A STUDY ON THE PERCEPTIONS AND ATTITUDES OF TEACHERS AND PUPILS TO THINKING MAPS

Dissertation submitted by

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ABSTRACT

The purpose of this study is to find out the perceptions and attitudes of teachers and pupils to Thinking Maps.
The research seeks to find out if teachers and pupils find Thinking Maps useful and easy to use. The emphasis in the new curriculum is to have thinking skills embedded across the subject areas. This study wishes to establish the extent to which these cognitive tools are being used in the school curriculum. It is hoped that the analysis of the findings will provide the evidence of how this thinking skills program has impacted the whole school and provide a basis upon which further improvements can be made.

The survey approach was used and data collected using questionnaires and an interview. The Deputy Head in charge of teaching and learning, Heads of Departments, Teachers and Students took part in the survey. The information collected was meant to capture the views of teachers and pupils on the usefulness, usability and usage of Thinking Maps.

The main findings were that teachers and pupils find Thinking Maps useful and easy to use. They like using them although the frequency of usage across the curriculum seems to suggest inconsistencies in breadth and depth. A small number of pupils can use these maps independently. This was interpreted as a lack of expertise by both teachers and pupils in using Thinking Maps which could have arisen from a lack of a support system after the initial training period. The overall picture is that teachers and pupils are positive about Thinking Maps and they are being used in the curriculum. What remains to be done is to continue with the development plans and move the Thinking Maps forward to a place where they are embedded in the curriculum.

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In loving memory of my father who by example instilled in me the love of God and life long learning without whom I would not have made it this far.

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CONTENTS

List of Tables and Figures

A study of perceptions and attitudes of teachers and pupils to Thinking Maps at CNS 0616256

1.0 INTRODUCTION

The last two decades have seen the development of a new thrust in intellectual development worldwide according to Fisher (2003). Mosley, Baumfield, Elliot, Gregson, Higgins, Miller and Newton (2005) suggest that most of the initiatives started in the United States with the United Kingdom following suit. These developments are in response to a fast changing society. A report by the Organisation of Economic Development and Cooperation (OECD) with reference to a conference 'Learning to think: Thinking to learn' (cited by Burden and Williams 1998: 4) pointed out 'five significant trends in societies across the world which call for a whole new range of cognitive skills.' These trends are a flexible workforce that can go through any amount of training and retraining, production tasks that are technological and complex, workers who can comprehend, interpret and communicate with machines, unlimited entrepreneur opportunities without guidance of good practice and the demands of being a good citizen where truth is no easy to define.

The capacity to learn is far beyond human imagination, according to Smith (1996), based on the research on how the brain learns accumulated in the last fifteen years. This has led to new strategies in teaching and learning that are brain friendly and encourage higher order thinking skills. Education should be in a position to produce people who can learn quickly and adapt to change. In the United Kingdom it has come in response to the five trends cited as well as the drive in general educational reform to raise educational standards in view of recent research findings on how the brain learns.

1.1 National Context

McGuiness (1999) reviewed and evaluated research into thinking skills with a view of translating the findings into classroom practice. Some of the key conclusions were that children should be coached in thinking skills and that they develop and use a variety of mental strategies. The possibility of embedding Thinking Skills within and across the curriculum and making thinking classrooms a reality was found to be feasible. Her findings have been instrumental in the current national initiatives, which have made Thinking Skills explicit in the curriculum. The national curriculum Dfes (2004) states that information processing, reasoning, enquiry, creative thinking and evaluation are the thinking skills that are embedded in the national curriculum. It is suggested by Dfes the (2004: 22) that 'by using thinking skills pupils can focus on knowing how as well as knowing what.' In doing so thinking skills become a tool and a means for learning within the school environment and beyond. The education system now aims to equipping individuals to be good learners through the secondary national strategy, which has the Every Child Matters (ECM) Dfes (2005) at its core.

The (ECM) agenda has the following five outcomes, be healthy, stay safe, enjoy and achieve, make a positive contribution and achieve economic wellbeing. These have become the pillars of the new curriculum and the Personal Development aims. The new National Curriculum, Dcfs (2008), to be implemented in September 2008 is designed to meet these needs with the following aims for all students to become:

- Successful learners who enjoy learning, make progress and achieve
- confident individuals who are able to live safe, healthy and fulfilling lives
- responsible citizens who make a positive contribution to society

The aims show that the heart of education is to produce people who can meet their needs and those of the society: the premise being that if children can learn how to learn by sharpening their thinking skills they can enjoy the process and achieve in exams and in life. The thrust is to make an educational system that can produce students who are well equipped for the work place and able to contribute positively to society. The Personal, Learning and Thinking skills (PLT), in the new curriculum bring together all initiatives that were introduced before to make students successful learners.

The Secondary National Strategy promoted personalised learning, Dfes (2007: 8) as creating a learning environment where students 'experience a range of approaches and opportunities that will enable them to increase their competency, as self-motivated learners.' Equipping pupils with thinking tools can help them realise their potential. The Dfes (2007) gives six core principles for designing effective learning opportunities two of which underscore the cognitive and affective aspects of learning. These are ensuring that every learner succeeds and the development of learning skills and personal qualities across the curriculum, in and outside the classroom.

The issue of inclusion is also revisited in personalized learning. The Dfes (2004:30) defines inclusion 'as providing effective learning opportunities for all'. Gifted and Talented are to be given extra challenge, underachievement tackled and vulnerable groups supported with a focus

on extending these students to higher order thinking as well as inculcate in them the transference of knowledge. Those with special educational needs are expected to make meaningful progress. Thinking skills are yet again at the core of these standards as a way of providing effective learning.

The schools improvement program (Dfes 2006) is also high on the agenda, with the government setting achievement targets for schools using Raise online. The aim of the report, according to Dfes (2006:1), is to 'help schools and inspectors see how effectively a school is performing in terms of achievement.' The schools are expected to use the data for self-evaluation and put in place plans to raise standards. According to research reviews by McGuinness (1999) thinking skills have been found to be effective in raising pupils' achievement.

1.2 Local Context

The school of study is a voluntary aided Catholic school with Science specialist status with 1442 students on roll including 208 in the sixth form. The specialist status comes with responsibility to perform and achieve high standards across the curriculum. Performance at KS3 and KS4 is above the national average with the last three years recorded as significantly high on 'Raise online'. The school teaching and learning policy, see appendix (x), embraces the ECM outcomes of enjoy and achieve and achieve economic wellbeing. The six aims cited in the policy are:

- To ensure that students understand what it means to be a successful learner; develop into confident learners who enjoy learning; can talk about themselves as learners and understand its life long value.
- To ensure that teachers understand how students learn; set high expectations of students; and plan and deliver lessons that student can both enjoy and achieve.
- To provide opportunities for students to take part in learning experiences beyond the classroom and become equipped with the skills they need to extend their learning beyond their school life.
- To provide teaching and learning environment that is exciting and challenging that embodies trust and respect, enabling both staff and students to give and achieve their very best.
- To ensure that staff have access to high quality professional development.
- To monitor the quality of teaching and learning annually.

It can be seen from these aims that the school is in line with the national agenda. The high aspirations and a deep commitment to staff and pupils are also evident. This echoes what Fisher (2003: 6) has stated as the purpose of education, which is to 'teach children to think critically, creatively and effectively.' The recent Ofsted inspection November 2007, which investigated inclusion, independence of learners and innovation, gave the school an overall judgment of good with some outstanding features. One of the outstanding areas is the personal development of learners, Ofsted (2007: 3) that they are 'well prepared for their future economic well being.' The school was set a target by (Ofsted 2007:3) to improve further 'the remaining inconsistencies in teaching by continuing to focus on the depth of thinking, participation and progression of

learners in the main school and sixth form'. The challenge is there to deepen the delivery of thinking skills.

The school has invested a lot of money into building a thinking school since 2002 to date. Staff and pupils have undergone training on thinking hats and cognitive reasoning tools by Edward De Bono, Thinking Maps by David Hyerle and Mind maps by Tony Buzan. Mind maps a way of organizing information in a way that is brain friendly with colour and pictures Buzan (2003). These were first to be introduced in 2002 through PSHE lessons followed by De Bono's six-hat, thinking which is a way of looking at one subject from different perspectives so that it can be fully explored, De Bono(1999). Thinking Maps and cognitive reasoning tools were introduced to teachers during training days. Initially departments had to come up with examples of how they could use these tools in their subject areas. The lesson plan was adapted to prompt teachers to incorporate Thinking Maps and tools. Lesson observations also focused on them. Teachers and pupils are expected to use these in their subject areas. All the teachers keep their training manuals and new teachers to the school are inducted to thinking skills. In addition to these the deputy in charge of teaching and learning compiled the 'Thinker Tool Box' which has a schedule for teaching thinking tools to year 7 and 8 and a summary of the thinking tools. Included in this toolbox is the theory underpinning learning and thinking skills, bloom's cognitive taxonomy, learning styles and Gardner's multiple intelligences. This is a handy reference kit for teachers and is complemented with ongoing training during school days and twilight sessions. This year some teachers were trained to be trainers for Thinking Maps

within the school. Anecdotal observations seem to suggest that students lack the ability to ask questions as well as verbalize their thought process. The Thinking Maps which is part of a Thinking skills program therefore offers an appealing focus for study.

1.3 The Purpose of the study

Five years down the line it is worth taking stock and find out how effective the teaching of thinking skills has been with a focus on Thinking Maps. The purpose of the study is to find out the perceptions and attitudes of teachers and pupils to Thinking Maps. The questions the researcher would like to find answers to will be;

- Do teachers and pupils find the Thinking Maps useful?
- Do teachers and pupils find it easy to use Thinking Maps?
- Do the teachers and pupils use Thinking Maps across the curriculum?
- What improvements can be made to this Thinking skills program?

It will be interesting to find out if Thinking Maps are embedded in the school curriculum and to find ways of improving other Thinking skills programs with the results. The findings would also help the school towards the set target for improvement in the Ofsted report of 2007. In future a similar study could be carried out after acting upon the findings and could be extended to other areas of the Thinking skills program.

Chapter 2

2.0 Literature Review

2.1 Definition of terms

The terms perception, attitude, thinking, thinking skills and learning will be defined in order to give a common understanding to the use of these terms in this study.

Perception

Perception is defined in the Oxford by Colman (2006) dictionary as the act, process, or product of perceiving ....., to become aware or gain knowledge of something through the senses, or to comprehend or grasp a stimulus. Perception according to Oxford is taken from Latin *percipere* to seize thoroughly, from *per* thoroughly + *capere* to grasp. In this study it is to be viewed as the comprehension of Thinking Maps.

Attitude

Oppenheim (1996: 174) in defining attitude states that most researchers seem to agree that 'an attitude is a state of readiness, a tendency to respond in a certain manner when confronted with certain stimuli.' This is in agreement with Ajzen (1988) who describes attitude as a predisposition to respond to an aspect of an individual's world. Oppenheimer goes on to say that attitudes are reinforced by beliefs and feelings which lead to behaviour or intents. In this study attitude refers to the response to Thinking Maps. The way teachers and students perceive Thinking Maps and their attitude to Thinking Maps is the core of this study.

Thinking

There are different perspectives on thinking which are psychological, philosophical and sociological. The psychological perspective which was done extensively by Bloom and associates (1956) views

thinking as an internal, mental process that constructs and operates on mental representation of information (Moseley et al 2005).This involves logic, rules, concepts, analogies, images and neural connections, Thagard (1996).The philosophical view of thinking is that of learning to know or the development of knowledge, built on the work of Jean Piaget (Moseley et al 2005).This has led to the critical thinking movement where the assumption is that there are generic thinking skills that can be taught without content and applied in different contexts. The other view in education is that thinking is always content specific.

The sociological perspective on thinking has the notions of community, authority, status, the sacred and alienation, (Nisbet, 1966) cited by Moseley et al (2005). The individual's thinking is affected by social influences that have these notions. In view of these perspectives on thinking it can be deducted that descriptive definitions of thinking tend to be psychological and those that are normative philosophical (Moseley et al 2005).

The different kinds of thinking, which McGuinness (1999: 5) lists, are drawn from (Marzano et al, 1988; Presseisen, 1986; Swarts & Parks, 1994) are:

> Sequencing and ordering information; sorting, classifying, grouping, identifying part/whole relationships, comparing and contrasting; making predictions and

hypothesising, drawing conclusions, giving reasons for conclusions; distinguishing fact from opinion; determining bias and checking the reliability of evidence; generating new ideas and brainstorming; relating cause and effect, designing a fair test; defining and clarifying problems, thinking up different solutions, setting up goals and sub goals; testing solutions and evaluating outcomes; planning and monitoring progress towards a goal, revising plans, making decisions, setting priorities, weighing up pros and cons.

Multiple intelligences are also cited as ways of enhancing thinking skills. Although this list is not exhaustive it has all three perspectives on thinking.

Lipman (2003: 178) cites 'inquiry processes, reasoning processes, information organization and translation' as the most relevant key areas for educational purposes.

Thinking for the purpose of this study can be viewed as a mental state and process which allows one to deal effectively with the world around them in realising set objectives, plans and desired ends.

Thinking as a skill

McGuiness (1999 : 4) comments on thinking as a skill as 'knowing how' rather than 'knowing that' and that like any other skill it involves 'being explicit about components of the skill, learning by observation and modelling, the importance of practice, feedback and transfer of learning.' Thinking, as a skill, has to be developed. It cannot happen on its own, the skill has to be identified, taught and every opportunity given to practice it.

Thinking skills

Thinking skills as a term according to Lipman (2003: 162) is a 'catchall phrase' which 'ranges from very specific to very general abilities.' McGuiness (1999: 4) gives some of the terms used for thinking skills which are 'thinking strategies, higher order thinking, thinking acts, habits of the mind, thinking dispositions.' In this study thinking skills will be used in a general way together with other terminologies and to refer specifically to those skills addressed by the Thinking Maps.

Metacognition

Flavell (1977) defines metacognition as referring to self knowledge about one's cognitive processes and products or anything that has to do with these. Cotton (1991) defines it simply as the process of planning, assessing, and monitoring one's own thinking, which is a good working definition for this study.

Curriculum

Wragg (1997: 1) states that 'curriculum comprise what children learn in school....what is actively sponsored or else condoned, by the school and its teachers, whether it is labelled on the time table or not'

Curriculum is defined by OCED (1990:88) as 'all the planned learning experiences which take place in the school and which contribute to successful student learning.' It refers 'to the context, structure and processes of teaching and learning which the school organises in pursuit of its educational objectives and values.' This definition captures the essence of what curriculum is, for the purpose of this study.

Learning is a term that can only be attempted to be defined, according to Whitaker (1995), as no one definition can fully capture it. Mezzirow (1983) is cited in Whitaker (1995:1) defining learning as the 'means by which people come to perceive, interpret, criticise and transform the worlds in which they live.' It would seem here that learning is seen as a process that brings about change within the individual and impacts on their environment. The idea of learning as a process is also given by Whitmore (1986) as 'a living process of awakening – a series of creative steps in enfoldment' quoted by Whitaker (1995: 1).If learning unfolds 'it goes on throughout life' according to Smith (1982:35) and can be intentional or unintentional, an activity which brings about change. Learning for the purposes of this study can be viewed as the acquisition and development of knowledge and skills that bring about change in behaviour.

2.2 Research findings on the brain and implications for teaching and learning

According to Smith (1996) the last fifteen years has seen an accumulation of eighty percent (80%) of how the brain works and how it learns. The capacity to learn is far beyond human imagination and the continual stimulation is believed to make the connections permanent. The development of the brain is said to be linked to Piaget's stages of maturation, (Smith, 1996). Higher order thinking skills are believed to encourage connections between neurons if rehearsed in a variety of contexts. Smith (1996) uses the work of Dr Paul Maclean of the United States who distinguished three main parts of the brain 'whose functions are active in any learning experience.' The three parts of the brain are the reptilian brain, the limbic system and the neo cortex. The reptilian brain is configured for survival, fight or flight. According to Smith (1996) under negative stress it dominates at the expense of higher order thinking skills. Thinking skills then can be said to be acquired and applied in an environment of low stress.

The limbic brain which is also known as the middle brain 'controls the emotions, maintenance functions and, most significantly, is the site of long –term memory,' (Smith1996:18).It routes information through the reticular system to where it is needed. It validates information that has an emotional connection and commits it to the long term memory. There are more neural pathways coming out of this part of the brain than they are coming from the neo cortex. This means the brain values information that has emotional meaning to it than higher order thinking skills. According to Hughes (1999) people remember context much better than they remember content. Thinking skills have to be put in a context which has an emotional appeal. It is the emotional and the unexpected experiences that people remember for a very long time. According to Hattie 'achievement is enhanced to the degree that students and teachers communicate appropriate, specific and challenging goals' Petty (2006:63). There is need for communication of goals that appeal to the emotions of the learner. The value judgement comes into play and that which is considered valuable is retained.

The neo cortex is the thinking cap of the brain. According to Smith (1996:19) it is 'used in problem solving, discerning relationships and patterns of meaning.' It seeks to make meaning of the much sensory information it receives. Learning will take place when the learner makes their own mental model of the information and assign meaning to it. Learners should be allowed to preview new material Smith (1996).The bigger picture should be given first before breaking it down into differentiated smaller chunks. The neurons will be able to make connections if new information is constantly given and is varied. In order to progress through new material Smith (1996) suggests individual, paired and group work. Learners are to review, recall and summarise content and to link it with learning goals. Without review information is said to be forgotten

almost immediately Hughes (1999). This calls for reciprocal teaching and cooperative learning which according to Petty (2006) increases learning.

The right and left side of the brain

In another research by Dr Roger Sperry narrated by Smith (1996) it showed that the two hemispheres of the brain specialise in different types of processing. However they actively communicate after analysing the input. The left hand is used in serial processing while the right hand is used in parallel processing. Individuals are said to prefer to use one side of the brain than the other. The functions of the left brain according to Smith (1996:20) are language, logic, mathematical formulae, number, sequence, linearity, analysis, words of a song, learning from the part to the whole, phonetic reading system and unrelated factual information. The functions of the right brain are forms and patterns, spatial manipulation, rhythm, musical appreciation, images and pictures, dimension, imagination, tune of song, learns the whole first then the parts, daydreaming and visioning, whole language reader and relationships in learning. It can be deducted from this list that Thinking skills use both the left and right side of the brain.

