UNIVERZITA KARLOVA V PRAZE

PEDAGOGICKÁ FAKULTA

DIPLOMOVÁ PRÁCE

2007 Dhyan E.W.M. Vermeulen

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Diplomová práce

Learning how to learn in Inclusive Secondary Education

Facilitating awareness of educational needs and SEN in 'learning how to learn' processes

Supervisor:

PhDr. Iva Strnadova

Student:

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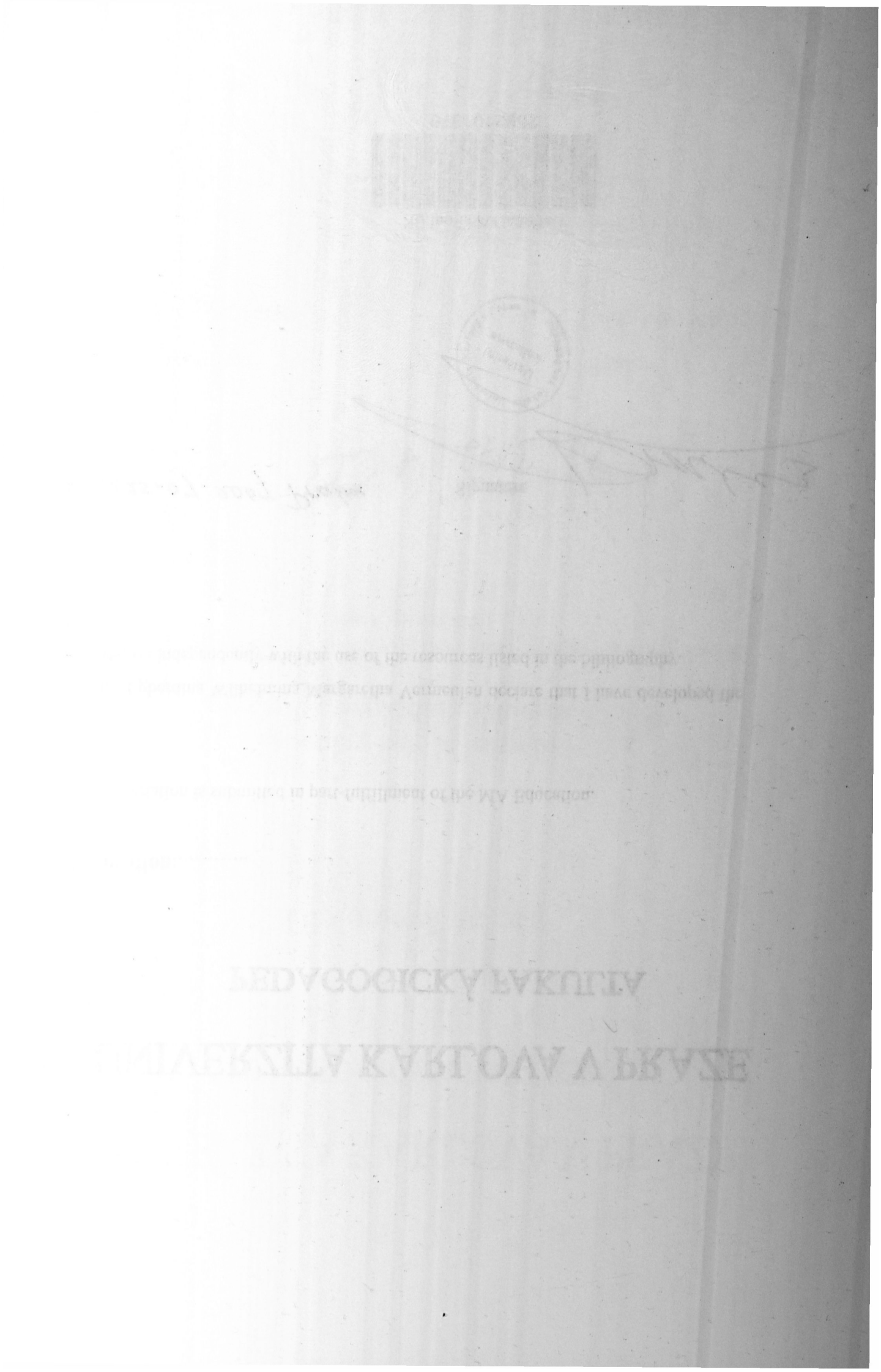
Declaration: .....

This dissertation is submitted in part-fulfillment of the MA Education.

Dhyan Egberdina Wilhelmina Margaretha Vermeulen declare that I have developed the dissertation independently with the use of the resources listed in the bibliography.

Signed: 25-07-2007 Praha



Abstract

The topic of this dissertation is "Learning how to learn in inclusive secondary education." The central subject of this dissertation is the facilitation of processes in which students develop awareness of their own learning-styles and educational needs. In my opinion, awareness of learning-styles and awareness of personal educational needs by students and teachers should lead to educational programmes, environments, settings and facilitations that promote more effective and joyful learning for all.

In their actual practices of educational change and development, schools meet several problems concerning the quality of education that produce questions for research. To find solutions for some of these questions we started a participative action research project. The action research area for this project was Inclusive Secondary Education and the co-researchers in the action-research process were teachers as well as students. All five schools involved in this research program are inclusive mainstream schools in the sense that children with visual or communication handicaps, physically and mentally handicaps (limit TIQ= 40) as well as students with behavioral problems and students without handicap are welcome.

In the inclusive school teachers will stimulate students to communicate their needs, they will listen carefully to understand the needs and they will assess vital signs, talents and qualities that can be helpful to overcome barriers for full participation. It is important that we recognize that inclusive education is not an end in itself. Inclusive education is not fundamentally an issue of disabled people. In educational terms, it is about the value of wellbeing of all pupils. Thus, the key concern is quality of education in an effective learning environment that promotes full participation for all children and young people.

