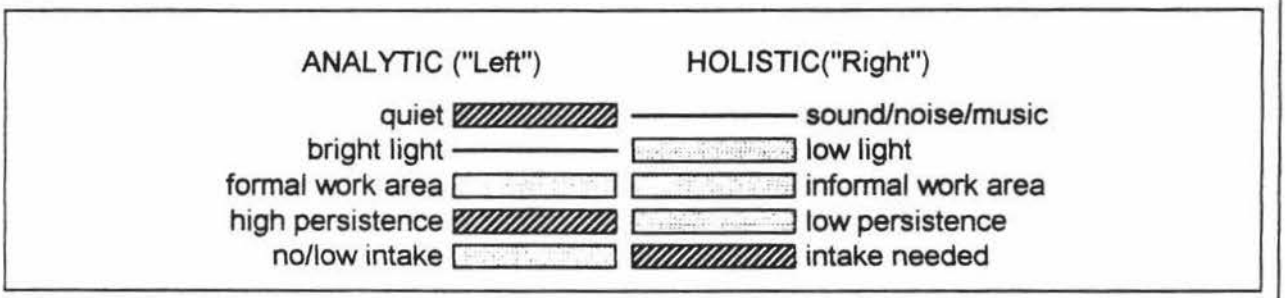
Learning Style Tendencies

Compare this with your Left/Right Brain Dominance on page 2



Three or more of the following elements: preferring quiet, bright light, formal design/study area, high persistence (to complete tasks without interruptions) and low need for intake tends to suggest an ANALYTICAL (sequential) learning style. On the other hand, preferring sound, soft lighting, informal design, low persistence (completing tasks in bursts while working on multiple tasks simultaneously) and need for intake suggests a GLOBAL/HOLISTIC (simultaneous) learning style (Bruno, 1988; Dunn, Cavanaugh, Eberle, and Zenhausern, 1982).

Report Guidelines

FOR STUDENTS:
For really improving your study techniques, follow the suggestions in your LSA™ Report and watch your own success. To achieve permanent improvement in learning and study situations, please share and discuss this report with your teachers, your parents or guardians and make sure your learning needs are met.

FOR TEACHERS :
Please help your students to analyse their profiles, discuss their reports and their personal preferences. Find out which areas of mismatch between the teaching styles used at your school, and your students' learning needs, could be the reason for frustration, poor learning motivation, stress or boredom, leading to learning difficulties and underachievement.

FOR PARENTS/GUARDIANS:
To help improve concentration, study skills, learning abilities, motivation and attitudes of this student, please follow the suggestions in this LSA™ Report closely, provide the necessary learning environment at home, accept their unique style, and support their true learning needs.

Learning Style Analysis™ - Junior

Dunn & Prashnig

[redacted]

™ Jnr - Personal Report

If you act on the recommendations in your Personal Report, you will enhance your learning abilities, your concentration and your study skills. But most importantly, you will find that you have greater school success!

BRAIN PROCESSING:

You have a great ability to switch between sequential (more left-brain) and simultaneous (more right-brain) style of brain processing.
In more rational, theoretical situations you will think logically, analyse, concentrate more on details and proceed step by step.
In more emotional, practical situations you tend to think creatively and consider various aspects at the same time.
Your ability to integrate your thought processes is a definite strength, especially in complex, difficult learning situations.

THINKING STYLE:

Your way of thinking often depends on what you are supposed to do or learn, with whom you learn, and mainly on the overall circumstances.
You are hardly ever really impulsive in your thinking style, and you generally prefer to reflect on things, to analyse and contemplate.
This kind of flexibility enables you to adjust to adverse learning situations.
However, you tend to use reflective thinking more often than not when you study and concentrate.

AUDITORY (hearing):

You find it very easy to learn by listening, and remember very well things you hear.
You often like to listen to conversations and can recall people's voices and remember much of what was said.
You are a good listener and benefit in learning when information is read to you.
You learn well from teacher talks, discussions, and from precise oral instructions.
Make sure that you can use audio tapes, "talking books" (tape versions of books), TV and video tapes for your learning sessions.
Creating your own tapes and listening to them several times when you have to learn something new and difficult will also help with your study success.