These tie in with preferred learning styles which are visual, auditory and kinaesthetic and Gardner's multiple intelligences. Moseley etal (2005) lists these intelligences as linguistic, logical-mathematical, musical, bodily-kinaesthetic, spatial, interpersonal, intrapersonal, and naturalist. Silver et al (2000) in connecting multiple intelligences and learning styles saw one as concerned with the content of learning and the relationship between learning and the eight distinct fields of knowledge and the later as how people perceive and process information. The

two theories have a direct link with each other since one can only process content in the way they perceive it.

Smith (1996) suggests that understanding the brain should lead to effective learning based on the whole brain. The relative lateralisation of the brain should enhance the learning environment by providing a variety of learning experiences which suit both sides of the brain. Petty (2006) gives examples of right brain teaching strategies as methods that show the holistic structure and key points, visual methods ,emotional, metaphorical and imaginative methods and direct experience and left brain as those that require creativity, problem solving and analysing. According to Gardner (2006) this implies a learning environment where key concepts are given multiple representations and education is individual centred. People learn in different ways visual learners will want to see information, auditory will want to hear and kinaesthetic will want to touch, Hughes (1999). Goleman (2005) added emotional intelligence as one's ability to manage self in five domains which are self awareness, mood management, self motivation, empathy and managing relationships. According to Goleman the success of an individual in school and beyond can be determined by their ability to manage these domains. This in a way is in agreement with the fact that the brain learns in a stress free environment and what appeals to the emotions.

According to Silver et al (2000) four principles of comfort, challenge, depth and motivation should be adhered to in a learning environment that acknowledges the brain research on learning styles and multiple intelligences. Cotton (1991) purports that in the thinking skills literature there is especially a strong emphasis on the importance of the learning climate. Change involves taking a risk, especially in habits of the mind, and for students to participate willingly they '...need to feel free to explore and express opinions, to examine alternative positions on controversial topics,

and to justify beliefs, about what is true and good, while participating in an orderly classroom discourse' Cotton (1991: 19) citing Thacker in Gough (1991). The importance of climate is such that Orr and Klein cited by Cotton (1991) suggest that teachers and administrators should continually evaluate the effectiveness of school and classroom culture in promoting critical reasoning.

2.3 Thinking skills approaches

Blagg (1991: 6) citing (Campion, Brown and Ferrara, 1982) states that 'it has been demonstrated that young children and low achievers are less able than adults or high achievers to talk about techniques and methods of learning and problem solving employed in specific tasks.' The implication of this as Blagg (1991) noted is that if learners are aware of their own learning processes and strategies 'metacogniton' they could widen them and have control as to when to select and apply them, this could lead to transfer and generalizations. Moseley et al (2005: 24) views 'thinking skills approaches as courses or organized activities which identify for learners translatable mental processes and/or require learners to plan, describe and evaluate their thinking and learning.'

There are approaches that have been developed to teach how to think which embrace the psychological and philosophical perspectives of learning. These are the general, subject specific and infusion approaches, (McGuinness, 1999).

The general approach is built on the work of Piaget and some are context free and others are set within a context. Some of the most successful approaches cited which are Feuerstein's Instrumental enrichment (IE), Blagg's Somerset Thinking Schools (STS), de Bono's Cognitive

Research Trust (CoRT) and Lake and Needham's Top Ten Thinking Tactics. Those that are within a context are Cognitive Acceleration through Science education (CASE) and Cognitive Acceleration through Mathematics education (CAME), Lipman's Philosophy for Children, Wallace's Thinking Actively in a Social Context (TASC) (Moseley et al 2005, McGuinness 1999).

Feurstein believed that intelligence could be modified after working with Jewish children who were coming to Israel after the holocaust. He was frustrated with using the standard IQ tests that were static and not dynamic. The Learning Assessment Potential Device (LAPD) was put together which was able to measure intellectual change (Blagg, 1991 McGuinness, (1999). Instruments were devised to form a programme of activities that could be used for intervention by an adult to address the deficient cognitive functions. This later became known as the Instrumental Enrichment program, (Blagg, 1991).These can be used with individuals, groups or whole classes and takes two to three years with three to five sessions of one hour per week. According to Blagg (1991) it comprises of fifteen modules with paper and pencil tasks and detailed teacher's manual.

Evaluations of the Instrumental Enrichment programme on subsequent intellectual performance in four countries Canada, Israel, US and Venezuela have shown that there is a significant difference between trained and control groups from different social backgrounds, according to McGuinness (1999) who cites Savell et al (1986).The effects were more noticeable on non verbal measures of intelligence and effects on self esteem, improved classroom behaviour and better performance on attainment/ achievement tests were said to be inconsistent and hence difficult to interpret.

The common features noted on those studies showing positive effects were at least one week training for instructors, eighty hours or more of exposure to the instruments over one to two years, and instruments taught in conjunction with subject matter of interest or importance to the student ,McGuinness (1999).The same conclusions were reached by Shayer and Beasly (1987) when reviewing the Israeli and American studies according to McGuinness (1999).They also made an interesting observation that most studies were done straight after the interventions and not later which might show the effects on subsequent and fresh learning. Blagg (1991) in his evaluation of Instrumental Enrichment in Somerset schools found that there were no differences in intellectual performance or other skills except on attitude and behaviour of both students and teachers. The main criticism of this programme is that it cannot be modified it has to be used as it is and trained personnel only can have access to the material. This, according to McGuinness (1991) led Blagg and his colleagues to develop the Somerset thinking Skills Course.
It would seem from these evaluations that for a cognitive intervention to work there is need for depth of training as well as a long time for practice with some form of bridging with content.

The subject specific approach focuses on the domain and learning in an explicit fashion (Moseley el al 2005) .The thinking strategy is embedded in the subject like reading science and mathematics.

The infusion approach according to (Moseley et al 2005) is one in which thinking is introduced across all the curriculum subjects by first identifying within the curriculum particular thinking skills and strategies that can be developed. The lesson plans are then tailor made to enhance topic understanding and thinking skills. The approach was developed in the US by Swartz et al and

adapted for Northern Ireland by McGuinness as Activating Children's Thinking Skills project (ACTS). There is also the work of Robert Fisher (1998) Philosophy for children and Gardner's multiple intelligences that have an across the curriculum approach (McGuinness 1999).Thinking Maps an invention of David Hyerle based on eight fundamental thinking processes also fall in this category since they integrate thinking skills and content across the curriculum (Hyerle 1995).Haynes and Jones (1999) are of the same view that they can be they can be applied to different subject areas taught at different age levels.

The approaches according to research seem to have no edge one over the other. Cotton (1991)in a review of 56 researches on thinking skills programs of which all were demonstrably effective, half were infused variety and the other half taught separately from the regular curriculum. Cotton cites several documents in the thinking skills literature (e.g., Branford, et al. 1984; Baum 1990; and Gough 1991) who support infusion of thinking skills activities into subjects in the regular curriculum and others (Freseman 1990; Matthews 1989; Pogrow 1988; and Baum 1990) who support separate thinking skills instruction. Cotton (1991) cites Freseman (1990: 48) as concluding that 'thinking skills need to be taught directly before they are applied to the content areas....[I] considered the concept of teaching thinking skills directly to be of value especially when there followed immediate application to the content area.'

Bransford (1986:69-70) is also of the same view as quoted by Cotton (1991) saying 'Blind instruction [in which students are not helped to focus on general processes or strategies nor to understand how new concepts and strategies can function as tools for problem solving] does not usually lead to transfer to new tasks....as the instruction focuses on helping students become problem solvers who learn to recognize and monitor their approaches to particular tasks, transfer is more likely to occur.' On the other hand Moseley et al (2005) gives a narration of gains by all

approaches. Haynes and Jones (1999) in mapping the arguments for curriculum choices in teaching thinking skills give an insight into the relevant factors which can be considered with different approaches such as resources and desired outcomes.

Infusion and separate instruction seem to be effective as long as both approaches focus on transference of skills. According to McGuinness (1999: 8) each approach runs such a risk, general thinking skills which are context free 'may become locked in' in that particular area of the curriculum, which is also true of subject specific approaches. The issue of transfer in the infusion approach is given by McGuinness (1999: 8) as that 'they may get lost in the midst of subject knowledge – based teaching/and or pupils may fail to see the connections between similar types of thinking in different subjects areas.' The suggestion she gives is to minimise these risks in all three cases.

2.4 The benefits of a Thinking skills programme

John Dewey (1916) is quoted by Fisher (2003: 5) as saying 'All which the school can or need to do for pupils, so far as their minds are concerned ...is to develop their ability to think.' This quotation alludes to the fact that there are benefits to the teaching of thinking. One of the benefits cited by Fisher (2003: 6) 'is that it is it is intrinsic to human development and that every individual has a right to have their intellect developed.'

Pleasure is another benefit cited, if the right intellectual simulation and challenge is given. Fisher (2003: 7) in quoting researchers says that students prefer lessons where they are challenged to think giving examples such as 'asked to interpret, analyse, or manipulate information, or apply acquired knowledge and skills to novel problems or new situations.' This is supported by research cited earlier which shows that learning takes place in an environment of high challenge

which enhances neural connections in the brain. Research done by over 130 teachers in the UK and summarised by the National Union of Teachers (NUT) innovation group (2003) showed that pupils who enjoyed lessons, were motivated, actively engaged and stayed on tasks longer.

The success of individuals and of society is another benefit given by Fisher (2003:7).The context this is set is the international concern to the falling educational standards which has led the drive to raise the standards in the United States and the United Kingdom. The claim is that 'teaching thinking and reasoning is central to raising standards even in the basic skills of the curriculum' and 'a successful society will be a thinking society in which the capacities for lifelong learning of its citizens are most fully realised.' Research supports these claim, according to McGuiness (1999: 29) 'several large scale classroom evaluation studies have successfully linked teaching thinking methodologies with learning outcomes both in the short and longer term although not all interventions are equally likely.' Cases cited is the Cognitive acceleration in science education raised pupils grades by one, philosophy for children impacted their cognitive and social development whereas instrumental enrichment had a positive impact on attitudes and behaviour. Gold (2002) also cites the same evidence and in addition that of year 1 students in Hammersmith and Fulham who showed progress on a reasoning test after having a year of thirty minute lessons on thinking and another Open University study that showed an improvement in Maths and Science when the teachers were trained in thinking. A year is a long time and performance could be due to maturation more than the thinking training. Hattie, according to Petty (2006; 65) who evaluated and reviewed more than 300 000 research studies attributed a leap of more than a grade to the teaching of thinking and intelligence. Dr de Bono is quoted by Blane (2006) citing studies done by the Atkey organisation showing a thirty (30) to one hundred (100) percent increase in

subject performance. The claims attribute all the success to thinking skills but it could be also other factors like high expectation by teachers.

In another research review involving thirty- three (33) research studies in America by Cotton (1991) found out that all the thinking skills and practices enhanced academic achievement. Those with quasi-experimental designs found experimental students out performing the control groups. Specific thinking skills programmes are cited by both Mcguiness (1999) and Cotton (1991) as having been shown to enhance achievement in subject areas and thinking skills in general. Some of these have been cited earlier on approaches to teaching thinking skills. In addition computer assisted instruction is said to be beneficial to students. Wegerif (2002:online) points out that technology is 'best thought of as a support and resource for dialogues in which thinking skills are taught , learnt and applied.' Thus the dialogue that ensues with the use of information technology and collaboration is what makes it effective.

The findings also supported instruction in many specific skills and techniques which showed gains on learning and intelligence measures. Study skills such as paraphrasing, outlining, developing cognitive maps and using advance organisers are cited from the researchers (Barba and Merchant 1990; Snapp and Glover 1990; Tierney, et al. 1989). Other specific skills and techniques cited are creative and critical thinking skills, Metacognition, and inquiry training. A research in Australian schools by McGrath (1997: online) showed gains in these skills when a thinking skills model that emphasised metacognition, disposition, questioning and skills was taught. NUT (2003) also agrees with these findings.

In addition to instruction in specific skills the findings pointed to various approaches that enhanced thinking skills including redirection, probing and reinforcement. These showed an

increase students' content knowledge and enhancing critical and creative thinking skills according to Cotton (1991) citing researchers (Cotton 1988; Pearson 1982; Robinson 1987; Tenenbaum 1986).Other approaches pointed out are asking higher order questions and lengthening the amount of time between questioning and answer from students. Student engagement and participation has been known to increase with these practices.

Student achievement gains are commensurate to teacher training, is another key finding in both research reviews by McGuinness (1999) and Cotton (1991).A positive relationship was found between teacher training and student achievement by researchers Crump, Schlichter, Palk (1988); Hudgens and Edelman (1986); MCREL (1985); and Robinson (1987) cited by Cotton (1991).

On social issues Dr de Bono has testimonials and case studies on his website which show the effect of teaching thinking skills using his tools. In the UK he cites the New Deal program which involved violent and unemployed youths with a turn around of ninety (90) percent fall in crime in the first year and a five hundred (500) percent rise in employment. This is in agreement with Fisher (2003; 8) who points out that 'intellectual challenge is not only a means for enjoyment and success in a rapidly changing world, but can also promote moral qualities and virtues.'

Fisher (2003; 8) points at the rapidly changing society in which skills for the future are no longer predictable for students as another reason why they 'will need to gain the skills that will give them the greatest control over their lives and learning, and for this they will need to think critically and creatively at the highest possible levels, and to develop an awareness of global issues and problems.' This is particularly important in the world of work where information technology is changing rapidly. Blane (2006) quotes Dr de Bono listing the benefits of thinking skills in business where phenomenal gains have been made with one company generating 21 000

ideas in one afternoon and another cutting down a series of meetings from thirty (30) to two (2) days and these and other successes can be accessed on Dr De Bono's website. There is the risk though of taking on some thinking skills programs on the basis of claims by inventors as they can not be devoid of bias. Thinking skills can be said to be liberating and empowering both individuals and societies. Liberating in the sense that there is no need to conform when generating new ideas and empowering when these ideas are acted upon.

Burden and Nichols (2000) in their evaluation of the process of introducing a thinking skills programme into a secondary school, pupils found these to be helpful in maths and geography. According to Burden et al (2000: 300) pupils reported an 'increased ability to break down and solve problems, to make hypotheses, to think before rushing in, improved vocabulary and their ability to work in pairs and groups.' Some teachers found the new strategies refreshing in reminding them what their profession was all about, that is to help pupils to learn. NUT (2003) had similar findings in which teachers felt that their confidence had increased and that they enjoyed the thinking skills activities.

There are benefits in teaching thinking skills as shown by research however there are also problems encountered in teaching them.

2.5 The problems encountered in teaching Thinking Skills

McGuinness (1999) points out that in all successful Thinking skills programmes the themes of teacher development and curriculum innovation and change emerged. Blagg (1991) pointed out the failure of Feurststein's instrumental enrichment in Somerset schools was due to lack of optimum training for teachers. This is pursued further by Burden and Williams (1998; 16) who notes that some of the factors that Blagg mentioned in passing actually contributed a lot to the

insignificant change in pupils attainment. These factors included 'the changing political nature at the time, lack of adequate resourcing, the indifferent or even hostile culture of some schools, and a feeling of isolation on the part of many teachers.' The resources had to be used without modification and some teachers had to endure hardship to keep the programme running according to Baker (1987) cited in Burden et al (1998).The CASE programme's success is attributed 'to the well developed teacher training and support' according to Mc Guinness (1999; 27).

In the ACTS programme McGuinness (1999; 20) report that teachers found the programme to be time consuming in terms of preparation for lessons which involved 'more planning and pre–class preparation.' They found that the lessons took longer .Pupils lacked the vocabulary to talk about their thinking process. The researcher found that the infusion methodology itself posed problems in that teachers found it difficult 'to keep the twin perspectives of thinking skills and content objectives simultaneously in view and to develop and sustain the metacognitive process.'

According to McGuinness (1999) research on teachers' cognition and beliefs reviewed by Calderhead (1996) show that teachers like pupils 'bring conceptions to the classroom about their discipline, images about themselves as teachers and about how children learn.' Pupils can also resist the innovation. Leat in McGuinness (1999; 28) suggests teacher support that 'include consortia or networks of teachers, peer coaching and a thorough exploration of evidence in relation to children's learning.'

Other researchers, Burden and Nichols (2000), in evaluating the process of introducing a thinking skills programme into a secondary school curriculum also found some barriers. Pupils ranked thinking skills the least as a curriculum subject with regard to enjoyment and it being

useful. More able pupils found it of limited value, average pupils were more positive as they enjoyed working with others and weaker pupils found it more confusing.

The other problem highlighted by Burden et al (2000: 302) was the limited amount of training received by the teachers which led them to focus 'too heavily in the first instance on programme elements as both necessary and sufficient aspects of cognitive enrichment.' This in turn led to a lack of transfer of skills to other curriculum subjects. McGrath (1999) also found similar results where teachers felt they had not been given enough theoretical grounding to help them with implementation. Support systems were not in place to help teachers who needed it. The issue of not being able to have any measurable outcomes for the thinking skills programme as a cognitive enhancement in its own right was also raised.The need for a pedagogical approach was acknowledged, which could integrate all the subjects in the curriculum, to inform both teachers and pupils of the benefits of a thinking skills programme without which 'is to doom it to failure,' Burden (2000: 304).Alcorn (1999) in his paper outlining the achievements of a prominent educationist pointed out the need for administrators, planners and policy makers to support teachers through educational change. The importance of teacher support when implementing change is emphasized and there is need for that in any Thinking Skills program.

Cotton (1991) makes an important statement concerning the thinking skills programmes, strategies and training in that there is no best way just as there is none in teaching many other things. The effectiveness of any thinking skills program is given by Sternberg and Bhana cited by Cotton (1991) concluded that 'the success of a given program depends on a large number of implementation – factors, such as quality of teaching, administrative support, appropriateness of the program for the student population, and the extent to which the program is implemented in the intend manner.'

It can be seen from research reviews and texts cited that there are benefits of teaching thinking skills as well as problems of implementation. Thinking Maps as a thinking skills program is supposed to have the benefits cited with others enhanced and risks of lack of transfer minimised.