Because the goals for full participation, independency and self- determination have to be set 'on the road of living and learning' students need communicative competencies for self-advocacy that will give them a clear voice in the democratic discourse. It is important that we recognize that inclusive schools have to promote the development of these basic communicative competencies for self-determination and self-advocacy in all pupils.

Acknowledgements

This work has its origins in my study at the end of the 1980s. As a student in social psychology at the State University Groningen, I learned about the ideas of Peter Senge and David Kolb, Alain Touraine and Ben Boog and understood that learning was something special. During this study, I did my first action research project. After that experience, I understood that 'action learning' should be a central focus in my study and professional work. However, inspiration is not enough. Without support of my husband Harry, the Erasmus Mundus coordinators: Dr. David W. Rose & Dr Jan Siska, Dr Jaqueline van Swet and my tutor Dr. Iva Strnadova, this dissertation would never have materialized. Further, I am greatfull to Gerard van den Hoven, my director APS who made it possible for me to combine study with my work as a professional and I thank my son Pepijn Sauer who took spare time to review the manuscript and to rescue the English language. I thank my colleagues: Dimph Rubbens, Atty Tordour, Jacqueline Schoones and Klaas Doorlag for there critical questions, argumentations and inspirations. To have the blessing to work in a joyful friendly and resourceful learning organisation made this study to a remarkable period in my life. I especially want to send my thanks to my special critical friends Alice Nabeta, Usha Gowri and Frits Roelofs and Humphry de Klerk. Lastly, I want to express my gratitude to the school-leaders, team-managers, teachers and all the students who took part in this investigation.

Chapter's overview

Statement

Abstract

Acknowledgments

Content

1. Introduction

The topic of this dissertation is "Learning how to learn in inclusive secondary education." The central subject of the dissertation is the facilitation of processes in which students develop awareness of their own learning-styles and educational needs.

The topic of the action research program I will present is "Learning how to learn in inclusive secondary education." A significant number of the schools I am dealing with explore new inclusive approaches and methods for learning. The change from curriculum focussed traditional learning to child centred learning with special regard to learning needs of children is not something that just happens. In their actual practices of educational change and development, schools have problems concerning the quality of education that produce questions for participative action research.

Why did I choose the topic: "Learning how to learn"?

My fascination for 'learning to learn 'or better 'learning how to learn approaches' is not new. In my professional practice as a post service trainer in educational consultancy, resourcefulness, imagination, and self-awareness are important items. In teacher training, I make use of instruments that should improve teaching and learning from sources like: multiple intelligence awareness, emotional intelligence, mind mapping, and reflection. However, I had the wish to do research on this subject in addition to learning disabilities in my professional practice; I didn't any research in this area before 2006. Nevertheless teachers told me that their students are more confident and think harder, find learning more enjoyable and (surprise) gain higher grades since they devised a program that provides more multiple intelligent resources. The methodological part of this study enabled me to connect 'experience and knowledge' developed in preceding professions with actual methodological questions. The new insights gained during this process, have led me to action research on the subject of "learning how to learn." It is significant to find aids and resources for facilitation that can serve awareness of 'how we learn', and how students involved can improve their learning ability.

To find solutions for some of the questions of the teachers we started a participative action research project. As co-researchers in action research students, teachers and school leaders had the opportunity to reflect on the effects of personal and collective action. In doing this they found results of interference between structures that are inherent in personal thinking and acting, and non-personal structuralizing influences. This already indicates that students and teachers are taken seriously without discarding the knowledgeable actor. In the action research processes in the schools was 'reflection on action' the key to gain more awareness of personal learning-styles and educational needs. In the action-learning project, we used self-assessment methods, and peer-to-peer

interviews as instruments for students. This action learning process was an inclusive aspect of cyclical process of participative action research in which the participants used the adequate knowledge from enquiry to arrive at choices regarding possible actions for more effective learning and improvement of education.

The key objectives of the action research program I will present are:

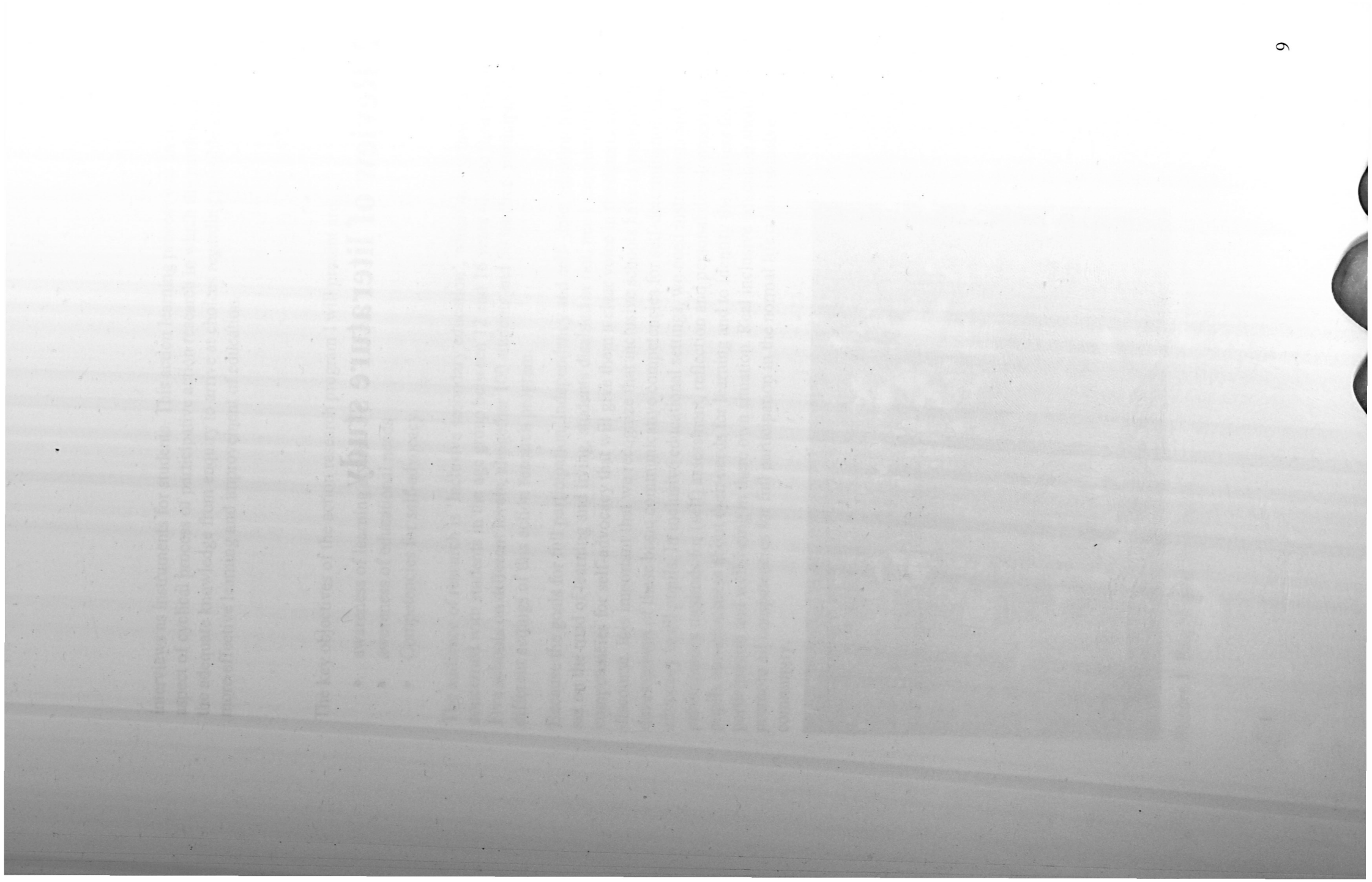
- awareness of learning styles
- awareness of educational needs
- Competencies for self-advocacy.

The audience of research is 'Inclusive secondary education', which means that it is concerned with students in the age group between 12 and 16 years old and their teachers. Five schools on different levels, altogether 100 students and 50 teachers participated in different settings of this action research program.

Because the goals for full participation, independency and self- determination have to be set on the road of learning and living, students disabled or not, need communicative competencies for self-advocacy that will give them a clear voice in the democratic discourse. It is important that we recognize that inclusive schools have to promote the development of these basic communicative competencies for self-determination and self-advocacy in all pupils. In inclusive educational settings, we need instruments and participatory methods for (self) assessment, reflection and personal development to raise pupils consciousness about their needs for learning and to identify the barriers for full participation and well-being in there own situation. Real inclusive education should promote all competencies for full participation in the normal life of an inclusive community.

Picture 1. Peer-to-peer interviews

2.Review of literature study



What is the nature of learning?

One aspect of learning is; knowledge or knowledge processing, another aspect is thought or cognition, a third aspect is personal mastery. Extraordinary thinkers like Leonardo da Vinci combined the intellectual quest for precision in thinking with an almost, rhapsodic, sensuous delight in the seen thing, the natural world. Leonardo conjoined ideas in a most extraordinary way. Leonardo believed in experience, ultimately even his observational drawings are conceived as explanations, as demonstrations. He continually learned in his passion to see current reality more clearly. He reached the peak by lateral thinking that became his learning habit. Seeing and touching the world of objects can be fascinating, once one begins to think about it, but a person could certainly pass through life without giving such experiences further thought.

Knowledge processing and cognition are personal tasks of mind. Cognitive psychology has made impressive progress in this field of mind since 1950. An ambitious effort to introduce unifying constructs into cognitive psychology comes from the work of John Anderson (1983). This psychologist, deeply rooted in the practice of artificial intelligence, has developed the so called: Adaptive Control of Thought (ACT) system, which is put forth as a general model of the 'architecture of cognition' (Gardner, 1985, Anderson, 1983). ACT incorporates a model of knowledge processing that describes the flow of information within the cognitive system. Nevertheless as the limits of the serial digital computer became clearer there had been a shift to a different 'model view' a view in which psychological, computational and neurological considerations are far more linked. Although, not without sympathy for the cognitive approaches that use the computer metaphor, we see that the serial computer model could not picture all aspects of human mind. The *perception development frequency* (PDF)* was another approach. Instead the metaphor of serial operations or computations upon symbols or strings of symbols, executives, interpreters and 'central control units, the PDF approach can be parallel extended to millions or even billions of connections and a coherent sum of units. The resulting networks feature the signaling of excitations from one network to another. In PDF 'Perception', 'Action', or 'thought', occur as a consequence of the altering of the strengths (weights) of connections among these units. A task is completed or an input processed if the system ultimately 'settles' or 'relaxes' on a satisfactory set of values or 'stable states' (in short a solution). In contrast to the view of learning as "storing facts" in the brain memory, PDF is set as the set of relationships that obtain among various aspects of facts or events as they are encoded in groupings, patterns or units. What are stored are the connections and strengths among units, which allow the patterns to be subsequently recreated. Analogously to PDF learning is a matter of finding the right connection strengths so that proper patterns of activation are produced under the appropriate circumstances. (Rumelhart. D, J Mc Clelland ,1986, Rosenfield, 1986, Gardner.H 1986).

