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CORT

Transfer and behaviour

Process of inquiry

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"The preceding pages present a viewpoint or theory about the nature of science, and, like other philosophies of science, the theory has consequences for the way in which scientists should behave if their enterprise is to succeed" (Kuhn, 1970:p207)

II Abstract

Research on thinking skill programmes is conducted globally and almost all current frameworks of thinking were recently collected together and analysed. I was particular interested in one thinking skill program; namely, CoRT by Edward de Bono. When I met Dr de Bono in 2004 he impressed me with his beliefs and theories. After studying him in Ireland and America, I noticed that an important question was often raised by participants attending a de Bono course i.e., "do students apply CoRT tools in daily life, in other contexts, and what are the noticeable effects on students' thinking behaviour?" If CoRT is offered to students, will they adapt the skill into a competence that helps them to cope in a continuously changing world? This dissertation will describe the research undertaken in a secondary school with low achieving students in order to offer a possible answer to these questions.

Respondents, students, parents and teachers were informed about this research and cooperated fully with their contribution being made by completing a questionnaire and giving an interview while observations were made by teachers. After analysing the data a preliminary, if somewhat cautious, conclusion could be drawn: that students do indeed transfer these learned tools into other contexts. Other positive effects on their thinking behaviour were less impulsion and increased capacity to make balanced decisions. Consequently, CoRT will be implemented into schools' curriculum next year and teachers will be trained in CoRT, with the research being presented to all participants. Also, further investigation will be undertaken to assess how greater skills transfer can occur.

Key words in this dissertation are:

thinking skills, CoRT, de Bono, transfer, high road transfer, low road transfer, critical thinking, taxonomy of Bloom, metacognition.

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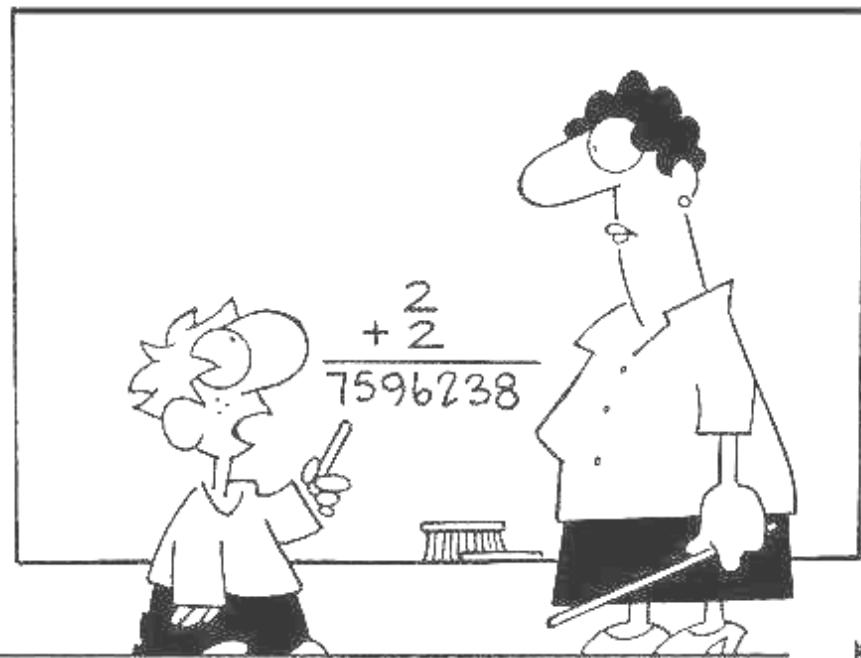
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"In an increasingly complex world, sometimes old questions require new answers."

Cartoons and drawing have their place in critical thinking (Moon 2008:27)

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Chapter One International Perspective

1. Introduction

“Teaching your children to think may well be the most important thing you can do for your children.” de Bono (1994:p300)

The importance of teaching thinking skills are clear to me. Gough (1991) says that thinking skills are perhaps most importantly in today's information age, and are viewed as crucial for educated persons to cope with a rapidly changing world. In this essay I intend to describe the different educational approaches between England and the Netherlands in dealing with creative thinking. I shall examine whether schools in both countries use the thinking methods illustrated by the CoRT program (Bono 1986) and the Six Hats Thinking method (Bono 1997) and, if so, how they use them for example, *via* a methodical approach, or a formal way of learning in which schools offer a segregated approach, or a more integrated methodology. In simple terms, thinking lessons are a way in which thinking skills are developed in an educational environment. If thinking is viewed as a separate competence, then one must presume that thinking can be taught. I was taught, as part of my educational philosophy, that thinking is a tool that is ingrained in every day practice, e.g., while performing in numeracy, literacy or science at school.

Although we apply thinking every moment of the day, the use and training of thinking skills are seldom taught by teachers in Holland. It is astonishing how little attention schools pay to the skill of thinking. My school, named Duhamel College, uses both thinking methods, which equips the student with a more problem solving attitude. Therefore we spend one hour a week on Thinking Skills. The strong belief is that students of all ages are more capable of facing problems while they are learning these thinking methods. Research (Higgins et al 2004) demonstrates how powerful this method is, and how students improve (www.edwdebono.com/cort/CXR06.html). I pondered on why only a few schools in Holland know this program and use it, or have the belief that thinking must and can be trained. The answer on the question if thinking skills can be taught is given by McGuinness (1999:p1) He points out that the most successful interventions are associated with a strong theoretical underpinning,

well-designed and contextualised materials, explicit pedagogy and teacher support. At the same time I wondered whether the same programs are used in the UK. As part of my MA SEN at Roehampton, I started to investigate this question by researching, reading and visiting three schools in England. The results and my findings I will present throughout this essay.

1.2 Creative and critical thinking

"Consider Einstein's equation, $E=mc^2$. Einstein did not invent the concepts of energy, mass, or speed of light. Rather, by combining these concepts in a novel way, he was able to look at the same world as everyone else and see something different"
(Michalko 2001:p11)

What do I think about creativity and creative thinking? What makes someone a creative person? When are you creative? What is creativity? Can you improve your creativity? Is there a difference between critical and creative thinking?

In literature one will say that creative thinking is all about breaking through thinking patterns with or without help of thinking programs, in order to find better solutions for the problem that we want to solve. This thinking occurs either accidentally or deliberately. It is the merging of ideas that have not been merged before. New ideas are formed by developing the current ones within our minds. Our brains are self-organising systems that organise incoming thoughts depending on what is already there. That is, we can only think of new ideas within the context of what we already know.

The inspection (Ofsted 2003) took as its definition of creative thinking:

"Imaginative activity fashioned so as to produce outcomes that are both original and of value. Creative processes have four characteristics. First, they always involve thinking or behaving imaginatively. Second, this imaginative activity is purposeful: that is, it is directed to achieve an objective. Third, these processes must generate something original. Fourth, the outcome must be of value in relation to the objective."

De Bono even invented a word that is now found in the Oxford English Dictionary. It is 'lateral thinking', (De Bono 1967) that is defined by the Oxford English Dictionary as: "a way of thinking which seeks the solution to intractable problems through unorthodox methods or elements which would normally be ignored by logical thinking".

Alternatively, Compact Oxford Dictionary says: "the solving of problems by an indirect and creative approach". Lateral thinking is specifically concerned with the generation of new perceptions and new ideas. Lateral thinking involves changing perceptions and flexibility. There is an overlap with creativity since both are concerned with producing something new, but lateral thinking is a more precise definition of the process of changing perceptions, i.e., changing the way we look at things.

It is generally accepted that thinking skills are the cognitive process and cognitive skills involved in making a rational decision on what to do or what to believe. (Ennis 2000). According to Cotton (1991) there is no universally accepted definition of higher-order thinking, creative thinking, critical thinking or decision making. Creative thinking is all about breaking the normal, logical thinking patterns. Breaking thinking patterns is breaking the normal, dominant, ordinary way that people think. It is breaking ones thinking barriers, both the logical and emotional ones. It is creating a breakthrough in the way an individual or a group look at things and problems. The human thinking system is a data processing system and functions by using patterns. It creates patterns, builds them and confirms them. The presence and use of patterns gives us a feeling of safety and makes it possible to exist in the way that we do. Without them, you couldn't drive a car or use a computer. It is brilliant and very fast but it gets into trouble if it has to create something new. It is necessary, therefore, to break through the routine of all those patterns if a person is struggling with a problem. The brain is a natural and powerful pattern maker. From birth it tends to see patterns everywhere. The very essence of learning is based on constructing patterns in order to control things and to use and arrange things in an automatic way. It is a brilliant system but it has some disadvantages; it is lazy as it always relies on old solutions and successes. If a certain thinking pattern has brought fortune, it will not easily be abandoned. This is the feeling of competence and self-assurance.

So, it is necessary to break existing thinking patterns in order to change perspective and create new, original ideas. To be a successful, creative thinker it is crucial to have the attitude to see the world in a different way, from another perspective, facing the

world and its problems in an exciting and flexible way. "It is obvious that the better you become at thinking skills the less often you will be stuck" (De Bono, 1992:51). Three principles are fundamental for creative thinking: postpone judgement and look for alternatives and opportunities (CoCD). Delaying judgement means that, for a certain period of time, every idea is considered without judging it enabling more and better ideas in less time. Afterwards, judgement and evaluation is more effective than it would have been had criticism followed immediately, and the generation of great ideas may have been inhibited. Put simply, if seeking a solution for a problem then look for many alternatives. The more ideas generated, the more likely there will be a winner amongst them. When problems are encountered, view them as opportunities to spark new ideas.

Thinking skills are important for effective questioning and extending pupils' oral responses in classrooms, as well as the potential contribution to assessment for learning. They develop a more effective problem solving attitude. They are approaches or programs that identify translatable mental processes for learners and/or which require learners to plan, describe and evaluate their thinking and learning. (NACCCE 2003). In education, a lot of thinking is still done by emphasising the analysis, where children are taught to understand the issue by logical arguments. They have to find the solution just by eliminating the incorrect options and fix on the correct one. It is what we call critical thinking, which is not bad, but by involving creative thinking as described earlier, by blending creative and critical thinking, the cognitive development of children will improve. In an activity like problem solving, both kinds of thinking are important. First, the problem must be analysed, then possible solutions are generated. Next, the best solution must be chosen and implemented, and finally the effectiveness of the solution must be evaluated. This is where critical thinking is used. Critical thinking is named after 'kriticos', which translated from Greek to 'judge'. This process reveals an alternation between the two kinds of critical and creative thinking. In practice, both kinds of thinking operate together and are not really independent of each other. De Bono developed the six hats thinking method (De bono 1997). It is a method for doing one sort of thinking at a time. There are six coloured hats each represents a type of thinking. White hat stands for facts and information, red hat stands for feelings and emotion, yellow hat means advantages, benefits, green hat

stands for exploration, new ideas and the blue hat is the control of the thinking process. Edward de Bono's black hat (De Bono 1997) is used as an assessment tool. When you put on your black hat, you ask yourself questions like: what could be the possible problems, what could some of the difficulties be, what are points of caution and what are the risks ? So it helps to make good decisions, it points out difficulties and it explores why something may not work. So critical thinking. It is, therefore, a very powerful hat, but by overusing it new ideas won't show up. It even kills creativity. That is why all the six hats are used separately, one after another.

1.3 Thinking Methods

"Thinking is not intelligence, or information, or being right but an operating skill that can be improved" (De Bono, 1994:p301)

Methods that are commonly used for teaching how to think are CoRT thinking lessons (De Bono, 1986), Six Hats Thinking (De Bono, 1969) Somerset thinking Skills (Blagg et al, 1988), Philosophy for Children (Lipman et al, 1980) and Instrumental Enrichment (Feuerstein, 1980). Nisbet et al (1990) lists over 30 such programs. In the USA there are already more than a 100 methods. Since the 1980s thinking skills appear in schools in the UK as well in the Netherlands. The term is ambiguous and it could be said that thinking methods are interventions that make a child a more effective thinker. My focus in this essay is on the programmes of de Bono.

In 2004, I studied Six Hats Thinking and the CoRT program of Dr. Edward de Bono in Dublin. Although CoRT (De Bono 1986)is not frequently used in Britain, the name of de Bono is strongly associated with thinking and thinking skills. De Bono developed the CoRT programme, the direct teaching of thinking as a subject, which has been in use in schools since 1972. He stresses the importance of consciously practicing certain strategies in order to become a more critical, creative thinker. His CoRT program exists of 6 books, each containing 10 lessons. The first book teaches the thinking tools such as Plus, Minus and Interest (PMI) and Other Peoples Point of View (OPV). PMI forces the child not to rush into a quick decision. Firstly, it lists all the things that are positive about an idea, followed by the negative ones and finally all the things that are interesting, irrespective of critical orientation. OPV shows the different

sides of a question, a topic or an issue. It is important to be aware of all the perspectives, because 90% of human mistakes are due to a wrong perspective. This has been confirmed by research at Harvard University. (David Perkins et al 1987) I became increasingly interested when I read that there is a positive impact on pupils' attainment in both curriculum and non-curriculum measures. Children can use this skill in other contexts, such as social ones.

Nickerson et al (1985) says: "*the tools of the CoRT program helps you to broaden your mind, to improve your planning, decision making, problem solving and creative skills and how to deal with information. In general, the CoRT operations seem more suitable for contexts of decision making and informal reasoning in humanistic, social, and design contexts. They have a straightforward and immediate application to the sorts of problems that arise in everyday life. The CoRT operations can be seen as simple practical tactics that may help individuals to think sensibly about non-technical things, and, also, help them to come to perceive themselves as thinkers.*"

The use of the Six Hats Thinking Method is comparable with a computer. In this analogy, Six Hats is the operating system and CoRT is the software. The Six Hats Thinking method prescribes parallel thinking, which means that everyone in a group dealing with the same problem, has to wear the same hat. The blue hat controls the process, making sure that all wear the same hat at the same moment. No adversarial thinking, but constructive thinking. Social constructivism explains why it is so strong. Vygotsky (1978) describes social constructivism as a very effective way of learning, constructing knowledge with one another in a social environment. The belief is that the apprentice constructs knowledge during interaction with his environment and that the effectiveness is far greater than on your own. "*Collaboration enables insights and solutions to arise synergistically that would not otherwise come about*" (Driscoll, 2004:p385) Think as a team: **Together Each Achieve More**. In my essay I confine myself just by comparing de Bono's methods.

1.4 Comparison between thinking skills in England and in the Netherlands.

Education in England is very controlled. It is a strongly central and leading sent system. Ofsted visits schools every six years and issues a report which can find on the internet. Ofsted observes the curriculum and results but the political idea was that every school had its own program and could do whatever it liked. The effect was that the results were very poor. There was a plea for intervention, which ultimately brought about changes to English Educational Laws. The content of educational programs was formalised in the National Curriculum. By taking away the autonomy of the teacher, the motivation of the teacher was also taken away. Motivation which has to do with changes of educational programs. Besides that, there is no necessity for innovation. Ofsted prescribe what has to be done. In Holland the curriculum is also more or less controlled, but not so strongly. Schools are also visited by a watchdog like Ofsted and the results are also on the internet, but a school retains its autonomy within government laws. The school has a wide discretion to set its aims and goals that makes it feasible to develop its own educational philosophy. That means that the conditions in Holland to introduce thinking skills in school are far better than in England. Nevertheless, thinking lessons aren't widely spread within the educational system in Holland. To appreciate the situation in England, knowing that everything is so controlled, I visited three schools¹ in England. The National Curriculum says something specific about thinking skills. The teaching of thinking skills is an explicit part of the National Curriculum. It contributes directly to an initiative of the Department of Education and Skills (DfES): '*Teaching and learning in the Foundation subjects at key stage 3) This emphasizes the importance of thinking skills approaches for the promotion of effective questioning and extending pupils' oral responses in classrooms as well as the potential contribution to assessment for learning.*' I am of the view that it should be this way in the Netherlands as well, which is not the case at the present time. Further, I noticed that English schools use the programs in a very practical way. There are two different opinions in the educational field. On one hand there is a strong belief that thinking skills should be taught separately with specially designed programmes (Freseman 1990; Matthews 1989). On the other hand there are people who are in favour of infusion throughout the established curriculum. This means, that the methods are not presented as a skill or tool on its own. (Gough 1991;

¹ Clifton Hills school-Surrey/Linden Bridge school-Surrey/Ashbrook school-Milton Keynes

Bransford et al 1984). My opinion and experience is, after I reflected every time when I did thinking lessons, that infusion gives far better results. If you use the method as an add-on element, it stays fragmented. In that way there is hardly any transfer of these skills to new contexts. In England on the schools I visited, once children have learned this competence, they use it during lessons in cognitive areas like numeracy, literacy and science, but also throughout the whole school day. In the approach the teacher uses the words and pictures belonging to the method. He would say: use your green hat to think up some new ideas. English schools even make a strong connection between de Bono Six Hats and the taxonomy of Bloom (Bloom 1956). Bloom classified thinking into a hierarchical model comprising of six levels, knowledge, comprehension, application, analysis, synthesis and evaluation. This taxonomy contained three overlapping domains: the cognitive, psychomotor, and affective. Within the cognitive domain, he identified six levels: knowledge, comprehension, application, analysis, synthesis, and evaluation. These domains and levels are very useful as you develop the critical thinking skills of children. Critical thinking involves logical thinking and reasoning including skills such as comparison, classification, sequencing,

cause/effect, patterning, webbing, analogies, deductive and inductive reasoning, forecasting, planning, hypothesizing, and critiquing. If you compare de Bono and Bloom you see the parallelism. Learning is enhanced when individuals develop the capacity to reflect on, and refine their existing ideas and beliefs. In the reflection, evaluation and metacognitive dimension (Flavell 1976), children learn to reflect on what they know and

De Bono	Bloom
White hat: information, data, research needed	knowledge
Red hat: feelings, hunches, emotions, intuition	evaluation
Black hat: caution, risks, judgement	analysis and evaluation
Yellow hat: benefits, good value, strength	analysis and evaluation
Green hat: creativity, new ideas, brainstorming	synthesis
Blue hat: thinking about thinking, metacognition	comprehension and application

fig 1. Comparison de Bono and Bloom taxonomy – P. van Kessel



develop awareness that there is more to know. They learn to question their own perspectives and those of others. They evaluate the validity of their own and others' ideas. They also develop their metacognitive skills in planning, monitoring and evaluating their own thinking processes and strategies. In that way, children have a far more developed attitude towards problems of any kind. The children in the SEN schools in England that I visited were, therefore, not so easily blocked. If the teacher asked the children when they ran out of ideas to put on their green hat, new ideas just

came up. By making associations with help from a little picture, they came up with new ideas. As an example of infusion, I saw that children used the hats in literacy, but also during lunchtime, when they were discussing healthy food.

1.5 Conclusion

"There is not adequate theoretical recognition that all which the school can do for pupils, so far as their minds are concerned . . . is to develop their ability to think." (John Dewey, 2004)

This essay gives a general idea about critical and creative methods in education in the UK as well as in the Netherlands. You could say that in the UK creative thinking is more common than in the Netherlands. Schools I visited are very enthusiastic and use it during their daily approach towards the children and the different parts of the curriculum. What is not clear is if approaches to thinking skills are effective in raising pupils' attainment. There is a whole range of research (Romney et al 2001) about this topic, but most of these reviews are not explicit about their scope and scale. My interest is about the CoRT program and Six Hats Thinking which I saw in both countries. In educational settings it is often criticised and it is claimed that there is not much research being carried out on its effects.

"We find the lack of adequate evaluation studies on the CoRT program to be both surprising and disturbing. The program has been in existence for over 10 years and is claimed to be in wide use both in the British Isles and in Venezuela. Furthermore, de Bono makes strong claims concerning the effectiveness of the CoRT program. Yet after 10 years of widespread use, we have no adequate evidence concerning those claims and thus no support for the effectiveness of the program or the theoretical assumptions from which it was derived" (Polson et al 1985 pp 417-455)

Nevertheless, teachers keep using the methods because on one hand it is in the curriculum and on the other hand there is a strong persuasion that it improves the cognitive development, as well as the welfare of the children. Therefore I want to write my dissertation about these methods and their effects on children's behaviour.

1.6 Evaluation.

“Good learners take their time, don’t mind asking questions, aren’t afraid of saying ‘I don’t know’ or of being wrong, can change their minds and enjoy finding out.” (Claxton, 1991)

Reading about creative thinking is enjoyable. Besides that it is very practical and powerful. I’m motivated to read about it and I like to work with the different programs. Children, students, in fact just about everyone enjoy thinking lessons, and good thinking needs motivation, because it requires effort. You have to develop the habit of thought. Using the CoRT program you see and feel that it crystallizes the thinking processes into simple tools. In that way it removes the complexity of thinking and makes it possible for people of varied ages and abilities to master the thinking process. On our way to inclusive education I would say that it is very useful because you can use it with almost every child. At Box Hill Commonwealth Rehabilitation in Australia, for instance, the CoRT program was used to teach deaf people thinking patterns and techniques that could be used to their immediate advantage. In 2006, Victoria became the first Australian state to put thinking on the curriculum as part of the Victorian Education Learning Standards (VELS) curriculum. Other states are about to follow. On our way to inclusive education, introducing thinking skills would be a great step forward. As a good example (www.worldcouncilfornewthinking.org) : teaching “thinking” with de Bono to unemployed teenagers in the UK increased the unemployment rate by five hundred per cent, whilst the CoRT program that was offered to violent teenagers at the Hungerford Guidance Centre in London (David Lane: <http://www.edwarddebono.com/jnd6.htm>) reduced actual criminal behaviour to one tenth of what it had been. Think about that!

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"Good learners take their time, don't mind asking questions, aren't afraid of saying 'I don't know' or being wrong, can change their minds and enjoy finding out" (Claxton, 1991)

Chapter Two Research Methodology

2.1 Introduction.

This essay illustrates and summarises a range of approaches undertaken by researchers in the educational field concerning research. This is the process by which new knowledge is created. The word 'research' has two constituents; 'Re', meaning repetition of an action, and 'search', meaning to look at or examine closely. Kerlinger (1986:p10) says: "*scientific research is a systematic, controlled empirical and critical investigation of propositions about the presumed relationships about various phenomena*". I shall précis the various approaches via a review of several research books that can be found in the bibliography. It is my view that most of these books fail to consistently define research terminology. The books are sometimes written in such a way that they fail to provide the necessary information or concepts which are crucial to me as a newcomer to researching. But, by reading those books, I have been able to write my proposal because I am eager to do my research on thinking skills.

Hargreaves (1996) remarks "*Research is needed so that it demonstrates conclusively that if teachers change their practice from x to y there will be significant and enduring improvement in teaching and learning; research has developed an affective method of convincing teachers of the benefits of, and means to, changing from x to y.*" This doesn't mean that research rests solely on the ability to convince. The first aim is that by undertaking research, one might achieve a better and wider perspective of the effects of a phenomenon e.g. thinking skill programme like CoRT, Cognitive Research Program (De Bono, 1986). Secondly I wish to become a research literate, to improve my critical thinking and learn how to read and evaluate published research. Ultimately, I want to design and conduct a research project. Essentially, there are two main motives to educational research viz "*to inform understandings of educational issues, drawing on and developing educational theory and to improve educational policy and practice, by informing pedagogic, curricular and other educational judgements and decisions.*" (BERA, 2000). On the value of educational research, Cohen (2000) noticed that it enables practitioners to develop their knowledge and provides an insight into today's educational belief.

2. 2 Paradigms.

"To be accepted as a paradigm, a theory must seem better than its competitors, but it need not, and in fact never does, explain all the facts with which it can be confronted"
(Kuhn, 1970:p12)

In the social sciences area of education, most research can be classified as fitting into one of three research paradigms (quantitative, qualitative and mixed methods research. (Johnson et al 2004) To undertake research it is necessary to create a framework for thinking and doing. It is, after all, about how one views the world. Kuhn (1970) called this a paradigm: "*accepted examples of actual scientific practice, examples which include law, theory, application and instrumentation together.*" His idea is the notion that science does not proceed towards truth. The truth about nature, according to Kuhn, can not be obtained nor approached by science. I share the view of Willis Harman who defines a paradigm as a shared set of assumptions: "*The paradigm is the way we perceive the world: water to the fish. The paradigm explains the world to us and helps us to predict its behaviour*" (Harman 1976). All scientists aspire to have a greater understanding of nature. From paradigms like positivism, postpositivism, pragmatism, interpretivism and constructivism I have to decide which paradigm would fit into my educational research in order to design the right research methodology and choosing the research methods. As I want to do my research based on mixed methods, as I will explain later, I tend lean towards to pragmatism.