2.6 An Overview on Thinking Maps

Thinking Maps are a creation of David Hyerle as a result of years of research and working with other thinking skills programmes. The inventor first published these maps in the article Expand your thinking in the 1990's.In 1992 Thinking Maps resource Draw, Show, and Map your thinking was used for elementary grade level in some American cities. He found out that 'Thinking Maps significantly affect standardized and qualitative measures of student performances.' Hyerle (1995:iv). The purpose of creating Thinking Maps was to have a common visual language for learning, transferring thinking processes and integrating learning.

The theoretical foundation of Thinking Maps according to Hyerle (1995; 6) are based on constructivism, developmental learning and interactive learning. Hyerle (1995:8) states that Thinking Maps are 'eight visual-verbal learning tools, each based on a fundamental thinking process and used together as a set of tools for showing relationships. Each Thinking Map has a basic visual starting point or graphic primitive.' These are meant to give students and teachers a common language for which they can use to engage meaningful learning. The inventor purports that these maps are flexible and their consistency promotes 'student centred and cooperative learning, concept development, reflective thinking, creativity, clarity of communication, and continuous cognitive development, Hyele (1995:8).' The effective and efficient use of these maps is said to be when they are used together as tools for specifically meeting a learning objective, outcome, or performance of task, Hyerle (1995). Thinking Maps are meant to support students as

they work together and construct knowledge. Their graphics will be given and the context in which they are used.

Hyerle (1995; 4) gives three types of visual tools, brainstorm webs, task specific 'graphic' organisers and his Thinking Maps. Brainstorm webs are given mind mapping, a creation of Tony Buzan, webbing and clustering. These according to Hyrle serve personal knowledge. The task specific graphic organisers are for isolated tasks which could be subject specific for example life cycles in science and timelines in history. Thinking Maps are supposed to serve as 'a common visual language in classrooms and whole schools', Hyerle (1995: 4). Thinking Maps are compared to graphic organisers by Hyerle (1995:5) and similarities listed are that they are visual, have concrete patterns and are useful for teaching and assessment. The main differences excluding the one given above are that the graphic organisers are often text or teacher centred, graphics are inconsistent, have static forms and difficult to transfer across the curriculum whereas Thinking Maps are student centred ,have consistent graphic language, highly flexible forms and are based on fundamental thinking skills. Thinking Maps are said to support three intellectual outcomes which are learning the eight definitions for thinking skills, applying thinking skills to complex and multi step problems and empowering students to use these visual tools for transferring thinking skills across the disciplines Hyerle (1995: 5).

2.6.1 Defining in context

The circle map Figure 3.1 is used to define an idea in context .This can be done with or without a frame of reference. The thinking process according to Hyerle (1995:18) is 'becoming aware of and defining some 'thing' in context and representing it using signs, symbols, or drawings.' It is used for brainstorming ideas.

2.6.2 Describing qualities

The bubble map Figure 3.2 is used for descriptions. The best adjectives are used. The thinking process of describing things 'is based on the use of words and numbers that identify qualities: character traits (communication skills), attributes (mathematics), and /or properties (science) of things, (Hyerle 1995: 24).

2.6.3 Comparing and Contrasting

The double bubble map Figure 3.3 is used to list the similarities and differences. It brings out the qualities that are valued the most and a discussion can be pursued on why this is the case. It can be seen as an extension of the bubble map. 'The double bubble map is a tool for comparing things, ideas, people, historical figures, and even cultures.....while simultaneously organising the ideas for a comparison writing prompt,' Hyerle (1995: 29).

2.6.4 Classifying

Classifying is given as the process of sorting things into categories or groups and creating new categories, often according to common qualities, Hyerle (1995: 32).The Tree map Figure 3.4 is used for sorting ideas in detail, giving the main idea and supporting ideas. Drawings and images can be made on the map to help with recall. Hierarchical classification can be done using the Tree Map.

2.6.5 Part- Whole

According to Hyerle (1995: 36) the term for defining spatial relationships 'are part – whole reasoning or structure analysis.' This process is defined as a way 'of identifying the relationship

between a whole physical object and its parts.' The Brace map Figure 3.5 is used to show component parts and subparts of a physical object and is different from a Tree map which is 'used for abstract categorization of groups of things,' Hyerle (1995: 37).

2.6.6 Sequencing

According to Hyerle (1995: 40) 'sequencing is the process of identifying the relationships between stages and sub stages of an event.' The flow map Figure 3.6 outlines the order of events and the sub stages and students can use it to order and sequence information.

2.6.8 Cause and Effect

The thinking process of 'identifying the interrelated causes and effects of events' is represented by the Multi- Flow map Figure 3.7 according to Hyerle (1995: 44). Students can use it to show and analyse cause and effect of an event and what might happen next.

2.6.9 Seeing Analogies

According to Hyerle (1995: 48), 'seeing analogies is the process of identifying similarities between relationships.' The Bridge map Figure 3.8 is a tool that students can use to show analogies. A relating factor that fits both sides of an analogy is given and pairs that have this relationship are written on the bridge.

Each of the Thinking Maps can have a frame around in the form of a rectangle or square. This gives a perspective to the information which can be personal or cultural. In doing so students are helped to think on how they have arrived at that knowledge, Hyerle (1995).

2.7 Thinking Maps in the Curriculum

Thinking Maps as structural aids have a large effect size according to Hattie and Marzano as quoted by Petty (2006: 294), 'these are strategies that show the structure and meaning of what is being learned.' Comparing and contrasting, time lines (sequencing),holistic mind maps and analogies in this form are given an effect size of 1.3 by Marzano, Petty (2006:117-126).The large effect size may mean that Thinking Maps as tools for learning are very effective.

Wragg (1997: 3) proposes a three dimensional, cubic curriculum which comprises of subjects being taught, issues that influence child development like language and thought and forms of teaching and learning strategies. A whole school approach is advocated if change and improvement is to take place. This is echoed by Costa (1985: 48) who lists three climate conditions that facilitate intellectual growth which is 'all participants share a common vision as the school as a home of the mind, the process of thinking is the content of curriculum and instruction and schools and classrooms are interdependent communities.' The whole school has to be focused on its goals. Thinking Maps as pointed out earlier provide a common language for thinking language for the whole school and classrooms. Hyerle advocates that the maps 'are most effective when they are used together as tools in response to the purpose of the learning objective, outcome, or performance task.' Students are said to benefit from interaction as they use a common set of tools to shape knowledge.Hyerle's views are supported by Buxton (2004) whose research with ICT software showed that students' thinking on the subject was enhanced by using a constant graphic but flexible template.

Thinking Maps in the curriculum seem to integrate the research on brain science with cross curricular disciplines. According to Hyerle (2000) research has shown that 80 to 90 percent of the

information taken in is predominantly visual. Although there are other learning styles, as pointed out earlier on Thinking Maps seem to integrate all the styles through discussions and questioning. Hyerle (2000:52) points out that these maps 'facilitates more explicitly four habits of the mind : questioning and posing problems, gathering data through all senses, thinking about thinking (metacognition), and listening and empathising.' In a small scale research carried out in the UK by Slack and Norwich (2007) on learning styles found that in spellings retention was higher one week after the teaching which matched the learning style. This in a way can speak volumes about the power of using Thinking Maps in learning since all three learning styles are incorporated. Claxton (2002: 17) on developing minds to learn in helping them to be resilient, resourceful, reflective and reciprocal describes the habits that are kin to those cultivated by using Thinking Maps.

Resilience is defined as the ability to lock to learning and resist distractions from outside or within, Claxton (2002). It implies persevering to see a task through. Lipton and Hyerle in their article 'I see what you mean' on the thinking foundation website point out that Thinking Maps are open ended which allows for a variety of responses. This allows students to lock into learning as they start from what they know and build new knowledge. Ausebel (2000) holds this view that the starting point of students' learning is their existing knowledge.

Resourcefulness is defined as the ability to draw on a wide range of learning methods and strategies as appropriate Claxton (2002: 17).Kinchlin (2007) in her research of the preferred role of students as learners found out that secondary school students were capable of commenting on their on learning and selecting vocabulary as appropriate when exploring issues. One of the recommendations is to engage students in the teaching and learning dialogue. Wragg (1997: 114) says 'pupils need to be aware of some of the factors that teachers know about, including how they

learn.' He goes on to say that this will produce students who are able to be autonomous and team learners of the future. Thinking Maps offer tools that students can use as they learn in any given subject. However teachers can equip and empower students when they are confident in the skill themselves.

Reflectiveness is described as the ability to think about learning profitably, Claxton (2002) which again the Thinking Maps facilitates during and after a learning process. They also foster bridging which according to Petty (2006: 296) is when pupils have to reflect on their work and give 'the strategies, skills, and general principles they used.' It also encourages transfer as pupils look at where else they could use the same skill. Thinking Maps also help in scaffolding to assist writing and thinking in any subject. Buxton(online) is of the view that Thinking Maps engages with the detail of a subject matter which helps students to linking information and have a deeper understanding. Spiegel (2003) described how the students in his school became better at describing their strategies and applying them to other subjects. Lipton and Hyerle in their paper 'I see what you mean' on their website give an overview of how these maps are tools for assessment. They can be used for formative assessment with a specific task as they mirror their thinking on the map. Monitoring can be done during the process and at the end which helps both student and teacher to make decisions about the process. It calls for proficiency in using the Thinking Maps for pupils to be able to truly reflect and make gains. This takes time and it is difficult to measure as there are many forces in play during a learning process.

Reciprocity is defined as making use of relationships in a productive, enjoyable and responsible way Claxton (2002:17). According to Harris (2008) students can be engaged and enjoy without learning and the teacher also not aware of intended outcomes. However Thinking Maps by describing the thinking skill students can be engaged productively with each other and the

teacher. The teaching of thinking as a skill and content is also done simultaneously when using Thinking Maps. Petty (2006) calls it a double decker which makes student engage on high cognitive level right from the onset and at the same time accessing content. When pupils work in pairs or groups they usually enjoy the interaction.

Hyerle features on his websites mapthemind and thinking foundation, research, articles and case studies of the successes gained with Thinking Maps. Accounts are from Australia, New Zealand, UK and USA. The successes have been recorded mostly in literacy writing and comprehension, mathematics and attainment in public examinations. Hickie (2006) found gains in reading and language over two years and none in mathematics. The time frame could have been too short for gains to be noticed in mathematics. Schultz (2005) found that there were gains in reading comprehension by students who have English as an additional language when they used Thinking Maps. Another research by Holzman (2006) had similar findings which showed gains by all children with different learning styles. Manning (2003) found that children with Special Educational needs had their attainment increased in an assessment of reading comprehension. Teachers observed increased performance levels in other areas such as reflective thinking, retention, recall, retention, quantity and quality of writing, motivation and cooperative learning skills. This again supports the habits of the mind which have been cited before.

Hyerle (1995) shows tables of schools that have seen a rise in attainment on Standardised Attainment Test and public examinations. This is also true of the school under study see appendices of the data taken from the Government statistics, Raise on line. One can credit Thinking Maps with all these successes but it should be pointed out that there is more to what goes on in the classroom to bring about effective learning. Thinking Maps alone for example, without a good learning environment may not achieve similar gains. Le Metais in Moon and

Murphy (2005) asserts that the full benefits of a change in the curriculum are realised when other things like teaching styles, materials and assessments are adapted to suit the change

.

Research on whole school initiatives, leadership, coaching and mentoring has shown benefits of using Thinking Maps. Spiegel (2003) reports a turn around in the school community when Thinking Maps were introduced building a community of enquiry. Thinking Maps have been used by the leadership in the school under study for professional development and sharing information.

It would seem that Thinking Maps are an effective learning tool that supports other habits of the mind thereby expanding the learning capacity of students. However it should be taken into account that like any other Thinking Skills program its success lies on a whole school approach and support.

The literature reviewed covered the research findings on the brain and how it learns, approaches to thinking skills, the benefits and problems of teaching thinking skills and using Thinking Maps in the curriculum. The research methodology will be discussed in the next chapter.

Chapter 3

3.0 Methodology

This chapter will outline the sampling procedure, research designs and instruments, their strength and weaknesses as well as whether or not they are fit for the intent and purpose of this study.

3.1 Sampling

The sample of this study will consist of one Deputy Head, Head of departments, classroom teachers and pupils. The teachers will be stratified according to departments and students according to year groups. The researcher will use a sample of 30 out of 60 teachers selected from the departments. The formula to be used to get the number of teachers from each department is Number of teachers in the department divided by the total number of teachers in the school and the result multiplied by thirty. The whole number will determine the number of teachers to be selected. This is to ensure a fair representation of departments in the sample. The same formula is to be used for selecting the number of students from each year group, Number of students in the year group divided by the total number of students in the school then the result multiplied by 125, resulting in a sample of 125 students in proportion to the numbers in the year group (See appendices for the break down of numbers).The sampling frame will be the school data base. The teachers and pupils will be assigned numbers and Microsoft Excel used to generate random numbers to select the respondents.

3.2 Research Models

According to Burton, Brundrett and Jones (2008) and Cohen, Manion and Morrison (2000) there are two paradigms which are commonly used in educational research. These are the positivist and

the interpretive models. The positivist is scientific, relying heavily on quantitative data, on the other hand interpretive is described as socially based, and the data is qualitative. This study is a social one and looks at the information from the perspectives of all involved. Thus, the interpretive model will be used.

3.3 Research Instruments

A survey will best fit this study of perceptions and attitudes. The purpose of a survey is to find 'how things are at the specific time at which the data is collected' as suggested by Denscombe (2003: 8). There are a lot of approaches or methodologies that can be used to collect data in this research design. (Cohen et al, 2000; Bell, 2005; Denscombe, 2003) give the following list according to Burton et al (2008: 73):

- Observations
- Interviews
- Focus groups
- Questionnaires
- Documents
- Diaries
- Tests

3.3.1 Observation

Observation according to Denscombe (1998) involves the researcher looking at what people will actually be doing. There are advantages and disadvantages of this form of collecting evidence. Burton et al (2008) suggest advantages such as: expertise on the part of the teacher as the observer, focusing on what actually happens, the observed phenomenon can be video recorded and viewed again and that a single observer can make comparative evidence of prior observation. However this method will not be used as there are lessons that have been observed by senior management and the facts and figures can be collected from them. The teachers and pupils will be used to triangulate the facts about the frequency of use.

The disadvantages given by Burton et al (2008) are that the exercise is time consuming, a single observer can be biased and end up filtering information as a result, observations can be misinterpreted and that those who are being observed can change their behaviour. This is true in this case of study as the observed lessons by senior management are bound to influence both teacher and pupil behaviour. Thinking Maps are most likely to be used in every observed lesson. In this case according to Cohen, Manion and Morrison (2000:315) that is where additional methods of collecting data are to be used 'to provide corroboration and triangulation, in short, to ensure that reliable inferences are derived from reliable data.' It is impossible to find time to observe colleagues during the term. This method although it may seem to have been appropriate for this study it does not suit the focus in that there are other easier and less time consuming ways of finding out the attitudes and perceptions to Thinking Maps cited above. The results on the observed lessons by senior management will be used and data collected from teachers and pupils will be used to provide corroboration.

3.3.2 Interviews

Interviews according to Cohen et al (2000: 267) 'enable participants –be they interviewers or interviewees- to discuss their interpretations of the world in which they live, and to express how they regard situations from their own point of view.' The advantages pointed out by Burton et al (2008) are that sensitive or information in depth can be collected from the one who is knowledgeable, it offers interaction between the researcher and the interviewee and can be very effective if there is trust between the participants. This method suits this study in that the Deputy in charge of teaching and learning and the implementation of the thinking skills program is the one in the best position to give insights on the use of Thinking Maps in the school. The researcher hopes to collect what Denscombe (2003: 111) termed 'privileged information' from one who is in a position 'to know'. The interview will be a follow up to a questionnaire with open ended questions given in advance.

The disadvantages which Burton et al (2008) give are that it requires skill on the part of the interviewer to keep the discussion focused, it is time consuming to perform, record and collate .The interview may be difficult to arrange. The interaction could sway the results. The Deputy Head is the only one who is to be interviewed which will minimise the problems. The lack of time will make it imperative to avoid from digressing from the focus of the study. The interest of both the interviewer and interviewee can not be ignored in this case as one is in charge of overseeing the program and the interviewer is a teacher who is implementing the program. Colleagues and some pupils taught by the researcher will be participants in the study. The results therefore, may be biased.

3.3.3 Questionnaires

Questionnaires are another research tool that has been considered and found to be fit for the purpose of this study. According to Cohen et al (2000; 247) 'the larger the size of the sample, the more structured, closed and numerical the questionnaire may have to be' and the converse is true for a smaller sample size. The type of questionnaires are given as structured, semi structured and unstructured. The advantages of using a questionnaire cited by Burton et al (2008:74) are; generating a lot of information quickly and easily, can be structured to make information comparable and easy to collate, remote access to respondents and respondents have anonymity, privacy and space for reflection. This study is going to involve a large sample for which this method will be the most efficient in giving results in a short space of time. Most of the questions will be closed for reasons cited above, see appendices (i, ii and iii). Since this study involves a program that is currently running in the school it is important to have assurance of anonymity and privacy in order to get honest responses. The information collected is going to be compared between age groups and departments which will be easy to do with this method.

Burton et al (2008: 74) points out that the questionnaire needs to be checked and this include having to conduct a pilot survey to 'ensure that instructions are unambiguous, responses are in the form expected and that it is manageable.' There can be a low return and responses lack detail as well as profound information. The lack of detail and deeper insight is counteracted in this study by asking pertinent questions only. Teachers will be asked to comment on any aspect of this thinking skills program in order to gain any other relevant details that may not have been covered by the closed questions.

The questionnaires can be administered by either post, phone or in person according to Burton et al (2008). The internet is also another way that is common nowadays. The researcher would have wanted to use this method but decided against it to avoid a low response. The questionnaires for pupils will be administered by the teachers, those of the Head of departments and teachers will be distributed during one of the staff meetings. Ethical issues are to be regarded. According to Stringer (1999) cited by Burton et al (2008: 52) 'the aims of an ethical approach to research involving human beings is to develop and maintain non exploitative social and personal relationships, and to enhance the social and emotional lives of those who participate.' The purpose of the research will be explained to participants and their consent will be sought prior to the survey. The major concern that the researcher anticipates among teachers is that of anonymity and confidentiality. Assurance will be given that the data collected will not be divulged. It will be stored securely and destroyed soon after in accordance to the guidelines given by Burton et al (2008).