In contrast, Rosa & Montero (1990) put an argument of Fodor (1983) who points out the impossibility of modeling global none-capsulated cognitive processes in a computational way, that is, higher processes that fix belief or knowledge. It is significant, as Riviere (1987) states, that information-processing psychology, in spite of its important

* PDF means als: Paralel Distributed Fregeunty, from PDP that means Paralel Distributed Processing.

3. Review of literature study

2.1 Learning

2.1.1. Learning how to learn, arguments
2.1.2. Experimental learning
2.1.3. Learning styles
2.1.4. Special Educational Needs
2.1.5. Competencies for self advocacy

2.2 Inclusive secondary education (the context of research, critical review)

2.2.1. Introduction of the subject and some arguments
2.2.2. Assessment
2.2.3. To conclude

2. 1.1. Learning how to learn, arguments

This chapter will discuss some main and counter theories related to the subject of research. The key objectives for this aspect of dissertation are 'the nature of learning', consciousness and awareness, learning styles, educational needs, competencies for full participation, inclusion, self-advocacy and learning to learn. The clarification found in this chapter should lead to the formulation of a hypothesis and questions for research. This quest starts with the central objective, 'learning'.

According Salomon and Perkins (1998) 'Learning (how) to learn' processes could be pictured as 'an intentional and conceptually oriented highroad of learning' rather than a 'low practical and automatic road of learning'. In addition to this view on the highroad of learning, we need instruments for reflection to mediate 'how we learn'. I feel that the inclusive secondary school that worries about mediating its own learning is far more likely to promote and foster effective and joyful learning for all. Nevertheless, this effective learning of any scope should involve not only one learning system. Because the complex nature of learning, several systems of learning will function together in spirals of reciprocity. Similarly, learning is not some all-proposed general ability that starts from scratch. Organizations learn through individuals who learn. Personal mastery is the discipline of personal growth and learning. People with high levels of personal mastery are continually expanding their ability to achieve the results in life they truly seek. From their quest for continual learning comes the spirit of the learning organization (Senge, 1990). Well-designed inclusive education therefore involves a strong learning environment, multiple intelligent recourses, multiple intelligent learning systems and different moments of synergistic interaction. (Vermeulen,2004 pp 189-200, Vermeulen, 2005/ 2006 pp 10-24, Vermeulen,2006 pp 2).' Teasing the varied meanings of 'learning to learn' in all areas apart starts with the illumination of the nature of learning itself. In this light, this enquiry might be a daunting endeavor.

Evidence from neuropsychological and developmental studies of mental processes (Damasio (1994, 2003) and Libet (1992) has indicated that our concepts of cognition need to be considerably broadened. Emotions and cognitions cannot be separated. When emotions kick in, the brain pays attention and that attention is necessary for memory and learning; thus a positive emotional hook, such as an intriguing question, enhances the possibility of learning. (Vermeulen,2004, 2005, Roelofs & Vermeulen,2002) The thinking part of our brain evolved through entanglement with older parts and is involved in emotion and feelings. Emotion and thought are physically entangled. This brings our body into the story because we feel emotions in our body, and the way we feel always influences our brain. In his pioneering book, Descartes Error: Damasio (1993. 2003) addresses this idea of the mixture of feeling and thinking. He uses the term of somatic markers for specific body feelings that go with specific cognitive experiences. Varela (2000) adds that the immune system has an emergent capacity to maintain the body and to have a history with it, to have "a self" as an emergent property. This self is something that is mapped in the brain. From the point of view of psycho-neuro-immunology, the body would also have an identity that is conceptually designated, but does not exist anywhere.

Processes in musical and other artistic activities, and, quite possibly, processes involved in knowing oneself and other persons merit the modifier cognitive (Gardner,1983 pp 53). I therefore agree with Gardner and believe that adequate models of human thought will have to incorporate aspects of biological systems (for example , processes of organic differentiation or fusion) as well as aspects of mechanical systems (the operation of electronic circuits or networks). As such, models of cognitive science now should be based in facts of neurological research as much as in models of artificial intelligence. However in my view there is a third field that has to be incorporated, that is the influence of complex environments (images, representations and collaborative interactions) in the complex cultures of the 'homo economicus' or 'the shopping walkman ego' in a globalized world. (Kunneman,1998).-(Vermeulen 1998).

In connection to the possibility of choice and the competence to choose, we need to develop new knowledge and tasks to survive in this technically high-developed Western world. Accordingly, the theory of justice is another aspect that seems exclusively human; the possibility to decide what is right and justifiable or wrong or with other words the moral aspect of learning. Connected to this moral aspect (inter) subjectivity that is strongly related to 'the paradox of weltanschauung' comes into play. We all think to have our personal 'philosophy of live' and in a way, we all build on 'mental patterns' and 'personal visions' based in earlier observations and experiences in society. We use personal observations that we see through the colored lenses of our vision to justify our behaviour. We interpret the world through already socially constructed knowledge based in experience, influenced by our socialization. Therefore, we act as an 'inter-subject' (actor) intended by what we learned to justify as being right or wrong. (Vermeulen,1995-1998).

contributions to understanding of many cognitive processes, is limited in its progress precisely in the study of some higher psychological processes. (Riviere, 1987, Rosa & Montero, 1990 Moll,1990). On the other hand, this approach to psychology comes from a solipsist notion of the human individual to which it is difficult to fit the social dimensions of learning and development. PDF's do not claim that they are actual brain models of brain processing but are rather engaged in '*neutrally*' inspired modeling of cognitive processes. (Rummelhart.D & Mc Clelland. J,1986) However this approaches gave us an instrumental view on how learning could proceed in some degree, it says nothing about the facilitation and the social mediation as participatory knowledge construction. The notion:"Social mediation of Participatory knowledge construction", suggests that cognitive processes can be socially mediated but that these same processes, under the right conditions might proceed without mediation. We know that young children are actively engaged in making sense of their worlds. Many scientists, including cognitive anthropologist, sociologist and psychologist, have examined the question of how people functions in a number of environments and practical settings. One major contrast between everyday settings and school environments is that the latter places much more emphasis on individual work than most other environments (Resnick, 1987, USA National Research Counsil 2002). Recent studies of collaborative learning confirm the importance of complex social learning environments. (Dunbar, 1996, USA National research counsel 2002). Children thus exhibit capacities that are shaped by environmental experiences and the individuals who care for them. Environment and development are not two parallel processes. Early biological underpinnings enable certain types of interactions, and through various environmental,cultural and social supports, the student's experiences for learning are expanded (Bransford, Brown & Cocking, 2002). Moreover based in these experiences we create mental models; deeply ingrained assumptions, generalizations or even images that influence how we understand the world. Environment community and structure are critical for meaningful learning.