Positivism has several assumptions. Positivism says that knowledge or facts can be gained by using quantitative approaches, methods, and analysis and that it is the only knowledge which is available to us, to science. What one feels, or the value that might be given to one's collected data will be rejected. "*Science separates facts from values; it is 'value free'*"(Robson 2002:p20). Positivists are, therefore, only interested in the bare facts. It is almost a mathematical approach by trying to find a relation between quantitative data and universal causal laws. "*Essentially, positivists look for the existence of a constant relationship between events, or, in the language of experimentation, between variables*" (Robson 2002:p21). By identifying and isolating those variables, cause and effect relationships can be determined and explained. Positivistic approaches and their quantitative practices dominated the field of educational research in the 1950s. Since the 1980s there has been a lot of criticism

about positivism. A more natural and constructive approach became preferred by some over positivism. The comment had to do with science's mechanistic and reductionist view of nature which, by definition, excludes notions of choice, freedom, individuality, and moral responsibility. (Cohen et al, 2000) This new idea is called the interpretivist/constructivist paradigm. It generally uses qualitative methods (Cohen et al, 2000). This constructivist approach allows methods which are more qualitative, naturalistic and subjective. The pragmatic paradigm, mentioned before, places research at the centre of importance with all methods and approaches welcomed to contribute to its achievement. Balancing its weaknesses against its strengths, the mixed method approach provides me with the best insight for the purpose of my research. Not only quantitative data, but also my point of view on the phenomenon I am researching is very important to me. It brings me nearer to understand the outcome of my research data.

2.3 Research design.

"Design is concerned with turning research questions into projects" (Robson 2002:p79)

When conducting research one has to consider several questions. Mainsteam and Semin (1988) write that the strategies and tactics chosen to undertake research depend on the type of question you want answered. The design concerns all the things involved in your research. Adams and Shvaneveldt (1991:p103) describe research design as "*(a) plan, blueprint or guide for data collection and interpretation – sets of rules that enable the investigator to conceptualise and observe the problem under study*". One has to keep in mind those questions related to purpose, theory, research question, method and sampling strategy; they are all related to each other. Somekh and Lewin (2005:p346) define it as methodology: "*the collection of methods or rules by which a particular piece of research is undertaken*" and "*the principles, theories and values that underpin a particular approach to research*".

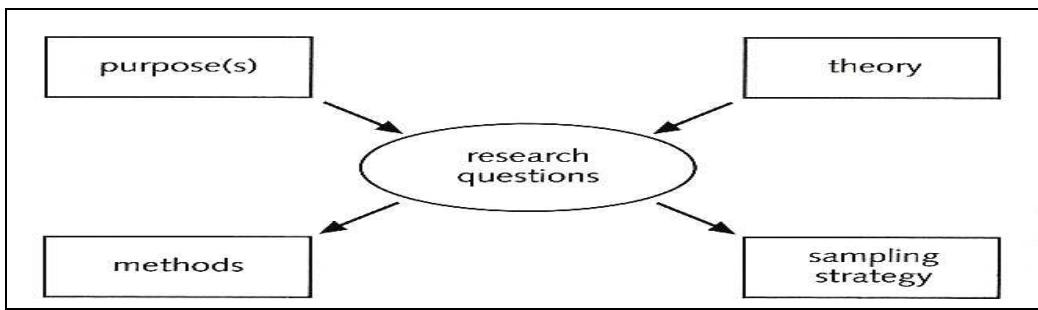


Figure 1 – Robson 2002 :p82

The research questions are the centre of the design as figure 1 shows. Research design must be seen as a structure that cements all the required elements like measures, treatments and groups together (Trochim 2006). The result of all these questions is one of the three major research designs: true-experimental, quasi experimental or a non-experimental. The question remains, however, as to which to select: quantitative, qualitative or mixed-method?

2.4.1 Quantitative research

“...the research scientist is not an innovator but a solver of puzzles, and the puzzles upon which he concentrates are just those which he believes can be both stated and solved within the existing scientific tradition”. Thomas Kuhn (1977:p234)

The definition of quantitative research would, to my mind, be a study that quantifies behaviour, measures variables concerning that behaviour, compares those variables and tries to find correlation between those variables. It requires coded measurement instruments such as questionnaires. By constructing complex statistical models it is possible to capture what is being observed and to explain what is observed. The subsequent findings can be generalized as long as valid sampling and data collection methods are used. Quantitative research is characterized by the use of numbers and statistics. The researcher knows in advance where his/her focus lies but the objective is to seek precise measurement and analysis of concepts, e.g. surveys, questionnaires. Kumar (1996;p10) explains it this way “*if you quantify the variation in a phenomenon, situation, problem or issue, if information is gathered using predominantly quantitative variables, and if the analysis is geared to ascertain the magnitude of the variation, then the study is classified as a quantitative research*”.

2.4.2 Questionnaires

A philosopher once said "*It is necessary for the very existence of science that the same conditions always produce the same results.*" Well, they do not. (R. Feynman, 1965)

Questionnaires are widely used and quite common in quantitative research because they provide structured, often numerical data. They can be administered without the presence of the researcher. The design of an effective questionnaire takes a significant amount of time, but they are comparatively straightforward to analyze (Wilson and McLean, 1994). To initiate a questionnaire one has to think carefully about the data to be collected and, in developing the questionnaire, the researcher always has to be aware that the questions are clear because, unlike an interview situation, they may not be present to clarify the questions. In addition, it must be developed in an interactive style "*This means respondents should feel as if someone is talking to them*" (Kumar 1996:pg110). It is necessary to consider the ethical issue as it is an intrusion into the private life of the respondent. Hence, it is imperative that the questions are sensible and clear otherwise the responses may not be valid. The advantages of using questionnaires are that they provide a lot of data in a short space of time. Additionally, questionnaires provide the respondent with anonymity, as there is no face-to-face interaction between the researcher and the respondent. "*The prevalence of a disadvantage depends on a number of factors, but you need to be aware of them to understand their possible bearing on the quality of the data*" (Kumar 1996:p114). So, it is essential to consider factors like limited application, low response rate, self-selecting bias, lack of opportunity to clarify issues, absence of spontaneous responses, influence by response on other questions, the possibility to consult others and no extra information can be added to an answer. Seen from my pragmatic paradigm I would say, that though questionnaires provide a lot of data, these data are very mathematical and I am more interested in stronger insights by talking to people and their behaviour I am researching.

2.5 Qualitative research

Qualitative research is based on the assumption that multiple realities do exist in the perception of the world. To understand all kinds of phenomenon a more diverse method is necessary; information collected through a variety of sources must be used and combined in a meaningful way in order to understand the phenomenon. Research is deemed to be qualitative if “*the purpose of the study is primarily to describe a situation, phenomenon, problem or event; the information is gathered through the use of variables measured on nominal or ordinal scales (qualitative measurement scales; and if analysis is done to establish the variation in the situation, phenomenon or problem, without quantifying it*” (Kumar, 1996:p10). Qualitative research is not as readily accepted by as quantitative research because one thinks that qualitative research is far too subjective. Since one started to do research there was a strong belief as Kerlinger said: “There’s no such thing as qualitative data. Everything is either 1 or 0.” (Miles et al 1994:p40) Qualitative research is a vast and complex area and mostly used when the researcher is interested in becoming more experienced in complex issues like behavioural disorder. This is because phenomenological enquiry uses a naturalistic approach in order to understand the phenomenon in context-specific settings. Therefore, qualitative research generates very detailed information. There are benefits and disadvantages at the same time to possess all the data gained by using methods like observation and interview because there is so much information and in that way you can describe the phenomenon in detail, but the difficulty arises when the researcher needs to decide how to categorise and generalise the data.

2.5.1 Observations

My research next year about the effects of Thinking Skill Programmes aims to demonstrate how the behaviour of children, and in particular their self confidence, can be investigated by observing what they are doing and describing, analyzing and interpreting what has been seen. In research, two main types of observation are commonly used: participant observation and structured observation (Robson 2000:p310). Kumar (1996) distinguishes two types of observation, namely participant and non-participant. The researcher either participates in the group that

they are observing or not. Participant observation is more qualitative in style, while structured observation is more quantitative. The latter is an efficient and structured way to collect information if the interest lies in quantifying some type of behaviour. The behaviour has to be described very precisely to ensure accuracy of the observation. "*The use of observational methods usually produces frequency counts of a particular behaviour*" (Marczyk et al, 2005:p119). Cohen et al (2000) names three types of observation: highly structured, semi-structured and unstructured. Highly structured has predefined criteria that allows the analysis of the data very rapidly. Semi structured observation has the same advantage, but the gathering of data is more flexible. The unstructured observation has no criteria and therefore the analysis of the data is more difficult. The major advantage of observation is that it reveals exactly what is happening, it shows 'the real world' although I am aware that observation is beset by issues of validity and reliability. "*Even low inference observation, is itself highly selective, just as perception is selective*"(Cohen 2000:p315) . Conversely, the outcome can be a disadvantage of observation. "*How do we know what the behaviour would have been like if it hadn't been observed?*"(Robson, 2000: p311). The problem is, that individuals or groups who are observed and are aware of that, might change their behaviour cause when you know you are watched you might change your attitude. Children in a classroom behave different when the teacher tells them he is watching them. This is known as the Hawthorne Effect (Gillespie 1991). Then there is the problem of bias. If the observer is biased, this can easily lead to unreliable data. It is hard not to be influenced by your own thoughts. Thirdly, the interpretations may change from observer to observer. First of all an observer has a limited focus. Secondly different observers may see and conclude different things although you have made clear what you want to observe. This may enrich your data: "*two researchers who are studying a single setting may come up with very different findings but both set of findings might be reliable*"(Cohen, 2000:p119) Besides that it also takes a lot of time to do observations, write everything down and gain from what you saw, useable, valid and reliable data. Observation is a method that can be employed in both quantitative and qualitative ways.

2.5.2 Interviews

The use of Interviews is a very challenging form collecting data. They require personal competence to ask the appropriate questions and to stay within the boundary of the design. They are very useful to gain an insight into the participant's experiences. "*Interviews 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*"(Cohen et al 2000:p267). They may be used as a follow-up to questionnaires to investigate their outcome. As I said before, you have to stay within the designed protocol and decide what type of interview to do. Cohen (2000) described four different types of interviews with his characteristics, strengths and weaknesses. An informal, conversational interview where no predetermined questions are asked and you go with the flow; a general interview, where the same information in different interviews is collected; a more specific interview in the form of a standardized, open-ended interview, where the interviewees can respond to open questions. If the interviewer is inexperienced, it is advisable to conduct a closed-fixed/closed quantitative interview, where the questions are established and the interviewees can choose answers out of a set of options. In this way you avoid "unstructured responses which are hardly to code." (Cohen 2000:p277). To achieve an effective interview it is important to pay careful attention to the design of the questions. Kvale (1996:p88) calls this planning interview-based research procedures. It is prudent to carefully phrase questions to prevent the desired answer from being apparent to the applicant. You have to avoid leading questions. Ask only one question about one subject at a time and all questions should be directly related to finding out the applicant's opinion of the research topic. My idea is that unstructured interview is a threat to the feasibility of my research. I might collect too much inferior data. Interview is useful and fits into pragmatism: it recognizes the existence and importance of the natural or physical world that includes language, culture, human institutions and subjective thoughts. (Johnson, 2004) Opponents of pragmatism reject pragmatism because of its logical failing as a solution. So again: structure of the interview is important

2.6 Mixed methods

"In the world of research, the prevalent experimental method consists of a set of controlled operations determined by hypotheses suggested by theoretical models. The chain "model - verification - correction of the model - reverification -..." is the basic structure ... for progress in science. However ... this method occasionally produces results entirely irrelevant to people with larger concerns... At times it becomes necessary to break this paradigmatic circle and to seek the natural, primary source of the phenomena: the visual experience of ordinary seeing. Although the researchers who enjoy this way of exploring are not very numerous, in the past a great part of fruitful psychological research developed in this fashion": (Kanizsa 1979)

Having described quantitative and qualitative research, I should now like to describe a further method, a mixed method approach, called the third paradigm. The pragmatic paradigm is the opportunity for "*multiple methods, different worldviews, and different assumptions, as well as different forms of data collection and analysis in the mix methods study*" (Creswell, 2003:p12). This implies that tools from both positivist and interpretivist paradigm may be used e.g. interviews, observations, testing and experiments. The benefits of mixed method research are triangulation (Cohen et al, 2000), complementary, development and expansion which makes, to my mind, research more valid. You can compare not only the outcome of data, but also the point of view of all involved in the research. The metaphor, used by professor Dr. Richard Pring during college at Roehampton University, that quantitative research is like a skeleton and qualitative research is like flesh on the bones convinced me. He referred to Birley and Moreland (1998) who said: "*The advantage of the quantitative approach is that it measures the reactions of a great many people to a limited set of questions, thus facilitating comparison and statistical aggregation of the data. This gives a broad, generalisable set of findings. By contrast, qualitative methods typically produce a wealth of detailed data about a much smaller number of people and cases. Qualitative data provide depth and detail*". Quantitative research is characterized by the amount of accurate data collected. One tries to achieve generalizations based on mathematical use and interpretation of those numeric data, while qualitative research shows the realistic point of view of the participant; it sets the results in a human

context, a real world. It makes human as important as it should be. Human is the central issue in my research. There is no rule that says that only one method must be used in an investigation (Robson 2002) and the use of triangulation will enhance the rigidity of my research. Robson says that methodological triangulation is a way of putting quantitative and qualitative research together and that it can help to counter all of the threats of validity. (Robson 2002:174-175) Triangulation is a powerful way of demonstrating concurrent validity, particularly in qualitative research (Campbell et al 1959). I would like to perform data triangulation e.g. observation, interviews and questionnaires, as well as methodological triangulation by combining qualitative and quantitative research. I will conduct observations to provide the information I need to answer my research question. This particular technique will be used because I want to observe behaviour children and interactions concerning their school task after they have followed Thinking Skill Programmes. The observations will last between 20 to 30 minutes without contemporaneous notes being taken, but with a clear focus on what is being witnessed. The written narrative will take place later, and it is my belief that the notes made at that time will capture the important points, because I have remembered them from my earlier observations. Questionnaires will be very useful for research. Robson uses Czaja and Blair's chart of comparison and the use of questionnaires (Robson 2002:237). The self-completion questionnaires will fit in with my research. With the help of questionnaires I will be able to investigate if there is a tangible improvement in solving problem attitude, social behaviour and self-confidence. When I design my questionnaires, interviews and observations, I have to deal with validity because otherwise I could draw the wrong conclusions from my data. I then have to ask myself if the instruments I am using provide answers to my research question. To be sure that an instrument measures what it is supposed to, I have to achieve good justification. To establish the reliability of the used methods I can perform the repeatability test followed by the equation $(\text{test score}) / (\text{re-test}) = 1$. (Kumar 1996:p141)

2.7 Conclusion

When weighing up the pros and cons my conclusion is that I prefer mixed methods. A mixed-method approach to research is one that involves "gathering both numeric information (e.g., on instruments) as well as text information (e.g., on interviews) so that the final database represents both quantitative and

qualitative information" (Creswell, 2003:p20). There is a strong belief that both types of research, quantitative and qualitative, are important. "*Neither one is markedly superior to the other in all respects*" (Ackroyd and Hughes 1992:30). By deciding which research design to select, I always keep in mind the three questions that can be asked in order to achieve a suitable research design (Edward & Talbot 1999). Firstly validity: 'am I going to get the information I need from the method I have selected?' Secondly, reliability: 'will it be possible for me to get a clear and accurate picture from the issue I am studying?' This is why triangulation should be used, not only defined as the use of two or more methods of data collection in the study of some aspects of human behaviour (Cohen et al 2000:p112) but also using insights from all directions like students, colleagues and parents. And, thirdly, feasibility: 'can I complete the work with everyone involved in the available time?' Dr. Richard Race emphasized feasibility during his lecture last May in the Netherlands. The cohesion between the choice of the methods and a paradigm can be explained as follows: not one paradigm actually prescribes or prohibits the use of quantitative or qualitative methods. My opinion is that the use of mixed-method research can only enrich educational research. My view is endorsed by Gorard (2004, p7) when he describes mixed-method research as an important element in the improvement of social science, including educational research.

Chapter Three Proposal

3.1 Preface

"There should be a certain ratio between those who are most inclined to think, and those who are most inclined to act" H.TH. Buckle (1865) History of civilization

Over the last few years there has been an explosion of interest associated with teaching the skill of thinking. These thinking skill programmes offer an important dimension to a child's education especially for those who have learning difficulties, as recent research reveals. (Gough, 1991) People like Feuerstein (1980) and Lipman (1980) have a strong belief in children's abilities. They consider that through thinking programs and thinking activities, learners can exceed their level of competence. Research (Romney, 2001) gives evidence for such a claim. In my school I work with the CoRT program (Bono, de 1986), which is a comprehensive program consisting of sixty thinking lessons divided into six sections. To clarify this program, I have added a small survey of this program (Appendix A) It was designed by de Bono and first published in 1973 and derives its name from the Cognitive Research Trust which de Bono established at Cambridge University, England. It includes detailed teacher guides and De Bono proclaims that thinking is a skill that can be learned, practised and enjoyed (Bono de, 1992:p300) That is where this program comes in. My research proposal is about the transfer of the skills learned through de Bono's thinking skill program. Do children use the tools at school and at other moments and besides school. This essay will represent my research plan and incorporates my thinking based on questions that I have posed to myself, followed by a specific question that will form the basis for research . This is followed by the procedures, methodologies and instruments that I shall use to collect my desired data, and check its validity and reliability. At the end there is a timetable that shows the progress and the link between time and research activity. This whole research project takes place in secondary school, visited by pupils with low intelligence and minimal motivation in learning. Their age is between 13 and 15.

3.2 Research question

“...the research scientist is not an innovator but a solver of puzzles, and the puzzles upon which he concentrates are just those which he believes can be both stated and solved within the existing scientific tradition”. Thomas Kuhn (1977:p234)

My research question is about the use of thinking skills. My school introduced the ideas and programs of Dr. Edward de Bono (Bono 1986) in response to the poor performance of children. It is estimated that only 5% of our brain capacity is used (Burnaford et al 2001: 33). By applying the CoRT program, which teaches children to think more creatively and critically, the ability to solve problems improves (Edwards et al 1986) . My research involves the CoRT program; not the entire program, but only the first and fourth book called Breadth and Creativity. This, because those two parts form the basic format of this program. In this way my research will be feasible and provides an insight if there is transfer of this CoRT program.

“It is obvious that the better you become at thinking skills the less often you will be stuck” (de Bono 1992:p51) In addition to de Bono’s assertion, there is also a change in social behaviour. One may presume that once you have learned the tools from book 1, and you use them not only at school, it may lead to a better social behaviour. In their effort to find a solution to an issue or problem, a child can get easily stuck but those who are trained in thinking skills can draw upon more tools to see opportunities which in turn gives them an enhanced ability to solve the problem. This results in an improved self-confidence that reduces the fear of failure. For this reason I wish to focus my research on the principle question:

“Is there transfer from the thinking skill program CoRT and its use towards daily live next to school ?”

The intention behind this question is to examine if teaching this CoRT program leads to practical use in school and also next to school. If so, then in what way do they use it ? If not, then why don’t they ? Cort is presented as a segregated subject during one hour a week and not in other subjects. So the question is if that all leads to practical use next to the thinking lesson hour and when children use CoRT. Sub questions will

be in what kind of situations the pupils will use the thinking skills, how frequently they use it and how their experiences are using these tools.

3.3 Aims & objectives

The first aim is to research if children use CoRT in daily live. Will they practise what they have learned ? Will they experience the presumed advantages apart from school ? Whenever I teach children how to think with de Bono's methods, I sense a flow between us, which, after questioning the children tells me that they are very motivated for thinking lessons. With this research I shall try to explain this flow in academic terms, providing the outcome of the methodology used to analyse the data in this research. My objectives are to make it a lasting part of the curriculum, part of the approach to children, part of culture in school, so that it will may be used throughout the school e.g. in meetings. If the outcome of my research shows that children use CoRT techniques apart from the CoRT lessons, thinking skill lessons may become an integral part of teaching within school. Teachers and children can use the skills in various activities like fear of failure training. With this in mind, my deputy-head has already been informed about my project and fully supports my research. The outcome will, therefore, be presented to teachers and staff, after all research is about discovery and it creates knowledge. Parents are involved in this research project and therefore they will be informed about the outcome. The close collaboration between me as a researcher and other participants will ensure that everyone knows about thinking skills. Secondly I wish to develop myself by undertaking this research and at the end of the project I would like to be able to carry out research in the educational field. Self-reflection will be an integral part of the process with the aim that, at the end, I will be a far better practitioner, regardless the outcome of the research. Finally I will present my dissertation to the university of Groningen to see if my research can be of any value for them.

3.4 Literature review

The effectiveness of thinking skill programs like CoRT and used in the educational field is arbitrary. Polson states specifically at the de Bono CoRT program

"We find the lack of adequate evaluation studies on the CoRT program to be both surprising and disturbing." (Polson, 1985:p444) About effectiveness of CoRT, Polson writes: "..., de Bono makes strong claims concerning the effectiveness of the CoRT program. Yet after 10 years of widespread use, we have no adequate evidence concerning those claims and thus no support for the effectiveness of the program or the theoretical assumptions from which it was derived." (1985 :p445)

This criticism was published in 1985, and still exists today despite the CoRT program being widely used. It can be considered as a mistaken assumption, because there has been significant academic research (Dingli,2001) carried out on the effects of thinking skill programs, the findings of which are favourable for the CoRT program:

Research was carried out in a school in Ragusa, Italy making use of the de Bono CoRT program to assess the effects of teaching Thinking Skills to young people (Tidona 2001). The process that was used over a whole year with 14-year old children in secondary schools and the effects on the experimental group and the control group are described. Pre- and post-tests were used and the experimental group showed a significant increase in the skills that were assessed by the assigned tests, while the performance of the control group didn't improve. The Centre for Learning and Teaching, based at the University of Newcastle upon Tyne, also presented a review on the effects of thinking skill approaches and its evidence. (Higgins et al, 2004:p10) This review concludes that there is a positive impact on pupils attainment and that there is also some evidence that pupils benefit from explicit training in the use of thinking skills strategies. A last good example is Box Hill Commonwealth Rehabilitation Australia where the CoRT program is used to teach deaf people thinking patterns and techniques.

3.5 Methodology

"Good learners take their time, don't mind asking questions, aren't afraid of saying 'I don't know' or of being wrong, can change their minds and enjoy finding out" (Claxton 1991)

The nucleus of educational research is analysis and interpretation. Those studies look at individuals, groups, institutions, methods and materials in order to describe, compare, contrast and classify (Cohen et al, 2005). I am particular interested in

researching a method: Cort. To commence research in the field of education, it is necessary to formulate a framework that gives structure to my thoughts, processes and undertaking. Kuhn (1962) called these frameworks paradigms. Positivism, interpretivism, behaviourism and constructivism are some of these paradigms. I have decided to use a mixed method approach, being the third paradigm. (Johnson et al 2004). I would like to use triangulation. The use of triangulation will enhance the rigidity of my research. Robson says that methodological triangulation is a way of putting quantitative and qualitative research together and it even helps to counter threats of validity. (Robson 2002:174-175) Data triangulation and also methodological triangulation. Data will come from questionnaires, observations and interviews. My research concerns two groups of secondary school, 16 pupils in each class and an average age of 14 years. I will select these groups at random, to be sure that any other group had just as much chance to be in or out of the research. Sampling design therefore is a random sample. In order to obtain the required data to answer my research question I will ask all teachers involving in teaching both groups, to fill in questionnaires: one half way the thinking lesson course (10 lessons CoRT 1) and again at the end. (20 lessons CoRT 1). By random I will interview 4 teachers, two of each group at the end of the thinking lesson course. And also four pupils, just by random. On the same moments, parents and pupils are asked to fill in similar questionnaires at the same time, so also twice. After every two lessons I will make one observation of four pupils during another moment in school, apart from the thinking lessons. Not only during regular school time, but also in lunchtime. The observations will last between 20 to 30 minutes without contemporary notes being taken, but with a clear focus on what I am witnessing. The written narrative will take place later. When I design my observations, interviews and questionnaires I have to deal with validity: to be sure that my instrument measures what it suppose to measure. To establish the reliability of my used methods I will do the repeatability test. I use the equation test score/re-test=1 (Kumar 1996:p141). Through triangulation my research will become more valid. To increase validity I will give feedback interim the process to the teachers and the parents.(Kallenberg 2007:p206). My narrative of the interviews will be given to the interviewee, shortly after I have done the interview. All narratives from observations and the returned questionnaires will be added to my dissertation.