[redacted]

AUDITORY (external):
You are a talker!
When you study, read or concentrate you really need to be with people.
Talking about things and discussing ideas - school related or not - definitely switches you on.
Rather than reading something, you often just like to talk about it.
Your understanding is much better when you can talk things over with your classmates, teachers or parents.
Your memory improves when you explain what you have learned to someone else.
One could even say, talking is also important for your feeling good and if you have no-one to talk to, you probably quite often talk to yourself.
As you can't always talk in class, you need to practice being quiet more often, and sometimes to do your school work without talking.

AUDITORY (internal):
There is a lot of self talk going on in your head!
You find it much easier to concentrate, read or learn when you can have an inner dialogue about the new information.
Rather than talking to class mates, teachers or parents you often just like to talk to yourself.Your overall understanding increases and your memory improves when you have inner discussions about difficult learning tasks.
Your reading speed might be slowed down because you tend to say the words in your head.
You probably use self talk for solving problems or sorting out difficult problems.
As talking to oneself can be quite lonely, see whether you can find someone you trust and with whom you are able to share your thoughts, especially when you learn something difficult.
Make sure that you cut out negative self talk and allow time for positive discussions with yourself to reduce your worrying if you have a tendency to do this.

VISUAL (words):
You are probably a 'book worm', as you have a strong preference for seeing written or printed information.
You remember much of what you read.
You can probably close your eyes, "see" the reading material, and remember what you have read.
You might like to take notes while you are listening so that you can read them later.
For study success you really need projects or assignments with clear, precise text and written instructions.
Make sure your teachers know that so that you always have written information available when you learn something new and difficult.

[redacted]

VISUAL (pictures):
You have a preference for seeing pictures, watching and observing.
For you to understand something new and difficult you need to see it, take it in and think about it.
In reading, you remember best when pictures are included in a text.
When taking on a new study project, use pictures, colours, films, graphs, magazines, and written text with pictures as learning materials.
It will also help you to draw colourful charts or symbols (mind maps) combined with words.
Watching people, and observing how things are done, helps you to learn and remember something new and difficult.

VISUAL (internal):
You have a vivid imagination and visualising definitely helps you to remember.
Your understanding is much better when you visualise what you have seen, heard, read or done.
Often you might picture difficult situations and 'see' the outcome clearly in your mind.
To enhance your learning, to improve your memory and reduce learning stress, make sure you take time out for visualising, maybe daydreaming (but not during class or study time!).
As you tend to worry through negative images in your mind, see that you can change them into more positive ones.
Practise seeing positive outcomes, particularly when you are struggling with learning.

TACTILE (touching):
You like to use your hands when you learn, read or concentrate.
You often take notes during a teacher talk, or play with your fingers when you read something new or difficult.
If you can't use your hands for note taking, playing or doodling when listening, you find it very difficult to concentrate.
Particularly under school stress, when you have to listen a lot or when you are bored, impatient or frustrated, you tend to fiddle.
To improve your memory, use hands-on techniques and learning tools which you can touch or move, such as Koosh balls, manipulatives, models, and real objects.
Your teachers and parents need to know that you learn better when you can use your hands.

KINESTHETIC (external):
You have a preference for practical learning or practical study situations.
You like being active and involved, and you learn best by "doing" or experiencing.
You might often be involved in physical or sports activities.
Usually you have high energy levels, although your movements might not always be fast.
Your understanding improves through practical experience, visits, projects, physical activity or involvement in real situations.
Try walking back and forth when studying or thinking, even reading.
Your teachers and parents need to understand this learning preference to arrange activites and support you in learning with your whole body.

[redacted]

KINESTHETIC (internal):
You are a true feeling person!
You strongly rely on your "gut" feeling in school and home situations.
Your intuition is much stronger than your logic, when you make decisions or solve problems. You definitely trust your instincts more than your rational thinking.
If you don't feel good about a learning task or your school work in general, your motivation goes down and your interest disappears.
In learning situations it is very important for you to feel good, otherwise it's hard for you to remember.
When you like a teacher and/or a subject you can learn well - if not, learning can become difficult.
To improve your study skills and to keep up your spirits, find a way to enjoy what you are doing, and how to go about it.