As Hilary Putnam (1981, 1983) have stressed:

"The community surrounding a cognizing individual is critical."

From the people around us we learn to understand which sorts of views are considered to be acceptable, which are false and dangerous and which are justified or not. Such judgments cannot initially be made by an individual but must stem from a collectivity; and because we all belong to communities, it makes sense for us to invoke such jugments (Putnam,1981, 1983). In sharp contrast the computer (serial or parallel) is simply executing what it has been programmed to, and standards of right and wrong do not enter into its performance without program. A computer can't be unjustified in its beliefs. Only those entities that excist within and are considered part of the community can be so judged (Gardner, 1985, pp 388). In contrast, other reservations about the computer as model center on the deep difference between biological and mechanical systems. To the extent that thought processes of biological, human entities are suffused with regressions, anticipations, frustrations and ambivalent feelings based in a long history of biological and cultural development. In this sense, humans differ from computers.

We can focus on the properties of thought, as suggested by intention and introspection connected to 'Weltanschauung' but how do we proceed with this new knowledge? When it comes to experiences that, however vivid to yourself, are not assessable to other individuals, intriguing questions arise. It is easy to understand why one should be equipped to react to things in ones environment- how else would one survive. However if both intelligence and (moral) expert reasoning in specific knowledge domains are developed through socially mediated cognitive activity, then the practical question still remains of how to ensure that these kinds of interactions take place in schools

The Vygotskian approach (Vygotsky,1978, 1983) shatters the dualism between individualism and society and emphasizes the development of the individual in social interaction; specifically, the individual is formed through the internalization of activities carried out in the bosom of society and through the interaction that occurs within the zone of proximal development. Moreover higher thought processes of people are in part an 'internalized dialogue'. The purpose of dialogue is to go beyond any one individual's understanding. In dialogue students become observers of their own thinking (Senge 2002). In the Vygotskian view, Cognition is a social product achieved through interaction. This position reflects a model that attempts to integrate the various psychological disciplines within a general theory in which each fulfills a specific, meaningful explanatory function within the whole, rather than an unconnected fragmentation among divers fields. (Rosa.A & Montero.I in Moll.L.C (1990)

Accordingly the idea of "Proximal learning", Vygotsky (1978) describes the process that transforms individual experience into group knowledge through conversation. Through conversation students can help each other to become aware of the incoherence in each other's thoughts, and in this way the collective thought becomes more and more coherent. Vygotsky coined the phrase "Zone of proximal development" to describe how children solve complex problems in company of more advanced peers. Proximal learning describes the process where expertise defined in accumulated experiences and capacities of the individual, move from status to solidarity in the face of increasingly complex conversations (Baker, Jensen & Kolb,2002).In this process individual knowledge becomes explicit and as such distributed among various members of the 'learning community' where people learn by experience.

2.1.2. Experimental learning

Whereas the previous principle borrows from models of informal learning in society, in profession, in learning communities of experts and in families, this principle suggest that the content of subject matter should change to provide better connections with the real context of knowledge use. Paolo Freire (1972, 1992) contrasts shallow learning that results from the banking concept (storing facts) with the transcendent deep experimental learning that results from problem posing education in a real world context. In his opinion, people learn quickly and effectively from experience. In deep transcendental learning learners learn through codification and communication of experiences. (Boog, Vermeulen,1994). The banking concept refers to a mode of education where learners

passively absorb information given by the teacher (Baker, Jensen & Kolb, 2002). In these settings, the learner has no opportunity for critical reflection or transformation of there own experiences into meaningful learning. In contrast, Nonoka developed the theory of deep learning. Deep learning pre-supposes knowledge creation. In his theory of organizational knowledge creation, Nonaka (1994, pp 15) says:

"Although ideas are formed in the minds of individuals, interaction between individuals typically plays a critical role in developing these ideas".