3. 6 Ethical considerations

I am fully aware that in my role as a researcher I have the responsibility to ensure as far as possible the physical, social and psychological well-being of my research participants. My relationship will be one of mutual respect and trust. I am aware of the professional codes contained in the Revised Ethical Guidelines of Bera (2004) and shall seek my deputy head's consent. By using the guidelines for informed consent (DHEW policy 1971; Cohen et al.2000:p 51) like a fair explanation of the procedures to be followed I do hope for his approval. I will explain to him the methodology and the ethical guidelines so that he is ensured of a justified research. I will explain to the children and teachers involved with my research, the design of my research, the aim of my work and what I will do with the results. I will assure them that their anonymity and privacy will be respected and that personal information shall be kept confidentially and secure, especially as it is all about sensitive information. As Frankfort-Nachmias and Nachmias say "The obligation to protect the anonymity of research participants and to keep research data confidential is all-inclusive. It should be fulfilled at all costs unless arrangements to the contrary are made with the participants in advance" (Frankfort-Nachmias 1992).

3.7 Anticipated outcome

"Discovery consists of seeing what everybody has seen and thinking what nobody has thought" (Szent 1962)

I am going to explore the field of thinking skill programs. I am not placed to predict the outcome of my research, but my suspicion is that children who work with de Bono's CoRT program have more creative ideas, a broader perspective and are therefore more capable to solve problems because they're not 'blocked' from the outset. They are more able to cope with everyday problems as well as problems with learning. Still leaves the question, if they use the CoRT techniques. My hypotheses is that I may see noticeable use of thinking skill tools of de Bono and probably change in attitude and behaviour and this is based on my previous experience of working with CoRT, as well as the outcome of several international research projects. (Dingli, 2001) But than again: will transfer take place ? Will they use the skill in other more social contexts

i.e., when they have to make decisions in other situations or circumstances. By increasing the number of possible solutions to a problem using the CoRT tools, it may be expected that they find out that their self-consciousness will grow and that the under-performing children that I work with will achieve more. By experiencing these effects, they might decide to use them more often. If this is so, than my head deputy definitely would make it part of schools educational philosophy.

3.8 Dissemination

"To understand is hard. Once one understands, action is easy" (Sun Yat Sen in Cohen 2005:p6)

I do hope that my school will implement a thinking skill program like CoRT into its philosophy. It is important to involve teachers in my research project. Wheatley (1992) explained it this way:

"We are never successful if we merely present a plan in finished form to employees. It does not work to just ask people to sign on when they haven't been involved in the design process, when they haven't experienced the plan as a living, breathing thing" So, if teachers are part of my research it is more likely that teaching thinking skills will have its place in school. We have worked with de Bono's CoRT program before, but due to re-organisation my present school has left its former organisation, which had CoRT and Six Hats Thinking already in its curriculum. Whether my school will continue with De Bono may depend on the outcome of my research. Last year my former school founded the De Bono Expertise Centre due to their strong belief in de Bono. The next step would be to come to infusion, in other words not only using CoRT as a separate hour of teaching thinking skills, because that gives better results according to research.(Dingli 2001) That means that you are not only teaching children the program segregated from the curriculum, but that you will find the approach throughout the school. It will be practised throughout the school and formalised in schools philosophy. In the meantime, the University of Groningen is planning a 4 year research project on the cognitive effects of both programs. The De Bono Expertise Centre asked me if I wanted to present my research in 2009 and, although the research is an attempt to explore the transfer of thinking skills and its use not only in education, but also in daily

live. My hope is that my research may be of benefit to the school and the children, now and in the future.

3.9 Time plan

The research design also includes a time plan which is formulated to track all aspects of the process and includes the various operational steps that I have to undertake. Adjustments to the timetable may be necessary as circumstance dictate; hence I shall reserve some time towards the end of the research to accommodate and variations. The timetable includes:

- Meeting with the deputy-head and teachers of both classes to inform him about my research;
- Detailed information for all colleague teachers who are teaching the two classes about the research, the ethical considerations my expectations and how they have to deal with my questionnaires;
- Information evening with the parents of the pupils involved;
- Instrument construction. Designing of valid and reliable questionnaires;
- From 1st of September until 1 December one group of 25 children are following CoRT once a week. I shall confine myself to the first ten lessons called breadth. In these 10 lessons I shall teach the children the use of the Direct Attention Tools (DAT) like PMI, OPV, C&S and APC.(See appendix A) With these tools they will learn to broaden their mind, to see things in other perspectives;
- From the 1st of September I will make observations on children preparing for assignments. I will do the same observations in the second group;
- From the 1st of November I will do observations again with the same aspects to focus on. At the same time I will give teachers, parents and pupils the first questionnaires. I will interview four children and four teachers on what they experienced during the program (for children) and if they saw the practical use of Cort-tools by children (for teachers);
- Feedback to teachers about my findings

- On the 20th December I will give pupils, parents and teachers the same questionnaire(s) again;
- From December to March I will analyse the data. In this same period I will try to attach my observations and interviews to the quantitative data from the questionnaires;
- From March to June I aim to make my analysis and conclusion and prepare my first analysis and conclusion; and,
- Between June and September I aim to write and present my final dissertation

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“Good learners take their time, don’t mind asking questions, aren’t afraid of saying ‘I don’t know’ or being wrong, can change their minds and enjoy finding out” (Claxton, 1991)

Chapter Four Introduction on the dissertation

4. Introduction

“Teaching your children to think may well be the most important thing you can do for your children” (Bono, de 1994)

Thinking is ever present and needed in everything we do, in both conscious and unconscious mind states. Gough (1991) says that thinking skills are perhaps the most important tool in today's information age and are viewed as crucial for people to comprehend and apply in the rapidly changing world we live in. Developing thinking in students through an educational program is not new and in recent years a raft of research has been carried out into ways to develop students' thinking and learning skills. 'Thinking skills' is a term that refers to capacities involving thinking and learning. Commonly used methods for teaching thinking skills are 'Somerset Thinking Skills' (Blagg et al, 1988), 'Philosophy for Children' (Lipman et al, 1980), 'Instrumental Enrichment' (Feuerstein, 1980), 'Six Hats Thinking' (De Bono 1969) and 'CoRT Thinking Lessons' (De Bono 1986). Nisbet et al (1990) lists over 30 programs often used across Europe, whilst in the USA there are already more than a hundred methods. Literacy, maths, science and all the other subjects are well established in the National Curriculum, yet thinking skills have significantly less attention, which is remarkable as they are very important when set alongside the rest of the curriculum. There is still a need for a broad range of competencies and thinking should be one of them. In 2004, the Ministry of Education published the renewed so called 'Kerndoelen Basisvorming', which translated in English is: 'main goals in basic education for secondary schools'. Main competencies, such as learning how to proceed, learning how to learn, learning how to communicate, learning to reflect and learning to reflect on the future are clustered into a pré-ambule and the schools have to work on these competencies. Specifically, competencies are skills that are useful, purposeful and used in other contexts. This pré-ambule is similar to the National Curriculum in England (www.nc.uk.net) where thinking skills are listed as information processing, reasoning, enquiring, creative thinking and evaluation. The Department of Education and Skills (DFES) says: *"This emphasizes the importance of thinking skills approaches for the promotion of effective questioning and extending pupils' oral responses in*

classrooms as well as the potential contribution to assessment for learning." In order to reach those goals, thinking skill programs like CoRT and Six Hats Thinking have been introduced into my school, a secondary school attended mainly by low achieving students. In an age where information is expanding exponentially and society is continually evolving, students require thinking skills in order to handle different contexts at different times. There is a growing realization that not only cognitive development should get attention but also higher metacognitive functions.

Metacognition involves thinking about one's own thinking, including skills in recognizing problems and planning what to do to solve them. The CoRT thinking skill program is one approach to develop these functions. Nickerson *et al* (1985) says:

"The CoRT operations can be seen as simple practical tactics that may help individuals to think sensibly about non-technical things and also help them to perceive themselves as thinkers". The strong belief is that students of all ages are more capable of facing complex problems while they are learning these thinking methods.

Research (Higgins *et al* 2004) demonstrates how powerful this method is, how students' learning is improving as well as their thinking and self confidence.

(<http://www.edwdebono.com/cort/CXR06.html>) The DfEE in England commissioned McGuiness to review and evaluate research into thinking skills. McGuiness (1999) points out that successful interventions to develop a good thinker are associated with, "*a strong theoretical underpinning, well designed and contextualized materials*". Both of de Bono's programs, Six Hats Thinking and CoRT, offer a very structured way of thinking. Over the years a wealth of research has been undertaken into thinking skill programs and their effectiveness (Dingli 2001). As a practitioner, I started to work with de Bono's thinking methods in 2003 and I became increasingly impressed by the results. The communication between students improved significantly and they achieved heightened self-awareness. But I wasn't sure whether the results were due to the students being offered the thinking programs or whether they were due to the cooperative approach that was used (Kagan 1994). I became very interested in another aspect of thinking skills having heard a radio interview in which a 13 year old girl, who belonged to a class that used thinking skills, explained that she used the tools of CoRT (<http://www.rthulp.nl/artikel/images/radio.wma>). Due to my work in classes delivering thinking lessons, my curiosity about the effects of the CoRT program increased. Several teachers asked me whether there was any evidence that CoRT had positive effects so when I started my MA and had to make a proposal, I

formulated my research question on the following question: "CoRT thinking skill program: do students transfer this program and apply it in other contexts?" In other words, is there a transfer between the skills that have been learned in segregated lessons and their application in daily life and other social contexts? Are students offered a program that they only use during thinking lessons or should they be given practical tools that provide them with a more problem solving attitude and are there noticeable effects on a student's thinking behaviour? The philosophy is that if students use the CoRT tools, once they have learned them and they show positive effects on students' thinking behaviour, CoRT may be the answer on the pré-ambule.

Until now, my school used what I call a stand alone approach. CoRT lessons are given in stand alone units whereby for one hour a week, instead of Literacy or Maths, they are specifically taught thinking skills as part of a bespoke Thinking Lesson. The lessons concentrate on offering a CoRT tool in an imaginary situation. So, if students learn a tool like Plus Minus and Interesting (PMI) points for the first time, the question to the students could be: "Suppose dogs could speak. What would be positive, what would be negative and what do you ask yourself?" A week later the same tool will be repeated, but in a more realistic situation, such as "Could you do a PMI on the issue 'stop smoking'?" Then a new thinking tool will be introduced and over a period of time the students improve their competence in using the tools but there is no immediate concern in transferring these skills into other subjects or situations in school. So, a further question in this dissertation will centre on whether the learned skills will be applied spontaneously in social contexts and I aim to offer a possible answer to this specific question. My research methodology contains triangulation in order to produce a valid research project. All participants involved in this research, i.e., parents, students and teachers who work with the students, have been questioned. It is obvious that I have high regard for the ethical guidelines established in the Revised Ethical Guidelines of Bera (2004). To collect my required data I have used questionnaires, observations and interviews. In order to provide a wider perspective, I conducted my research not only in a class 2 of my secondary school (age 13-15) but also in a first class (age 11-13). In my analysis and conclusion I will present the data concerning my research question. My firm belief is that teaching students how to think critically and creatively does have positive effects and can be transferred to other situations in and around school including in my school with low achieving students.

Whilst talking about the importance of thinking skill lessons at my school, Ferry, age 14, stated: “*When I have finished school and I will have a job, I have to think for myself, so that's why I have to learn and to practice thinking at school*”. In Chapter Two I will explicate on thinking in relation to known literature, subsequently clarifying my methodological design in Chapter Three. The data of my research will be presented in Chapter Four, the analysis and careful conclusion in Chapters Five and Six. Although most references are English, one has to be aware that this research is done in the Netherlands. In any case where the used literature differs from the Dutch situation, I will elucidate those particular issue(s).

PAH van Kessel MA SEN

Chapter Five Literature review

5.1 Introduction

If critical thinking was nothing more than a combination of thinking skills and learning how to construct knowledge it would be easy to learn. Students regard their teacher as a facilitator who conveys all kinds of knowledge that is readily accepted. However, in turn, teachers want their students to think critically. And teachers have an enormous influence on a student's development. McBer (2000:7) confirms this, also concluding that teachers really do make a difference: "Outstanding teachers create an excellent classroom climate and achieve superior pupil progress largely by displaying more professional characteristics at higher levels of sophistication within a very structured learning environment." Maclean (cited in Wilson 2000:2) warns not to overestimate thinking skills; education tries to achieve effective learning but "effective learners need motivation, confidence, concentration. Thinking skills alone will not provide these features." In the field of education there are still a lot of critical questions towards thinking skill programmes. Maclean (cited in Wilson:3) enumerates such questions: "do we need to develop new ways of thinking?.....if we improved learners thinking skills, would we help them to get better at areas of the curriculum?.....as with all core skills, how does the school plan and manage that process to ensure coherence and consistency of approach?" This literature review outlines the necessity for critical thinking and provides answers on these questions, together with the respective approaches within frameworks (Moseley 2005) and the research that has been undertaken.

5.2 Thinking skills

Thinking skills. It isn't hard to locate and read a range of books on this topic. As Nisbet notes (1990) the concept of teaching thinking is not new. In literature thinking is seen as a very important skill that can be trained. Nevertheless, there are only a few schools that include 'critical thinking' explicitly in the curriculum. The way we think nowadays has its roots in history; in the Middle Ages reading, writing and thinking were only preserved for the people who worked in religious ministry. Those who were illiterate readily believed what the church prescribed. So their thinking was

restricted and fundamentally concerned with theology and the doctrine and the Christian dogma; hence no open minds and no critical thinking. Creating new knowledge when it was based on experiments and logical thinking was rejected. During the Renaissance, people discovered the classic thinking methods of the ancient Greek philosophers, the so called Greek Gang of Three: Socrates, Plato and Aristotle (De Bono 2006:15). Collectively, they formed the thinking habits of Western Europe. In the 18th century in a period called the Enlightenment, humanity was given a more central role, with thinkers starting to use reason when exploring the world. To this day Western culture relies on this way of thinking where everything is reasoned. One could say that the critical thinking of the Greeks, based on argument and critical thinking was reinvented and until nowadays still used. Critical thinking is named after 'kriticos', which translated from Greek means 'to judge'. 'Critical' in critical thinking doesn't mean searching for negative aspects but the thorough and deep examination of an idea instead of considering it simply at face value (Moon, 2008). It is generally accepted that thinking skills are a cognitive process and that cognitive skills involve making a rational decision on what to do or what to believe (Ennis 1996). According to Cotton (1991) there is no universally accepted definition of higher order thinking, creative thinking, critical thinking or decision making.

By way of emphasising the phenomenon of thinking , critical thinking is defined as, "working out whether we believe what we see or hear; taking steps to find out whether something is likely to be true; arguing our own case if someone does not believe us" (Cottrel, 2005:8). Defining reasoning, Fisher said "Critical thinking is a kind of evaluative thinking which involves both criticism and creative thinking and which is particularly concerned with the quality of reasoning or argument which is presented in support of a belief or a course of action" (Fisher, 2001:13). So, taking these perspectives on critical thinking into consideration, one can say that critical thinking skills are the intellectual disciplined processes where conceptualizing, synthesizing and gathering information are the main activities. In his book *How We Think*, John Dewey (1997) defined critical thinking as a way to reflect in order to suspend your judgment, maintaining a healthy scepticism and an open mind. His definition asserts that there are two components concerning critical thinking: intellectual and emotional. Examining a problem, trying to find its weaknesses and strengths, mostly by questioning, is the intellectual component. Reflecting, evaluating and thinking about

the issues can lead to an emotional response. Critical thinking is very much affected by the personal characteristics of thinkers who use critical thinking. Moon (2008) says that "emotion is recognized to play a part in critical thinking as it does in all cognitive processing". Emotion interacts with cognitive activity and the thinker should be aware of the influence of feelings and monitor that influence as appropriate and possible. Theory around thinking skill programmes like the one expressed above can always be traced back to the taxonomy of Bloom. Researchers like Bloom have attempted to identify the key skills in thinking. Bloom (1956) classified thinking into a hierarchical model comprising six levels, or what he called 'the cognitive goals of education': knowledge, comprehension, application, analysis, synthesis and evaluation. His model divides thinking skills into lower-order and higher-order skills. Knowledge, understanding and application are lower level skills while analysis, synthesis and evaluation are higher level skills. By offering thinking skill programmes education is trying to achieve a higher level of thinking. Recently Anderson and Krathwohl (2001) have adapted the model whereby 'knowledge' has been amended to 'remember', which focuses on recalling the facts. The highest level is transformed from 'evaluating' into 'creating' and this is a far more complex and abstract mental level than simply regurgitating facts that have been remembered. In this way Bloom's model changes from verbal outcome toward a more active attitude.

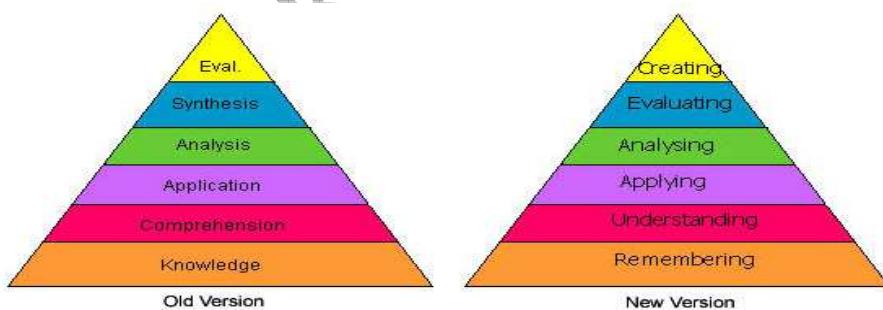


fig 1 - http://www.odu.edu/educ/llschult/blooms_taxonomy.htm

Bloom's taxonomy, which is built on earlier research by Piaget (1923) and Vygotsky (1987), suggests that thinking skills are developed by cognitive challenges. Behaviourism emphasises stimulus and response but constructivism focuses itself on the mental processes between input and output. A thinking skill programme is intended to control these processes. Vygotsky's theory is the idea that the potential for cognitive development depends upon the "zone of proximal development" (ZPD); a level of development attained when students engage in social behaviour. ZPD is "the

distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky 1978:86) Full development of the ZPD depends upon full social interaction. Vygotsky envisioned even a more complex relationship between learning and development than conceived by Piaget. Learning skills can lead development, but development can not be separated from its social context. Language plays an important role in mental development so by offering thinking skills you blend learning and development in a social context with language in order to achieve a more reflective and independent learner.

Thinking skill programmes attempt to improve the three highest levels of thinking (fig.1). When analysing, the process of critical thinking is applied which relies not on assumptions but analysing facts from every possible perspective. By asking critical questions, one can determine and link relationships between different components of an issue enabling the statement or question to be classified, structured, accepted or even rejected. Synthesis offers an array of possibilities and gives way to freedom of expression. The student can integrate and combine ideas into a plan or idea that is new to him or her. Questions like 'what might happen if I combine?' and 'what solutions should I suggest?' are commonly involved in synthesis but creative thinking is necessary in order to achieve this level of thinking. The highest level is where the student can make valued decisions about issues, can see what the most important parts are, what has priority, and how to assess. Thinking skill methods (see 2.3.2) focus themselves on the higher level of thinking.

The starting point for critical thinking is constructivism, which encompasses a view of learning where learners are seen as building or developing their understanding of how the world works based on their experiences and interaction with people around them. In order to understand the world as it is, one has to generate a mental picture about the world and think and argue within one's conception. These mental conceptions are built with existing knowledge, which contains declarative knowledge (the content), procedural knowledge (thinking and reasoning) and metacognition (regulation of the thinking process). Metacognition is the recognition of your own knowledge and the processes of knowing. Kuhn (1999) focuses on the developmental aspect of critical thinking and expounds that metacognition is directly relevant to critical thinking

processes and that even critical thinking cannot occur “while the learner is in the more naïve belief state about the nature of knowledge.”(Moon 2008:p49) “ Metacognition or reflexivity, the critical reviewing of one’s own processes is central both to deep reflective learning and critical thinking” (ibid., p147). The student doesn’t, therefore, focus on the content or the outcome but on the cognitive and emotional processes he or she went through to achieve an acceptable answer to a problem. It is the main goal that students reflect on their own thinking.

5.3.1 Thinking in education

In recent years there has been a growing interest in developing thinking and learning skills (Fisher 2005). Previously, the belief and conviction was that a good learner absorbed information and had a lot of passive knowledge. Education nevertheless believed in convocation, lectio and disputio: bringing students together in classes, teaching the transfer of knowledge and dialogue to increase logical thinking. There is evidence, claims Fisher (2003:18), that traditional teaching is efficient in what the Greeks called ‘tekne’, the technical side of knowing how to do. But those methods are less successful in what the Greek called ‘phronesis’, the practical intelligence, the higher order of thinking. So, knowledge is growing rapidly and explosively, i.e. the internet, and is also quickly outdated. Halpern (2002:37) emphasises the importance again by saying, "The rapidly accelerating pace of change that marks the opening of the 21st century has made the ability to think critically more important than at any other time in history." The post modern world of today demands different attitudes, different knowledge and other skills. Teaching how to think is such a skill and essential for students if they want to improve themselves in handling the complex world of today. Fisher (2005) states that if you teach students how to think, the result is that they are better able to communicate, to benefit from the thinking of others, able to solve problems and to face new challenges. "Thoughtfulness should not only be the intellectual but also the moral aim of education" (Fisher 2005:VIII). The introduction of thinking skills programmes within education is, on one hand, influenced by some leading authorities in this field, as well as by policy. Ennis (1996:XVII) justifies the importance of critical thinking by pointing out that: "it is critical to the survival of a democratic way of life." Costa (1985) said that helping students to become more effective thinkers is increasingly recognized as a primary goal of education. According

to Claxton (2007) there are two main reasons for reconfiguring education and its curriculum: an economic and a personal argument. Knowledge is changing so rapidly that it is hard to imagine what one has to teach students. Understanding the knowledge that students will need in the future is simply not possible and is recognised by Bayliss (2003) who wrote in her review "What we got wrong in 1998 was our judgement of speed. 2003 is a staging post towards our 20-year vision; but many of the changes we predicted by 2020 are already with us." Education must try to help students in developing a higher order of thinking. When students have the ability to perform better in thinking, they will be of far more greater economic value. Future trade and industry needs flexible, independent and reflective workers. People will become more innovative and self-reliant on their thinking skills which make them more marketable for jobs in the future. Secondly, one feels more confident in dealing with the complexities and uncertainties of modern life. In order to make thinking skills a greater part of the curriculum it is important that the National Curriculum starts changing. As Claxton said during the 13th International Conference on 'Thinking' last June in Sweden, education makes students ready for a life of tests instead of the tests of life. The traditional, conventional knowledge established in the National Curriculum is not fine-tuned, nor ready for the future. Bayliss (2003) emphasises that education has to evaluate whether education prepares students adequately for the future, "Many, including many teachers, believe the country is still educating for a disappearing world." Therefore it needs to be adapted because "young people want more real life gumption, more initiative just as prospective employers and anxious governments do. More fundamental even than the concern with literacy and numeracy is the need to protect and develop young people's learnacy" (Claxton 2007). Education will only flourish if it is adapted to the increasing demands and needs of the time. QCA (2007) wrote a pamphlet in which educationalists are challenged to think about the changes which have to be made. "The curriculum cannot remain static. It must be responsive to changes in society and the economy, and changes in the nature of schooling itself." (ibid.) QCA mentions five forces for change: change in society and nature of work, new technology, new insight in how people learn, a need for greater personalisation and innovation and an increasing international dimension to life and work. Bayliss (2003:pp13) states that the UK still has nineteenth-century curriculum and qualification systems that fail to prepare young people for a knowledge based world. The curriculum is the pulse of a school. It is the currency through which we exchange

thought and ideas. Education recognises the growing need for informed, skilled and educated students who value openness, creativity, and good thinking. A competence-led curriculum where thinking skills are integrated has to be in continuous development. Thinking skills have to be adopted in the curriculum and Personal Learning and Thinking Skills (PLTS) as an explicit part of the National Curriculum in education worldwide and contributes to the DfES's current initiative 'Teaching and Learning in the foundation subjects' at Key Stage 3. DfES (2007) writes that "Teaching should ensure that 'investigating and making' includes 'exploring and developing ideas' and 'evaluating and developing work'. 'Knowledge and understanding' should inform this process. Pupils should be taught to analyse and evaluate their own and others' work, express opinions and make reasoned judgements." The Ministry of Education in Holland, as said before in the introduction, introduced the pré-ambule where the importance of critical thinking is emphasized and established in the Curriculum. Hamers and Van Luit (1999) explain that the adaptation of the curriculum is not exclusive to England but that teaching thinking is important for education in all other countries. As formal schools minister David Miliband (2004) said, "Give a child a lesson and you keep them learning for an hour; teach them how to learn and you make them citizens for life." (Education Guardian 6 July 2004, cited in Teaching Thinking & Creativity summer 2004))

5.3.2 Thinking skill methods used in education

"Learning can be defined as changes in pupil's behaviour which takes place as a result of being engaged in different experiences" (Kyriacou 1997)

This paragraph gives an overview of methods used to improve students thinking. Nisbet et al (1990) lists over 30 such programmes. Nisbet (1990) identifies two main approaches: one through specifically designed programmes and the other by infusion throughout the curriculum. McGuiness (1999) describes a third approach where thinking skills can be embedded in particular subjects e.g., in science, mathematics or more generally across the whole curriculum. Although researchers are divided over the number of approaches, one can say that the thinking skill programmes distinguish between specific programmes and an approach embedded in

subjects or across the curriculum. Moseley et al (2005) classifies the various frameworks of thinking with an underpinning learning theory. He explains that every approach fits within a taxonomy or a ‘framework’ as he calls the classification. He distinguishes 4 frameworks dealing with: instructional design (e.g. Feuerstein IE 1980), productive thinking (e.g. Bono de 1986 CoRT), cognitive structure and/or development (e.g. Gardner 1983) and ‘all embracing’ frameworks (Wallace et al 1993). DfES differs, however, and has three broad categories of approaches of thinking: cognitive intervention approach, brain-based learning approaches and philosophical approaches. (DfES 2007 Thinking Skills).