MOBILITY:
Your answers are not consistent and research with this instrument has shown there are several reasons for this:
a. you have probably overlooked something when you answered the questions; or
b. an error was made transferring the results onto the response sheet or entering them into the computer programme; or
c. you might have thought about something else while answering these questions, not only how you learn something new and difficult; or
d. there might be changes going on around you which you probably don't understand; or
e. you could be going through a difficult period yourself which often leads to inner confusion and to contradictions in answering the questions.
Please go back to the questionnaire and check your responses to questions 13A & 13B.

NEED FOR INTAKE:
Your need for intake - eating, nibbling, chewing or drinking - while you concentrate or study is dependent on what you do.
But you prefer to have some form of intake more often than not.
Although you don't always need to eat or drink during class or study time at home, you don't really like to go without it for long periods either.
However, when you are really interested or totally absorbed in a learning situation, you often forget about food or drink.

TIME OF DAY:
A specific time of day is not really important for your study success.
You can learn and concentrate quite well at any given time.
What is more important for you is the overall situation, what you do, why, and with whom.
Whether or not you are interested in your school or homework determines how well you learn.It is important for your teachers and parents to know this, and for them to support you accordingly.
Your flexibility allows you to adjust well to changing time conditions at school or in your study schedule at home.

[redacted]

SOUND:
You really need it quiet while concentrating, reading or writing.
You can learn best when it's silent in class or at home.
To improve your concentration, work in quiet classrooms with carpeted floors reducing noise.Use ear plugs to cut out distracting noises.
For doing your homework, find a quiet place with very few distractions.

LIGHT:
Your need for light while concentrating or working is dependent on what you do.
When you are interested in your learning tasks, light is not really important to you.
But generally you prefer not having too much bright light in your environment.
Although you don't always need low light in classrooms or study areas, you don't really like bright light all the time around you either.

TEMPERATURE:
You are flexible as far as temperature goes.
When you study, you are more influenced by what you do, with whom, and how you feel about learning in general.
Often it's more important how interested you are in a learning task than whether it's cold or warm in your learning environment.
Varying temperatures do not influence your learning ability as you can adapt well.

WORK AREA:
You are flexible in your need for formal or informal furniture and classroom set-up.
When you read, study or concentrate, you are more influenced by what you do.
When you are interested in a learning task, the work area is not really important to you.
You have the advantage that you can adjust easily to either type of classroom or study environment because you are highly adaptable to any kind of furniture and room set-up.

PAIR:
You really need a friend or classmate to study or learn with.
When you have someone else to solve problems or exchange ideas with, you find learning much easier and have a better understanding of the subject.
Sharing the workload with a friend or classmate helps you to better understand difficult learning content, and gives you more confidence.

PEERS:
You are quite flexible when it comes to working with other students.
But you don't really like to learn or work with a group of like-minded classmates all the time.Sometimes you need your peers, and other times you don't.
For your learning success, it is important that you are interested in the learning task.
Your other learning preferences should also be matched.

[redacted]

TEAM:
You are a team player!
You learn best when you can be in a team of students.
You find it easy to work with other students in class.
Team-learning activities are good opportunities to work with others.
This will give you more confidence in learning something new and difficult.
For doing homework, see if you can do it with a group of friends.
It is important that your parents understand that you learn best in a team.

AUTHORITY - TEACHER:
You definitely feel more secure when you can work or learn closely with a teacher.
You like being told what to do and how to do it.
You accept authority and learn best when you get lots of feedback showing that you are on the right track.
Disagreement with your teachers doesn't feel good, and you always try to resolve it quickly.
It is important for you to have regular contact with your teachers, especially when you are learning something new and difficult.