3.3.4 Focus Groups

Another approach that could have been used in this study is that of focus groups. Cohen et al (2000) cites Morgan (1988; 9) describing it is a group interview which relies on the interactions within the group to give participants views. One of the advantages given which is relevant for this study is its ability to generate data and evaluations from different sub-groups. The disadvantages pointed out by Cohen et al (2000) outweighed this advantage in that a lot of considerations have to be made to create the right number of people and right balance within the group. The group dynamics have to be right. Time would not allow the researcher to attempt using this approach.

3.3.5 Documents, Diaries and Tests

Documents will be used in this study bearing in mind that they are not 'value neutral' and may have been written with a particular agenda or perspective in mind as suggested by Burton et al (2008). Denscombe (1998:162) is of the view that such records 'tend to be partial.' The school teaching and learning policy, the thinking skills 'tool kit', the PSHE program and the summary of Key stage 4 results for the past five years will be some of the documents that will be used. Their insight into past events, as cited by Cohen et al (2000) will be valuable for this study.

The use of diaries over a period of time was considered but the time frame for this study was constraining. It would have provided comparative information between age groups and departments on the use of Thinking Maps. Burton et al (2008) points out that diary keeping could be cumbersome which could impact on the results and such may defeat the purpose of this study.

Tests were considered in terms of application of Thinking Maps but this meant designing different tests for each age group and learners according to Burton et al (2008) making it difficult to make comparisons. This could have made it easier for the researcher to demonstrate if pupils had learnt how to apply the Thinking Maps or not.

3.4 Analysis

The information collected will be analysed in the next chapter using frequency tables and then presented using bar charts and pie charts. These are visual charts that make it easier for anyone to make sense of the findings. These findings will be interpreted and discussed in view of the research questions. Recommendations will be suggested for the school based on these findings. It

is hoped that the findings will help the school to strategically plan to meet the target set by Ofsted in readiness for the next inspection.

CHAPTER 4

4.0 Data Presentation and Analysis

In this chapter research findings and analysis will be done using the 'holistic' approach which according to Burton et al (2008) data presentation and analysis is combined as opposed to the 'atomistic' approach where the two are separated. The key research questions are going to be used to guide the analysis .These is:

- Do teachers and pupils find the Thinking Maps useful?
- Do teachers and pupils find it easy to use Thinking Maps?
- Do teachers and pupils use Thinking Maps across the curriculum?
- What improvements can be made to this thinking skills programme?

4.1 Do teachers and pupils find Thinking Maps useful?

The results for the question that could establish whether or not teachers and pupils find the maps useful are given in the table blow.

HOD (N= 12), TEACHERS (N=30), PUPILS (N=125)

Table 4.1

Do Thinking Maps help students learn?

	HOD	TEACHERS	PUPILS
Strongly Disagree	16.7 %	0 %	2.4 %
Disagree	0 %	3.3 %	9.6 %
Neither Agree nor Disagree	25 %	20 %	25.6 %
Agree	41.6%	60 %	49.6 %
Strongly Agree	16.7 %	16.7 %	12.8 %

The table shows that all three groups agree that Thinking Maps help students learn effectively with a total of agree to strongly agree for Heads of Department 58.3%, Teachers 76.7 % and students 62.4 %.This is in agreement with the view given by the Deputy Head, citing the evidence which is now on David Hyerle's thinking Foundation website, where students indicated that Thinking Maps help them to organise their thinking prior to writing. Teachers also made comments which go on to show their importance in learning. These are given below;

- Help to organise thoughts.
- Good to explain complex grammar rules.
- Help students to revise.
- Easier way of presenting information.
- Help in creativity.

- Useful as starters and showing 'processes' in Business Studies.
- Good for summarising information and making comparisons.
- Suit us because of the visual nature of the maps.

There are very few in all three groups who do not agree, Heads of departments 16.7 %,Teachers 3.3 % and Pupils 12 %.More students were undecided than the other two groups.

Pupils' response to the question whether they used the Thinking Maps for other things outside of school work 67.2 % disagreed and strongly disagreed while 12.8 % were undecided and 20 % agreed that they used them.

Teachers and pupils as shown above all agree that Thinking Maps are useful in learning. This is in agreement with the researches cited which have shown that pupils' learning is enhanced when Thinking Maps are used. The reasons cited by teachers all tie in with brain research which has shown that modelling, scaffolding, continual stimulation, previewing material, multiple representations of information, formative and summative assessment all enhance learning.

The issue of transfer of skills beyond the school setting was very low. Pupils do not seem to use Thinking Maps outside of the school setting. It could be that the Thinking Maps are not being taught often enough inculcate the desired outcome of transfer. Claxton (2007) points out that teacher questions in an epistemic classroom should continually prompt students to look for wider real life opportunities for application. In the research by Burden and Nichol (2000) some students even reported that their skills to transfer the thinking skills were reduced. These findings give weight to McGrath (1997) model and research findings that metacognition, disposition, questioning and Thinking skills should be the package for teaching and learning. The results

show that good questioning by both teachers and pupils encourage transfer. The Deputy Head pointed out that it came to her attention that not all staff believed they are effective and hence did not use them at all. This unwillingness to change is not new as research findings have shown that like any innovation there is that chance that it can be resisted and the way forward could be to establish the root of the problem. The implications could be staff development programs. However it should be noted that although there seems to be little or no transfer beyond the school learning within is being acknowledged to have been enhanced by using Thinking Maps. This also could be an advantage of using Thinking Maps, that thinking is being enhanced as well as understanding of content. What can not be determined is how much time and instruction is needed for transfer to take place. The inventor purports that these Thinking Maps help transfer, which could be true across the curriculum. It can be argued as well that just as learning can be unconscious, transfer could be happening but not as apparent. The exam results in the school have been on a steady rise since 2002 at both Key Stage 3 and Key Stage 4 (see appendices).This could be a testimony to the effectiveness of Thinking Maps and other Thinking Skills programs running in the school.

Teachers and pupils find Thinking Maps to be useful within the curriculum but do not find them useful elsewhere. The lack of transfer could be lack of expertise with the Thinking Maps on the part of the teachers and teaching and learning strategies employed within the classroom. Pupils dispositions also play a part. Staff development can be the answer to helping teachers to applying the Thinking Maps and have classroom ethics that foster higher thinking skills and metacognition.

4.2 Do teachers and pupils find it easy to use the Thinking Maps?

The table below shows how the Heads of Departments rated teachers and how teachers and pupils rated themselves as to whether or not they found Thinking Maps easy to use.

Table 4.2 I find Thinking Maps easy to use.

	HODs rating Teachers	**TEACHERS**	**PUPILS**
Strongly Disagree	16.6 %	0 %	3.2 %
Disagree	0 %	16.7 %	12 %
Neither Agree nor Disagree	41.9%	16.7 %	19.2 %
Agree	33.2 %	60 %	48 %
Strongly Agree	8.3 %	6.6 %	17.6 %

The Heads of Departments (HODs) had only 41.5% strongly agreeing and agreeing that the teachers find it easy to use Thinking Maps, the teachers themselves had 66.6% and pupils 65.6%. Teachers and pupils seem to agree that the maps are easy to use. There is a big difference between Heads of Departments perceptions about the teachers, 16.6 % strongly disagreed compared to 0% for teachers who only disagreed by 16.7%.Also 41.9% of the Heads of

departments were undecided compared to 16.7% of the teachers. What could be the cause of such a disparity in perception?

The results show that the majority of the teachers and students find it easy to use the Thinking Maps. The figures are lower though in compared to the response to their usefulness. This is in agreement with the researches reviewed which have shown successes with different age groups. If junior schools could easily use Thinking Maps then more could be expected of secondary school pupils. The Deputy Head's view is that pupils use the maps well when their teachers are positive about them. This tally with the view cited earlier that teachers bring into the classroom their on set of beliefs that can either hinder or promote progress and successful learning. The training time given, two hours as cited by the Deputy Head is not enough and research evidence cited showed there is need for more time although it is not clear what amount of time is necessary to bring about the desired change. This could be the reason why the Thinking Maps ease of use was lower than their perceived usefulness.

The disparity between the HODs perceptions of teachers' views on Thinking Maps ease of use and the teachers themselves is quite interesting. Huntley (2008) pointed out that professional competency is an important personal, professional and social issue at any time which when coupled with appraisal becomes even more significant. This could be the reason why a high percentage of teachers said they find it easy to use the Thinking Maps which did not match with the Heads of Departments who usually observe teachers for appraisal. Pupils and teachers on the other hand seem to have a similar perception. Could it be that the Heads of departments are out of touch with what goes on in the classrooms on a day to day basis or that is a perception based on lesson observations? It could be that teachers and pupils are free to experiment and at ease when they are not being observed which the HODs never get to see.

Some teachers did not find them easy to use citing the fact that they are rigid and their structure restrictive. This is contrary to the views of Hyerle who advocates that they are flexible. The inventor could have been thinking of the ways in which they can be used and not so much their structure. The amount of writing that can fit into a given map and onto a page in an exercise book is restricted. The other problem given in using the Thinking Maps is that it takes a lot of time to draw the maps in class. Pupils tend to draw bubbles instead of circles which if not accurately drawn looks untidy.

If teachers and pupils find it easy to use Thinking Maps there should be greater independence on the part of the students as to when they use them. The researcher sought to find this out by asking both teachers and pupils whether this was true. See Appendices (7), (9) and (10) for the full results and questions. Only 36.7% of the teachers believed pupils could use Thinking Maps without any help compared to the 20 % of the pupils. Very few teachers 30% disagreed that pupils needed help whereas 66.4% of pupils agreed and strongly agreed that they needed help. There is a big gap between teachers' perceptions and the pupils' own perceived ability to use Thinking Maps with greater independence. The Deputy Head acknowledged the fact that getting to an embedded stage where pupils are sufficiently well trained to choose maps for themselves is difficult in a large school given the staff turnover. The Deputy Head holds the view that can only be arrived at when teachers have 'developed a thinking conversation to accompany the fluent use of the maps.' Smith (1996) pointed out continual review of material for greater retention. This applies to both teachers and pupils in this case, teachers need to have their knowledge of the maps refreshed and in turn help pupils to review their use in order to encourage independence. Teacher support should be available and sharing of good practice encouraged instead of feedback given on lesson observations that link with performance management. Thinking Maps could be

incorporated into schemes of work and good practice shared during departmental meetings and staff meetings. The brain learns best in a climate of low stress and high challenge and pupils can be adventurous if they are secure in their knowledge of the Thinking Maps. The fact that pupils are not yet autonomous in using the Thinking Maps might suggest that in real terms they do not find them easy to use as yet , something they would not readily admit in the other question.

On another related question on whether teachers and pupils like using Thinking Maps the following responses were collected from Heads of departments on teachers and teachers' own views, then teachers views on pupils and the pupils' own views.

Table 4.3 Do teachers like using Thinking Maps?

	HODs rating Teachers	**TEACHERS**
Strongly Disagree	0 %	3.3 %
Disagree	0 %	10 %
Neither Agree nor Disagree	33.6%	10 %
Agree	49.8 %	60 %
Strongly Agree	16.6 %	16.7 %

The Heads of departments had 66.4 % strongly agreeing and agreeing that teachers like using Thinking Maps while 76.7 % of the teachers were of the same view. There is a big gap between

the HODs who were undecided and the teachers'. There is however a higher level of agreement between the two groups. This shows that on the whole teachers like using Thinking Maps and Heads of departments are aware of this. This may suggest that although it is challenging to teach pupils to use these maps the teachers like using them. Those who do not like using them are in the minority.

Table 4.4 Do pupils like using Thinking Maps?

	Teachers rating Pupils	**PUPILS**
Strongly Disagree	0 %	2.4 %
Disagree	23.3 %	27.2 %
Neither Agree nor Disagree	0 %	16.8 %
Agree	53.4 %	38.4 %
Strongly Agree	23.3%	15.2 %

Teachers rated pupils highly than the pupils themselves with 76.7% strongly agreeing and agreeing compared to the 53.6 % pupils. Interestingly enough 75.9 % of the teachers said they liked using Thinking Maps. It seems the teachers' own belief system played a part here. Although pupils find these easy to use they do not seem to like them that much. A lot more students were undecided and disagreed and strongly disagreed than they did on ease of use. This attitude is in

contradiction to their perception that these maps are useful. Thinking Maps being visual tools one would expect more pupils to be enthused by them or is it that those who do not like them a lot are not visual learners. Thinking Maps seem to cater for both the left and right side brain as well as all types of learners. There is the chance to draw the map thereby doing, which favours kinaesthetic learners and the discussions that go on when using the maps should appeal to the auditory learner. Holzman (2004) found that all children benefited from using Thinking Maps regardless of their primary learning style. The reasons could be the same as those cited before which are lack of competence in using these tools and lack of support.

To find out if Thinking Maps are used in the curriculum the researcher wanted to find out if teachers and pupils know and used all Thinking Maps as well as establish the frequency of usage.

4.3 Do teachers and pupils use Thinking Maps across the curriculum?

The response to whether teachers and pupils know the Thinking Maps are given in the table below.

Table 4.5 I know all the Thinking Maps.

	TEACHERS	PUPILS
Strongly Disagree	0 %	4.8 %
Disagree	33.3 %	29.6 %
Neither Agree nor Disagree	33.3 %	27.2 %
Agree	26.7 %	28 %
Strongly Agree	6.7 %	10.4 %

The percentage of teachers who agreed and strongly agreed to know all the Thinking Maps was 33.4 %, the other 33.3 % were undecided and 33.3% disagreed. On the other hand 38.4 % of the pupils agreed and strongly agreed, 27.2 % were undecided and 34.4% disagreed and strongly disagreed. There are more teachers and pupils who are not confident about their knowledge of Thinking Maps than those who are. This is consistent with the Deputy Head's observation that although it is a requirement for every observed lesson to include Thinking Maps some teachers only use them then with only a few maps used regularly and others not covered at all.

One teacher suggested that these maps be put in the students' diary together with examples of how all of them can be applied on one topic. Another commented that the low ability students found some of the maps difficult to use citing the multi flow map in particular. Two teachers confused the Thinking Maps with mind maps.

The researcher sought to find out if these Thinking Maps are being used every week in the curriculum and not for performance management only. The results are shown in the table below.

Table 4.6 I use Thinking Maps every week

	HODs	TEACHERS	PUPILS
Strongly Disagree	16.7 %	10 %	8.8 %
Disagree	25 %	10 %	36 %
Neither Agree nor Disagree	0 %	40 %	26.4 %
Agree	41.6%	36.7 %	19.2 %
Strongly Agree	16.7 %	3.3 %	9.6 %

Heads of departments had a high expectation of the teachers with 58.3% with the view that Thinking Maps are being used every week in the department, in comparison only 39.6% of the teachers said they use them every week and even fewer pupils 28.8% .More students disagreed and strongly disagreed to the use of Thinking Maps than teachers and Heads of departments. The Deputy Head as cited earlier on was the first one to acknowledge the inconsistencies in frequency of use. The reasons that some teachers gave in their comments were that some maps are more useful than others to individual subjects and that they cater for one particular learning style. The teacher's comment could be right that although these eight Thinking Maps represent fundamental thinking skills they may not be effective tools on every topic in every subject. Haynes and Jones (1999) put it well in their paper in identifying that the quality of skills learned using different approaches may overlap and in some cases differ in breadth and depth. The question arises then that should it be made imperative for all subjects to use the Thinking Maps or should it be left to departments and teachers to choose where and when they can be used in the curriculum. Research has shown that they can be used in all subjects and what differs then could be the breadth and depth.

If some maps were being used more than others which ones are they? The researcher asked Heads of departments and teachers to say which Thinking map they used the most. Pupils were asked to say in which subjects they had used each of the eight Thinking Maps. The following results were obtained as presented in the compound bar chart below.

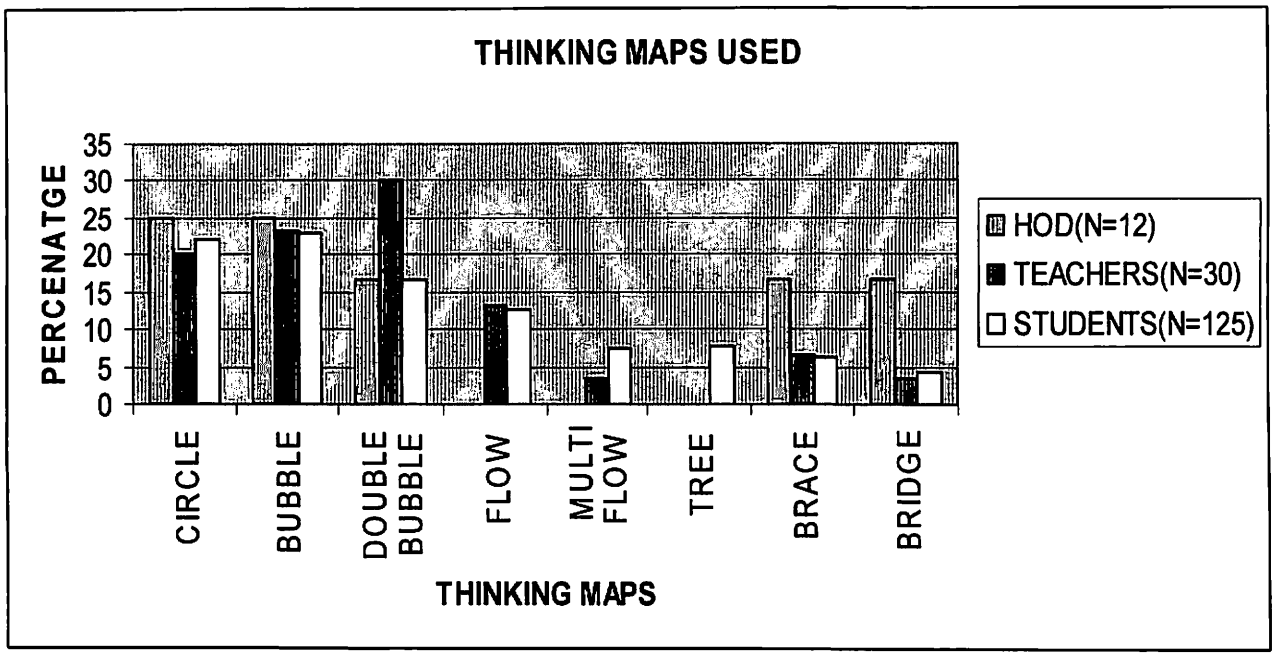

Figure 4.1 Bar chart

It can be seen from the bar chart that most Heads of departments said they used the Circle and Double Bubble map. Most teachers said they used the Double bubble map. Students said they used the Bubble map the most across the curriculum. These three the Circle, Bubble and Double bubble maps are the ones which seem to be the most popular in the curriculum.