I will confine myself to the methods that are specifically designed for productive thinking. I do so because my research project is focussed on two of these programmes, namely CoRT and Six Hats. Besides that, those methods are well researched (see chapter 2.5) and evaluated by Higgins et al.(2004), McGuiness (1999) , Moseley et al (2005). Wilson (2000:33) enumerates the following thinking skill methods which are commonly used in education:

Instrumental Enrichment (IE): a programme for effective learning, developed by Professor Reuven Feuerstein (Feuerstein et al. 1980). It is a context free intervention programme based on ‘mediated’ learning. One learns to interpret information and to solve problems by using 14 instruments over a period of two to three years.

CASE (Cognitive Acceleration through Science Education): originally a project in England which was carried out at King’s College London school of Education. (Adey et al.1995) Activities were developed in order to improve thinking skills of students over the long term. The theoretical background for CASE is based on the ideas of Piaget and Vygotsky (see 2.2)

Somerset Thinking Skills Course (Blagg et al 1988): a general thinking course. It consists of a handbook and several modules including the foundations of problem-solving, analysing and synthesising, propositions in space and time, predicting and deciding. The exercises may be used as a free standing programme or integrated across the curriculum.

Philosophy for children (Lipman et al.1980): Lipman believed that students were ‘natural philosophers’, constantly asking questions, considering alternatives and seeking answers. Teachers should exploit dialogue. This programme was further developed by Fisher (1995, 1998). The role of the teacher changes from facilitator to mediator. The programme emphasises ‘mediated learning’ where the teacher plays a key role in helping the student make sense of his or her environment.

Cognitive Research Trust (CoRT) (de Bono 1986) His approach, especially tools as ‘thinking hats’ are used in schools. He developed a programme consisting of six sections, each of ten lessons. Each section covers one aspect of de Bono’s definition of thinking: breadth, organisation, interaction, creativity, information and feeling and action. Its overall aim is to translate thinking by use of structured exercises.

6 Hats Thinking (de Bono, 1997) This way of thinking uses the metaphor of hats. Thinking is divided into six areas. Each of them corresponds with six different colour hats; red, yellow, white, black, green and blue. It is a clearly defined and structured framework, which focuses itself on one type of thinking at a time i.e., parallel thinking. Using the hats reduces the complexity of trying to do everything in order to solve a problem. It forces the thinker into one of the 6 modes of thinking: emotion, facts, alternatives, control over own thinking, advantages and disadvantages.

5.3.3 De Bono’s lateral and parallel thinking tools

Edward de Bono is well known for writing books and developing approaches and methods for creative and critical thinking. His programmes CoRT and Six Hats emphasise problem solving techniques. “Critical thinking, scholarly thinking and generative thinking all have their place. I am only concerned that education should take notice of generative thinking” (De Bono, 1976:16). The concept of de Bono’s methods is that improved critical thinking is derived from better perception. “In practical life very few errors in thinking are logical errors.....The errors are not so much errors as inadequacies of perception....perceptions are not complicated....they don’t need working out...it is simply a matter of being aware of them. And that is one of the functions of thinking: to direct attention across the perceptual field.”(Bono, de 1976: 62 and 72). Therefore his methods are called Direct Attention Tools. Claxton

(1997:184) supports de Bono's idea of poor perception: "If you have been repeatedly told, implicitly or explicitly, that there is basically only one way of looking at things, there is no point in thinking about how you might look at them differently." The importance of perception is clear. Claxton (1999:2) speaks about the mind working in D-mode, the way of thinking, figuring matters out, weighing up the pro and cons, constructing arguments and solving problems. Still in D-mode, perception is diagnostic."...a skimpy approach to perception may neglect information that does not,

De Bono	Bloom
White hat : information, data, research needed	knowledge
Red hat : feelings, hunches, emotions, intuition	evaluation
Black hat : caution, risks, judgement	analysis and evaluation
Yellow hat : benefits, good value, strength	analysis and evaluation
Green hat : creativity, new ideas, brainstorming	synthesis
Blue hat : thinking about thinking, metacognition	comprehension and application

fig 2. Comparison De Bono 6 Hats & taxonomy Bloom – source P. van Kessel

on first sight, seem to be significant, but which, had attention been less precipitate, might have revealed its relevance and its worth" (ibid 165). In solving problems we tend to use logical, conventional patterns of thinking. By using the tools of the CoRT programme, one will break through these patterns. The aim of this programme is to help students

develop a fluent use of the tools, through practice, and to achieve four levels of thinking, which are, general awareness of thinking as a skill; a more structured approach to thinking; deliberate use of the CoRT tools; and an appropriate use of the tools (Moseley et al 2005). De Bono's tools teach us how to broaden our perspective by breaking through patterns, by varying our perspective in order to see other possibilities. He calls it 'lateral thinking', which is defined by the Oxford English Dictionary as: "a way of thinking which seeks the solution to intractable problems through unorthodox methods or elements which would normally be ignored by logical thinking". Lateral thinking neglects and ignores the Western philosophical and scientific tradition since Socrates, Plato and Aristotle (see 2.2). One can see similarity between the Six Hats Thinking and Bloom's taxonomy (fig 2). This indicates that the low order of thinking, as well high order of thinking is practised with this program, but still the processes of thinking will always be intertwined with domain knowledge. If a student doesn't have much thought about an issue he or she can't think about it from multiple perspectives.

5.4.1 Can thinking be taught?

"Much of education is focussed on the achievement of certain basic skills, rather than on the potential that might be achieved. Perhaps our present mental and intuitive capacities are only a shadow of what might be. Perhaps it is possible to teach people to be more effective thinkers, to be more intelligent. The movement to teach children thinking skills stems from the belief that thinking can be learnt and taught." (Fisher 1992).

Whether thinking skills are taught via the methods described in chapter 2.3.2 by fitting into one of the main frameworks of thinking approaches, the main concern is to ensure that students who are offered thinking skill programmes transfer those learned skills in other contexts, the main research topic in this dissertation. The early beliefs about transfer were that once you had learnt something properly, you could use this capability whenever you needed it. Nowadays, perception on transfer tells us that transfer is quite a problem. Claxton (1999:199) notes that: "Mental skills do not float around freely inside the head, like goldfish in a bowl, waiting to be hooked by any passing problem to which they are germane." The methods of de Bono claim such transfer to other contexts is possible, "The dilemma is that it is usually possible to teach only situation-centred skills. You train a person to behave in a certain way in a certain situation. The way out of the dilemma is to create situations that are themselves transferable. We call such situations tools." (de Bono 1976:50). Although there are a great variety of frameworks (Moseley et al 2005) one should not underestimate the difficulty of teaching students how to think as it isn't just a set of skills that can be used without context and the ability to think critically also depends on domain knowledge and good practice. Papastefanou & Angelis (2007) emphasise this by saying that thinking skills are not automatically transferable. Thinking skills become even more effective influenced by non cognitive factors, e.g. self-esteem. This however "cannot be fully measured."(ibid:618)

5.4.2 Research on teaching thinking

Many years of research on the direct teaching of thinking (Edwards 1991a, 1991b, 1994b&c, 1995) have shown the benefits of teaching students new thinking strategies. Higgins and Hall (2004) conducted a ‘meta-study’ into thinking skills where they reviewed a wide range of research in which control groups were used. Their study indicated that thinking skill approaches are effective in improving students’ learning. Moseley et al (2005) evaluated 42 major frameworks, including Bloom’s taxonomy and de Bono’s lateral and parallel thinking tools.

Nickerson (1988) warns of “unsubstantiated claims, one-sided assessments, and excessive promotionalism”. His conclusion was that, “The field needs more self criticism. It is a bit paradoxical that some developers of programs to teach critical thinking have had less than severely critical attitudes towards their own work”. The key conclusions of McGuiness (1999) are that Instrumental Enrichment (Feuerstein et al. 1980) shows after extensive evaluation, positive effects primarily on measures of non-verbal reasoning. Somerset Thinking Skill course (Blagg et al 1988), now known as Thinking Skills at Work, show positive effects on a range of cognitive and related outcomes. The positive effect of Philosophy for children (Lipman et al 1980) lies in improving students’ discussion and argumentative skills and the ability to formulate questions. It also improves the child’s self esteem. More collections of research can be found in references such as Segal et al (1985), Nickerson et al (1985) and Perkins et al (1987). The use of mind tools, like those offered by the de Bono’s CoRT lessons is more effective because they can guide and organise the thinking efforts in a fruitful manner. But it is necessary to apply them deliberately, that is they should be evoked explicitly in order for them to produce considerable effects. Tidona (2004) explains in her research that the effects of CoRT are difficult to measure, but that students significantly improve in literacy. There is not enough research evidence that shows improvement in thinking performance which can be attributed to CoRT (Moseley 2005) apart from anecdotal evidence. Edwards (2001), on the other hand, explains that by using the CoRT program the results reinforce the obvious potential of such programmes for improving the thinking of students. According to Willingham (2007) thinking skills will find a transfer to other structures and other contexts. Alternatively, evidence shows that thinking skill programmes primarily improve thinking with those

kinds of problems practised during the program. In general it is doubtful if students will effectively apply critical thinking tools in other situations. Whatever approach is adopted, it must maximise transfer (Fisher 2005). As a practitioner in education I will conduct research on this topic. The specific research question is formulated as follows: “CoRT thinking skill program, do students transfer this program and apply it in other contexts?” If CoRT is transferred to other situations, then a skill transforms into a competence or an ability that students can use in daily life. If not, it remains a tool that can be used, albeit in a limited capacity, but one could question whether the framework of de Bono is relevant to the curriculum at my school in order to develop learning about how to think and think how to learn. Perkins (1987:288) states that “...transfer occurs as the automatic consequence of varied practice.” But then again, Schwarz asks whether, “thinking skills are transferable to the other subjects in which we immerse our students?” (Schwarz in Perkins 1987: p 269). In order to find out what CoRT does at my school and assess whether contradictory research from Perkins (1987) and Schwarz does not provide this answer, I will conduct a small scale research. Besides, I hope to find answers on the sub-question, “Does CoRT effect students’ thinking behaviour and, if so, in what way?”

The data will be presented in chapter four, with the analysis and conclusions following in chapters five and six of this dissertation.

5.5 Summary

Learning is essentially a growth, not an accumulation, and must always spring from and return to what is known. Good learners take their time, don't mind asking questions, aren't afraid of saying 'I don't know' or being wrong, can change their minds and enjoy finding out.” (Claxton 1984)

In order to direct or focus attention de Bono claims that a framework is needed that can be used deliberately in everyday life as well as in the classroom (Moseley 2005). Thinking skill programmes see their purpose as the deliberate training of thinking, but good thinking is more than a skill. Perkins and Grotzer (1997) explain that good thinking involves the disposition to think in different kinds of way and in

different kinds of situation; the self-knowledge to monitor and manage one's own thinking effectively and the awareness that different pockets of knowledge and know-how are relevant in specific cases. Programmes that aim to improve these more general concepts as well as the repertoire of skills and strategies seem to be more successful (Perkins and Grotzer cited in Claxton 1999:130). Frameworks of thinking are a welcome and indispensable addition to the curriculum. Finally, there is a last point to the importance of teaching thinking, i.e., the temptation to believe that by offering thinking skills the whole package of learning is covered. Learning, however, also involves changing to different modes of learning (Claxton 1997). Sophisticated learning can only exist if a student is able to use those different modes of learning: observation, imagination, incubation as well as hard, disciplined analysis and reasoning (Claxton, cited in Teaching Thinking & Creativity summer 2004). There is another element that is as equally important as the approach to thinking in order to achieve positive results, and that is the teacher. McGuiness(1999) emphasises that teaching thinking demands that teachers, pupils and technology interact with one another. This requires, in her opinion, trained thinking skill teachers who can make students conscious of their own thinking. They can equip students with thinking strategies that can be applied throughout their learning. Grey (2006:146) notes that, "if children are aware of their own learning styles and can reflect on their own learning and identify their next steps, they are more likely to make progress."

Chapter Six Research methodology CoRT research

6.1 Introduction

“.... present a viewpoint or theory about the nature of science, and, like other philosophies of science, the theory has consequences for the way in which scientists should behave if their enterprise is to succeed” (Kuhn, 1970,:207)

This chapter illustrates and summarises a range of approaches undertaken by researchers in the educational field and includes my own methodological design. Research is a process by which new knowledge is created. The word ‘research’ has two constituents; ‘Re’, meaning repetition of an action, and ‘search’, meaning to look at or examine closely. Kerlinger (1986, p.10) says: “*scientific research is a systematic, controlled empirical and critical investigation of propositions about the presumed relationships about various phenomena*”. I shall précis the various approaches known in literature. I designed my research methodology regarding the guidelines in order to carry out my research on transfer and behavioural effects of the CoRT thinking skills program. By undertaking research, I aim to achieve a better and wider perspective of the effects of a phenomenon e.g. a thinking skill programme like Cognitive Research Program (CoRT) (De Bono, 1986). Further, I wish to improve my critical thinking and learn how to read and evaluate published research. Ultimately, with this accrued knowledge I will design and conduct my research project.

Essentially, there are two main motives to educational research viz, “*to inform understandings of educational issues, drawing on and developing educational theory and to improve educational policy and practice, by informing pedagogic, curricular and other educational judgements and decisions.*” (BERA, 2000, p.2). On the value of educational research, Cohen (2000) observed that it enables practitioners to develop their knowledge and provides an insight into today’s educational belief. Forced by a rapidly changing world (see chapter 2) one needs to be an effective critical thinker. This prompted the research question whether CoRT can and will be transferred to other contexts and therefore whether it can be changed from a skill to a competence. In my view, my chosen methodology may make it possible to answer this research question in a very cautious, tentative way. To justify and explain my choices I have divided this chapter into theory combined with my specific research design needed to

investigate the transfer of thinking skills and its possible effects on behaviour. In the next paragraphs I will clarify my choices for questionnaires, interviews and observations.

6.2 Educational research and paradigms

"To be accepted as a paradigm, a theory must seem better than its competitors, but it need not, and in fact never does, explain all the facts with which it can be confronted" (Kuhn, 1970, p. 12)

In the social sciences, particular in the field of education, most research can be classified as fitting into one of three research paradigms: quantitative, qualitative and mixed methods research (Johnson et al 2004). To undertake research it is necessary to create a framework for thinking, acting and understanding. Deciding between quantitative and qualitative research or even mixed methods is dependent on your chosen paradigm. A paradigm is a framework to categorize observations and thoughts. Positivists are clearly in favour of quantitative research as data is classified and counted in order to explain the investigated phenomenon. Interpretists reject positivism (Johnson 2004) and qualitative research is more valuable to them. It is impossible to quantify everything that is observed. Ones choice, therefore, depends on one's personal view of society and its appearances, how one sees reality: continuously in terms of 'yes' or 'no' or as observed phenomenon which one can interpret. Kuhn (1970, p.10) called a paradigm, "*accepted examples of actual scientific practice, examples which include law, theory, application and instrumentation together.*" His idea is the notion that science does not proceed towards truth. The truth about nature, according to Kuhn, can not be obtained nor approached by science. I share the view of Willis Harman (1976) who defines a paradigm as a shared set of assumptions; further on the paradigm helps us to explain the world and its behaviour. All scientists aspire to have a greater understanding of nature. From paradigms like positivism, postpositivism, pragmatism, interpretivism and constructivism I had to decide which paradigm would fit into my educational research in order to design the right research methodology and choose the research methods. Both quantitative and qualitative research have their weaknesses and strengths. Quantitative and qualitative data will contribute to my research. My research will be a

qualitative research. Regarding my research question I am convinced that it will be hard to find answers within narrow analytical paradigms. Positivism has several assumptions. It says that knowledge or facts can be gained by using quantitative approaches, methods, and analysis and that it is the only knowledge which is available to us, to science. Subjective aspects, such as what one feels, or the value that might be given to one's collected data will be rejected. “*Science separates facts from values; it is ‘value free’*” (Robson 2002, p.20). Positivists are, therefore, only interested in the bare facts. It is almost a mathematical approach by trying to find a relation between quantitative data and universal causal laws. “*Essentially, positivists look for the existence of a constant relationship between events, or, in the language of experimentation, between two variables*” (Robson 2002, p.21). By identifying and isolating those variables, cause and effect relationships can be determined and explained. Positivistic approaches and their quantitative practices dominated the field of educational research in the 1950s. Since the 1980s there has been a lot of criticism about positivism. A more natural and constructive approach became preferred by some over positivism in the fields of educational research. Arguments to broaden the researcher's perspective had to do with science's mechanistic and reductionist view of nature which, by definition, excludes notions of choice, freedom, individuality, and moral responsibility (Cohen et al, 2000). This idea is called the interpretivist/constructivist paradigm. Interpretists find qualitative methods apposite (Cohen et al, 2000) because it allows a more naturalistic and subjective interpretation on confirmed occurrences which often are not quantifiable. This fits well in my research where a phenomenon such as thinking and its effects are very hard to quantify. There are so many variables that can be interpreted in different ways, that I prefer qualitative research. Balancing its weaknesses against its strengths, the qualitative approach provides the best insight for the purpose of my research. The numeric data, particularly obtained by questionnaires will be my precursor for qualitative analysis and interpretation. I am aware of its difficulty. Johnson (2004:21) explains it this way, “...problems how to qualitatively analyze quantitative data.” Not only quantitative data, but also my interpretation on the phenomenon I am researching is very important to be able to underpin the analysis of my small scale research. It brings me nearer to understand the outcome of my research data. Behaviour of people is, to me, a phenomenon which cannot be captured by quantitative data alone. Qualitative data might bring subjectivity into my outcome, so I have to be aware of this

possibility, otherwise the research will not give a reliable and valid outcome. A qualitative research gives me a greater opportunity to explain and describe my findings within the context of the research: 2 groups, small scale and short term research. To justify the interpretation and conclusion I can link and clarify these outcomes with quantitative data.

6.3 Qualitative research

Qualitative research is based on the assumption that multiple realities do exist in the perception of the world. To understand all kinds of phenomenon a diverse method consisting of quantitative and qualitative elements is necessary (paragraph 3.2); information collected through a variety of sources must be used and combined in a meaningful way in order to comprehend the phenomenon. Research is deemed to be qualitative if "*the purpose of the study is primarily to describe a situation, phenomenon, problem or event; the information is gathered through the use of variables measured on nominal or ordinal scales (qualitative measurement scales; and if analysis is done to establish the variation in the situation, phenomenon or problem, without quantifying it*" (Kumar, 1996, p.10). Qualitative research is not as readily accepted by positivists as quantitative research because their opinion is that qualitative research is far too subjective. Since commencing my research, I have decided to adopt qualitative research using both quantitative but above all qualitative data, which will provide meaningful data to inform my research question (paragraph 3.2) I disagree with Kerlinger who said, "*There's no such thing as qualitative data. Everything is either 1 or 0.*" (Miles et al 1994, p.40) While I recognise the value of mathematical data produced by using quantitative data I sense that the addition of qualitative data will enhance and enrich my findings. Qualitative research is a vast and complex area and mostly used when the researcher is interested in becoming more experienced in complex issues e.g. behaviour and mental processes. Phenomenological enquiry, carried out by qualitative research, uses a naturalistic approach in order to understand the phenomenon in context-specific settings. Johnson (2004:20) points out that the strengths of qualitative research are that it is very good for describing complex phenomena and a small collection of cases in depth. As I said before, my research is a small scale research so very suitable. Qualitative research generates very detailed information about what happens with students using

thinking skills. Not just a simple ‘yes’ or ‘no’ as in quantitative research, but productive and rich data which can exemplify and explain the analysis and conclusions. There are both benefits and disadvantages to possessing all the data gained by using methods like observation and interview because there is so much information that, while it is possible to describe the phenomenon in detail, the difficulty arises when the researcher needs to decide how to categorise and generalise the data. In Chapter 4, where data is presented, I outline and illustrate my choice of ways to handle the overwhelming, unstructured, but rich amount of data collected for my qualitative research.

6.4 Quantitative research

“...the research scientist is not an innovator but a solver of puzzles, and the puzzles upon which he concentrates are just those which he believes can be both stated and solved within the existing scientific tradition”. Thomas Kuhn (1977, p.234)

The definition of quantitative research is, to my mind, a study that quantifies behaviour, measures variables concerning that behaviour, compares those variables and tries to find correlation between them. It requires coded measurement instruments. By conducting quantitative research I can question a large group of respondents and, by doing so, I obtain numeric insight which makes it possible to produce percentages and other statistics. In my research, over 50 people are involved. One of the conditions to be able to do quantitative research is to have a large group of participants otherwise the research will not be representative and, therefore, invalid. The results will generally be presented in charts, tables and graphics as a clear way to demonstrate the results. Quantitative research is characterized by the use of numbers and statistics. Through deduction one tries to formulate hypotheses based on general theories. In this way one tries to find an explanation from general theory towards something specific. Kumar (1996;p10) explains it this way “*if you quantify the variation in a phenomenon, situation, problem or issue, if information is gathered using predominantly quantitative variables, and if the analysis is geared to ascertain the magnitude of the variation, then the study is classified as a quantitative research*”.

In summary, I can say that quantitative research is positivistic and deductive. There is only one, unambiguous objective truth. In my research I will use a questionnaire to provide the necessary quantitative data for the main question whether CoRT can be transferred which I will link to other data received by interviews and observations.