AUTHORITY - PARENT:
You definitely feel better when you can learn or do your homework with a parent or grown-up member of your family.
Being told what to do, and how to do it, gives you more confidence for your school work.
You accept authority and learn best when you get lots of feedback showing that you are on the right track.
Disagreement with your parents is very unpleasant for you and you always try to resolve such conflicts quickly.
See that you can have regular study times with an adult, especially when you are learning something new and difficult.

LEARNING MOTIVATION:
You really like to learn!
Whenever you have to learn something new, particularly when it's interesting, you enjoy doing it, and your motivation is always high.
You get a real kick from achieving something at school, and this keeps you going.
It is very important for the quality of your school work that you be allowed to say how you want to do your learning tasks.

PERSISTENCE:
You almost always complete what you begin, particularly in your studies.
It may bother you, not to do so, and you would rather spend time completing your homework than do other activities.
You prefer to complete one assignment before you start a new one.
Long-term learning projects with not too much supervision may suit you best.
Your following-through is very logical and systematic, usually following strict guidelines.

[redacted]

CONFORMITY:
You work and learn best when you know what is expected of you.
You are eager to follow instructions and guidelines set by your teachers and parents.
Your willingness to follow rules and regulations, to respect other people's opinions, is an expression of your need to conform.
You learn best with clearly defined school and home rules, and like to know what teachers and parents expect from you.
For school success you need long-term goals or study projects, clear directions, little change and predictable learning outcomes.

RESPONSIBILITY:
You almost always do what's expected of you in school situations or at home.
You carefully consider all the consequences before you do something.
In your school work you are very reliable and show great willingness to take responsibilities and follow directions.
You feel most comfortable when you do things you are supposed to do.
When you make a mistake, you try to correct it as soon as possible.
As school is very important to you, you are serious about your learning tasks, your study projects, and your home duties.

STRUCTURE:
You don't mind being told what to do, or how to do it.
In fact, it may feel better for you to know all the guidelines and exactly what is required.
It gives you more confidence when you know how to go about a learning task.
You may work better with teachers giving you directions, and you like frequent feedback.
See that you have all aspects of a task clear before you begin - this will greatly enhance your concentration and school success.

VARIETY:
Your answers are not consistent and research with this instrument has shown there are several reasons for this:
a. you have probably overlooked something when you answered the questions; or
b. an error was made transferring the results onto the response sheet or entering them into the computer programme; or
c. you might have thought about something else while answering these questions, not only how you learn something new and difficult; or
d. there might be changes going on around you which you probably don't understand; or
e. you could be going through a difficult period yourself which often leads to inner confusion and to contradictions in answering the questions.
Please go back to the questionnaire and check your responses to questions 8C & 8D.

APPENDIX C
Letter to Board of Trustees requesting consent

15 July 1998

The Chairperson
Board of Trustees

Dear Chairperson,
I would like your permission to carry out educational research at ... School. The research question is 'Do students learn best when instruction and learning context is matched with their learning style?'
The case study I propose would involve ... his class, ... and her class. This research is part of my Master of Educational Administration degree.

I believe this topic of learning styles is of significant educational value and it would be advantageous for ...School to be involved in this research.

Enclosed is my final proposal submission forwarded to my research supervisor, (John O'Neill). This details plans of what I would like to do.

The Code of Ethical Conduct will be strictly adhered to, as outlined in my proposal. Should any ethical matters arise, I will discuss them promptly with you.

The research will not interfere with my teaching and AP obligations. Data collecting will be done outside school hours, (probably lunch times). As with all my tertiary studies in the past, university studies are completed in weekends and holidays.

The costs would be for ... to attend a course about Learning Styles in Auckland. This 2 day course (Friday 11th and Saturday 12th)is in September and costs $230 each. While they are in Auckland they could perhaps visit Gladstone School which has its entire programme set up to cater for children's learning styles. The other costs would be overnight accommodation and 2 reliever days.

... are happy to have this count as their professional development allocation for the year. They are keen to attend the course and to take part in the research. The benefits to ...School would be their extending their repertoire of teaching knowledge and skills, which will improve their quality of teaching, thus enhancing children's learning at ... Catering for individual learning styles is cross-curricular and in line with our school philosophy of child centred learning.