Table 4.7 Students' results showing the breakdown of numbers per map per subject

	CIRCLE	BUBBLE	FLOW	BRACE	TREE	DOUBLE BUBBLE	MULTI FLOW	BRIDGE	TOTAL
ENGLISH	84	64	44	19	17	72	24	11	335
HISTORY	32	33	30	16	43	40	21	10	225
SCIENCE	31	38	22	14	10	37	19	13	184
RELIGIOUS EDUCATION	20	25	9	6	4	23	3	1	91
GEOGRAPHY	17	25	6	4	8	12	6	3	81
MATHS	10	14	24	1	8	7	2	14	80
PHSE	14	7	5	13	4	11	10	4	68
DESIGN &TECHNOLOGY	10	14	14	4	3	3	3	1	52
DRAMA	12	10	8	0	0	5	5	0	40
PE	13	13	2	3	1	3	4	1	40
HEALTH AND SOCIAL CARE	9	12	3	1	2	2	0	0	29
ART	16	9	0	0	0	2	0	0	27
MODERN FOREIGN LANG	9	10	0	3	1	0	1	2	26
BUSINESS STUDIES	10	13	1	1	0	1	0	0	26
MEDIA	6	9	1	0	1	6	1	0	24
MUSIC	4	9	1	1	0	0	1	1	17
IT	3	7	0	0	1	0	0	1	12
TOTAL	300	312	170	86	103	224	100	62	1357

The table shows the popular maps across the curriculum in rank order as Bubble, Circle, Double Bubble, Flow, Tree, Multi Flow, Brace and Bridge. The subjects where Thinking Maps seem to be used the most is shown in the table with the top six as English, History, Science, Religious Education, Geography and Mathematics. The pie chart Figure 4.2 in Appendices presents this information according to subject usage in percentages. The results seem to suggest that all the Thinking Maps are being used across the curriculum what is lacking in most subjects is

consistency. The top three subjects seem to have breadth. The superfluous usage of the Thinking Maps support the results shown earlier that pupils were not confident in their knowledge of the Thinking Maps and the Deputy Head's observation that they have not been embedded in the curriculum as yet. One of the teachers' comments showed disappointment that pupils did not know what an adjective is despite the fact that Thinking Maps have been in the curriculum for more than five years now. The frequency as suggested by the teachers' and pupils' responses is not every week.

The thinking skills which are represented by the top three Thinking Maps are Describing, Defining in context and Comparing and contrasting. Petty (2006) who cites Hattie and Marzano's work which gives an effect size of 1.2 to 1.3 to Graphic organisers advocates the use of these in almost every topic. He asserts that the more abstract a topic is the more reason it has to be represented visually. English, History and Science are the top three subjects where Thinking Maps are used. The kinds of thinking involved seem to be prevalent in all subjects which could explain the popularity. The researches that are recorded on David Hyerle's websites seem to all show gains in languages and subjects that use language a lot. These results seem to be consistent with these researches. Hickie (2006) in her research found that there were gains in reading/language and none in mathematics after two years of using Thinking Maps. It could be that the languages and humanities tend to use these maps more often. The time frame could have been short to yield significant gains. Maybe subject specific approaches for Mathematics and Science could have yielded greater gains in conjunction with Thinking Maps.

The three part lessons where the starter, lesson development and plenary have to be evident could be the other reason why these three thinking processes are used more often than most. The three maps can be easily be used at the beginning of a lesson to brainstorm ideas by defining them in

context which could be describing and comparing and contrasting. They can be used during the lesson as formative assessment tools and at the end of the lesson as assessment for learning tools. When these maps are used with computer software formative assessment is said be more efficient and effective as the students thinking is displayed on their computer screens according to Buxton (2007).The brain research reviewed again supports these three part lessons which could explain why they are widely use across the curriculum.

The fact that thinking Maps are not being used consistently and extensively throughout the curriculum despite the fact that teachers and pupils find them to be useful and easy to use could be a lack of expertise and support. Recommendations of what can be done to improve this thinking skills programme will be done in the final chapter.

Chapter 5

Conclusions and Recommendations

The school in which this study took place is an aspiring thinking school. A number of Thinking skills programs were introduced and integrated into the curriculum since 2002. The purpose of this study was to find out if teachers and pupils found Thinking Maps to be useful, easy to use and whether they were being used across the curriculum. The interpretive paradigm was used to conduct the research by means of a survey. The sample comprised of the Deputy Head in charge of teaching and learning, Heads of Departments, teachers and pupils. The literature reviewed highlighted the approaches to thinking skills, the benefits and barriers to teaching thinking skills, an overview of Thinking Maps, their application in the curriculum as determined by the inventor David Hyerle and what other scholars and researchers say about them.

The findings were interesting in that most pupils and teachers said Thinking Maps are useful, found them easy to use and liked them but not as much. The perceived usefulness and ease of use of Thinking Maps did not match their attitude to Thinking Maps. This disparity was interpreted by the researcher as lack of expertise and support in using Thinking Maps. In addition Thinking Maps did not seem to be embedded across the curriculum although there is evidence that they are being used in almost every subject .The breadth and depth of usage is inconsistent, with only three subject areas where there is seemingly consistency of use.

In order to improve the Thinking Maps program within the school there is need for continual training and support for teachers and students. The system that is already in place needs to be revisited and time found within the teaching day to refocus on Thinking Maps.

The pedagogy is important in making the teachers own the innovation. Resistance to change could be simply lack of knowledge and expertise as found in the research reviews by (Blagg, 1991; Cotton, 1991 and McGuiness, 1999).The tool kit that was given out by the Deputy Head has all the theoretical perspectives and pedagogy that could help teachers to understand why thinking skills are important. The Thinking Foundation manual is good in explaining and giving examples for application but again these could be tucked away somewhere. The training time given, two hours as cited by the Deputy Head is not enough. If time could be found for all departments to run a review session once every term as part of the craft of the classroom it could go a long way in building the confidence of teachers in using Thinking Maps NUT (2003) found that teachers who worked together during their thinking skills research projects reported increased confidence in teaching the skills. These meetings could help in providing the support that is needed. Goodlad (1984) quoted by Costa (1991) observed that 'teachers are extremely isolated .They perform their act behind closed doors and have little time within rigid daily schedules to meet, plan, observe, and talk with each other.' Incentives could be offered during implementation in the form of not taking up gained time to help teachers use this time as they please to harmonise their day to day tasks with the new innovation.

Expertise could be enhanced by incorporating the Thinking Maps into the schemes of work where departments could identify areas where they could use these maps effectively. This could impact in the way students learn both the skill and content which could make it possible for them to transfer the skill. The use of Thinking Maps as a requirement for performance management observations could be removed so that teachers and students can be creative in the way they use these maps. Peer observations could be used instead and room made on the timetable for such activities. Peers could plan lessons together and take turns to deliver them. Supervision is better

than inspection in facilitating change. This could also remove the pressure of using Thinking Maps at all costs even where they are least effective.

Pupils could be assisted to remember the Thinking Maps by having them printed in the diary with examples from different subject areas. In addition to this they need to be involved in making decisions about their own learning. The same pedagogy that teachers are expected to know should be passed on to them so that they not only use the strategy but know why they are using it. A common understanding and language can be shared by both teachers and students. Pupils could be asked to make portfolios of their Thinking Maps and assessed on them according to the manual instructions. Finally the rota that was put in place of teaching Thinking Maps to all year groups if adhered to could help reenergise the program.

The school under study has made progress in making Thinking Maps a whole school agenda. This research has established the fact that teachers and pupils find Thinking Maps useful. This is a good starting point in getting them embedded in the curriculum. The above recommendations may be able to help to that end as well as address the inconsistencies cited by Ofsted (2007).

The findings in this research could have been improved by carrying out interviews of some teachers and students to gain insight to some of the responses in longer time frame circumstances. The findings from this research that Thinking Maps are useful and easy to use can be realised in other settings where Thinking Maps are used. The recommendations can be applied to other thinking skills programs being carried out within the school although they can not be generalised as they are unique to this particular school. A further study can be carried out after implementing the recommendations to see if Thinking Maps will be embedded in the curriculum. In addition similar studies can be undertaken in other thinking skills programs within the school curriculum.

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APPENDICES

APPENDIX 1

A study of perceptions and attitudes of teachers and pupils to Thinking Maps at CNS 0616256

Dear Colleague

As part of my MA studies I am investigating the perceptions and attitudes of students and teachers to Thinking maps. The purpose of the study is to find out if teachers and pupils find Thinking maps useful and easy to use which I hope will allow us to further develop their use in the curriculum.

I would be pleased if you could help by completing the questionnaire by ticking one space only for all the questions except the last two where you have to write in the space provided.

All the information that I collect will be kept confidential and will not be passed on to any third party in a form that you will be able to be identified.

It is perfectly acceptable for you not to participate or to stop at any point during the study. Your participation or non-participation in this study will not affect your status in this school. Furthermore, your participation in this study is not in response to financial or other inducements.

At your request, I will also make my findings available to you when I am finished with my study. If you are interested, contact me on email smi@cardinalnewman.net or contact my advisor Dr Neil Burton on neil.burton@beds.ac.uk. You can also contact either of us if you have questions about the study after you have completed your part of the study. If you have read and understood these instructions, and you do not have any questions about them, please sign below.
I volunteer to participate in this study, entitled 'A study of perceptions and attitudes of teachers and pupils to thinking Maps.'

Signed
Participant's signature
Print participant's name here:

Signed
Researcher's signature
Print Researchers name here:

APPENDIX 2

STRATIFIED SAMPLE SIZES FOR TEACHERS AND PUPILS

YEAR GROUP	No IN YEAR GORUP	CALCULATION	SAMPLE SIZE
7	242	242/1225 x 125	25
8	256	256/1225 x 125	26
9	243	243/1225 x 125	25
10	247	247/1225 x 125	25
11	237	237/1225 x 125	24
TOTAL	1225		125

SUBJECT	SAMPLE SIZE
SCIENCE	3
MATHEMATICS	3
ENGLISH	3
PE	3
RELIGIOUS EDUCATION	3
DESIGN & TEXTILES	3
ART	2
MODERN FOREIGN LANGUAGES	2
GEOGRAPHY	2
DRAMA	2
HISTORY	2
BUSINESS STUDIES	1
HEALTH & SOCIAL CARE	1
TOTAL	30

APPENDIX 3

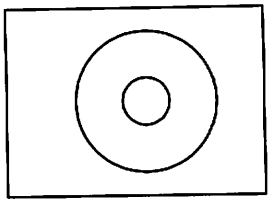
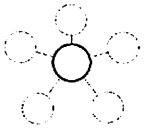
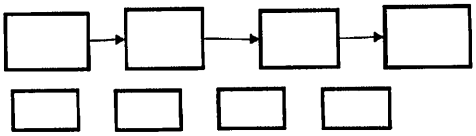
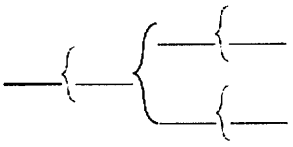
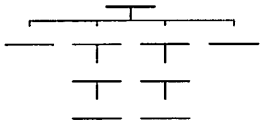
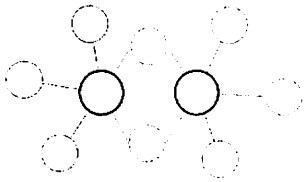
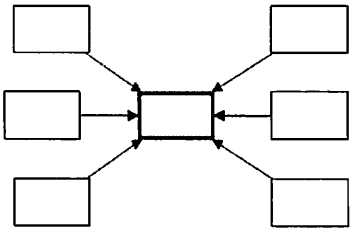
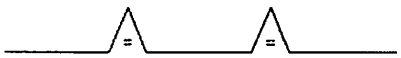
Student Questionnaire Year Group Sex M /F

Please complete the questionnaire by placing a tick in one space only.

Question	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. Thinking maps help me to learn.					
2. I like using thinking maps.					
3. I find it easy to use thinking maps.					
4. I know all the thinking maps.					
5. I use them only when the teacher asks me to.					
6. I use thinking maps every week in school.					
7. I use thinking maps for other things outside of school work.					
8. I would like more training on using thinking maps.					

Please turn over the paper and write down next to each thinking map the subject/subjects where you have used it before. Thank you.

9. In which subject(s) have you used the following Thinking Maps?
   - **Please write the subject(s) in the box next to the Thinking Map.**

APPENDIX 4

Teacher Questionnaire

Department..... Number of years in the school.....Sex M/F

- **Please complete the questionnaire by placing a tick in one space only.**
- **Fill in the spaces for questions 10 and 11.**

Question	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. Thinking maps help students to learn					
2. I like using thinking maps					
3. I find it easy to use thinking maps.					
4. I know all the thinking maps.					
5. I use thinking maps every week.					
6. My students like using thinking maps.					
7. They can use thinking maps without my help.					
8. I would like further training in using thinking maps.					
9. It takes longer to plan a lesson which involves thinking maps.					

10. The thinking map I use the most is .....
11. Please comment on any aspect pertaining to the use of thinking maps
.....
.....
Thank you.

APPENDIX 5

Questionnaire for the Deputy Head's Interview

1. What is your role in the Thinking skills program?

2. Why did you choose thinking maps as part of the Thinking skills program?

3. How were the teachers trained to use the thinking maps?

4. How do you train new teachers when they join the school?

5. How do teachers and pupils value the use of the thinking maps?

6. How thinking maps being used throughout the curriculum?

7. Are there any problems you have picked up on using thinking maps?

8. What is the impact of this thinking skills program?

In all of the above I will be very grateful if you supply evidence where necessary on the day of the interview.

A study of perceptions and attitudes of teachers and pupils to Thinking Maps at CNS

0616256

APPENDIX 6

Head of Department - Questionnaire

Department..... Number of years in the school.....Sex M/F

- **Please complete the questionnaire by placing a tick in one space only.**
- **Fill in the spaces provided for questions 7 and 8.**

Question	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. Thinking maps help students in this department to learn.					
2. Teachers in the department like using thinking maps.					
3. Teachers in the department find it easy to use thinking maps.					
4. Thinking maps are used every week in the department.					
5. Everyone in the department would benefit from further training on using thinking maps.					
6. It takes longer to plan a lesson which involves thinking maps.					

7. The thinking map used the most in this department is .....

8. Please comment on any aspect pertaining to the use of thinking maps

.....

.....

Thank you.

APPENDIX 7

Heads of Departments – Questionnaire Results

Question	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. Thinking maps help students in my department learn effectively	16.7%	0%	25%	41.6%	16.7%
2. The teachers in my department like using thinking maps	0%	0%	33.6%	49.8%	16.6%
3. The teachers in the department find it easy to use thinking maps.	16.6%	0%	41.9%	33.2%	8.3%
4. Thinking maps are used every week in the department.	16.7%	25%	0%	41.6%	16.7%
5. Everyone in the department would benefit from further training on using thinking maps.	0%	0%	33.3%	50%	16.7%
6. It takes longer to plan a lesson which involves thinking maps.	25%	33.3%	41.7%	0%	0%

APPENDIX 8

Please comment on any aspect pertaining to the use of thinking maps:

- Too restrictive.
- They are excellent for sneaking down case studies.
- Similar to brain storming from years ago but more advanced.
- Certain flow maps are more useful than others to individual subjects e.g. circle and flow map in maths.
- I find them especially useful as starters, and showing 'process' in business.
- Is there a danger of 'overload' if we insist all lessons are to include a thinking map and thereby are pupils put off?
- Only caters for one particular style.
- Helps the kids to revise. Easier way of presenting information. Leads itself to a bit of creativity.
- A number of students in years 10- 13 have told me that they prefer to use other of forms of 'notes'
- Most lower ability students find it difficult to use the multi-flow map.
- Can be good to explain complex grammar rules but I feel the rigid structure is restrictive.
- Are these in the diary? They should be, along with suggestions for applications e.g. one topic and all 8 could be applied.
- Helps me organize thoughts. I do one often when I plan a new topic.
- Ideas for use with different topics. Main problem is that they take the students so long to draw.

- Work very well in lessons but students find it difficult to link/transfer knowledge when working independently.
- I do believe that thinking maps have a place in the curriculum and within my subject area. However, it should be up to the member of staff to be free to use a map, when they see the value in doing so. For example, I disagree with the policy that every observed lesson must contain a map and sometimes I find myself 'inventing' a reason to include one, just because the lesson is being observed, when I could use a better resource to serve the purpose. I also find it difficult to believe that the students (and some staff) understand how to use the maps properly, and yet this initiative has been in the school for some time. For example, if a Bubble map has been introduced correctly, why do some staff not know that it is to be used for adjectives only and a lot of our students do not know what adjectives are! I am not convinced that the Thinking Maps make much difference to the thinking skills (or development of them) in our students.
- Very convenient for summarising data and comparing two or more views.
- Suits us because of the visual nature of the maps.
- We should use the 'cause and effect' map more with depth. It's possible to teach a whole lesson/topic using all of the thinking maps. Some sixth formers are ambivalent towards thinking maps they have their own learning strategies which have proved ok at GCSE.
- Pupils dislike them and complain about using them.