6.5 Mixed methods approach

Having described quantitative and qualitative research, I should now like to describe a further method, a mixed method approach, called the third paradigm which is becoming increasingly accepted and applied. Some call it a pluralistic or eclectic paradigm. Johnson (2004:14) positions this as “a natural complement to traditional qualitative and quantitative research.” My research tends to be mixed methods, but the emphasis of data collecting and analysis is mainly qualitative. The pragmatic paradigm is the opportunity for “*multiple methods, different worldviews, and different assumptions, as well as different forms of data collection and analysis in the mix methods study*” (Creswell, 2003, p.12). This implies that research methods used within positivist and interpretivist paradigms may and can be used e.g. interviews, observations, testing and experiments. The benefits of mixed method research are complementary, developmental and expansive. “They can provide quantitative and qualitative strengths, can answer a broader and more complete range of research.” (Johnson 2004:21). It is possible to compare not only the outcome of data but provide stronger evidence for a conclusion through convergence and corroboration of findings (ibid:21). The metaphor, used by professor Dr. Richard Pring during a lecture at Roehampton University, that quantitative research is like a skeleton and qualitative research is like flesh on the bones illustrates the value of a mixed method approach. Pring referred to Birley and Moreland (1998, p.127) who said: “*The advantage of the quantitative approach is that it measures the reactions of a great many people to a limited set of questions, thus facilitating comparison and statistical aggregation of the data. This gives a broad, generalisable set of findings. By contrast, qualitative methods typically produce a wealth of detailed data about a much smaller number of people and cases. Qualitative data provide depth and detail*”. Quantitative research is characterized by the amount of accurate data collected. One tries to achieve generalizations based on mathematical use and interpretation of those numeric data, while qualitative research shows the realistic point of view of the participant; it sets the

results in a human context, i.e., a real world. As education and my school are part of this real world, understanding it is central to my research. To exclude the real world from a unique phenomenon such as human behaviour could result in an unreliable outcome. Quantitative data needs qualitative data in order to validate and enrich the outcomes of research, especially the sub questions. In order to elaborate on the test question, whether CoRT can be transferred, it is necessary to collect narrative data to expatiate on the question if and how CoRT is used and what it means to students. Considering weaknesses and strengths of qualitative, quantitative and mixed methods research, my research will be carried out as a qualitative research.

6.6. Participants involved in my research

My research is based on a VMBO-school (pre-vocational secondary education) in the southern part of the Netherlands where I work as a teacher. It is a small school visited mostly by low achieving students, who attend for 4 years. In the first two years subjects such as maths, literacy and English are central subjects. In those two years they have to make their career choice. In the final two years they are trained for a working career within a technical or welfare environment. My research is performed in classes over the first two years. Participants involved in my research are a selection of students, teachers and parents associated with two randomly picked classes:

- 16 students, age 13 -14, 1st year secondary school VMBO
- 15 students, age 14 -15, 2nd year secondary school VMBO
- Parents of these 31 students
- 13 teachers

Apart from the participants above who underwent questionnaires, interviews and observations, 4 critical friends, reviewed my work and have been used to determine whether my questionnaires and semi-structured interview design are executable, reliable and valid. They did so by giving their comments independently from one another.

6.7 Classes and CoRT lessons

I have conducted my research in two classes consisting of a first and second year class. In both classes a teacher offered them a weekly CoRT lesson. Both teachers are qualified CoRT trainers and well acquainted with the program. The classes are randomly chosen by simply picking a raffle ticket. Every week a new CoRT thinking tool is introduced (see chapter 1). The way of teaching, time and day of the week and the tool offered for that week are exactly the same. In order to investigate if reinforcement will produce noticeable effects, the second year class receives some extra tuition on thinking skills *via* 2 hours a week during social studies, a tutor session where counselling takes place around their choice of career and support sessions where students in the classroom can ask for individual help in any subject. After each CoRT lesson both teachers have discussed the process and determined which tool would be introduced and the content of the lesson for the following week. This has been done over a period of 18 weeks, interrupted by two holidays.

6.8 Research methods

“Design is concerned with turning research questions into projects” (Robson 2002, p.79)

In order to collect data for my research I have used questionnaires, interviews and observations. Firstly, I used questionnaires mainly to collect data towards my main research question: Do students transfer and apply the CoRT thinking tools in other social contexts? Secondly, I will use interviews. The outcomes of the questionnaires have determined my interview design. Thus my main research question can be answered but also my sub questions can be explored. These are: “Can students indicate when they are using CoRT?”, “Can students give examples of use in or outside school?”, “Do parents/teachers see their child or student using CoRT?” and “Can a parent or teacher describe such situations?” Thirdly I have made use of observations to establish the use of CoRT tools and which tools are used most. To prevent excessive data an observation sheet is designed in consultation with the two teachers.

6.8.1 Questionnaire

"A philosopher once said "It is necessary for the very existence of science that the same conditions always produce the same results." Well, they do not". (R. Feynman, 1965)

Questionnaires are widely used and quite common in quantitative research because they provide structured, large scale numerical data. Questionnaires are very useful for research as they can be administered without the presence of the researcher. The design of an effective questionnaire takes a significant amount of time, but they are comparatively straightforward to analyze (Wilson and McLean, 1994). The self-completion questionnaires will fit in with my research and with the help of questionnaires I will be able to investigate if there is a tangible improvement in using CoRT tools alongside the thinking skill lesson.

In order to devise a questionnaire I have to think carefully about the data to be collected and, in developing it, I always have to be aware that the questions are clear because, unlike an interview situation, I am not physically present to clarify the questions. In addition, the questionnaire must be easy to fill in, must not take too much time for the respondent and must have a so called interactive style "*This means respondents should feel as if someone is talking to them*" (Kumar 1996, p.g110). The questionnaire will be developed in such a way that anonymity for respondents is guaranteed. Hence, it is imperative that the questions are sensible and clear otherwise the responses may not be valid. The advantages of using questionnaires are that they provide a lot of data in a short space of time. Additionally, questionnaires provide the respondent anonymity, as there is no face-to-face interaction between the researcher and the respondent and no names are to be filled in. "*The prevalence of a disadvantage depends on a number of factors, but you need to be aware of them to understand their possible bearing on the quality of the data*" (Kumar 1996, p.114). So, it is essential to consider factors like limited application, low response rate, self-selecting bias, lack of opportunity to clarify issues, absence of spontaneous responses, and influence by response on other questions, the possibility to consult others and no extra information can be added to an answer.

Questionnaire Student Thinking lessons (CoRT) Class 1

1. Were you at the information evening in October	<input type="checkbox"/> yes	<input type="checkbox"/> no
2. What do you think of CoRT thinking lessons <small>(you may fill in several answers)</small>	<input type="checkbox"/> funny <input type="checkbox"/> hard to use <input type="checkbox"/> stupid <input type="checkbox"/> boring <input type="checkbox"/> useful <input type="checkbox"/> difficult <input type="checkbox"/> exciting <input type="checkbox"/> easy to use <input type="checkbox"/> interesting <input type="checkbox"/> practical <input type="checkbox"/> something else, namely: <hr/> <hr/>	
3. Do you use CoRT tools ?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
4. Do you use CoRT tools during lessons	<input type="checkbox"/> Yes	<input type="checkbox"/> No
5. Which of the 10 tools do you use at school during lessons	<input type="checkbox"/> FIP <input type="checkbox"/> AGO <input type="checkbox"/> PMI <input type="checkbox"/> APC <input type="checkbox"/> OPV <input type="checkbox"/> Planning <input type="checkbox"/> CAF <input type="checkbox"/> Decision <input type="checkbox"/> C&S <input type="checkbox"/> Rules <input type="checkbox"/> None	
6. During what lessons do you use CoRT thinking tools <small>(you may cross several answers)</small>	<input type="checkbox"/> Human interest <input type="checkbox"/> Tutor lessons <input type="checkbox"/> Maths <input type="checkbox"/> ICT <input type="checkbox"/> English <input type="checkbox"/> Gymnastics <input type="checkbox"/> German <input type="checkbox"/> Welfare <input type="checkbox"/> Dutch <input type="checkbox"/> Art <input type="checkbox"/> <input type="checkbox"/> Technique	

fig 3 Part of the questionnaire used for students

A possible disadvantage may be that “respondents won’t necessarily report their beliefs, attitudes etc. accurately” (Robson 2002:233) I have designed a questionnaire (see Appendix C) that all participants have to complete, adjusted to the three specific groups: student, teacher and parent. They deliver data about the quantity of using CoRT tools in and outside the thinking lessons seen from each group of participants’ point of view. The questionnaires for parents and teachers each contain 12 similar questions. Parents have 3 questions with the opportunity to answer in full sentences, teachers have 4 such questions. Those open questions are designed to give an insight into the sub questions concerning how CoRT is used and the effects on thinking behaviour, e.g. “can you describe a situation where CoRT was used?” and “do you see changes in thinking behaviour?” The other multiple choice questions are intended to determine if students use CoRT tools. Paragraph 2.4.2 describes the types of transfer and their difficulties, so this questionnaire must gain an insight into the transfer of thinking skills in other contexts.

For students, I designed two questionnaires (Class 1 and Class 2). Class 1 only had one thinking lesson per week and class 2 received one thinking lesson and an infused

Seen from the pragmatic paradigm perspective, I would say that whilst questionnaires provide a lot of data they can be very mechanical and I am more interested in probing the inner aspects of the human psyche by talking to people and assessing the behaviour I am researching. So, questionnaires will be part of my research design in order to underpin the data obtained by using observation and interview.

approach during three other lessons a week. The students' questionnaire consisted of 21 questions. Qualitative questions like, "Can you describe situations?" and quantitative questions like: "Do you use CoRT after school?", were merged. During the last thinking lesson of the 18 lessons course, I explained to the students that they had to complete the questionnaire according to their beliefs. To have some control over reliability, question 3, 4 and 7 are controlled questions. If a questionnaire will give contradictory answers on those particular questions this questionnaire will be taken out of the research. By sending and returning them by post I also ensured their anonymity which gave me a level of assurance that they would fill in the questionnaire as honestly as possible.

6.8.2 Interviews

"Interviews concern interpersonal interaction and produce information about the human condition" (Cohen et al, p 92)

Use of interviews in terms of collecting data is very challenging for a researcher. Is it possible to gain answers on the prepared questions without influencing the interviewee which is, as I said, hard but challenging? The interviewer will ask appropriate questions but has to remain within the boundary of the design. Interviews can be very useful for gaining an insight into the participant's experiences. "*Interviews 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*" (Cohen et al 2000, p.267). I will use interviews to gain more in-depth data next to my questionnaires, in order to underpin my sub question: "If you use CoRT outside the class, can you give an example?" (see 3.7) As I said before, it is imperative that the interviewer stays within the designed protocol and to decide the type of interview he/she wants to do. Cohen (2000) described four different types of interviews with characteristics, strengths and weaknesses. An informal, conversational interview where no predetermined questions are asked and you go with the flow; a general interview, where the same information in different interviews is collected; a more specific interview in the form of a standardized, open-ended interview, where the interviewees can respond to open questions. If the interviewer is inexperienced, it is advisable to conduct a closed-fixed/closed

quantitative interview, where the questions are established and the interviewees can choose answers out of a set of options. In this way you avoid “*unstructured responses which are hard to code.*” (Cohen 2000, p.277). To achieve an effective interview it is important to pay careful attention to the design of the questions. Kvale (1996, p.88) calls this planning interview-based research procedures. It is prudent to carefully phrase questions to prevent the desired answer from being apparent to the interviewee. I am aware that I have to avoid leading questions. Only one question about one subject will be asked at a time and all questions should be directly related to finding out the respondent’s opinion of my research topic. An unstructured interview is a threat to the feasibility of my research as I might collect too much inferior data. Interviews, however, are useful and fit well within the framework of pragmatism: they recognise the existence and importance of the natural or physical world that includes language, culture, human institutions and subjective thoughts (Johnson, 2004). Opponents of pragmatism reject it because of its logical failing as a solution. So, again, the structure of the interviews is important. My interview design will be a more specific interview in the form of a standardised, open-ended interview, where the interviewees can respond to open questions. The design will include questions that will be asked to all the interviewees in order to form a baseline of opinion and enable the results to be compared against one another.

I will interview participants from each group: 3 students from class 1; 3 students from class 2; 4 parents and 5 teachers including the two teachers doing the thinking lessons. The interviewees will be picked at random by picking a raffle. This is ethically justified, because on the information evening all participants was asked if they were willing to be interviewed with the remark that they could always refuse and even withdraw from the research. I will ensure that boys and girls are represented equally because in my research design gender is not included.

6.8.3 Observations

My research concerning the use of Thinking Skill Programmes will also be observed. I will investigate this by observing students at specific times and at other moments during school time. I will count the numbers of times I see students using CoRT during the lessons. I will conduct observations to provide data needed to

answer my main research question. In research, two main types of observation are commonly used: participant observation and structured observation (Robson 2000, p.310). Kumar (1996) distinguishes two types of observation, namely participant and non-participant. The researcher either participates in the group that they are observing or not. Participant observation is more qualitative in style, while structured observation is more quantitative. The latter is an efficient and structured way to collect information if the interest lies in quantifying some type of behaviour. The behaviour has to be described very precisely to ensure accuracy of the observation. "*The use of observational methods usually produces frequency counts of a particular behaviour*" (Marczyk et al, 2005, p.119). Cohen et al (2000) name three types of observation: highly structured, semi-structured and unstructured. Highly structured has predefined criteria that allows the rapid analysis of the data. Semi-structured observation has the same advantage, but the gathering of data is more flexible. The unstructured observation has no criteria and therefore the analysis of the data is more difficult. While the focus in gaining qualitative data is on interviews, the observation will be of a quantitative nature. The major advantage of observation is that it reveals exactly what is happening, it shows 'the real world' although I am aware that observation is beset by issues of validity and reliability. "*Even low inference observation, is itself highly selective, just as perception is selective*"(Cohen 2000, p.315) . Conversely, the outcome can be a disadvantage of observation because it is hard to interpret data. "*How do we know what the behaviour would have been like if it hadn't been observed?*"(Robson, 2000: p311). The problem is that individuals or groups who are aware that they are being observed might change their behaviour as a direct result. Students in a classroom behave differently when the teacher tells them he/she is watching them; this is known as the Hawthorne Effect (Gillespie 1991). Then there is the issue of bias where, if the observer is biased, this can easily lead to unreliable data. It is hard not to be influenced or tainted by your own thoughts and experiences. Thirdly, the interpretations may change from observer to observer. First of all an observer has a limited focus. Secondly different observers may see and conclude different things although you have made clear what you want to observe. This may enrich your data: "*two researchers who are studying a single setting may come up with very different findings but both set of findings might be reliable*"(Cohen, 2000, p.119) Besides that it also takes a lot of time to conduct observations, write everything down and glean useable, valid and reliable data from what has been witnessed. Observation

is a method that can be employed in both quantitative and qualitative ways and this fits nicely in my chosen research paradigm: a mixed method approach. The observations will last between 20 to 30 minutes without contemporaneous notes being taken, but with a clear focus on the use of thinking tools and if so what specific thinking tools. Observers use an observation form (appendix F). The written narrative will take place later, and it is my belief that the notes made at that time will capture the most important points. The participants at this time are the students only. Both groups will be observed during tutor lessons and environmental studies. Observation will be performed 21 times over the period October until April. The observation will be semi-structured, so where to look for, namely do they use CoRT tools and what CoRT tools, is defined. To reduce bias, every observation will be done by two teachers. This implies that I can compare notes from the observation and that almost every student is captured during the observation time.

6.9 Validity and reliability

“There is no easy, single, way of determining construct validity” (Robson 2002, p. 102)

Every researcher has to deal with validity and reliability. Cohen (2000:105) explains that “threats to validity and reliability can ever be erased completely;” Cohen (2000) mentions all kinds of validity (18). Validity concerns the question: “are we actually measuring or observing what we claim to be?” and reliability: “would the same procedure, experiments or actions carried out again produce the same result?” (Swetnam, 2003:23). Quantitative research can easily contain wrong measurements; qualitative research has to deal with subjectivity. Use of triangulation is done to counter the threats mentioned by Cohen. There is no rule that says that only one method must be used in an investigation (Robson 2002) but the use of triangulation will enhance my research. Robson says that *“methodological triangulation is a way of putting quantitative and qualitative research together and that it can help to counter all of the threats of validity”*. (Robson 2002:174-175) Triangulation is a powerful way of incorporating concurrent validity, particularly in qualitative research (Campbell et al 1959). I would like to perform data triangulation e.g. observation, interviews and questionnaires, as well as methodological triangulation by combining qualitative and quantitative research. Data is collected from three groups of participants (see 3.6) I

am aware that in educational research it is very hard to be objective. Also Miles (1994) states that if during data collection triangulation is consistently used double-checked; the research will be valid and reliable. So, source triangulation (parents/students/teachers), observers triangulation (both teachers doing the same and comparing) and data triangulation using qualitative interviews, quantitative questionnaires and observations. People are involved in such a way that it is almost impossible to rule out subjectivity. When I design my questionnaires, interviews and observations, I have to deal with reliability and validity otherwise I could draw the wrong conclusions from my data. I then have to ask myself if the instruments I am using provide answers to my research question. To be sure that an instrument measures what it is supposed to, I have to achieve good justification. The reliability of methods can be assessed by doing the repeatability test followed by the equation (test score)/(re-test)=1 (Kumar 1996, p.141). I will not do so, because there is no equivalent class. In order to achieve reliability, transcripts of interviews will be sent to the participants. They are asked to confirm them and to provide further comment if they do not agree with the transcript. During the interviews questions of the questionnaires are used again. This as a form of repeatability. Any observations are also then checked by the two teachers and at the end of my research the results are presented in a presentation for all participants with their final remarks also incorporated into my dissertation. By doing this all above I hope to write a valid and reliable dissertation.

6.10 Ethics

“Ethical dilemmas lurk in any research involving people” (Robson 2002, p.66)

Fully aware of my role as a researcher, I have the responsibility to ensure, as far as possible, the physical, social and psychological well-being of my research participants. My relationship will be one of mutual respect and trust. I am aware of the professional codes contained in the Revised Ethical Guidelines of Bera (2004) and have gained my deputy head's consent to follow them. Following these guidelines will prevent my role as researcher from clashing with that as a teacher in the school, where the research takes place, I will be involved too. This might cause ethical dilemmas, so by observing the guidelines my role as a researcher is clear. I explained

to him the methodology and the ethical guidelines that I will abide by drawing upon DHEW policy 1971; Cohen et al 2000, p.51. The students, parents and teachers involved in my research have been told about the design of my research, the aim of my work and what I will do with the results. I will assure them that their anonymity and privacy will be respected and personal information will be kept confidentially and securely, especially as it centres on sensitive information. Therefore the data will be stored in a safe place. In accordance with Frankfort-Nachmias and Nachmias (1992) I will protect the anonymity of research participants and keep research data confidential. The transcript of the interviews will be given to the interviewees and only with their approval after they have read the transcript will it comprise part of this dissertation. At the end of my research project all participants are invited to a presentation of my findings before further dissemination takes place. The names of those involved with my research will not be written down here or known to others, thus protecting confidentiality.

6.11 Summary

"Design is concerned with turning research questions into projects" (Robson 2002, p.79)

When conducting my research I have considered several questions. Mainstead and Semin (1988) write that the strategies and tactics chosen to undertake research depend on the type of question you want answered. The design concerns all the things involved in your research. Adams and Shvaneveldt (1991, p.103) describe a research design as "*(a) plan, blueprint or guide for data collection and interpretation – sets of rules that enable the investigator to conceptualise and observe the problem under study*". I have to keep in mind those questions related to purpose, theory, research question, method and sampling strategy; they are all related to each other. Somekh and Lewin (2005, p.346) define ethical considerations as methodology: "*the collection of methods or rules by which a particular piece of research is undertaken*" and "*the principles, theories and values that underpin a particular approach to research*".

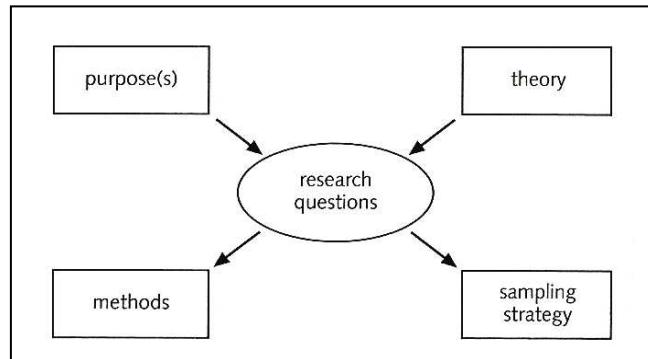


Figure 4 – Robson 2002 , p.82

The research questions are the centre of the design as figure 4 shows. I maintain that theory tells me (see chapter 2) that students benefit from thinking skill programmes. My chosen methods will provide the required data which will give me, after analysis (chapter 5), the answer to my research question. Interviews and observations will enrich my data analysis and will underpin my conclusion. It is very important that interpreting the quantitative data is done in a careful and objective way. The data will be used to describe a phenomenon, namely transfer of thinking skills.

Chapter Seven Presenting the data

7.1 Introduction

After discussing paradigms, methods and methodology in previous chapters I will now present my collected data and analyse them to formulate a tentative conclusion. A more extensive analysis will be done in chapter five. I collected this data in order to investigate my main research question: "will there be a transfer from CoRT thinking tools towards other contexts?" In other words, can these thinking tools, performed in a systematic way, be transferred into a student's competence and applied in daily life? Furthermore I attempt to answer the sub questions: "how do they use thinking tools?" and secondly "are there changes in behaviour?" To inform all participants, 31 students, 31 parents and 13 teachers, an information evening was convened in October 2007, which was attended by 20 parents, 12 students and 4 teachers. At the end all attendees were asked if they were willing to complete a questionnaire in March 2008 and participate in an interview in April 2008. I also sought the permission of parents to observe students in relation to the research. The participants who were not able to be present were informed by letter and received the same booklet (appendix H) containing all information given during the information evening. By November, all participants had pledged their support, completed the questionnaires, and indicated that they were willing to be interviewed while parents consented to their child being observed. Data was gathered by using questionnaires for all participants. Interviews were conducted on a random selection of students, parents and teachers. Furthermore, the outcome of observations performed by two teachers are presented herewith. They both made independent notes (see appendix F) and met to compare them every week. Questionnaires provided information, interviews monitored these outcomes and vice versa. Observations were made by two teachers for 21 weeks in order to establish whether thinking tools were used in the classroom, which tools were preferred and if the use of tools increased.