If you would like me to discuss my research more fully at a Board of Trustee meeting, I would be pleased to do so.

Yours faithfully
Jeanette McCallum

APPENDIX D
Consent Form: Phase One

CONSENT FORM

M. ED. ADMIN. THESIS

To explore the extent to which a teacher's and their students' self-knowledge of learning styles is perceived to improve learning and teaching in one primary classroom of Year 4and 5 children.

Researcher: Jeannette McCallum
Massey University

I have read the Information Sheet for this study and have had the opportunity to attend a meeting to have details explained to me. My questions about the study have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I also understand that I am free to withdraw from the study at any time, or to decline to answer any particular questions in the study. I agree to provide information to the researcher on the understanding that it is completely confidential.

I wish to participate in this study under the conditions set out on the Information Sheet.

I would like / I would not like to attend a meeting to have details of the research explained to me.

Signed: .....

Name: .....

Date: .....

APPENDIX E
Information Sheet: Phase One

INFORMATION SHEET
MASSEY UNIVERSITY
M. ED. ADMIN THESIS

Learning Styles: Do students learn best when instruction and learning context match their learning styles?

Researcher: Jeannette McCallum
Contact Address: 11 King Street
Kerikeri
Ph. 09 - 4077068

Topic of Study:

To explore the extent to which a teacher's and their students' self-knowledge of learning styles and whether matching instruction and learning context to their learning styles is perceived to improve learning and teaching in one primary classroom of Year4 and 5 children.

What will you, as a participant, have to do?

Your child will be asked to respond to these questions. They will be interviewed in groups of four children. The interviews will be taped and you may have access to the tapes.

Before they learn about their learning style they will be asked:

- How do you learn best?
- How does the teacher help you to learn?

Your child will be given a Learning Style Analysis (questions about how they learn). The Learning Style Analysis will then be professionally analysed. I will explain the results to you and your child. You will be notified when this takes place. The completed analysis will be given to you to keep, free of charge.

After a term of matching their learning styles and learning context the children will be asked the following question:

- Was there anything different about the way you learned in this unit?

- How do you learn best?
- Has knowing about how you learn best helped you to learn better at school?
- How?

What can the participants expect from the researcher?

If you take part in this research, you have the right to:

- refuse to answer any particular question, and to withdraw from the study at any time;
- ask any further questions about the study that occur to you during your participation; (the submission for the research proposal is available for you to read)
- provide information on the understanding that it is completely confidential to the researcher. All information collected is coded for anonymity, and it will not be possible to identify your child in any reports that are prepared for the study;
- verify the accuracy of any statements attributed to you by the researcher in a follow-up interview;
- be given access to a summary of the findings from the study when it is concluded.

APPENDIX F
Letter to Parents: Phase One

14 September 1998

Dear

This is a follow up letter to the one sent last week about my research.

Briefly, I am researching whether knowing one's learning style improves learning and teaching. ...are learning about how to cater for learning styles and will then be teaching a unit that takes into account each child's learning style.

I would like to interview children in groups of 4 (for 5 minutes during lunch time) The questions are 'How do you learn best? How does the teacher help you learn?'
Your child will be given a Learning Style Analysis. I send this away to be professionally analysed. This is free of cost and results will be explained to both you and your child.
At the end of the year I will ask your child, (in a group of 4) how do you learn best? Has knowing about how you learn best helped you to learn better at school? How?

For your child to be interviewed and have their Learning Style analysed, please sign the consent form below.

I hope that your child gains insight into the learning process through this research and that it helps them with their learning as they progress through the education system.

Thank you

Jeannette McCallum

I give consent for ..... to be part of this research.

I would like to be present for the interview and Learning Style analysis Yes/ No

APPENDIX G
Letter to Parents: Phase One

Saturday, 14 November 1998

Dear

Re: research into Learning Styles and how knowing one's learning styles affects learning success.

A twelve page analysis and report of your child's learning styles has been completed.
This profile allows you to discover your child's strengths in 21 basic areas of the learning style model.