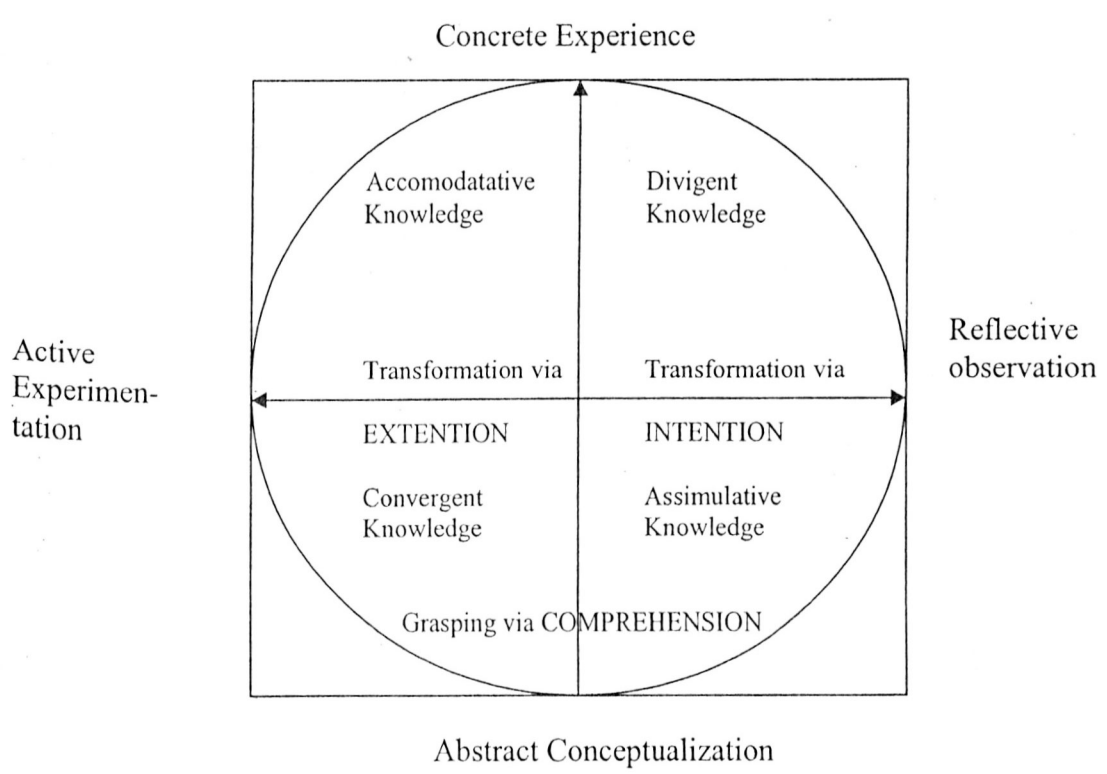
The premise of Nonaka is that it is the continual dialogue between explicit and tacit knowledge that drives the creation of new ideas and concepts. In this premise explicit knowledge has been seen as 'the "knowing about and knowing that", while tacit knowledge can be seen as – the uncodified' knowing how. (Nonaka,1994). In addition to this premise, explicit knowledge is more information based, and knowledge as such is not assessable for practical use without its tacit dimension. The uncodified 'knowing how' or tacit knowledge develops along its own path within each person. That is what each individual learns, through observation, trail, error and practice. This path of learning is authentic and unique for each person. The interplay of tacit and explicit dimension of knowledge manifests them if persons come together in a joint, and meaning making process. (Nonoka,1994)

The experiential learning theory (ELT) created by Kolb in 1984 provides a holistic model of the learning process and a multi-linear model of adult development. Both of these models are consistent with what we now know about how people learn, grow, and develop. The theory is called experiential learning to emphasize the central role that experience plays in the learning process. The learning process is "the process whereby knowledge is created through the transformation of experience" (Kolb, 1994, p 38). Another reason the theory is called "experimental is its intellectual origins in the experiential works of Lewin, Piaget, Dewey, Freire, and James, forming a unique perspective of development. (Baker & Jensen & Kolb,1997)

The Experiential Learning Cycle of development

The four learning modes of the experimental cycle of development (See Pictures below) constitute a four stage experiential learning trajectory, whereby the learners resolve the tension of two dialectically opposite learning dimensions in a cyclical fasion. The cycle begins with concrete experiences that serve the basis for observations and reflections. These reflections should be assimilated into abstract concepts from which new implications for action can be drawn. According Kolb & Fry (1975) secondary school students may have already begun to develop specialized preferences and abilities in their learning style, in later years of secondary school and beyond the individual begins to make choices, which will significantly shape the course of their development. The choices an individual makes in this process tend to have an accentuating, self-fullfilling quality that promotes specialization (Kolb & Fry,1975). The students involved in the self-assessments for "Learning how to learn" are in the first years of the secondary school. Our assumption is that, if students are more aware of there learning styles they probably could be more open to the possibilities of choice. That's the reason that we involved groups of students of all three schools in the qualitative learning style analysis. For this

analysis they used their experience with the two learning style assessments they did. Most students point out that they have more than one learning style in the sense of LSI..



Picture 2.a. Cycle 1 Kolb (1984)

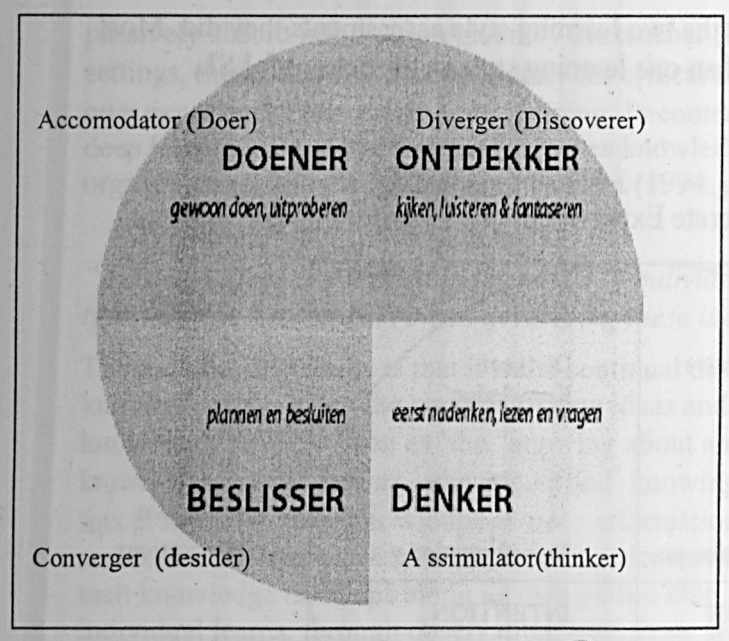
2.1.3. Learning styles.