7.2 Questionnaires.

In order to get an insight into the transfer of thinking tools, I designed a specific

questionnaire for each group. Before using them in my fieldwork they were presented to three critical friends who were familiar with CoRT and invited to

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complete one and provide feedback. They unanimously agreed that the colours disturbed and confused them. Teachers stated that while filling in the questionnaire they kept asking themselves what the intention of the colours was; they distracted their attention. So I decided to colour-code them after they had been returned. The colour code was used to divide the category of questions into three: questions on use, questions on behaviour and common questions. They were all despatched to respondents by post, filled in anonymously and returned by post. 31 students, 13 teachers and 31 parents received a questionnaire. 22 students filled it in correctly and returned it, 14 parents and all teachers returned their questionnaire. The questionnaire for the students was exactly the same but were marked 'class 1' and

'class 2'. Class 1 and 2 took part in the CoRT program once a week, class 2 had a more integrated approach for another 2 hours a week. Their teacher also confronted the students with the tools during mentor hour and Dutch. The questionnaire contained three kinds of questions: questions about using thinking tools, questions about how the thinking skills were used and questions in relation to behaviour. (See appendix VI.1) All students had to indicate whether they used CoRT tools, teachers and parents were asked if they saw students/children using CoRT tools, giving a 'yes' or 'no' answer. Figure

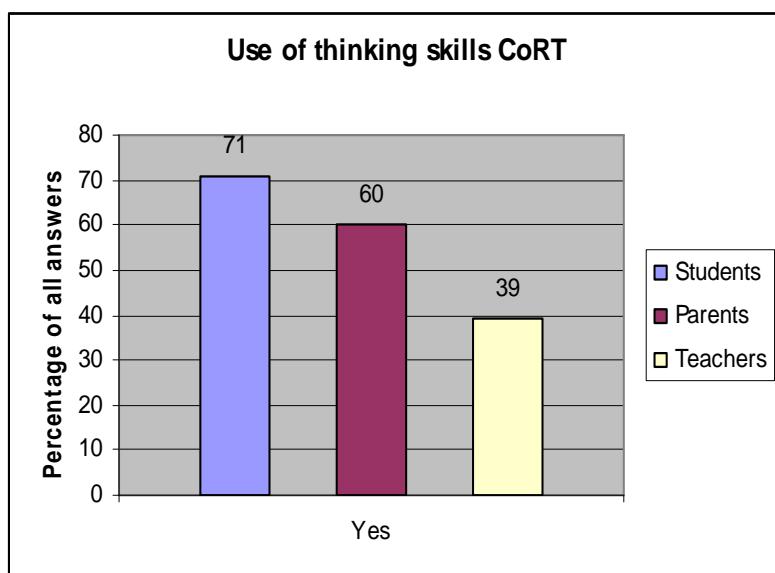
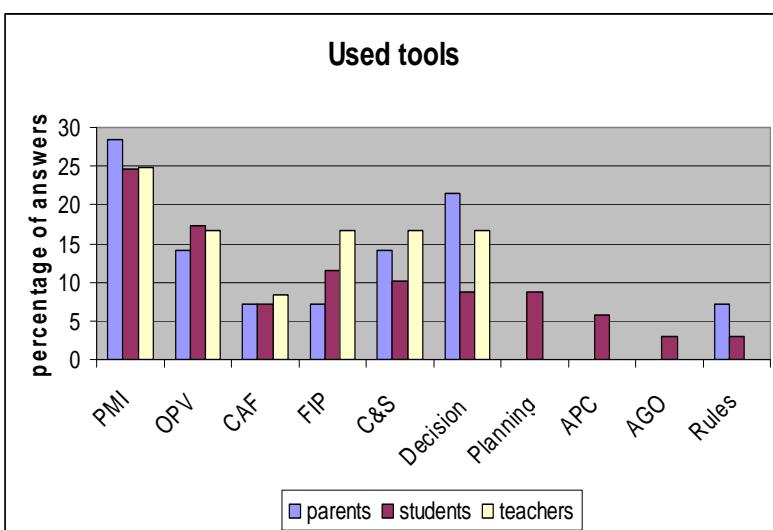


figure 4.1 Use thinking tools



figure 4.2 Which tools are



4.1 shows the outcome. Students and parents do agree about using CoRT. 61% of all teachers hardly recognised the use of CoRT. The second question, about using CoRT tools, was the one in relation to the tool(s) they use. The outcome is shown in figure 4.2 On this question participants agreed more than they did about the use of CoRT. PMI, OPV and Decision are named as the most used tool. ‘Decision’ as a tool is a combination of PMI, OPV, CAF and C&S. In order to investigate if students use the tools openly, another question for students was introduced: “do you talk about thinking tools with your teacher while using them?” and “do you talk about thinking tools with your parents?” 82% of the students answered in the negative on the first question, 72% in the negative on the second question. All participants were asked about the little CoRT cards (see appendix VI.7) students were given at the start in October. 91% of the students said they never used them. 92% of the teachers never saw students use the cards. 84% of the parents responded that their child didn’t use the cards. So a first cautious analysis indicates that CoRT tools are used, and PMI, OPV and Decisions are most used.

fig 4.3 Use of CoRT

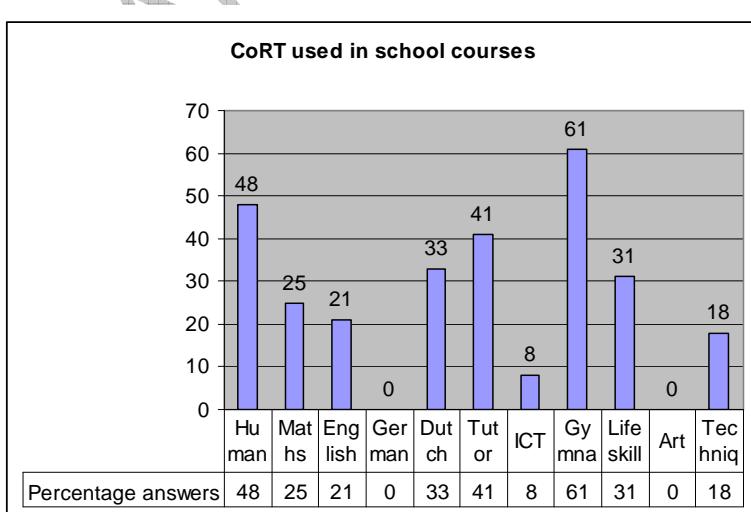
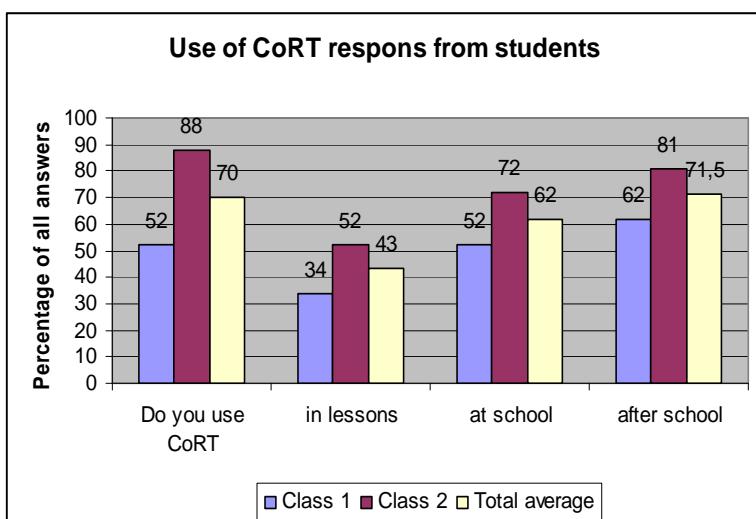


figure 4.4 CoRT in course

7.2.1 Questionnaires for students

The questionnaire intended for the students was marked ‘class 1’ and ‘class 2’. In this way it was possible to differentiate between both classes. When the questionnaires were returned I coded them: **common questions, questions of use, questions of how they are used, questions of behaviour.** The four questions

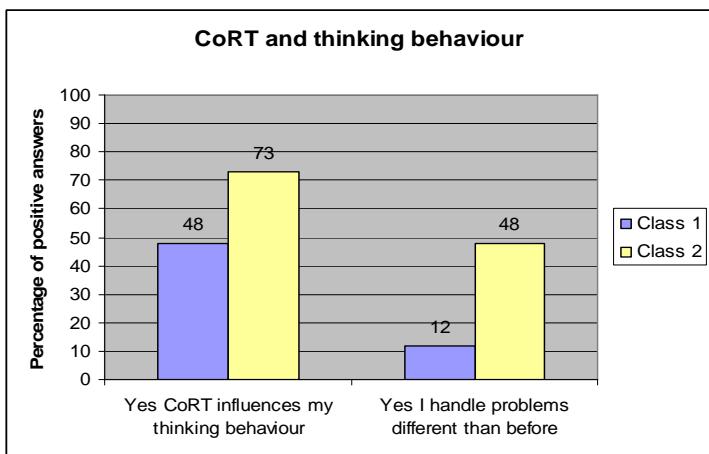


figure 4.5 Influence on thinking behaviour

of use are: “do you use CoRT?”, “do you use CoRT in lessons at school?”, “do you use CoRT at school outside the lessons?”, and lastly, “do you use CoRT after school?”. In all four categories class 2 has a significantly higher score than class 1 (see figure 4.3).

CoRT is used more after

school than in lessons and in school. On the question about what subjects CoRT was used in, the outcome was that it was used equally across all courses (see figure 4.4). Only German as a second modern foreign language and Art have no score. Talking about these results with both teachers learned that they reject Thinking Skills and prefer their own way of teaching. This teaching is based on reproductive educational strategies which are attached firmly in their personal beliefs. It is most likely that this standpoint has his influence on the use of CoRT. Only class 2 has German in its curriculum. Students could give examples of how they used CoRT in and after school: 36% (8 out of 22 students) could not give an example of a time when they used it in school and 27% out of those 22 students could not give an example of a time when they used it outside the school. One student said: “I use OPV and PMI a lot when I have arguments with my parents” and another student made a remarkable statement saying: “With PMI I stay out of a lot of trouble with my parents.” The questions about behaviour are about thinking behaviour. “Do you think CoRT influences your thinking behaviour?” and “do you handle problems in a different way knowing CoRT?” were the two questions. “I watch more accurately, react less impulsively and take more time” were 91% of the responses to the request to give examples about the change of thinking. Furthermore only 21% responded positively on the question about whether they reflected on their behaviour in their work with the help of CoRT tools. When analysing the data I would say, that the use of CoRT is significant higher outside than inside the classroom. My explanation is that during class there is hardly any time to use CoRT. It is most likely that students still practise and use them in situations that are offered them while learning the tools. This means that low road transfer is confirmed

7.2.2 Questionnaires for teachers

All 13 teachers involved with my research and teachers of both classes returned the questionnaire. The questionnaire contains questions about the use of CoRT, how it is used and changes in behaviour (see fig. 4.6). 4 out of 13 teachers were present at the information evening so it is debatable whether the answers are valuable to my research.

Therefore, the answers have differentiated between those who were at the presentation and those who were not. 25% of teachers who are informed equates to 1 teacher, whereas 11% of teachers who are not informed also equates to 1 teacher. Teachers who are informed about CoRT do witness more use than their uninformed colleagues. Two gymnastic teachers (uninformed) commented that students used CoRT tools occasionally to address arguments with one another. Only 23% of all teachers (3 teachers) see some change of thinking behaviour. Teachers stated that students have more arguments and see the consequences of what they are doing by using CoRT tools. These results do not give me a deeper insight. The outcome of this questionnaire indicates that one has to be informed to recognise the use. This assumption can be underpinned when I see overall more positive response from students and parents. Students and parents were more present on the information evening.

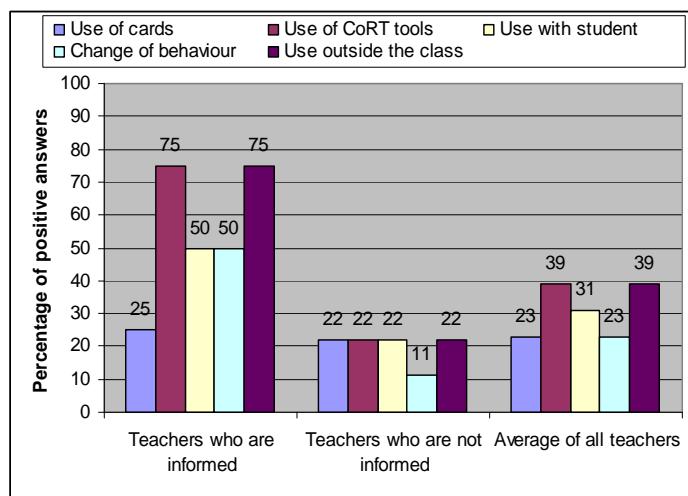


figure 4.6 Response of use seen by teachers

7.2.3 Questionnaires for parents

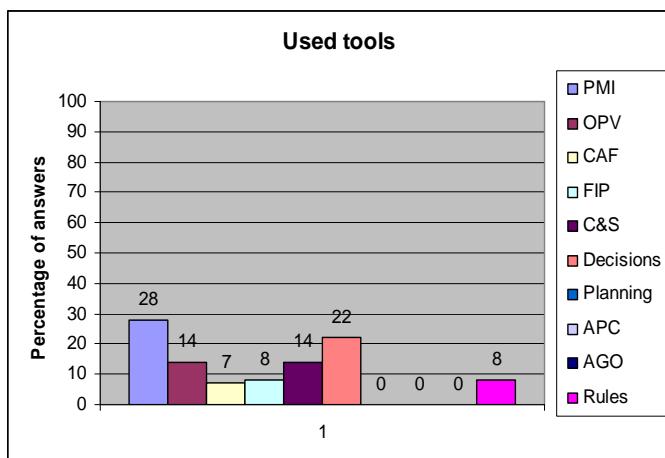


figure 4.7 Use of specific CoRT tools

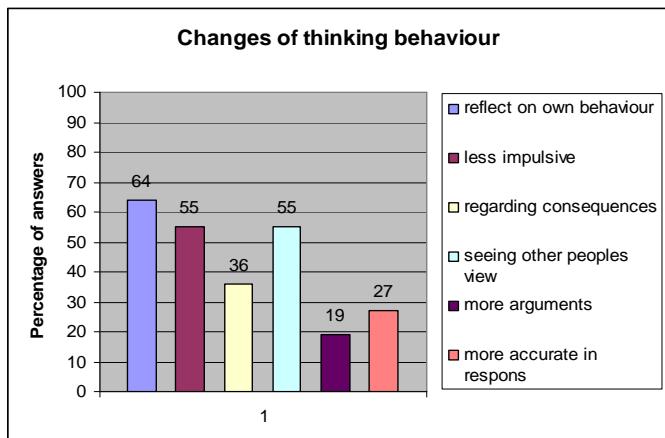


figure 4.8 Changes in thinking behaviour

altercation with neighbours where the child used OPV, conversations about next year's school course and an explanation at home about an argument with a teacher. So this outcome indicates that students use the tools especially in social contexts. This can be explained because the tools are offered at school in similar situations. Transfer therefore is quite easy.

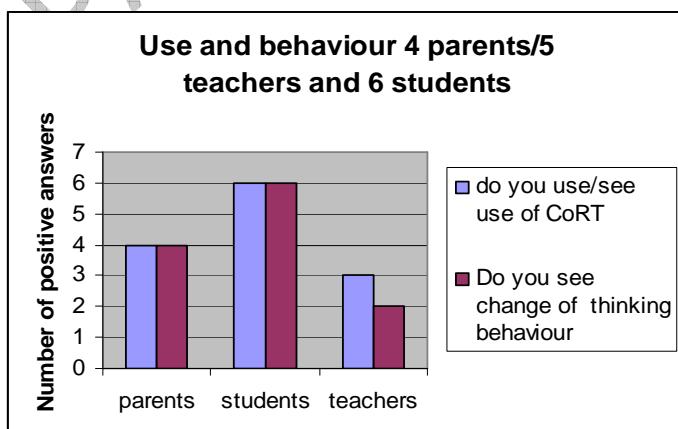


figure 4.9 Use of CoRT/ change of thinking behaviour

Of 14 returned questionnaires representing parents who did attend the information evening and described the information as relevant, interesting and easy to understand. As shown in figure 4.1, 60% of the parents recognised the use of CoRT.

Figure 4.7 gives an overview of the tools that are used most. 11 parents stated that they saw a change in thinking behaviour in their child (see figure 4.8) 8 Parents responded that they could give an example of a time when they saw their child using CoRT. The situations centred on a quarrel in the street, an argument about a paper round, an

7.3 Interviews

interviewed 4 parents and 5 teachers on an one to one basis. All were semi-structured interviews (see appendix VI.3).

My reason for doing so was mainly to combat the problem of too much unstructured data (see paragraph 3.3). Interviews with students were held on a semi-structured basis, in groups at school with 3 students interviewed from each class. All interviews were held in April when all students had finished the first part of the CoRT program with its 10 tools. The two main questions were about the use of thinking tools and the change in thinking behaviour. The transcript of the interviews were given to the interviewees and adapted with their remarks. This adjusted version was used in my research. The answers on the main question “are CoRT tools transferred to other contexts?” and sub questions, “how do they use them?” and “are there changes in thinking behaviour?” of all interviewees are presented in the table as qualitative and quantitative data (see figure 4.9) Overall 87% of all participants answered ‘yes’ on the question whether CoRT was used or had been seen to be used. 80% of all participants answered ‘yes’ on the question whether they noticed a change of thinking behaviour.

7.3.1 Interviews with the parents

The parents who were interviewed were very enthusiastic and spoke openly about their experiences with the thinking skills. One parent made a slight change to the transcript following which he gave his endorsement. Both parents were present in three out of four interviews. After reviewing the interviews I concluded that all parents interviewed were enthusiastic about CoRT lessons. All parents interviewed had attended the information evening in October and could, without hesitation; give several examples where their child had used CoRT tools. They unanimously told me that their child didn't use the little cards, with one parent offering the following explanation, “It is in his head and when I asked him to stop playing on the computer he says he will do a PMI or an OPV.” Three out of four parents enquired whether it would be possible to translate the CoRT words like PMI, OPV and C&S. I noticed that during the interview two out of four parents had some trouble with the abbreviations. All four parents agreed that they noticed a change of behaviour where their child was less impulsive and had more understanding for other people's view, meaning the parents point of view!

Interviewees	Do you see that your child uses the tools ? If so, can you give an example ?	Do you see changes in thinking behaviour ? If so, can you describe the change(s)
parent 1	<p>Yes, several situations.</p> <p>We had an argument together and we looked at all the possibilities, also to all the views of those involved.</p> <p>Also, when our daughter had a fight with another student in her class we said to her: look at it from her point of view. You are not always right.</p> <p>What can the opponent think in this situation? I played the opponent and my daughter was herself.</p> <p>When she has an argument with her brother she also says : lets do it with the Bono.</p>	<p>Yes, for instance my example about the argument with her fellow student: she now understands how other people may think in certain situations and she can accept those differences. The time of making decisions about differences is shorter. There is a question and the way of thinking is shorter, more in the right direction, more to the point.</p>
parent 2	<p>Yes in several situations, but he never uses the names of the tools.</p> <p>We think he uses the tools in situations outside of our house, for instance during football. There is a boy who pesters him a little. The trainer says that he is different in that situation than before. He is also more open for arguments : If you do this, then.....</p> <p>We also know that he uses the tools constantly in school in all kinds of situations. It helps him to make a lot of things clearer to him</p>	<p>Yes, he discusses more with us than before. He is quicker with his opinion about things, wants to look at more sides of questions and we notice that he uses terms that belong to the CoRT tools.</p> <p>He is quicker in making a decision about something. For instance: Shall I do my homework now or tomorrow? Now he says: I'd better do it now, then I'm ready and I'll have a day off tomorrow.</p>
parent 3	<p>Yes, but he only uses them in his head. When he comes home and something happened at school we see a difference in the way he talks about that situation. He is more prepared to see things from another angle.</p> <p>He is also more willing to find a solution together when there is an argument about something. He used to think very black and white. Now he is more willing to listen to other</p>	<p>Yes, we had an argument about something. I suddenly saw him slow down in his reactions. I noticed, that he thought: "I have to think first and then react." We both knew that we were both a bit wrong in this situation and I thought: "yes, now I see you using the tools" And I said to him: "I give you a compliment, because I saw you using the tools and I</p>

	peoples arguments and accepts them sooner. For example: He offered to help out in school but he also had to do his job (bring round papers). He said: "mom, I've already arranged things with the teachers involved to sort this problem out" I thought this was very good of him. Before he would not have thought about this.	think it is very good of you". Normally he would leave the room, throw with the door and go to his own bedroom, but now I saw him think and he stayed.
parent 4	Yes, he uses it all the time. He uses it to find different ways of solving a problem. Before he had the CoRT tools he was not willing to listen to arguments. Now he is more willing to listen to other people and accept is when they have another opinion. He even wants to accept that opinion.	Yes, he is more willing to listen to my arguments when I help him with his homework. He is more willing to try other ways of finding an answer to difficult questions. I often say: "think about the CoRT tools. (the cards)"

7.3.2 Interviews with the teachers

Thirteen teachers work with both classes. Only five of them were willing to be interviewed. Eight teachers could not be interviewed citing insufficient knowledge about thinking skills or had not been able to attend the information evening. 40% of the teachers interviewed were not at the information evening claiming their unfamiliarity with CoRT had prevented their attendance. Grey (2006) explains in this way: "Many teachers feel they can not afford the time for their pupils to learn more creatively because the bureaucracy of the National Curriculum urges them on to 'more efficient' ways of learning".(ibid:128). Although Grey refers to England, I heard the same argument when the teachers in my research explained their absence during the information evening. Their responses were, therefore, minimal. Four out of five teachers observe students using the thinking tools but cannot say with any authority which tools are being applied or how. Three out of five see some change in behaviour where the student is less impulsive. Two out of five have an instinctive feeling that these changes are associated with the CoRT program. This might indicate that CoRT may have influence on students' behaviour.

Interviewees	Do you see that your student uses the tools ? If so, can you give an example ?	Do you see changes in thinking behaviour ? If so, can you describe the change(s)
teacher 1	Yes. I saw students use the tools several times. Once a student told me she used OPV in order to decide to raise extra money for a day out with the class	Some change. But the most common change is that students are less impulsive, take more time to think more thoroughly
teacher 2	Students use them now and then during Literacy. The use I see is that they are talking about thinking. I know not enough about these CoRT tools to recognise them.	No, I don't see changes in relation to the CoRT tools
teacher 3	I don't see them with CoRT cards, but I hear them talk about what to do when they have to solve a problem. They use words as FIP and APC but I don't know enough from this CoRT program to recognise the use and how they use it.	The change is that students don't react primarily. They sometimes react with remarks as:'I will use PMI or OPV now'.
teacher 4	No, because I was not at the information evening. I hear them talk about PMI and OPV but I don't know what it is all about.	No, I don't see a change.
teacher 5	In my lessons they use it quite a lot. Especially when they disagree about what to do, how to do it and who has to do it. I don't know the thinking skills well enough but to my idea they use them because I hear them using words like OPV and C&S	Change is, that there is less trouble. They agree more with one another, especially after I have heard them using thinking tools.

7.3.3 Interviews with the students

All students felt uninhibited in answering the questions. I made an appointment with the group of three, with each speaking one after another, in order to make it possible for me to transcribe the interview which was recorded. The effect was that I got clear data, and students now and then supplemented one another. Overall they did not disagree on any of the questions, they just had subtle distinctions. All students said

unanimously that they use CoRT both in school and in their private lives. One student preferred to use them outside school. All could give examples of situations where they used them. Three out of six students said that it helped them to make decisions.

	Do you use the tools ? Where do you use them ? If so could you give an example ?	Do you notice changes in thinking behaviour ?
student 1	Yes I use the tools. I use them at school but also at home. I use the tools to make a decision about the choice of school next year. I chose a total different direction. I also used the tools to find out what I wanted to do next year in school	I've been changed: There are less arguments. I'm more willing to talk about things. I don't panic quickly anymore.
student 2	I use the tools at school as well at home. I cannot say where I use them most. I am more willing to give the other person the benefit of the doubt. Normally I would hit the person who pesters me or start a fight, now I am more willing to talk about things and it is easier for me to walk away from it.	Yes I make decisions about things but not before thinking on other peoples view.
student 3	Yes I use the tools. At school with friends but also at home with my brother. I explained it to him. I used PMI en APC to make the decision to stay and not to move to another school.	Definitely. I make quicker decisions than before and I don't feel sorry afterwards about it.
student 4	Yes, at school and at home. I had a problem at the football club and I used the Cort tools there. I use it automatically to solve problems with friends. I don't use the words PMI or OPV exactly	I use the CoRT tools when I have an argument. I was always too impulsive. Now I think: Why does he say this, what does he actually mean by that. I am more willing to look at things from other people's point of view.
student 5	I use them during thinking lessons, not so much during other lessons but most of the time outside the classroom and at home. I start earlier with my homework instead of one day before a test. To do so I used planning several times.	It helps me to think quicker.

	C&S changes my mind often.	
student 6	I like to use them outside school because it gives me more self esteem. I used to swear at people and talk back if someone said something to me, now I think: It doesn't give me anything if I do this, so I leave it be. The consequence is that I have less problems with teachers and other students.	By using them I have the feeling that I don't make stupid decisions which gives me a good feeling.