I have found interviewing the children very rewarding and that the children have clear ideas about how they prefer to learn. I would like the opportunity to share these with you. Also, on Thursday, the 19th November I will be briefly updating the PTA about my research.

If you would like the Learning Style Analysis and Personal Profile I am available to discuss the findings at a convenient time. There are some options below if you so choose. The interviews are optional. If you prefer I could send the report home with your child, but I recommend a meeting to discuss how to optimise the results to advantage your child's learning.

Yours sincerely,

Jeannette McCallum

.....

lease circle a time that is convenient for you to attend.

Tuesday 17 November 8am or 3pm

Thursday 19 November 8am or 4 pm

Friday 20 November 8am or 3pm

Sunday 29 November 4pm

APPENDIX H

INFORMATION SHEET
MASSEY UNIVERSITY
M. ED. ADMIN THESIS

Learning Styles: Do students learn best when instruction and learning context match their learning styles?

Researcher: Jeannette McCallum
Contact Address: 11 King Street
Kerikeri
Ph. 09 - 4077068

Topic of Study:

To explore the extent to which a teacher's and their students' self-knowledge of learning styles and whether matching instruction and learning context to their learning styles is perceived to improve learning and teaching in two primary classrooms of Year 3 and 4 children.

What will you, as a participant, have to do?

Your child will be asked to respond to these questions. They will be interviewed in groups of four children. The interviews will be taped and you may have access to the tapes.

Before they learn about their learning style they will be asked:

- How do you learn best?
- How does the teacher help you to learn?

Your child will be given a Learning Style Analysis (questions about how they learn). The Learning Style Analysis will then be professionally analysed. I will explain the results to you and your child. You will be notified when this takes place. The completed analysis will be given to you to keep, free of charge.

After a term of matching their learning styles and learning context the children will be asked the following question:

- Was there anything different about the way you learned in this unit?
- How do you learn best?

- Has knowing about how you learn best helped you to learn better at school?
- How?

What can the participants expect from the researcher?

If you take part in this research, you have the right to:

- refuse to answer any particular question, and to withdraw from the study at any time;
- ask any further questions about the study that occur to you during your participation; (the submission for the research proposal is available for you to read)
- provide information on the understanding that it is completely confidential to the researcher. All information collected is coded for anonymity, and it will not be possible to identify your child in any reports that are prepared for the study;
- verify the accuracy of any statements attributed to you by the researcher in a follow-up interview;
- be given access to a summary of the findings from the study when it is concluded.

APPENDIX I

CONSENT FORM

M. ED. ADMIN. THESIS

To explore the extent to which a teacher's and their students' self-knowledge of learning styles is perceived to improve learning and teaching in two primary classrooms of Year 3and 4 children.

Researcher: Jeannette McCallum
Massey University

I have read the Information Sheet for this study and have had the opportunity to attend a meeting to have details explained to me. My questions about the study have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I also understand that I am free to withdraw from the study at any time, or to decline to answer any particular questions in the study. I agree to provide information to the researcher on the understanding that it is completely confidential.

I wish to participate in this study under the conditions set out on the Information Sheet.

I would like / I would not like to attend a meeting on Monday 22 February at 4pm in Room 6 to have details of the research explained to me.

Signed: .....

Name: .....

Date: .....

APPENDIX J
Letter to Parents: Phase Two

27 March 1999

Dear Parents and Caregivers,

The Learning Style Analyses have been completed for Room 8 children. If you would like to come along to Room 6 and have the reports and profiles explained, there will be a meeting at 3pm on Wednesday 31 March in Room 6.

Your child is very welcome to come to the meeting because the information will benefit them. There will be time for you to discuss the reports with them and clarify any queries you may have with interpretations.

Now the Learning style analyses have been completed, the next step is to talk to the children about their learning styles and make decisions about how to cater better for them in their classroom. ... will try to match their learning styles. Because every individual prefers to concentrate and absorb information in different ways, I hope that their learning potentials will be enhanced when they can do this in their favoured conditions.