Learning style Inventory, Introduction:

Learning involves different activities: the learning process needs to be organized and steered; knowledge has to be absorbed, processed, and applied. Students develop different ways of doing this; everyone has his own learning style. Learning style based learning means that when learning you also pay attention to 'how you learn' and 'how you could improve your learning. Kolb developed a model for successful research. From dozens of well-known learning style aspects he chose two that appeared relevant:

- The dimension of learning from concrete experience versus learning from abstract concepts;
- The dimension of learning through active experience versus learning through reflective observation

These two learning aspects reveal four learner types: the diverger- discoverer (or dreamer), the assimilator- thinker, the converger- decider, and the accommodator- doer.



Picture 2.b: Poster used during students LSI self-assessments in The Netherlands

Kolb developed a questionnaire to map people's learning styles (The Learning Style Inventory Test). This test forms the basis for the self-assessment instruments used for the self-enquiry during the participative action project: "Learning how to learn". (See also, Chapter four.

Multiple learning styles

- The concept of multiple Intelligences is well-known in the educational field. The concept assumes that there are various types of intelligence. In his basic study, Frames of mind: The theory of Multiple Intelligences Gardner (1983) describes seven Intelligences. Later in 1995, he added two more. Gardner describes intelligence as the ability to solve a problem or to adjust a result. He speaks of multiple intelligences since it assumes that there are various ways to be intelligent. The multiple intelligence approach takes the differences among students into account. Since each student has a personal style to solve problems, the multiple intelligence approach offers a specific alternative for each style. Gardner believes that the current approach to education is very limited in this regard, with the linguistic and logical- mathematical intelligences dominating to the detriment of the other six. By introducing multiple intelligences, teachers can enhance the uniqueness of each student.

Picture 2.b Multiple learning style posters in Dutch.

2.1.4. Special Educational Needs

The slogan that 'all students can learn' is intended to promulgate what the Malcolm Report (Malcolm,1993) called: "A new way of thinking" It is a direct refutation of the long-standing belief that innate ability determines life-stances (Shepard, L, and E 2001). Although such affirmations by themselves will not be sufficient to provide the necessary opportunities, the slogan is important because it serves to disrupt the self-fulfilling practices of old exclusion paradigm. In the old segregating paradigm, only certain very able students were good enough to master difficult content and therefore, only an elite group was given access to challenging matter. However also very able pupils may have particular learning needs because they are very capable in some areas such as physical education, but they can have difficulties in another area such as literacy, perhaps leading to a judgment that he or she has SEN. such as dyslexia.

The Educational Act 1996 (Education Act 1996, section 312) defines SEN as:

"a child has special educational needs if he has a learning difficulty which calls for special educational provision to be made for him".

If a people with SEN. relating to 'learning difficulties' brought about by ' difficulties in learning' can be defined in terms of 'slow progress' and 'low attainment' then a very able pupil is one making rapid progress and attaining a high level. Nevertheless, a pupil may be able in some school subjects but might have behavioral, emotional and / or social difficulties. Occasionally, a pupil with SEN such as autism may have a particular skill in the area of learning such as drawing, playing with numbers or music at a level that is higher than age average (Farell,2004).). However if we look from a multiple intelligent learning style perspective all pupils have personal educational needs (PEN). Farell 2005 distinguished between integration and inclusion. If we contrast the term integration, we will find that: while both terms are to do with the provision for students with SEN in mainstream schools, integration has been characterized as assuming that the mainstream school system remains the same but that extra arrangements are made to provide for peoples with SEN. If we accept this distinction, inclusion present the aim to encourage schools to consider their structure, teaching approaches, pupil grouping and use of

support. Moreover, they have to do it so that the school responds to the perceived needs of all its pupils. They should also focus on the qualities and learning styles that can help them to attain learning that is more effective. Schools that have this approach focus on the vital signs to achieve goals in the zone of prior development (ZDP). Before we can focus on vital signs, we have to know what the vital signs are and we have to be sensitive to the personal needs in the ZDP of each student. According to this view every student has personal educational needs. Integration (social inclusion) would appear to support the raising of standards of attainment for students with and without a learning barrier or disability. I am conscious that this statement is a subject for discussion because there are children who have very specialized and multiple disabilities that need a standard of expert attention that is not realizable in the mainstream of primary and secondary education. In the Netherlands, such students can use their personal financial, the so-called 'back-pack' for expert help and extra equipment.

2.1.5. Competencies for self advocacy

A classic role, related to the classic idea of action research, was 'to make people aware' of certain problems in their real life situation. Moreover disadvantaged groups were supposed to be insufficiently aware of their suppressed position in society. Action research was seen as a means to discover their problematic position, to organize themselves politically and to improve their situation. This conception was very optimistic, but included an overestimation of the 'makability' of society. (Van der Kamp, 1996). This conception simply had to cause disappointments and it often did. According to Kunneman (1994), social scientists have to promote reflexivity among the actors of a social intervention. Fortunately, teachers and students nowadays want to be responsible for their own lives. They like to participate fully. Full participation is the establishment of self-control and self-determination in the total management of your everyday life affairs (Lobato & Evans,2005). Teachers and students like to learn from their own observations. They like to know their personal strengths and weaknesses. They ask for full participation in the debate of what constitutes itself as 'normal' and good for their wellbeing and the wellbeing of the people they are connected with. Students claim their rights of free choice and self-determination, a patronizing role is therefore completely out of date. Paternalistic authority can never be legitimated, in either individual or collective decisions. To be self-determinates, students need to possess the capability to make informed choices: consider facts, appreciate the consequences and exercise decisions with respect to them (Nikku,1997, p 55). Although students with complex needs or multiple disabilities can hardly communicate their needs, they need guardians, coaches and buddies who can understand what they need (Siska,2007) and who appreciate their observations to give them 'voice for choice'. This is all to ensure that all students, disabled or not, have the equality of opportunity in the chances and choices they need to develop themselves. (Tielman and Vermeulen,1999). The liberal ideal of individual's rights for self-determination is a condition for participation in a democratic school culture. In this involving culture, teachers will stimulate students to communicate their needs, they will listen carefully to understand the needs and they will assess vital signs, talents and qualities that can be helpful to overcome barriers for full participation. Because the goals for full participation, independency and self- determination have to be

set 'on the road of living and learning' students need communicative competencies for self-advocacy that will give them a clear voice in the democratic discourse. It is important that we recognize that inclusive schools have to promote the development of these basic communicative competencies for self-determination and self-advocacy in all pupils.