APPENDIX 9

Teacher Questionnaire Results

Question	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. Thinking maps help students learn effectively	0%	3.3%	20%	60%	16.7%
2. I like using thinking maps	3.3%	10%	10%	60%	16.7%
3. I find thinking maps easy to use.	0 %	16.7%	16.7%	60%	6.6%
4. I know all the thinking maps.	0 %	33.3%	33.3%	26.7%	6.7%
5. I use thinking maps every week.	10%	10%	40%	36.7%	3.3%
6. My students like using thinking maps.	0 %	23.3%	0%	53.4%	23.3%
7. They can use thinking maps without my help.	0 %	30%	33.3%	33.3%	3.4%
8. I would like further training in using thinking maps.	10%	20%	26.7%	40%	3.3%
9. It takes longer to plan a lesson which involves thinking maps.	16.7%	43.3%	26.7%	13.7%	0 %

N=30

APPENDIX 10

Student Questionnaire Results Years 7, 8, 9, 10&11

N= 125

Question	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. Thinking maps help me to learn.	2.4%	9.6%	25.6%	49.6%	12.8%
2. I like using thinking maps.	2.4%	27.2%	16.8%	38.4%	15.2%
3. I find it easy to use thinking maps.	3.2%	12%	19.2%	48%	17.6%
4. I know all the thinking maps.	4.8%	29.6%	27.2%	28%	10.4%
5. I use them only when the teacher asks me to.	0.8%	19.2%	13.6%	39.2%	27.2%
6. I use thinking maps every week in school.	8.8%	36%	26.4%	19.2%	9.6%
7. I use thinking maps for other things outside of school work.	33.6%	33.6%	12.8%	19.2%	0.8%
8. I would like more training on using thinking maps.	8.8%	27.2%	31.2%	18.4%	14.4%

APPENDIX 11

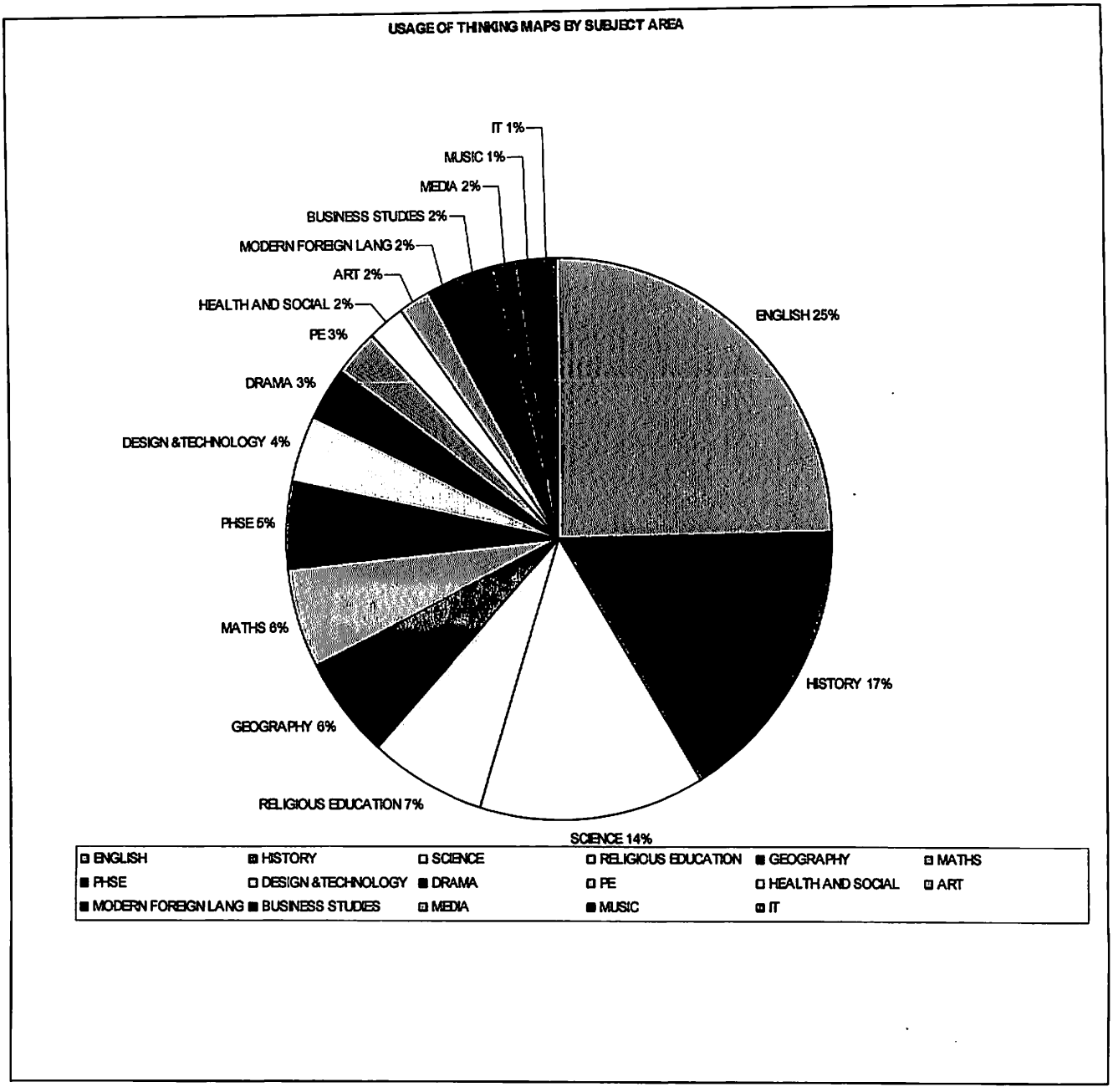


Figure 4.2

APPENDIX 12

Deputy Head's Interview

1. What is your role in the Thinking skills program?

My role was initially to instigate the training and use of Thinking Maps in the school and now to develop and sustain it.

2. Why did you choose thinking maps as part of the Thinking skills program?

I was impressed by these thinking tools following two courses I attended run by Kestral Consulting. I pursued this interest and was subsequently trained as a trainer for Thinking Maps. I liked the way the maps could be easily used in the classroom with little or no resource implications. I was impressed by the spread of Thinking Maps world wide and research findings from the USA.

3. How were the teachers trained to use the thinking maps?

The whole staff was given an initial taster session followed by a day's training in Thinking Maps. They had a second days training about a year later when we picked up on Bridge Maps particularly because these seemed to be the least used by everyone. After that I have done short sessions as an introduction for new staff and then longer sessions for new staff each year to induct them into the Maps

4. How do you train new teachers when they join the school?

New members of staff have to attend two sessions on Thinking Maps as a compulsory part of CPD. I break the maps into two groups for this. I don't find this ideal as they tend not to have sufficient time to really think about the maps in these sessions – this is something I want to change e.g. try and get a whole morning with new staff.

5. How do teachers and pupils value the use of the thinking maps?

I have not really asked them this and would think – from what has been said to me – that it's a mixed response. They tend to like particular maps which David Hyerle says is what tends to happen. Appreciation of the maps varies from those who use them a lot and really like them to those who think they are a passing 'fad' and ignore them as much as they can.

6. How are the thinking maps being used throughout the curriculum?

They are used by all teachers because when we observe teachers teaching they must use a Thinking Map as part of the lesson – this does not mean they are used throughout the curriculum and this is very varied. Observations show that there are still some staff who only use the Maps when they are observed while others use some of the maps very regularly though perhaps not all the maps. Some schemes of work incorporate Thinking Maps while others do not. We need greater consistency throughout the school.

7. Are there any problems you have picked up on using thinking maps?

The problems really centre around the teachers rather than the pupils. Not all teachers believe the Thinking Maps are effective. However, these staff have not used them extensively and base this view on their own unwillingness to change and to master the maps. Pupils use the maps well when their teachers are positive about them and provided they are not bombarded with instructions to use the maps – which can happen after training sessions. Videoed evidence gathered from students several years ago and now featured on David Hyerle's Thinking Foundation website, indicates pupils recognised the benefits of using Thinking Maps to organise their thinking prior to writing. Getting all pupils trained in the maps continues to be a problem as this is done by the English Department and some members have over the years resisted the Maps but not told me! Hence I only find out they are not teaching them when other staff complain that a class does not know about them. Getting to an 'embedded' level where teachers have also developed a 'thinking conversation' to accompany the fluent use of the maps, and where pupils are sufficiently well-trained to choose the maps for themselves and use them accurately is difficult to achieve in a large school with a constantly changing staff.

8. What is the impact of this thinking skills program?

1. **It is difficult to separate Thinking Maps from many developments in our Teaching and Learning at CNS. However, since we introduced them exam results have improved considerably throughout the school.**

2. **Anecdotal evidence also points to pupils and staff finding them helpful when the teacher is positive about them and can demonstrate accurately how to use them and then gives the students plenty of practice, e.g. some sixth form students using them in English have recently and reluctantly admitted that they have been very helpful in the study of their texts – the teacher deliberately made the students use the maps in order to develop her own fluency.**

3. **Some staff have developed an interest in the 'thinking' agenda and so I now have other teachers trained as trainers.**

4. **Thinking maps are used in other contexts such as leadership and management in the presentation of information e.g. the Assistant Head in charge of ICT presented the future developments for this area via Thinking Maps. The Headeacher recently presented post-Ofsted planning using the Thinking Maps software.**

5. **The SENCO has run a meeting for parents demonstrating the use of Thinking Maps**

6. **Circle maps are used during the primary transfer meeting with parents as a non-threatening and quick way of passing on information about their children to the new form tutors.**