Looking forward to seeing you on Wednesday,

Jeannette McCallum

APPENDIX K
Letter to Parents: Phase Two

Monday, 19 April 1999

Dear Parents
Your child's Learning Style Analysis has been completed. Sorry you were unable to attend last term's meeting to explain the profiles and reports. However, the completed LSA is enclosed. To let me know you have received it, would you please sign the bottom of this note and return it a.s.a.p.

At a first glance the Learning Style Analysis is a rather daunting document and may need clarification. If you would like me to explain it further, please contact me and we'll find a mutually agreeable time.

Briefly, the whole analysis is geared towards your child's preferences, flexibilities and non-preferences when learning new and difficult information.
Pages 1-4 are the profile and pages 5 onwards are making recommendations for learning.

This term ...is implementing changes in Class 2 to cater for the different learning styles.
At the end of Term 2 I would be interested in whether you believe there have been any changes in your child's learning.

Thank you again for your co-operation,

Jeannette McCallum

APPENDIX L
Letter to Parents: Phase Two

(09) 407 7068
jeannettem@xtra.co.nz

Saturday, 29 May 1999

Dear Parents and Caregivers,

Thank you for your continuing support in my Learning Style research.

So far there has been:

- An interview with your child about how they learn best
- A Learning Style Analysis administered and an explanation given to you about the results. (If you missed out, I would like the opportunity to share these with you)
- The teacher has begun matching preferred learning styles with instruction and the classroom setting

Now the data collection phase is drawing to a close and I would like to interview you and your child.

The questions I would like to ask are:

Children

How do you learn best? / What is your learning style?

Has knowing about how you learn best helped you to learn better at school? How?

Has it helped your learning outside school? How?

Since the class has been set up differently and the teacher has been teaching all different styles what has changed about your learning?

Parents and Caregivers

How helpful was the learning style analysis in understanding how your child learns?

Have you noticed any changes in your child's learning since their learning styles have been catered for at school?

What are these changes?

If possible, I would like to interview you before the end of this term (25th June)

Which would suit you better? Please circle one.

A telephone interview between ..... and ..... on week days / weekends

A group discussion at school one day after school (preferred time is.....

An interview with you at school (preferred time.....

Any comments

If you have any queries, before school is a good time to catch me or leave a message and I can get back to you.

Once again I thank you for your support and look forward to sharing the results with you.

Yours truly,

Jeannette McCallum

APPENDIX M
Letter to Parents: Phase Two

Sunday, 13 June 1999

Dear re: learning style analysis research

Thank you for responding to my request for an interview with you.

I would appreciate your coming to an interview on
I hope this time suits you. If not please let me know and we'll sort out another time.

Looking forward to seeing you,

Jeannette McCallum

APPENDIX N
Letter to Research Participant Requesting Consent

11 King Street
Kerikeri

15 July 1998

Dear...

I would like to invite you to become a research participant in educational research at ... School. The research question is 'Do students learn best when instruction and learning context is matched with their learning style?'

The case study I propose would involve your class, parents and you as a teacher. Data will be gathered throughout the study from interviews between you and me. With your permission, these interviews will be taped and later transcribed. There will also be interviews with your students and parents of the students that will also be taped and transcribed. This research is part of my Master of Educational Administration degree.

I believe this topic of learning styles is of significant educational value and it would be advantageous for you, as a teacher, to explore in a case study.

Enclosed is my final proposal submission forwarded to my research supervisor, (John O'Neill). This details plans of what I would like to do.

The Code of Ethical Conduct will be strictly adhered to, as outlined in my proposal. Should any ethical matters arise, I will discuss them promptly with you.

You have rights, following the principles required by the Massey University Human Ethics Committee. I, as the researcher, will take every care to fulfil these: the right to decline to participate; to refuse to answer any particular questions; to withdraw from the study at any time; to ask any questions about the study at any time during participation; to provide information on the understanding that your name will not be used unless you give permission to the researcher; to be given access to a summary of the findings of the study when it is concluded.

I hope you consider this invitation.

Yours sincerely,

Jeannette McCallum