7.4 Observations

The mentor and one other teacher made structured observations in each class every week, from October until April, comparing their checklist as they went along. With a

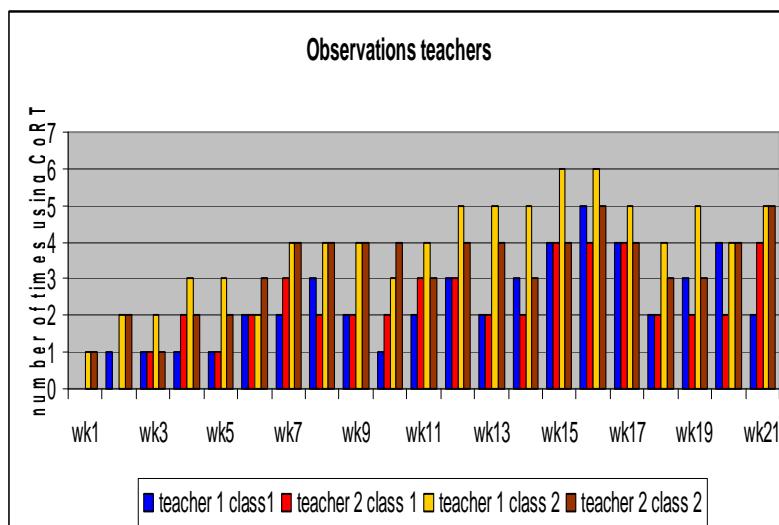


figure 4.10 Number of times CoRT use was observed

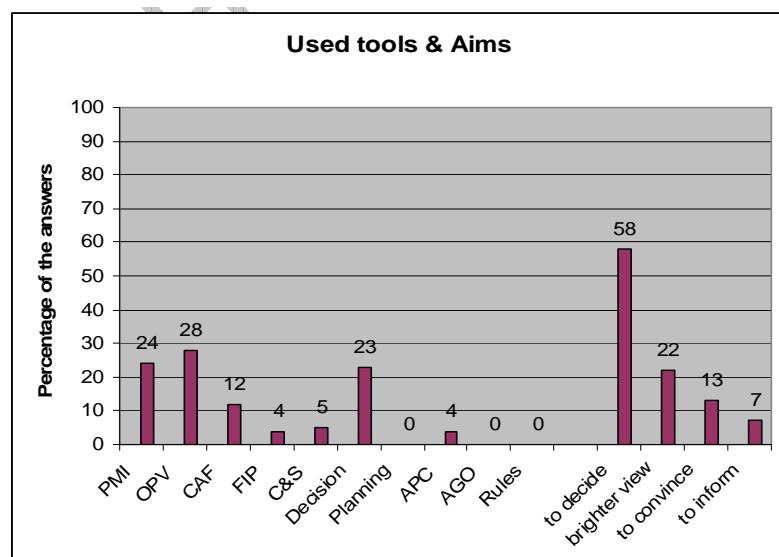


figure 4.11 Tools used by students and observed by teachers

coding scheme (see appendix VI.F) both teachers observed whether students used CoRT tools and confirmed the number of times when they did (fig. 4.10) Furthermore, they tried to score which tool was being used and what it was used for (see figure 4.11) The number of times that the use of CoRT was observed increased over the weeks of the research. Every two weeks another new tool was introduced so another tool was available for observation every other week. To

establish and confirm the tool(s) students were using and its aim, teachers asked the students after a lesson which tools they had used. By doing so it validates the findings. It is qualitative research on one hand because positivists would notice that if you are looking at the same you see the same and quantitative on the other hand because what observers see is not simply determined by what one sees. (Robson 2002:21) OPV, PMI and Decisions are most used. It must be said that PMI as an example, was introduced in the first week of the project so could therefore be practised longer and more intensive. The tools in figure 4.11 are in the same sequence as offered to students in the project. The aim to use tools is to take a decision, to be better informed, to convince one another or to have a better insight in the problem the student is solving.

7.5 Summary

In this chapter data obtained by questionnaires, interviews and observations were presented. The coding in colours was made after the questionnaires were returned. The outcome of questionnaires and interviews between students and parents were more consistent than those between students and teachers. There were hidden control questions in the questionnaires. Question 3 of the questionnaire for teachers and parents were similar to question 15 of the questionnaire for the student and elicited the same response. Questions 4 and 11 (for parents) were the same and the response didn't differ. Question 18, 19 and 20 (for students) were answered negatively as was the corresponding question for parents and teachers. So after my first cautious analysis I would say that CoRT is transferred to other social contexts, it probably changes students' thinking attitude and that this all is particularly confirmed and recognised by students and parents. A more detailed analysis can be found in next chapter.

Chapter Eight Analysing the data

8.1 Introduction

“But the trouble arises when we find that testing thinking is extraordinarily difficult and beset with pitfalls” (De Bono, 1976:200)

In this chapter I will analyse the data presented in Chapter Four more closely. By interpreting the data in relation to additional literature and literature mentioned in Chapter Two I will attempt to answer the research question as well as the sub questions. I am fully aware that my research is small scale so I have to be very cautious in my analysis. Willingham (2007) advises anyone conducting research on thinking skills to be very careful in drawing conclusions and cites four reasons for doing so. First of all he states that the programs are only evaluated once on the same group. Secondly, as in my research, there is no control group in order to determine if gains have to do with the thinking skill program. Third the control group used in other research has not had a comparison intervention which means that effects may be attributed to the teacher doing something new and exciting and therefore not to the program. And fourth, there is scarcely a measure to confirm if transfer takes place in totally different contexts than those offered during the teaching of thinking skills. With this in mind, I will try to analyse and interpret the data in an unbiased manner realising that as a researcher I am part of this research at my school. In summary, I acknowledge in advance the limitations of my research agenda.

8.2 Interpretation and dispute on data concerning my research question

My main research question is, whether CoRT tools will be transferred to other situations in life, as well as in and outside school. De Bono claims: “The transfer outside school seems good.” (ibid 1976:217). As Bransford et al state, offering educational programmes is core to education: “...the main goal of schooling is to help students transfer what they have learned in school to everyday settings of home, community and workplace.” (ibid 1999:73). The outcome of the questionnaires shows that students use CoRT in school as well outside school. There is even a slight increase towards use outside school. The cautious conclusion is that one can say that

there is transfer of CoRT tools where transfer is defined as: "...the ability to extend what has been learned in one context to new contexts" (Bransford et al. 1986:51). This is confirmed by the outcome of the same question on parents. The response of the teachers, however, differs at this point. 39% of the teachers recognise use of CoRT while students and parents have a score of 71% and 60% respectively. To my mind, the fact that teachers do not recognise the use of CoRT has to do with them not being informed because other educational development took priority. Only 4 out of 13 teachers were present in October when all participants were informed which may have biased their responses. The questionnaire does not give insight into this assumption, yet the interviews with parents and students confirm the use. The first question in my semi structured interview, "Do you see your child using CoRT / do you use CoRT?" was answered unanimously. Strikingly, all given examples of this fixed use have to do with making decisions, postpone decisions and being more cautious by building up one's opinion. De Bono (1976:129) claims that "CoRT encourages pupils to look in a wider sweep round a situation instead of rushing off after the obvious, short term, egocentric, pre-judged line of thought." My data demonstrates some evidence towards this claim: "before he had the CoRT tools he was not willing to listen" (parents interview), and "I watch more accurately, react less impulsively and take more time" (students questionnaire). But as I said before (see paragraph 2.2) the aim is to achieve a higher level of thinking. As Halpern (1998:453) said, "This is the Achilles' heel of transfer." Perkins (1987:288) calls this higher level of thinking high road transfer: "High road transfer reflects deliberate mindful efforts to represent principles at a high level of generality, so that they subsume a wide range of cases." Data of my research shows that students stay on the level of low road transfer. That means that they use well practised routines in conditions and contexts similar to those when they learned the CoRT tools. I call it near transfer. Near because it is a transfer between similar contexts which were offered during thinking lessons but not identical contexts. On the other hand, I did not notice negative transfer, neither during observations or interviews. Negative transfer, as described in Perkins (1987:287) means that what you have learned during thinking lessons impairs the use in other situations. The given examples of how students used the CoRT tools are almost identical to the content of the Thinking Lessons. During those lessons situations were offered to be solved by using the tools. The most used tools out of ten are PMI, OPV, C&S and Decisions. If you compare the outcome with the described situations given on the question "Can

you give an example of how CoRT is used? “I notice coherent consistency. The four tools are properly used in the right context. The described situations have anything to do with different perspectives which refers to OPV: (parent 1 in interview) “we looked at all the possibilities and also to all the views of those involved” (parent 2 in interview) “...he is more prepared to see things from another angle” (student 2 in interview) “I am more willing to give the other person the benefit of the doubt.”

In Chapter Three I explained that research would take place in two different groups. Different because Class 1 got only one thinking lesson a week, Class 2 received a more integrated approach. Their teacher infused his educational style with thinking lessons for another three hours a week. De Bono (1976:138) claimed that this would significantly improve the performance by students. If I compare the results on the question “Do you use CoRT?” (see paragraph 4.2.1 – figure 4.3) between the two classes, I notice a slight difference in lessons, in school as well after school. Perkins (1987) did research on de Bono’s claim. His outcome was that there was no difference between his research groups. He even did research on three groups receiving CoRT lessons. His conclusion was “none of the research results supports the claim that reinforcement has positive measurable effects.” (ibid 1987:470). This contradiction can only be explained by me linking this outcome with the research of Marzano (2003). In his book he emphasises the important role of the teacher in the development of students. Marzano explains it this way: “My basic position is quite simple: schools can have a tremendous impact on students’ achievement if they follow the direction provided by the research.” (ibid:4). According to Marzano the impact of the teacher is far greater than educational programs, parents and society. I will elaborate on this issue in paragraph six where I will make some conclusions.

8.3 Interpretation and dispute on data concerning sub questions

Knowing that students transfer their thinking skills into other situations it is obvious that my attention be attracted and therefore focussed on the outcome of my sub questions. It is obvious because if students use the tools ,I as a researcher, want to know if use of the tools affect their thinking and what the character of the changes of thinking are. Therefore, the next two questions were adopted in the questionnaire and the semi structured interview. Firstly: “Do you notice changes in

thinking behaviour?" and, secondly, "Can you describe the changes?" In earlier research about the effects of the Bono's CoRT, mentioned in paragraph 2.4.2, Edward and Baldauf (Perkins 1987:467) investigated and reported changes in thinking behaviour: "52% of the parents saw positive changes in thinking behaviour." They restricted themselves by only asking the parents *via* a questionnaire. In my research I involved students and teachers as well. If I compare the outcome of my questionnaire with their outcome it differs slightly. 79% of the parents state that they saw a change of thinking behaviour. If I involve teachers and parents, the outcome is 56%. If I include interviews on all participants, 76% confirm the noticeable change of thinking behaviour. Parents see changes in making decisions more significant. Teachers explain in the interviews that students are acting less impulsively. Students are also describing making wise and thorough decisions: "By using them I have the feeling that I do not make stupid decisions which gives me a good feeling." From this I deduct that students change their behaviour deliberately by including CoRT into their thinking. I cannot say that CoRT is responsible for that change. I can conclude that CoRT is being used in the way students learned the skill at school. It is debatable if their thinking attitude changed or that students are less impulsive as a consequence of CoRT. Students use the tools in a similar way as tools were offered in thinking lessons. I can, therefore, say that there is low road transfer. I cannot confirm whether students use high road transfer as I would need another research design and another different research question. In chapter 2.2 metacognition was introduced as a higher level of thinking, i.e. the ability to reflect on one's own thinking and learning process. If I review the qualitative data in the interviews, however, I would be inclined to say that students do reflect on their own thinking: "I have to think first and then react" (interview parent 3) "They take more time to think thoroughly" (interview teacher 1). So, CoRT may even be the first step towards higher order of thinking. But there is a caveat to presume that CoRT might achieve this higher order of thinking. Teachers are already overwrought with a growing demanding curriculum concerning skills, learning based on competencies and examination requirements. Teachers are the first who have to be trained in the use of CoRT so management's approval is necessary. My argument is, regarding the data, that CoRT is transferred to other contexts and has positive effects on thinking behaviour although I am aware that they can not be fully measured (paragraph 2.4.1)

8.4 Summary

The purpose of this study was to investigate if the thinking skill program CoRT can be transferred and therefore will produce an answer on the so called Kerndoelen and its pré ambule described in Chapter One. The outcome is encouraging and I will elaborate on this in Chapter Six (paragraph 6.3) supported by recommendations and proposals on how to make CoRT part of the present curriculum in schools. I agree with Resnick (1987) who states that: "it ensures that something worth while will have been taught and learned even if wide transfer proves impossible." (ibid 1987:48). I am aware that this research was short term and small scale but the analysis of the data indicates that at my VMBO school, pre vocational secondary education, and classes with students between 13 and 15 years of age, CoRT is well conceived by the students. Furthermore, the effects point out an increasing self-awareness of their thinking used in different contexts.

Chapter Nine Conclusion and discussion

“The working of one mind are not witness able by other observers, its career is private.” (Ryle, 1962:11)

9.1 Introduction

This final chapter will be a critical self-reflection and evaluation on my work as well as provide a conclusion of my findings linked with the analysis in Chapter Five. Finally, I shall offer recommendations towards implementation and dissemination of thinking skills in my school.

9.2 Reflection on my research

“Knowing that one should think critically is not the same as being able to do so. That requires domain knowledge and practice.” (Willingham 2007:13)

Having gained the full agreement of my deputy head I did research on thinking skills in general and CoRT in particular. The research concentrated on the possible transfer and side effects caused by this program. Conscious of the difficulties in investigating the transfer of thinking skills, I designed a semi-structured interview, questionnaires and an observation sheet in order to be able to answer my research question and sub questions. My starting point was a mixed method approach (see paragraph 3.5) for which purpose I collected both quantitative and qualitative data. The data gave me an insight into the way CoRT was transferred and a glimpse at the effects on students. By analysing and interpreting the data my research question was answered as well as my sub questions. I continuously compared the outcome from all participants with former research located in literature. I combined my ideas with, on the one hand, researchers who could confirm my conclusions and, on the other hand, those who did not fully agree with me and my findings. I even had to deal with contradictory research, i.e. Perkins (1987) who stated that reinforcement has no positive measurable effects (p 470). Through deliberately chosen methods of research established in my research design I was able to gather a lot of data regarding my research question, probably too much information. So what has to be considered, if I

were to repeat my research, is how to limit the amount of questions to those that are relevant to my research project. Coding such a large amount of data is time consuming and forces the researcher into constantly making choices. Besides that, I do not think it is ethical to ask participants questions that are not relevant to the research, for example, the question regarding whether students used the distributed little cards with the icons of CoRT. This question gives me an insight into how to offer the program, i.e., distributing the little cards is unnecessary. The outcome on this question is that 96% never saw the cards or used them; hence it is not relevant and does not contribute to the research question or the sub questions. In conclusion, I have to err on the side of caution. The results of my research indicate that there is a particular transfer; namely, low road transfer. (Perkins 1987) Although my research indicates the use of thinking tools and a slight change of thinking behaviour, I can not say with any degree of conviction that it is wholly attributable to de Bono's program. Mosely (2005) explains it this way: "there is sparse research evidence to show that generalised improvements in thinking can be attributed to training in the use of CoRT or Thinking Hats tools." (ibid: 139). Willingham (2007) emphasises that thinking skill programmes in general do not provide sufficient evidence that they are successful in teaching students to think critically. According to Willingham (2007), "There is no such thing as critical thinking skills. There are strategies that aid critical thinking - but these can only take one's thinking to the precipice, no further." By reviewing the literature in relation to my research project I feel affinity with Mosely (2005:138) who suggests that de Bono's validation for CoRT is the fact that it is used worldwide. More specifically, it is said by de Bono (1987:13) that, "They must make sense because they work. That is the ultimate test of reality." The question regarding whether a student's critical thinking will be developed by offering them only CoRT or another thinking skills program, is the subject for new research, along with what can be done to facilitate transfer and to improve transfer from low road transfer to high road transfer.

According to Costa (1986) the student is the centre of these answers, "For an accurate and more complete understanding of student thinking, however, tests are not enough. Teachers must carefully observe and listen to students. They also let the students' work speak."(ibid:287). This point of view holds currency, but to me the role of the teacher is even more important as their role is pivotal to the development of the student. Marzano (2003) postulated that a skilled and professional teacher determines for 67% of the learning adequacy. Teachers involved in my research

project were not trained in CoRT and secondly they were not so engaged as the two teachers doing the research classes and offering the program. In this way I agree with Garmstons research who presumes that “only a few teachers agree that schools have major responsibility to teach thinking” (Garmston 1985, cited in Costa 1985:24) This might explain why the evolved teachers in my research give fewer answers in comparison with the number of answers from parents and students. Students, as the data shows, start using thinking tools. The challenge for us as teachers is to practice CoRT with students in a variety of situations. These situations have to be meaningful in order to achieve transfer. Halpern (1998:451) writes that “there are numerous, qualitatively different types of evidence showing that students can become better thinkers as a result of appropriate instruction.” So, if my research shows that there is transfer and a positive change of thinking behaviour, I can conclude that CoRT can be an appropriate solution to the requirements in the National Curriculum. In an era of inclusive education, thinking skills would fit perfectly in an educational philosophy. Resnick (1987) says that “Higher order thinking is the hallmark of successful learning at all levels, not only the more advanced.”(ibid 1987:45) In my view, thinking skills should be offered to all students including low achieving students. This might be the reason that in the National Curriculum of Venezuela CoRT is adopted in the National Curriculum. If it helps students to deal with the complex world of today, low achieving students need thinking tools as a minimum. Halpern is in favour of application of rational methods in problem solving (Halpern, cited in Moseley 2005:146) and I am also, but Halpern also claims that there are: “Unfortunately no quick and easy programs that will make you a better thinker, despite some unscrupulous claims that you can think better instantly without really trying.” (ibid:26). On this point, I disagree with her. I think that my research, albeit small-scale, demonstrates that having delivered thinking skill lessons for half a year, students become better and different thinkers with enhanced self-esteem, lower impulsion and greater self-analysis about thinking which, in turn fully validates my research.

9.2.1 Reflection on myself as a researcher

Research is the path to knowledge. Knowledge about thinking skills is obtained by methodically investigating my question and by performing this research on a program that I am part of, I became a more competent teacher. First of all I developed a more objective attitude. Not seeing statements as an absolute truth, but trying to seek and identify the theory underpinning it has become more important to me. When my curiosity is aroused I start by reading the references at the back of the book to determine how a conclusion is drawn, on what framework someone is building his or her idea: this is significant to me. Secondly, I became aware of my bias towards CoRT. As an admirer of Edward de Bono I was convinced of the impact of his program. I committed myself to studies done by Edwards and Baldauf (1983) who spoke about “anecdotal data overwhelmingly positive about the benefits of CoRT” (Edwards and Baldauf cited in Perkins 1987:454) It is not my opinion but the opinion of participants using CoRT that are important. Again and again I had to remind myself that the validity of the research will be founded on the respondent’s answers and not my assumptions. So designing my research methodology I continuously kept in mind that questions had to be valid: do these questions actually measure or observe what I want to investigate, want to know? Being critical of my own thinking was probably one of the hardest parts of this research.

9.3 Dissemination

“...before the century is out, no curriculum will be regarded as acceptable unless it can be shown to make a contribution to the teaching of thinking.”(Nisbet 1993, cited in McGuiness 1999)

Five years ago I discovered de Bono’s programmes. My former director mixed de Bono, Gardner and Boekaerts into one educational belief. I was impressed because all three fitted well and were perfectly blended. In order to be able to carry out this educational philosophy I went to Dublin and America to study thinking skills and become a certified Advanced Practical Thinking Trainer (APTT) De Bono trainer. Until this MA study I only had anecdotal evidence of the effects of de Bono’s program. In

schools there is a lot of debate on thinking skills with questions like “who should teach these courses?” and “Should they be stand alone or incorporated into specific content areas?”, which remaining unanswered. Perkins and Solomon (1989) confirm that this debate is ongoing but their research showed that there is no disagreement over the need to help students improve their thinking. Mifsud (2006) did recent research on implementation of CoRT in secondary schools. She emphasises that students become even more enthusiastic about thinking skills if they are reinforced across the curriculum. Marzano’s work has influenced my belief that the attitude of teachers towards CoRT needs every possible attention. Mifsud (2006) points out the teacher’s role this way: “Thinking Skills teachers need to be given examples of transfer and be encouraged to apply the CoRT 1 tools to other areas across the curriculum.” (ibid:56). So, in starting the process of implementing CoRT in my school, the first priority is and will be the teacher. To illustrate this I cite Palmer (1998) who states that: “Good teaching can not be reduced to technique; good teaching comes from the identity and integrity of the teacher” (ibid:10). Having gained support from my deputy head teacher I delivered a presentation to all participants on the 30th June on the outcome of my research, together with all other colleagues in school who were not involved in my research plus invitees who expressed an interest in my research. At the end of the evening participants were questioned about the presentation. All of them corroborated the presented conclusions. None of them rejected the outcome. Next school year (2008 – 2009) the first classes of the school will have CoRT every week and the teachers will be trained to deliver them. In 2010 the whole program will be evaluated since it would have had time to bed in and can be properly assessed. Researchers are divided in the approach to thinking skills with one corner favouring specific programmes and the other corner an approach that is embedded in subjects throughout the curriculum. It is clear that CoRT is a specific program. The main goal for me is to teach next year’s students the tools and then to assess areas where students can apply their learned skill into different subjects. In the meantime I will continue doing research on the two groups of this year’s research for another 12 months. Finally, I will present my dissertation to de Bono’s Expertise Centre and will provide my dissertation to Dr. S. Dingli from the University of Malta in her capacity as an expert and researcher on de Bono’s work. Lastly, I will hand over the dissertation to the University of Groningen who commence four years research into CoRT in schools in 2009.

9.4 Summary

In reviewing my entire research project I can summarise my dissertation in just a few words. The world of thinking skills is very extensive, but by reading books, journals and articles, and attending lectures at Roehampton University, I was able to understand the theory around research. I explored the real world, performed my qualitative research within the academic guidelines and found answers to both research questions and sub questions. Thinking skills are transferred to other contexts, thinking skills may change students' behaviour in a positive way. I state this very carefully and have to be cautious because other circumstances might also have influenced this change of behaviour. What about school environment, the role of the teacher? Marzano (2003) in fact explained in his research the important influence in students' development. Thinking skills are important to students, but far more important is the teacher's awareness. Bullough and Gitlin (1994) put it this way, "Teaching is a relationship, a way of being with and relating to others, and not merely an expression of having mastered a set of delivery skills."(ibid:72). The learning process for me and the final results for my school is the ultimate gain. By offering students thinking skills they become better reflective practitioners. Constructivism calls this learning how to learn. So, therefore, thinking skills fit within the new educational philosophy in my school. The best possible way to express this all is to end this dissertation with this classic quote:

*"Therefore, good Brutus, be prepar'd to hear;
And since you know you can not see yourself
So well as by refection, I, your glass,
Will modestly discover to yourself
That of yourself which you yet know not of."*

(William Shakespeare 1599, Julius Caesar)

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PAH van Kesselsma sen

VI Appendices

Appendix A CoRT at a glance

Dr Edward de Bono's *CoRT* Program was written in 1972. While at Cambridge University in the United Kingdom, de Bono formed the Cognitive Research Trust from which the abbreviation, *CoRT* is derived.

The *CoRT* Programme teaches thinking skills through the use of thinking "tools" in a formal, focused and deliberate manner. The programme has a multitude of applications.

The *CoRT* lessons are in six groups of ten lessons. Lessons 1-10 are called *CoRT* 1, Lessons 11-20 are called *CoRT* 2 and so on.

CoRT, named after the Cognitive Research Trust established by Dr. De Bono in Cambridge, England, is now the most widely used course in the world for the direct teaching of thinking. Over 7 million students in over 30 countries including the U.K., the United States, Canada, Australia, Japan, Singapore, Venezuela and Ireland are using it.

It is generally accepted that one of the most important tasks that formal education can hope to accomplish, is to produce individuals who can **think** for themselves and who can become people who they **think** they can become, who can judge for themselves, have developed a much greater understanding and appreciation of their own potential and that of their fellow human beings, who can effectively participate in social, economical and political processes, are proactive and constructive and have become free in far more than the political sense of the word.

The *CoRT* Thinking Programme represents the most comprehensive approach to the teaching of thinking. It includes generative and creative thinking, operational and constructive thinking. It is used by children and adults across a broad span of age and ability levels. When used in any kind of classroom, it effects positive change in the

learning environment. The thinking skills it teaches provides pupils not only with tools to improve their academic records, but also gives them real life skills.

Success in using the CoRT tools does not depend on prior knowledge, a great memory, or reading or writing skills. Students of varying abilities benefit from CoRT, including special education students, gifted and talented students, ESL students, and at-risk youth.

My research is about CoRT 1 where children learn the DAT (Direct Attention Tools)

CoRT Lesson Groups Achievement Objective

CoRT 1 Lessons 1-10

Breadth

Each of the tools encourages you to broaden your thinking. Often, we take too narrow a view when we think. We tend to *judge* rather than *explore*

Lesson 1 PMI Plus, Minus, Interesting

PMI
How to treat ideas. The deliberate examination of an idea for good (Plus), bad (Minus) or interesting possibilities. PMI use eliminates the immediate acceptance or rejection of an idea

Lesson 2 CAF

CAF
All the factors we can choose or identify that are involved **Consider All Factors** in a situation help us think more effectively about that situation. Otherwise, we tend to think only about the first factors that come to mind.

Lesson 3 Rules

Rules
This lesson summarises the first two lessons, reminding us of the important basic principles involved.