APPENDIX 13

CIRCLE MAP

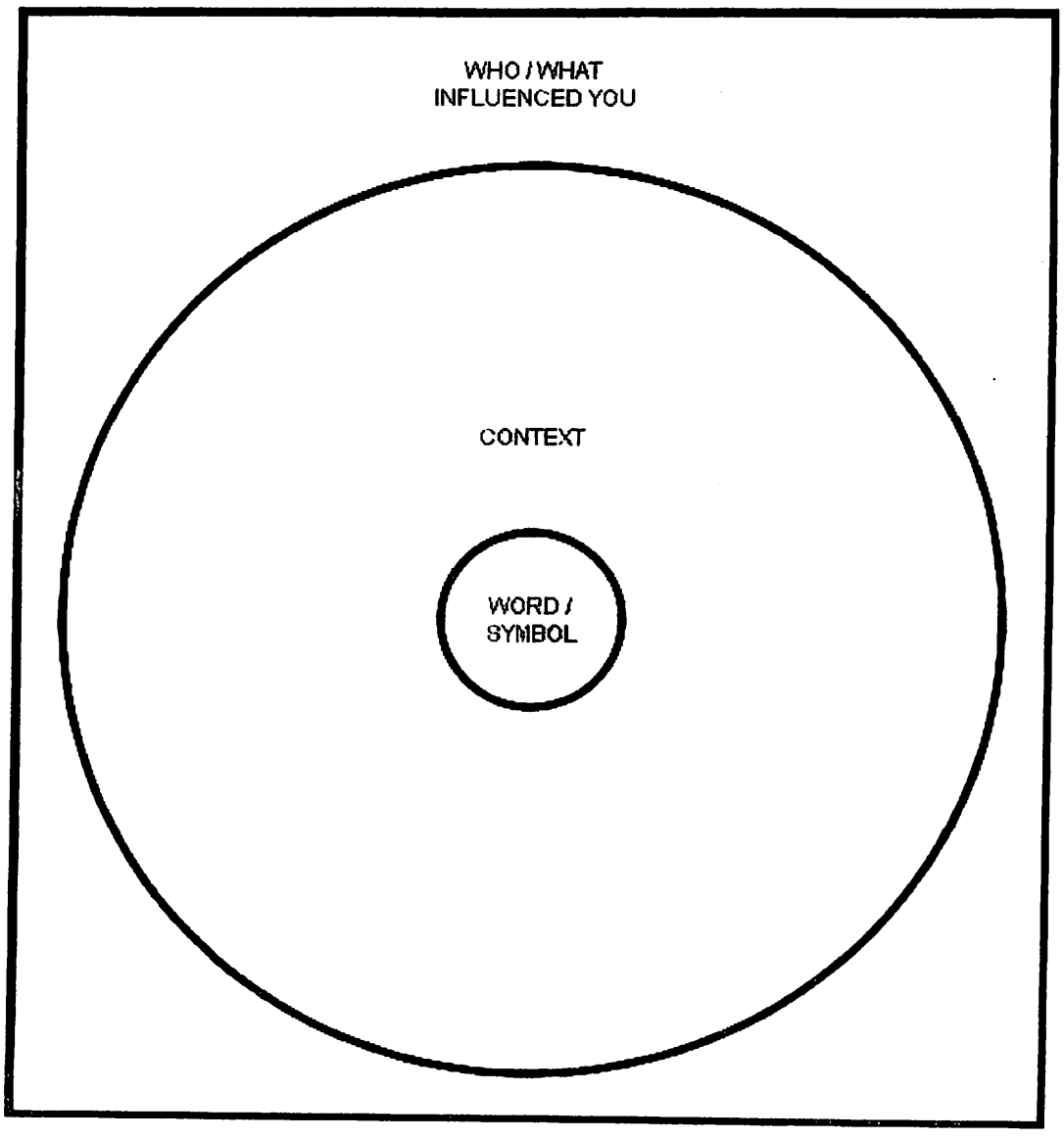


Figure 2.1

APPENDIX 14

BUBBLE MAP

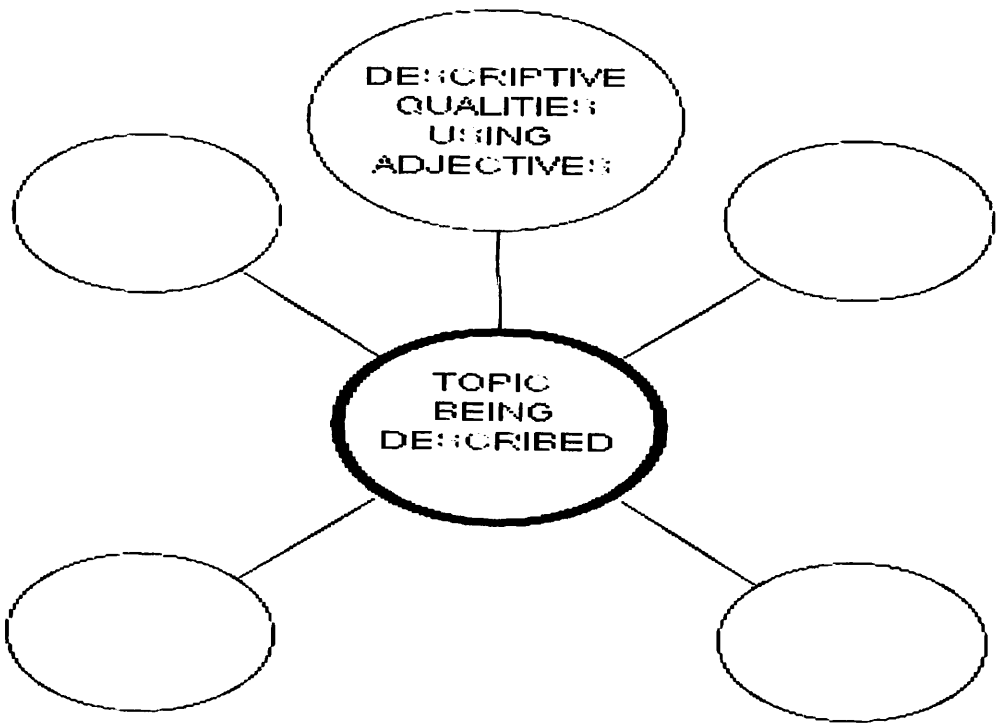


Figure 2.2

APPENDIX 15

DOUBLE
BUBBLE MAP

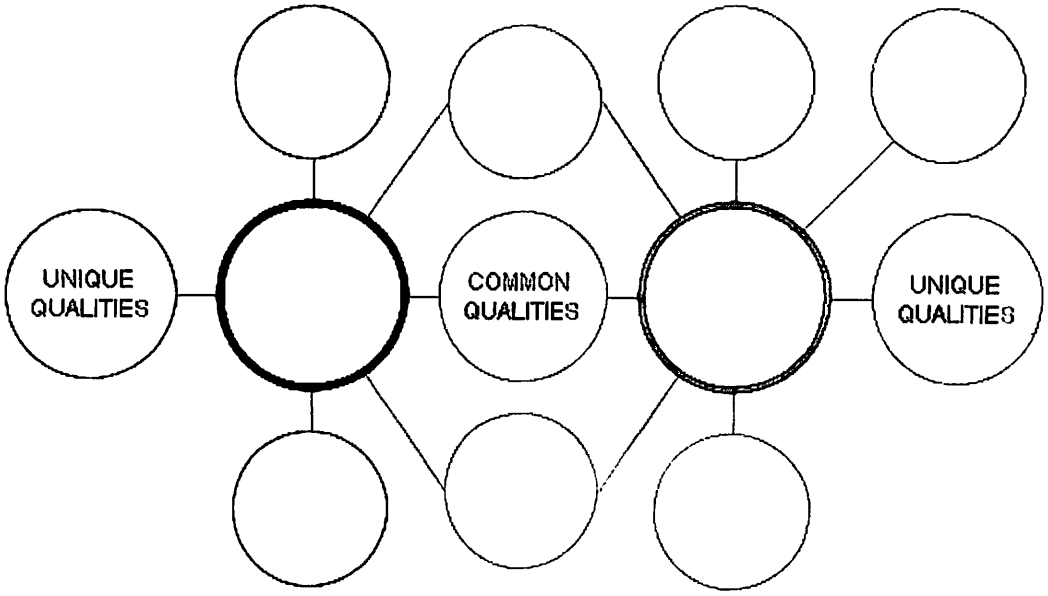


Figure 2.3

APPENDIX 16

TREE MAP

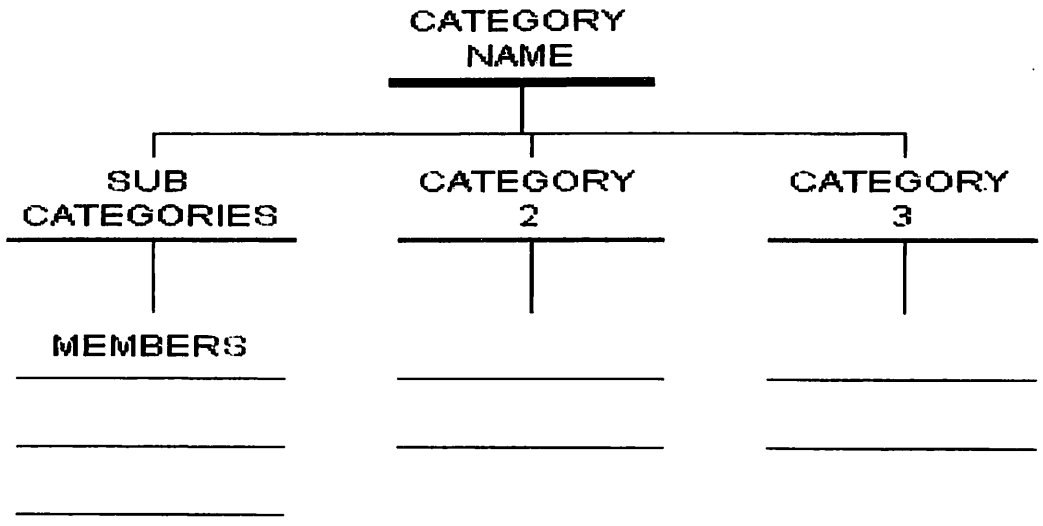


Figure 2.4

APPENDIX 17

BRACE MAP

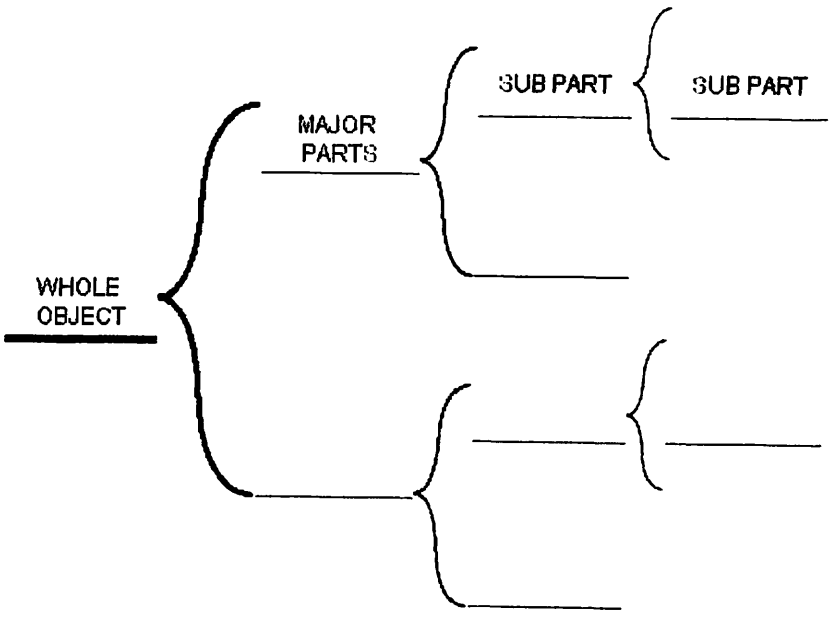


Figure 2.5

APPENDIX 18

FLOW MAP

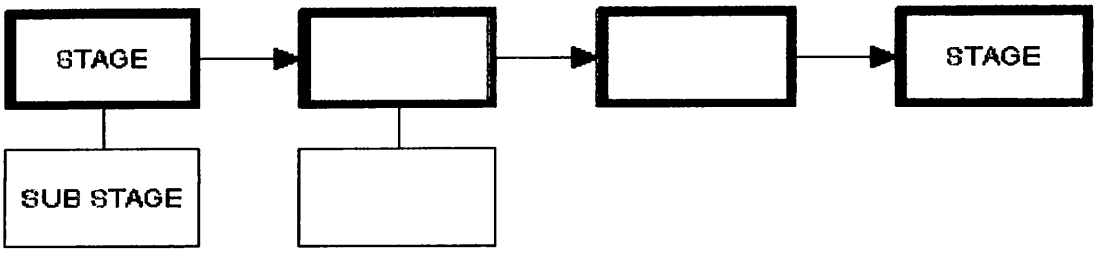


Figure 2.6

APPENDIX 19

MULTI-FLOW MAP

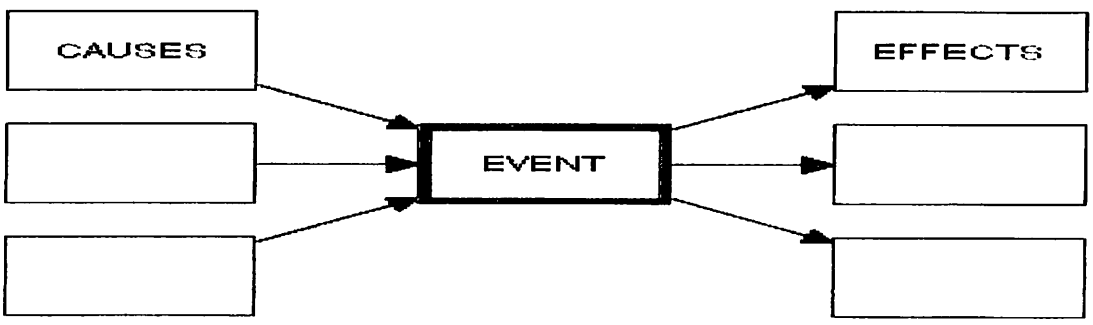


Figure 2.7

APPENDIX 20

BRIDGE MAP

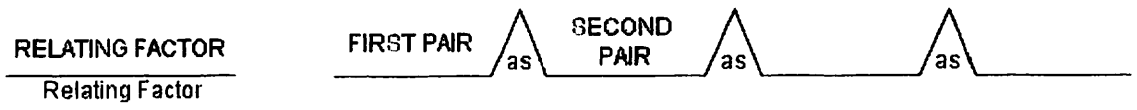


Figure 2.8

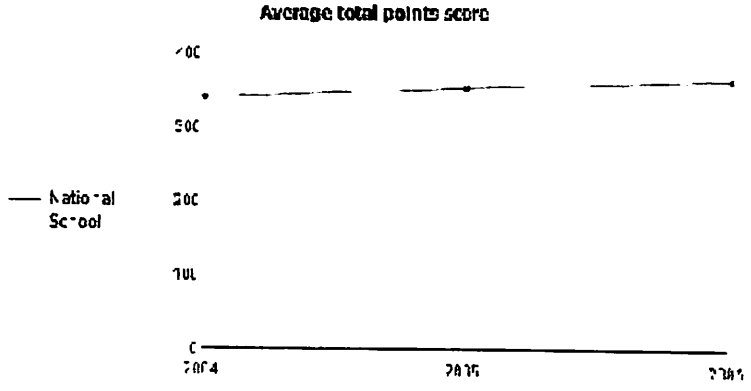
APPENDIX 21

Key Stage 4 average point score, 2004 to 2006

A Specialist Science College (8214606)

Average total point score, all subjects

The report provides analysis of pupils average point scores at GCSE/GNVQ since 2004. Significance tests have been performed on the data.



2006 Validated data

RAISEonline

Page 1

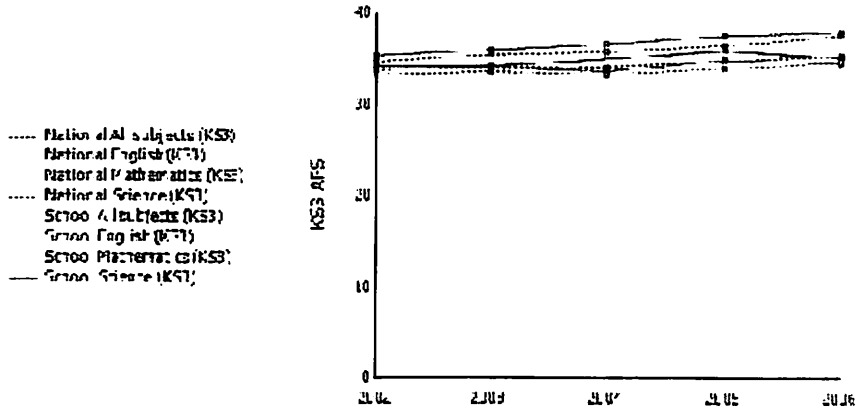
APPENDIX 22

Average point scores, 2002-2006 for all national curriculum core subjects

A Specialist Science College (8214606)

This report provides analysis of pupils average point scores over the last five years in the national curriculum subjects. Significance tests have been performed on the data.

Key Stage 3 average point score (All national curriculum core subjects)



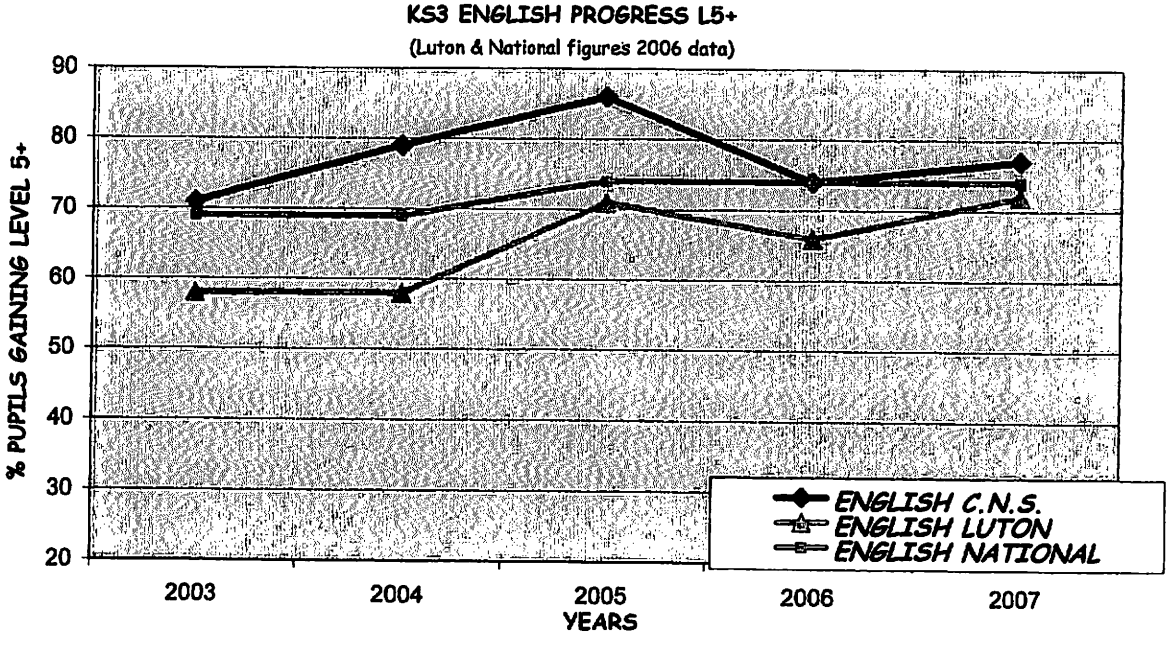
Year		2002	2003	2004	2005	2006
All Subjects	Cohort	742	718	722	244	233
	School	34.2	34.2	35.0 ↑	35.8 ↑	35.0 ↓
	National	33.8	34.1	34.1	34.7	35.2
	Difference	0.4	0.1	0.9	1.1	-0.2
	Significance			Sig.	Sig.	
English	Cohort	246	238	239	244	233
	School	33.3	32.8	34.7 ↑	35.3	33.0 ↓
	National	33.3	33.4	33.5	34.0	33.8
	Difference	0.0	-0.6	1.2	1.3	-0.8
	Significance			Sig.	Sig.	Sig.
Mathematics	Cohort	248	240	241	244	232
	School	35.4	35.9	36.5	37.3	37.7

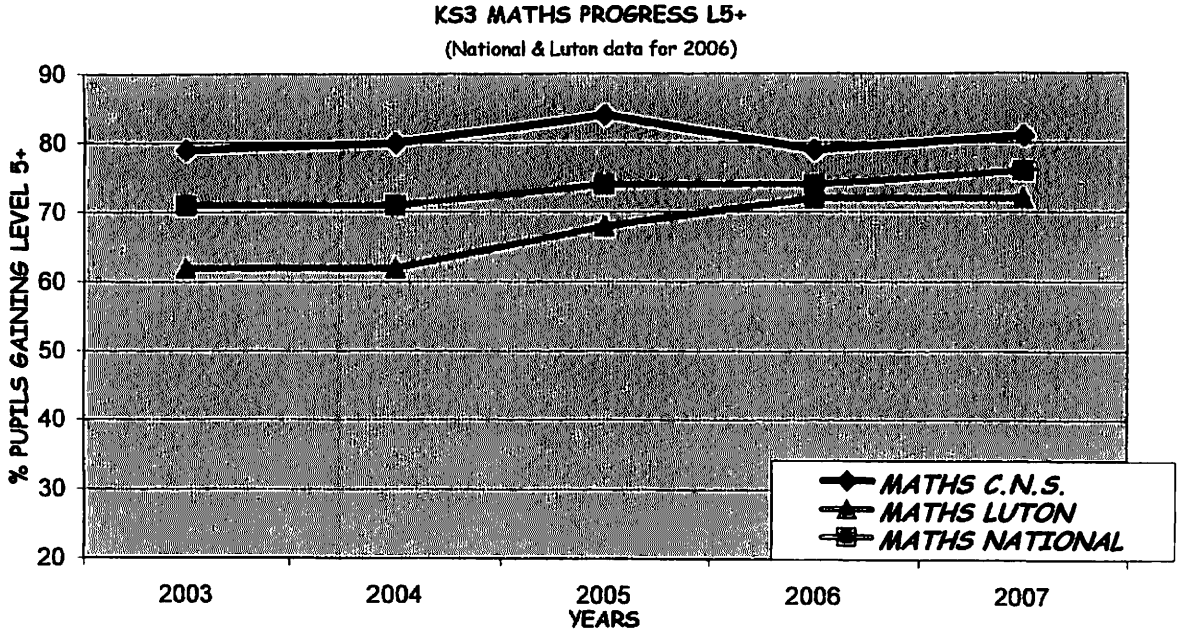
2006 Validated data

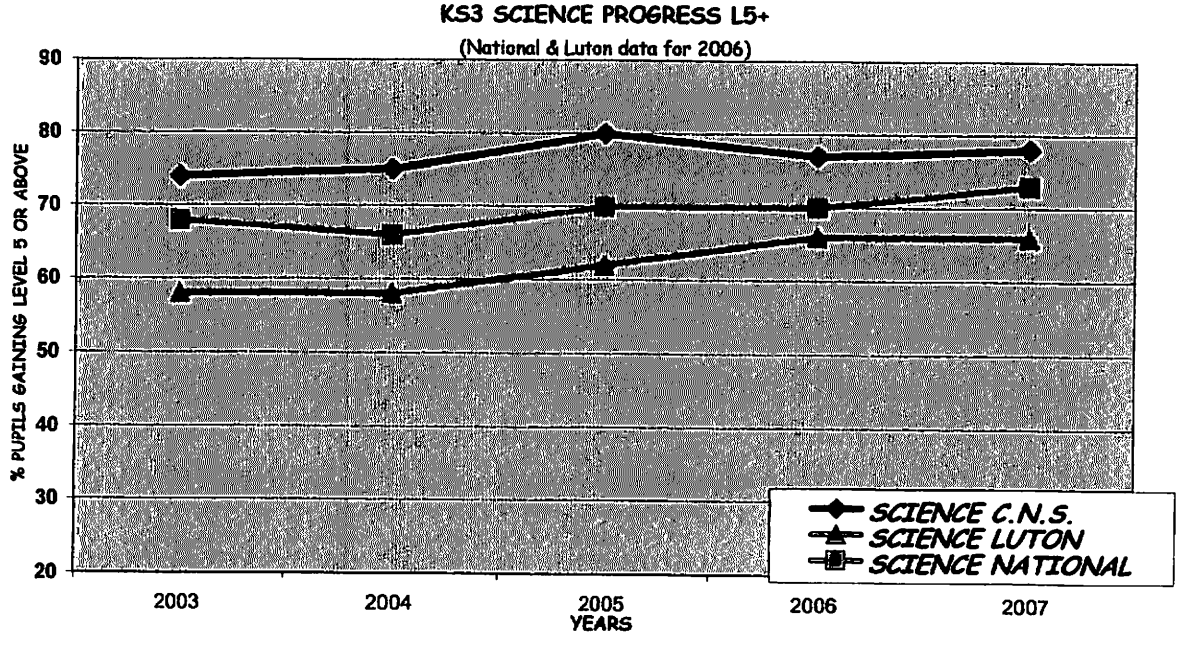
RAISEonline

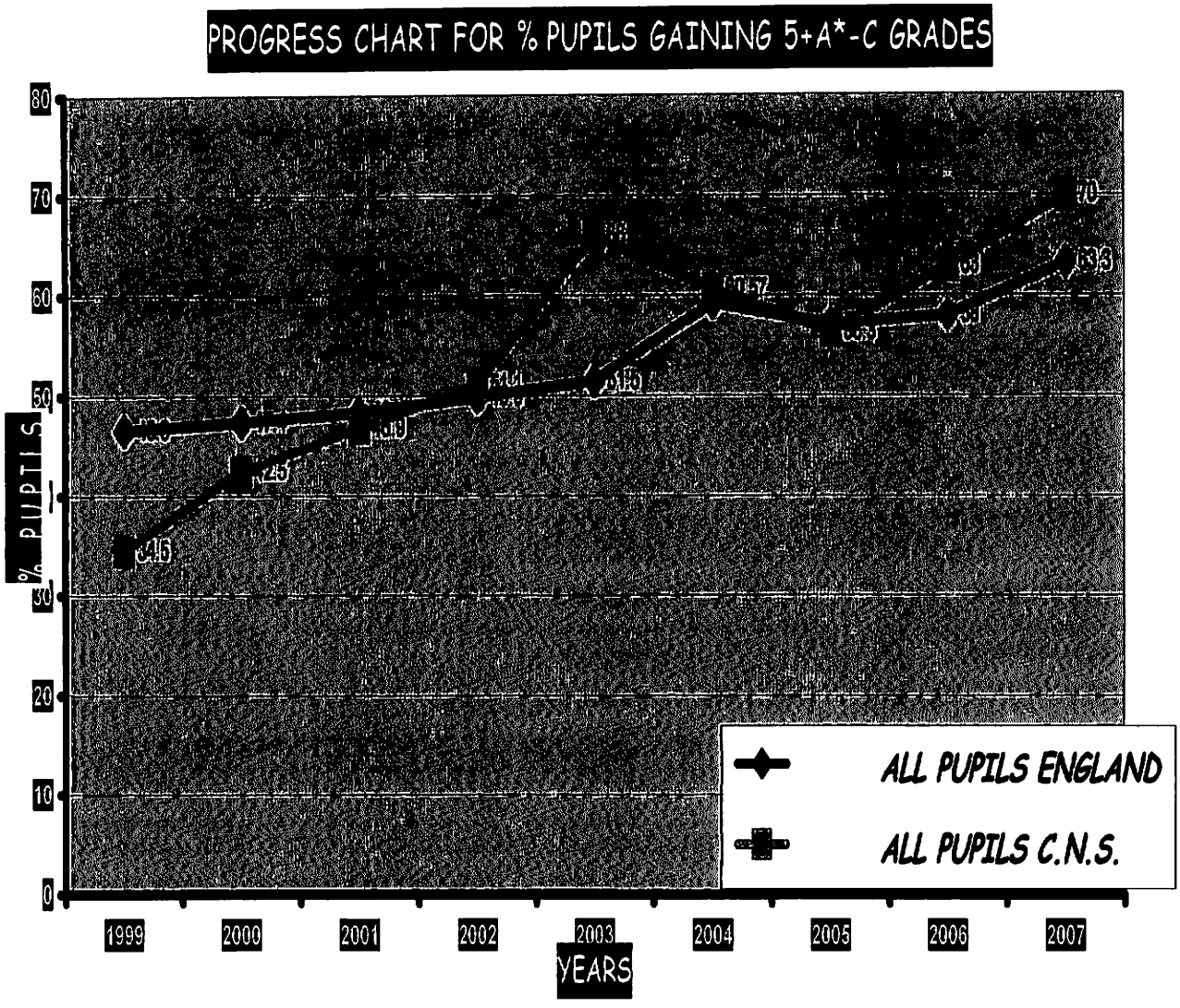
APPENDIX 23

	2003	2004	2005	2006	2007
ENGLISH C.N.S.	71	79	86	74	77
ENGLISH LUTON	58	58	71	66	72
ENGLISH NATIONAL	69	69	74	74	74
	2003	2004	2005	2006	2007
MATHS C.N.S.	79	80	84	79	81
MATHS LUTON	62	62	68	72	72
MATHS NATIONAL	71	71	74	74	76
	2003	2004	2005	2006	2007
SCIENCE C.N.S.	74	75	80	77	78
SCIENCE LUTON	58	58	62	66	66
SCIENCE NATIONAL	68	66	70	70	73