Lesson 4 C&S Consequences and Sequel

C&S
All action has a consequence. Any action has either an immediate, short, medium or long term consequence. In some circumstances, action has all these

consequences. A thinker needs to be aware of these possibilities

Lesson 5

AGO

AGO

This lesson teaches the value of picking out and defining **Aims, Goals and Objectives**. It explains how we should be clear about our own aims. It suggests we should also try to understand the aims or intentions of others.

Lesson 6

Planning

Planning

There are basic features and processes involved in planning. Lesson 6 draws together Lessons 4 and 5

Lesson 7

FIP

First Important Priorities

FIP

When thinking, we need to choose from a number of different possibilities and alternatives. Priorities need to be put into order before effective thinking can take place.

Lesson 8

APC

Alternatives,

Possibilities, Choices

APC

A 'generative thinker' or action thinker is always interested in generating new alternatives and finding new possibilities. Most people are confined to the obvious ones.

Lesson 9

Decisions

Decisions

Because *de Bono Thinking* is about making decisions, this lesson draws together most of the principles already learned.

Lesson 10

OPV

People's View

OPV

We are often trapped into believing our viewpoint is **Other** right. A useful thinking skill is to move away from one's own viewpoint and consider the points of view of others. This lesson encourages us to ask the question, "Why does that person have that point of view?" This lesson does not encourage us to say, "You are wrong/stupid/a dingbat! I am right!"

Appendix B

CoRT and its picto's

CoRT I - BREADTH

SYMBOL	SHORT NAME	FULL NAME	HELPS IN:	HELPS TO:	STEPS TO TAKE	KEY QUESTIONS	USE THIS TOOL FOR:
	P.M.I.	Plus Minus Interesting	EVALUATION	LOOK AT ALL ASPECTS	1.FIND ALL POSITIVE POINTS 2.FIND ALL NEGATIVE POINTS 3.FIND ALL THE INTERESTING POINTS N.B. -VE POINTS & +VE POINTS CAN BE ALSO INTERESTING POINTS	1.WHAT IS POSITIVE? 2.WHAT IS NEGATIVE? 3.WHAT WOULD BE INTERESTING? 4.IT WOULD BE INTERESTING IF...	ASSESSING A SITUATION MAKING CHOICES DESIGNING A PROJECT
	CAF	Consider All Factors	INFORMATION	LOOK AT ALL FACTORS	1.SEARCH ALL FACTORS; 2.ON WHAT SHALL WE THINK? 3.WHAT SHOULD NOT BE OMITTED?	1.WHAT IS INVOLVED? 2.WHAT IS IMPORTANT? 3.WHAT HAS BEEN LEFT OUT? 4.WHAT OUGHT WE CONSIDER AS WELL?	PLANNING/JUDGING CONCLUDING/DISCUSsing PROJECTING/TAKING ACTION
	A.P.C.	Alternatives Possibilities Choices	CREATIVITY	SEEK OTHER WAYS	1.LIST WHAT YOU KNOW 2.LIST WHAT YOU HAVE 3.LIST THE TRADITIONAL METHODS OF DOING THAT PARTICULAR THING	1.ARE THERE ANY MORE ALTERNATIVES/ POSSIBILITIES/ CHOICES?	UNDERSTANDING/EXPLAINING SOMETHING PREDICTING THE FUTURE CREATING A COURSE OF ACTION
	FIP	First Important Priorities	INFORMATION	LOOK AT WHAT GOES FIRST/IS MOST IMPORTANT	CHOOSE THINGS TO BE 1.DONE FIRST 2.MOST IMPORTANT 3.+VE PRIORITIES: WHAT YOU NEED 4.-VE PRIORITIES: WHAT YOU DO NOT NEED	WHICH OF THESE ARE: 1.THE MOST IMPORTANT? 2.THE MOST URGENT?	CHOOSING A COURSE OF ACTION FROM A LIST OF PROPOSED ACTIONS
	O.P.V.	Other People's Views	INVESTIGATION	LOOK AT SITUATIONS FROM OTHER PEOPLE'S VIEWS	1.PRIORITIZE A LIST OF ALL PEOPLE INVOLVED 2.THINK WHAT THEY WOULD THINK 3.SEEK THEIR OPINION	WHAT WOULD <u>NAME</u> THINK?	GETTING IN OTHER PEOPLE'S SHOES
	A.G.O.	Aims, Goals, Objectives	DIRECTION	REACH DIRECTIONS INTENTIONS GOALS OBJECTIVES	NOTE: 1.THE OVERALL OBJECTIVE 2.THE SUB-OBJECTIVES 3.THE RIGHT-NOW OBJECTIVES	1.WHAT IS OUR AIM/GOAL OBJECTIVE? 2.WHY DO WE DO THIS? 3.WHAT STEPS FOLLOW THIS POINT? 4.WHAT DO I DO NOW?	LOOKING AT THE INTENTION BEHIND THE PROPOSED ACTION/PLAN/DECISION/RULE/INVENTION
	C & S	Consequence And Sequel	EVALUATION	LOOK AT WHAT WILL FOLLOW AFTER ACTION TAKEN	LOOK AT THE: 1.IMMEDIATE CONSEQUENCES 2.NEAR FUTURE CONSEQUENCES 3.CLOSE FUTURE CONSEQUENCES 4.REMOTE FUTURE CONSEQUENCES	1.IF THIS IS DONE WHAT WILL HAPPEN? 2.IF THIS IS NOT DONE WHAT WILL HAPPEN? 3.THING NO ACTION CAN HAVE ITS CONSEQUENCES	ASSESSING CONSEQUENCES OF: ACTION/PLAN/DECISION/RULE/INVENTION

Q R

Questionnaire Parents Thinking lessons (CoRT)

1. Did you visit the information evening in October ? yes no
2. The information on that evening was:
 (you may fill in several answers) clear not clear
 interesting not interesting
 easy to understand difficult to understand
 difficult important
 valuable something else namely :
-
-
-
-
-
3. My child uses the little cards with the Bono tools yes No
4. I see my child using de Bonos CoRT tools Yes No
5. When you filled in (question nr 4) yes, which tool(s) did he/she use
 (you may fill in several answers) PMI Decision
 OPV Planning
 CAF APC
 FIP AGO
 C&S Rules
6. Did your child explain the tools to you as a parent ? Yes No

*Thank you for filling in this questionnaire.
Please return it in the enclosed envelop
before 15th of April*

Appendix D

Questionnaire teacher

Questionnaire Teacher Thinking lessons (CoRT)

1. Did you visit the information evening in October ?
 yes no

2. The information on that evening was:
(you may fill in several answers)
 clear not clear
 interesting not interesting
 easy to understand difficult to understand
 valuable important
 something else namely :

3. I see student(s) using the little cards with the Bono tools
 yes No

4. I see/notice my students using CoRT tools
 Yes No

5. If your answer (question 4) was yes or sometimes, could you describe such a situation ?

6. Did you use one of the tools with your student ?
 Yes No

7. When you filled in (question nr 4) yes, which tool(s) used the students
 PMI Decision
 OPV Planning
 CAF APC
 FIP AGO
 C&S Rules

- (you may fill in several answers)

8. Did students explain the tools to you as a teacher ?
 Yes No

9 . Do you see changes in thinking behaviour of students ?

yes

no

10 If you have filled in yes (question nr 9) can you tell what the difference is ?

(you may fill in several answers)

- he/she watches longer
- he/she notices more and different perspectives
- he/she talks more accurate
- he/she plans work better
- he/she reflects on his/her own behaviour
- he/she reacts less impulsive
- he/she postpones decisions
- he/she underpins his/her statement with more arguments
- he/she looks after the consequences
- he/she has more solutions to a problem
- different, namely

11.Did you see situations outside the class where students used CoRT ?

yes

no

12.If you filled in yes (question 12) can you describe such a situation ?

*Thank you for filling in this questionnaire.
Please return it in the enclosed envelop
before 15th of april*



Questionnaire Student Thinking lessons (CoRT) Class 1		
1. Were you at the information evening in October	<input type="checkbox"/> yes	<input type="checkbox"/> no
2. What do you think of CoRT thinking lessons (you may fill in several answers)	<input type="checkbox"/> funny <input type="checkbox"/> stupid <input type="checkbox"/> useful <input type="checkbox"/> exciting <input type="checkbox"/> interesting <input type="checkbox"/> something else, namely: <hr/> <hr/> <hr/>	<input type="checkbox"/> hard to use <input type="checkbox"/> boring <input type="checkbox"/> difficult <input type="checkbox"/> easy to use <input type="checkbox"/> practical
3. Do you use CoRT tools ?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
4. Do you use CoRT tools during lessons	<input type="checkbox"/> Yes	<input type="checkbox"/> No
5. Which of the 10 tools do you use at school during lessons (you may cross several answers)	<input type="checkbox"/> FIP <input type="checkbox"/> PMI <input type="checkbox"/> OPV <input type="checkbox"/> CAF <input type="checkbox"/> C&S <input type="checkbox"/> None	<input type="checkbox"/> AGO <input type="checkbox"/> APC <input type="checkbox"/> Planning <input type="checkbox"/> Decision <input type="checkbox"/> Rules
6. During what lessons do you use CoRT thinking tools (you may cross several answers)	<input type="checkbox"/> Human interest <input type="checkbox"/> Maths <input type="checkbox"/> English <input type="checkbox"/> German <input type="checkbox"/> Dutch	<input type="checkbox"/> Tutor lessons <input type="checkbox"/> ICT <input type="checkbox"/> Gymnastics <input type="checkbox"/> Welfare <input type="checkbox"/> Art <input type="checkbox"/> Technique
7. Do you use CoRT tools in school but not during the lessons ?	<input type="checkbox"/> yes	<input type="checkbox"/> no
8. If you filled in yes (question 6) could you describe such a situation ?	<hr/> <hr/> <hr/> <hr/> <hr/>	

9. If you filled in yes (question 7) which tools do you use
(you may cross several answers)

- PMI
- OPV
- CAF
- FIP
- C&S
- Decision
- Planning
- APC
- AGO
- Rules

10. Do you use CoRT tools after school

- yes
- no

11. If you filled in yes (question 9) could you than describe such a situation.

12. Do you handle problems in a different way now you know the CoRT tools ?

- yes
- sometimes

13. If your answer (question 12) was yes or sometimes, could you describe how different your handling is ?

(you may fill in several answers)

- I watch longer
- I watch from more, different sides
- I watch more accurately
- I am aware of consequence
- I react more quietly
- I postpone my decision
- I have more understanding for other people view
- different, namely

14. In what situations do you find CoRT tools useful ?

(you may fill in several answers)

- at learning
- when you have an argument
- making decisions
- when you cooperate
- when you reflect on your own behaviour
- conversations with my parents
- by making up my mind
- different, namely

15. Do you use the little cards with the icons of CoRT printed on ?

yes
 no

sometimes

16. Do you think that CoRT influences your thinking behaviour ?

yes
 no

17. If you filled in yes (question 16) could you give an example ?

18. Did you use CoRT tools to reflect on your handling ?

yes
 no

19. Did you explain the use of thinking skills to your parents ?

yes
 no

20 .Did you explain the use of thinking skills to your (school)friends ?

yes
 no

21, Did you explain the use of thinking skills to your teachers ?

yes
 no

Thank you for filling in this questionnaire.

Please return it in the enclosed envelop before 15th of April

Appendix F Observation scheme

- Class 1 Mentor A
- Class 1 Mentor B
- Class 2 Mentor A
- Class 2 Mentor B

Observation scheme CoRT

Week number	Number of times you saw student using CoRT	Which tool ?	Which situation
1			
2			
3			
4			
5			
6			
7			
8			

Semi structured interview.

- * important questions which need a clear answer.

Questions interview parents

- * Did you visit the information evening in October?
- * Do you see that your child uses the tools?
- * If so, can you give an example?
- * Do you see changes in thinking behaviour?
- * If so, can you describe the change(s)?

Questions interview teacher

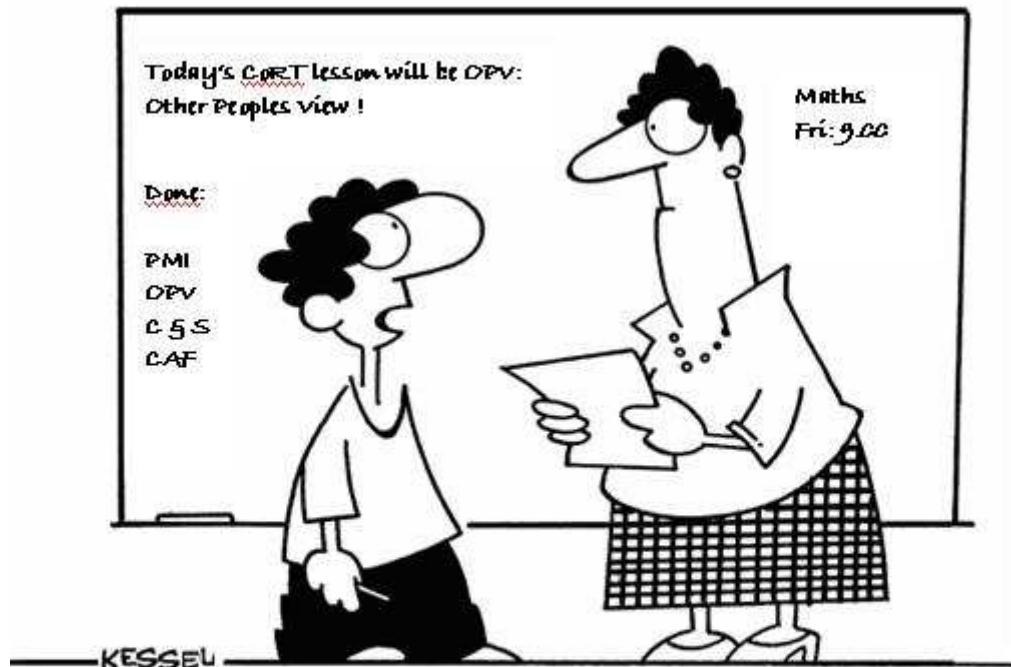
- * Did you visit the information evening in October?
- * Do you see that your student uses the tools?
- * If so, can you give an example?
- * Do you see changes in thinking behaviour?
- * If so, can you describe the change(s)?

Questions interview student

- * Do you use the tools?
- * If so could you give an example?
- * Do you notice changes in thinking behaviour?
- * If so, can you give me an example?

Information evening

30 October 2007



"YES I GAVE YOU MY HOMEWORK TWO
DAYS TO LATE. BUT I AM ALWAYS FOUR
DAYS TO LATE. SO IF YOU LOOK IT AT THAT
WAY, MY HOMEWORK IS TWO DAYS TO
SOON!"

Preface

"Good pupils take time, don't mind asking questions, are not afraid to say "I don't know" or "sorry, I'm wrong", but they can change their minds, find solutions en enjoy it when they do so" (Claxton 1991)

First I would like to welcome you to this evening and secondly I would like to thank you for joining my research. I hope to finish my study next year, in September, and this research enables me to support your son or daughter better on the Duhamel College. Without you this research could not take place. Filling in the questionnaires is your own chose and the research will take place by using very carefully the ethical guidelines that are prescribed? That means that you can be sure that your questionnaire is anonymous and you will all receive a transcript of the outcome of the research.

In mid-June there will be a presentation of this research to all who are involved.

Peter van Kessel
October 2007

Program of the evening:

Tuesday 30 October,
19.30 hrs

- | | |
|-------|--|
| 19.15 | Coffee |
| 19.30 | Word of welcome |
| 19.35 | Presentation of the thinking lessons with a few nice examples
- explanation with film/ radio-interviews / pictures
- explanation of the “tools” and the icons
- more examples |
| 20.45 | Opportunity to ask questions |
| 20.55 | Handing out the information booklet |
| 21.00 | Closure |

1. Research

This school year two classes of my school take part in a research. This research is conducted by Mr. van Kessel as the final assignment for his study at the university of Roehampton in London (Eng.).

The Ministry of Education has given the VMBO the assignment to give more attention to skills.

In the past few years education was filled with all kinds of renewal. This renewal was the outcome of all kinds of research. Working with skills and competences are now the newest movements within education. To develop competences you will have to offer certain skills. Learning to learn, learning to reflect on yourself, learning to use problem solving strategies.

A few years ago I got in touch with the thinking strategies of Edward de Bono. I was allowed to study these strategies in Dublin (Ireland) and Chicago (USA).

This thinking method can be used to work on the attainment targets of skills in the VMBO:

learning to know the social environment (1)

learning to deliver (2)

learning to learn (3)

learning to communicate (4)

learning to reflect on the process of learning (5)

learning to reflect on the future (6)

The method of De Bono teaches/tells us very clearly to look very carefully and think very carefully. That's why it fits perfectly to train these skills and change them into competences. Skills is a trained methodology and when you use those skills in practice it becomes a competence.

That is where the research is looking for: Will the methodology of De Bono be used in different subjects? But will it also be used in other situations in or out of school? To get a good research it is vital that I get the help of pupils, parents and teachers. This means that in March pupils, teachers and parents will get a questionnaire. Together with interviews, observations and the outcome of those questionnaires I will be able to make a careful analysis of the question whether the strategies of De Bono will remain just skills or whether it gives the pupils real competences to cope with the enduring quick changing world around him.

2. The 6 thinking hats and CoRT.

The program which is investigated is the CoRT program. In the research the results of CoRT will be examined. To make sure that you will recognise the use of it by the children, I will give you a short resume of CoRT. Some already may have heard about the Six Thinking Hats which I will explain first

2.1 The Six Thinking Hats.

Thinking about a problem or taking a decision can be simplified by using the six different hats. The user is only wearing one hat at a time, but he can change them any time he likes.



The white hat: you ask for information and data that are important for you to solve the problem.



The yellow hat is the positive hat. With this hat you look at the advantages. Why would something be possible?



The black hat is the negative hat. Why is it not possible? What are the disadvantages? Why is it impossible, not a good idea?



The red hat is the emotion, your gut feeling. What is my first intuition about this problem?



The green hat is the hat of creativity. It gives you new creative ideas on possible solutions



The blue hat is worn by everybody. It is the administrator. It controls which hat we are wearing, and keeps the goal in mind. What is the outcome? In the group this hat is very important, because everyone must wear the same hat on the same moment

An example:

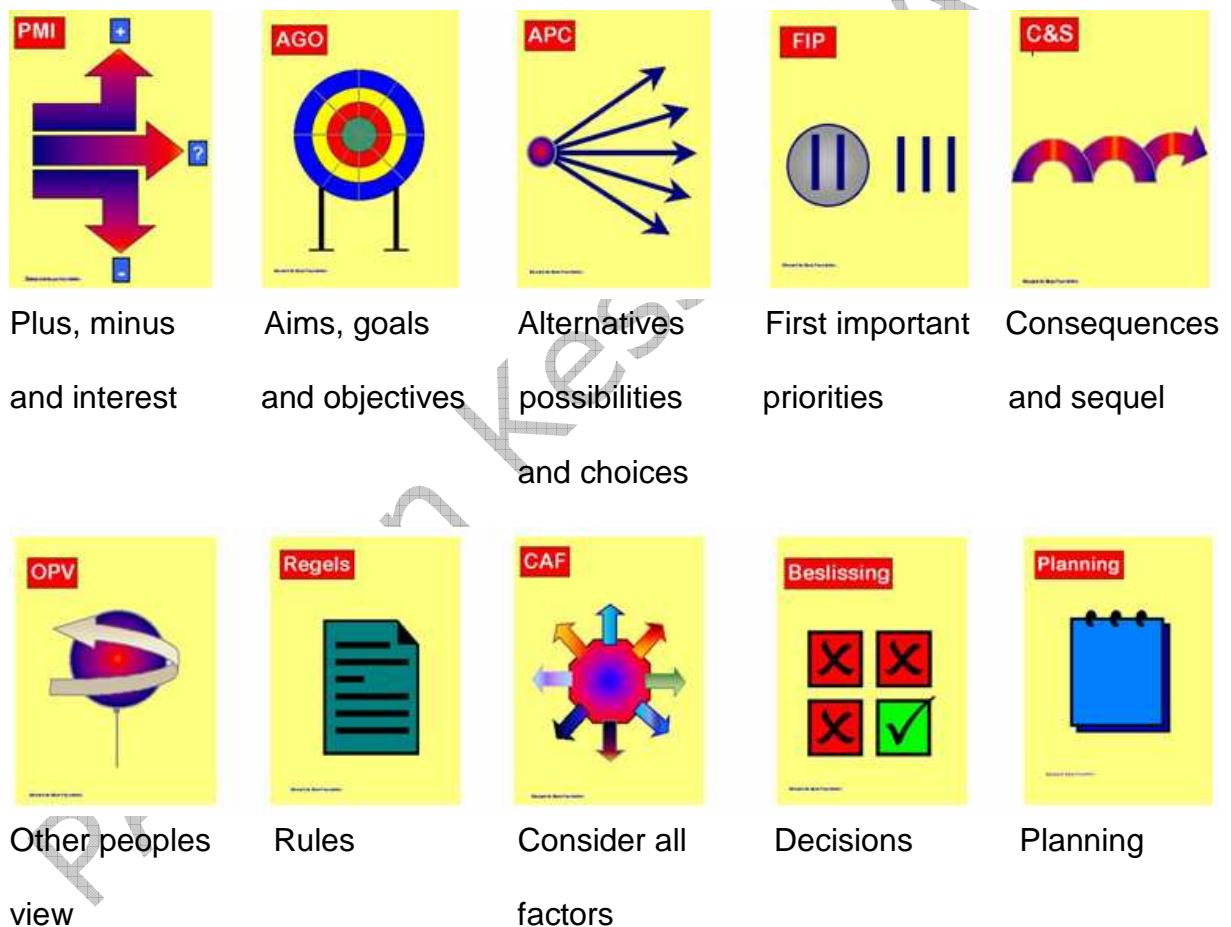
After VMBO I have to choose a follow up education:

With sensitive topics it is better to start with the red hat: I would like to be a nurse

The white hat gives you the necessary information. What is the education needed to become a nurse? Is it an education with only learning or is it also done by doing practice (BOL or BBL) What are the subjects you need to do? Can I also go to such an education if I only studied technique? etc. etc. After this you can look with the yellow hat what the possibilities are: sure of a job, a good salary, a job close to home, etc. etc. After that it is good to look at the disadvantages : you have to work irregularly, in the weekends, you have to face death etc. etc. If this makes the decision difficult you can look at other possibilities with the green hat: If I can't be a nurse because of all I know now I can possibly do something else in healthcare, for instance a receptionist or a doctor's assistant. etc. etc.

2.2 CoRT program

The CoRT program has 10 different tools. You can pick the one you want the most at that moment. You can use some of them, but you can also choose to use more or all of them.



During the use of the tools you wear different thinking hats. PMI (advantages, disadvantages and questions,) is a combination of the yellow, black and white hat. The tools are very clear and easy to use. The pupils all received a pack of cards with the tools on it, so they can actually use them. Ask them for an explanation at home, they surely will be able to give it after a few weeks.

An example:

A student wants more pocket money. **PMI**: What are the advantages? (more money, able to buy more, able to buy more expensive things), what are the disadvantages (less dressing money, have to buy my own cigarettes and candy) and the questions you can ask: How much more money will I get? Will I still get my dressing money? Will I have to pay my own contribution for the football club? Do I have to buy my own sandwich in school? **C&S**: What are the consequences? Do I have to save money for bigger things to buy? for instance a bicycle? Will I still get money for unexpected things? What do I do when I accidentally run out of money? **CAF**: If I get more pocket money I will have to save more to pay my own vacation. If you look at a problem in all these different ways it will be a very careful decision that you make and not only one just based on a first feeling.

3. What can be expected from me as a parent or teacher?

Once a week there will be a lesson in thinking strategies. The teacher will teach the children the tools of the CoRT-program. It is up to you to observe in the coming months whether your student/child:

uses the CoRT tools...

in which situation the student uses the CoRT tools

does the student use the cardset with the CoRT tools on them.

does the student explain the tools to you or someone else?

Is there a different way of thinking noticeable? Does the student think differently from before or longer?

does the student use the thinking techniques while having a discussion, doing an assignment, or in other moments?
etc. etc. etc.

In March you will receive a questionnaire with these kind of questions on it. Those questions will be put in a way that it will not give you much time to answer them. If you need more explanation, you can ask your questions by mail petervkessel@wxs.nl, or by telephone: 0416-352344.

I hope to see you all at the presentation of my research in June.