KS3 MATHS PROGRESS L5+
(National & Luton data for 2006)
% PUPILS GAINING LEVEL 5+
90
80
70
60
50
40
30
20
2003
2004
2005
2006
2007
YEARS
MATHS C.N.S.
MATHS LUTON
MATHS NATIONAL


KS3 SCIENCE PROGRESS L5+
(National & Luton data for 2006)
% PUPILS GAINING LEVEL 5 OR ABOVE
90
80
70
60
50
40
30
20
2003
2004
2005
2006
2007
YEARS
SCIENCE C.N.S.
SCIENCE LUTON
SCIENCE NATIONAL


PROGRESS CHART FOR % PUPILS GAINING 5+A*-C GRADES
% PUPILS
80
70
60
50
40
30
20
10
0
1999
2000
2001
2002
2003
2004
2005
2006
2007
YEARS
ALL PUPILS ENGLAND
ALL PUPILS C.N.S.

E.C.M.

ENJOY &
ACHIEVE ECONOMIC WELL BEING ☐

Teaching and Learning

"To celebrate and enjoy our learning by using our special God-given talents to achieve our very best"

Rationale:

We believe that our understanding of what it means to be uniquely human is at the heart of our vision of teaching and learning. We aim to foster the God-given talents of staff and students, enabling them to enjoy and achieve, appreciating learning as a gift for life.

Aims:

1. To ensure that students understand what it means to be a successful learner; develop into confident learners who enjoy learning; can talk about themselves as learners and understand its life-long value.

2. To ensure that teachers understand how students learn; set high expectations of students; and plan and deliver lessons that students can both enjoy and achieve.

3. To provide opportunities for students to take part in learning experiences beyond the school classroom and become equipped with the skills they need to extend their learning beyond their school life.

4. To provide a teaching and learning environment that is exciting and challenging that embodies trust and respect, enabling both staff and students to give and achieve their very best.

5. To ensure that staff have access to high quality professional development.

6. To monitor the quality of teaching and learning annually.

Objectives:

1a) To introduce and establish a 'learning to learn' curriculum.
1b) To have clear routines at the start of each day that encourage and foster a climate for learning and the desire to learn.
1c) To equip students with a toolbox of thinking strategies that will enable them to work independently and with others across all subjects.
1d) To ensure that all students have an academic mentor with whom they meet each half term to discuss their progress and set targets for improvement.
1e) To encourage peer assessment, self assessment and formative feedback from teachers (in line with the Assessment for Learning Policy).

2a) To employ well-qualified teachers who have demonstrated an understanding and interest in how children learn.
2b) To ensure that all departments have up to date schemes of work that are thorough, differentiated and challenging for students at all levels of ability.
2c) To plan all lessons to include learning objectives, starters, explanations, learning activities and plenaries.
2d) To regularly monitor the pupils response to lessons.
2e) To share good practice across Departments - in particular those that relate to the specialism.
2f) To plan lessons that develop skills such as literacy, numeracy and ICT and are both boy and girl friendly.

3a) To use the school specialism to provide alternative learning opportunities for students.
3b) To provide opportunities for students to take part in cross-curricular activities such as enterprise, citizenship and cultural events; to have opportunities to organise events, to represent their peers, to engage in group work, problem solving, debating and campaigning, and service to the community.
3c) To work with the local and wider Catholic community through the Specialist Science group.
3d) To develop opportunities for students to demonstrate spiritual, moral social and cultural values and awareness.
3e) To set and mark homework regularly (in line with the Assessment for Learning Policy & Homework Policy), so as to encourage students to work independently.
3f) To use the most up to date technology available to us and to the students so as to enhance the quality and enjoyment of their learning.

4a) To ensure that classrooms are clean, tidy and attractive.
4b) To display the thinking and learning curriculum in all classrooms.
4c) To ensure that resources are well-prepared and the best we can provide.
4d) To use the assertive discipline system to manage students behaviour in a way that is fair and balanced.
4e) To speak to students and be spoken to in a respectful manner.
4f) To display a love and enthusiasm for our school.

4g) To create a culture of achievement and reward students for excellence.

5a) To develop a programme of twilight training that is targeted at specific aspects of teaching and learning.
5b) To encourage all department meetings to include the sharing of good practice.
5c) To offer all staff the opportunity to observe other members of staff teaching.
5d) To develop and affirm staff by encouraging them to lead training in areas of special strength and excellence.

6a) To develop a programme of HOD and SLT observations annually which will include the observation of PSHE and Citizenship.
6b) To encourage all staff to reflect on teaching strategies and areas for development and to provide support to raise standards.
6c) To maintain up to date statistics on the quality of teaching in the school to complement the data on pupil progress.

Race Equality Monitoring **Date: 9th March 2006**

1. **Does this policy have any implications for race equality?**

Yes, because good teaching and encouraging all students to enjoy and achieve will raise the self esteem of all groups and aid future economic well-being regardless of ethnic background

2. **If 'yes', will it advantage or disadvantage any particular ethnic group**

No, students have an entitlement to good quality teaching and this policy should ensure that for all

3. **How will this policy, if relevant, promote good race relations?**
(See Q1 above)

Monitored by the Governors Curriculum Committee.

• Inclusion: To what extent does inclusion contribute to the distinctive identity and effectiveness
of the school?
• Independence: How effectively do learners develop and apply initiative and take responsibility
as they progress through school and into the sixth form?
• Innovation: How innovative is teaching, learning and the curriculum in meeting individual
needs, interests and aspirations? How does specialist status contribute?
Other aspects of the school's work were not investigated in detail, but inspectors found no
evidence to suggest that the school's own assessments, as given in its self-evaluation, were
not justified, and these have been included where appropriate in this report. Evidence was
gathered from documentation, assessment data, meetings with key staff, governors, students
and a sample of lesson observations.

Description of the school

Cardinal Newman Catholic School is a popular, over-subscribed school serving a wide area in
and around Luton. The attainment of students on entry is average but the proportion of students
with learning difficulties and/or disabilities is below average. The percentage of students
claiming free school meals is low in relation to national levels. A higher than average proportion
of students are from families with minority ethnic groups but the percentage of pupils who
speak English as an additional language is low. The school is the only one with a sixth form in
Luton. The school was awarded specialist school status in science in 2004.

Key for inspection grades

Grade 1 Outstanding
Grade 2 Good
Grade 3 Satisfactory
Grade 4 Inadequate

Overall effectiveness of the school

Grade: 2

Cardinal Newman Catholic School is a good school with many outstanding features. The care,
guidance and support provided by staff at all levels contribute to the strong sense of community
valued by individual students, their parents and carers. It is exemplified by effective team work

by senior leaders and governors through to collaborative learning in the best lessons. It is
underpinned by the clear vision for continuous improvement that is well informed by and communicated to all.
Students start at the school with average attainment, make good progress and reach standards
in national tests and in GCSE examinations above national averages; achievement and standards
are good. Provisional results for 2007 indicate that overall trends in students' performance
continue to rise in all Key Stages. Almost all students achieve at least five or more qualifications
at GCSE level and a very high proportion gain 5 A*-C, including English and mathematics.
Science results were above the national average but slightly below specialist college targets.
Most subjects achieved improvement in 2007 including those that have less consistent success
such as modern foreign languages. Target setting for the school and for individual students is
based on secure procedures in all subjects and goals are sufficiently challenging to promote
further improvement. The school's inclusive approach ensures that students of all abilities,
including those with learning difficulties and/or disabilities, make good progress. Results show
that the progress of boys and students predicted with borderline grades accelerated following
a concerted effort to identify and address the underachievement of particular groups of students.
The personal development and well-being of learners overall is outstanding. The impact of
learning and academic mentoring is significant because all staff and many students contribute;
role models are plentiful. Students appear well prepared for their future economic well-being
because they develop qualities of value in the workplace; good attendance and listening,
cooperative and supportive relationships, trust and responsibility, secure literacy, numeracy
and information and communication technology skills. Students have earned a good reputation
through their positive attitude when on work experience and when visiting local colleges for
vocational courses. Most students respond positively to behaviour policies and expectations

of homework but a small minority remain dependent on direction at the expense of showing
initiative. However, when lessons heighten active participation students' self-discipline, enjoyment and enterprise are evident.
The quality of teaching is good overall. School monitoring records indicate an increase in the
proportion of outstanding teaching since the last inspection. The impact of professional development is significant. New teachers to the school receive comprehensive support differentiated to their needs. Established teachers are able to select from a menu of 'craft of
the classroom' activities, closely matched to the expectations made of them to deliver individual,
departmental or school improvement priorities. For example, the school is aware of the need
to develop students' independence; leading teachers' lessons in school contain challenges for
students to think for themselves, take initiative in paired or group work or demonstrate their
understanding to others. The impact of the national secondary strategy is also evident; interesting starter activities get students quickly and enthusiastically engaged in the best lessons. Whilst teaching remains variable across the whole school, qualities of importance to
the school's vision for improvement are identified accurately and promoted regularly.
Inspection Report: Cardinal Newman Catholic School, 13 November 2007 **4 of 10**
The school's specialist status contributes well to partnership links with other schools and educational settings. For example, work with primary schools has strengthened the continuity
of the curriculum in science from Year 5. Opportunities to sustain learning at secondary school
have increased through focused activities such as the 'Mission to Mars' day. Significant additions
to the curriculum have broadened the range of opportunities open to students with differing
needs, interests and aspirations in addition to a strong core of provision. The curriculum is
enriched with a typical range of events, visits, visitors and extra-curricular activities but some
students have experienced only a few of these due to financial constraints used to remove the
school's deficit. Nevertheless, the curriculum overall is outstanding due to judicious use of
school and local provision. Efficient use of resources leading to continuous improvement in
performance indicates that the school gives good value for money.
Care, guidance and support are outstanding because the extensive range of strategies used in

school are well integrated with external agencies to diagnose and resolve students' individual needs. Frequent monitoring of students' progress in subjects is supplemented by innovative assessment and tracking of students' learning skills across subjects. This contributes to a convincing picture of a large school in which individual students are known and valued and if appropriate, supported through additional resources such as the student progress centre. Not all parents are convinced that the new system of meeting with mentors to overview progress with students is successful. However, where particular teachers and subjects have embedded new approaches and talk authoritatively about students as learners as a whole, parents are appreciative and feel able to support students out of school.
The school has made good progress since the last inspection and its strong leadership team places it in an excellent position to improve further. For example, improvements in modern foreign languages have significantly increased the proportion of students achieving higher grades and in art and design the expertise of an advanced skills teacher (AST) has been deployed to improve provision and outcomes. Self-evaluation is now used more consistently across the school, supported by rigorous monitoring and evaluation of performance matched with excellent professional development opportunities. The need to develop higher level thinking skills in the sixth form has been interpreted as an opportunity to balance good examination results with more challenging, interesting and independent learning earlier on. Not all plans have yet achieved maximum impact but leadership and management is outstanding overall because at all levels staff are driven by a shared commitment to improvement and the principle that 'every child matters' is a reality at Cardinal Newman.

Effectiveness of the sixth form

Grade: 2

The school has an inclusive sixth form that successfully meets the needs of students with a wide range of ability and backgrounds, including some that join from other schools. Because

it is the only school sixth form in Luton, some Cardinal Newman students pursue the wide
opportunities in the area. However, a good proportion of students prefer the supportive approaches with which they are familiar. They also benefit from a good choice of curriculum
options because effective collaboration exists between the school and local colleges. Students
make good progress overall but it is better in vocational courses and in their second year.
Average standards are achieved overall. Their personal development is good but the school is
right to promote more independence in order to accelerate their progress at sixth form level.
Strategies to ease transition into the sixth form whilst adding to the range and challenge of
courses show good leadership and management but the full impact on students' study skills
Inspection Report: Cardinal Newman Catholic School, 13 November 2007 **5 of 10**
require continued evaluation. Nevertheless, sixth formers make an active contribution to the
school, show responsible attitudes towards other students and value the opportunity to work
with respected teachers.

What the school should do to improve further

• Tackle remaining inconsistencies in teaching by continuing to focus on the depth of thinking,
participation and progression of learners in the main school and sixth form.
Inspection Report: Cardinal Newman Catholic School, 13 November 2007 **6 of 10**

Any complaints about the inspection or the report should be made following the procedures set out
in the guidance 'Complaints about school inspection', which is available from Ofsted's website: www.ofsted.gov.uk.
Inspection Report: Cardinal Newman Catholic School, 13 November 2007 **7 of 10**

Inspection judgements

16-19
School
Overall
Key to judgements: grade 1 is outstanding, grade 2 good, grade 3 satisfactory, and grade 4 inadequate

Overall effectiveness

2 2

How effective, efficient and inclusive is the provision of education, integrated care and any extended services in meeting the needs of learners?

Effective steps have been taken to promote improvement since the last inspection Yes Yes
How well does the school work in partnership with others to 1 1

promote learners' well-being?
The capacity to make any necessary improvements 1 2

Achievement and standards

How well do learners achieve? 2 2
The standards 2 3 [1] reached by learners
2 2
How well learners make progress, taking account of any significant variations between groups of learners
2
How well learners with learning difficulties and disabilities make progress

Personal development and well-being

How good is the overall personal development and well-being of the learners? 1 2
The extent of learners' spiritual, moral, social and cultural development 1
The extent to which learners adopt healthy lifestyles 1
The extent to which learners adopt safe practices 1
How well learners enjoy their education 2
The attendance of learners 2
The behaviour of learners 1
The extent to which learners make a positive contribution to the community 2
How well learners develop workplace and other skills that will contribute to their future economic well-being 1

The quality of provision

How effective are teaching and learning in meeting the full range of the learners' needs? 2 2
How well do the curriculum and other activities meet the range of needs and interests of learners? 1 1
How well are learners cared for, guided and supported? 1 1

[1] Grade 1 - Exceptionally and consistently high; Grade 2 - Generally above average with none significantly
below average; Grade 3 - Broadly average to below average; Grade 4 - Exceptionally low.

Annex A

Leadership and management

How effective are leadership and management in raising achievement and supporting all learners? 1 2
How effectively leaders and managers at all levels set clear direction leading to improvement and promote high quality of care and education 1
How effectively leaders and managers use challenging targets to raise standards 2
The effectiveness of the school's self-evaluation 1 2
How well equality of opportunity is promoted and discrimination

tackled so that all learners achieve as well as they can
How effectively and efficiently resources, including staff, are 2
deployed to achieve value for money
The extent to which governors and other supervisory boards 2
discharge their responsibilities
Do procedures for safeguarding learners meet current Yes Yes
government requirements?
Does this school require special measures? No
Does this school require a notice to improve? No
Inspection Report: Cardinal Newman Catholic School, 13 November 2007 **9 of 10**
Annex A

Text from letter to pupils explaining the findings of the inspection

14 November 2007
Dear Students
Inspection of Cardinal Newman Catholic School, Luton LU2 7AE
Thank you for introducing us to your school during our recent inspection. We enjoyed the
opportunity to share your achievements and talk to you in lessons and through discussions.
Your views, and those of your parents, were very helpful in confirming what staff told us about
the school. We agree that Cardinal Newman Catholic School is a good school with many outstanding features.
We particularly liked the following things about your school.
• You get outstanding care, guidance and support to help you achieve your best.
• Standards of work and examination results are good and rising.
• You contribute positively to the school as a community and value support.
• The school is very well led and managed by an outstanding team.
• There is a wide range of courses, preparing you well for the future.
• You enjoy teaching that makes learning interesting by getting you involved.
• Your parents are supportive of the school and many are keen to help you too.
What we have asked your school to do now.
• Ensure that you enjoy learning and achieve well across all subjects by involving you actively
in lessons, developing your depth of thinking and independence as you progress through
the school.
We wish you success in working together to build on the school's reputation,
Ian Middleton HMI Susan Hartropp AI
Inspection Report: Cardinal Newman Catholic School, 13 November 2007 **10 of 10**
Annex B