2.2 Inclusive secondary education (the context of research, critical review)

2.2.1. Introduction of the subject and some arguments

In an inclusive school, teachers seek opportunities to look at new ways of involving all pupils to draw experimentation and learn through experience and reflection (Fredrikson,2002, Vermeulen, 1998, Korthage,1999, Farell,2004). In the inclusive school teachers will stimulate pupils to communicate their needs, they will listen carefully to understand the needs and they will assess vital signs, talents and qualities the pupil has to develop that can be helpful to overcome barriers for full participation.
Some people take the view that inclusion is about getting more pupils in mainstream schools and fewer or none in special schools and other venues regarded as segregating, it may be argued that special schools also can be inclusive (Farell,2000). It is important that we recognize that inclusive education is not an end in itself. Inclusive education is not fundamentally an issue of disabled people. In educational terms, it is about the value of wellbeing of all pupils. Thus, the key concern is quality of education in an effective learning environment that promotes full participation for all children and young people.
It may also be argued that rigid assessment arrangements and state controlled ethnocentric curricula, exclude pupils in terms of their own knowledge. Cultures that shape processes of selection and ranking between avoiding 'undefined qualities of the pupil' support exclusion. This kind of selecting and ranking creates barriers for inclusive improvement (Amstrong, Amstrong & Barton, 2000,Vermeulen,2005). In reflection to the experiences concerning school improvement and in-service teacher training for inclusive education, these counter-productive and incoherent policies create stressful situations and de-motivation among teachers who seek to implement inclusive educational practices. These paradoxes in policies provide other schools good arguments for educational conservatism.

2.2.2. Assessment

The Dutch test institute CITO and the UK Qualifications and Curriculum Authority both take the view that inclusion in education means 'securing appropriate opportunities for learning, assessment and qualifications to enable the full and effective participation of all pupils in the process of learning' (Wade,1999, Boersma ed all,2001). Vagueness arises with terms such as 'appropriate opportunities for learning' and 'effective participation' to which it is very difficult to attach meaning. For example children should be reaching their 'full and effective participation' yet how 'the appropriate opportunities for learning' can be identified and whether or not the student reached 'full and effective participation' is not clear. For example: In most of the Inclusive PRO schools (schools for practical secondary mostly adaptive education) in the Netherlands, individual education plans (IEP's) are developed for, and not with the pupils and parents. The plans are made for the remedial teachers, care services and therapist and have no active implications as a plan of action for the pupils themselves. The voice and observations of the 'disabled' young person has only low impact or no impact in the development of IEP's in Dutch schools. In most of the situations in UK IEP's are developed for pupils and parents and not

with pupils and parents. (Farell,2005). One of the subjects of Dfes 2004b description called: Removing barriers of achievement (p 97) is: "raise the achievement of children considered to have SEN. The focus of raising expectations and achievement is developing teachers 'skills and strategies' for 'meeting the needs of children with SEN', focusing better on 'the progress that children make'. Teachers in this case have to face the same problem as described above. The special needs code of practice (1.2) sets out guidance on policies and procedures that aim to enable pupils with SEN to reach their full potential, be fully included in their school communities, and make a successful transition to adulthood (Department for Education and Skills, 2001 UK). The code is permeated with references to pupils needs, their standards of achievement, directed by the curriculum. Instead of the disabling curriculum directed approach we have to focus on improvement of student's talents. We need to give student's feedback in such a way that they become conscious of 'how they learn best'. We have to stimulate them to find their preferred ways of processing information and help them to develop effective intellectual competencies, including cognitive, affective, physiological, psychological and sociological functions. (Zhang & Sternberg, 2005)

I feel that: "If pupils and parents are involved in the search ' how to learn best' and in the process to develop an Individual Development Plan (Dutch variation of IEP) then achievements can be noted and celebrated as well as any difficulties clarified and addressed. When addressing pupil participation in this way, pupils will be actively encouraged to track their own progress and record achievement within the program of action designed to meet their particular learning or behavioral difficulty will contributed to improved confidence and self-image. (Zhang & Sternberg,2005, Ahs,2001, Farell,2005, Backhaus and Liff,2007). This should be one aspect of self-advocacy because self-advocacy should not only be about saying how one feels about the situation. (Siska,2006, Aspis,2002). Aspis (2002 in Siska,2006) emphasizes the importance of action and the need to achieve real and long-lasting change.

2.2.3. To conclude

Processes in musical and other artistic activities, and, quite possibly, processes involved in knowing oneself and other persons merit the modifier cognitive (Gardner,1983 pp 53). I therefore agree with Gardner and believe that adequate models of human thought will have to incorporate aspects of biological systems (for example , processes of organic differentiation or fusion) as well as aspects of mechanical systems (the operation of electronic circuits or networks). As such, models of cognitive science now should be based in facts of neurological research as much as in models of artificial intelligence. However in my view I see a third field that has to be incorporated, that is the influence of complex environments (images, representations and collaborative interactions) in the complex cultures of the 'homo economicus' or 'the shopping walkman ego' in this globalized world. (Kunneman,1998). In connection to the possibility of choice and the competence to choose, we need to develop new knowledge and tasks to survive in this technically high-developed Western world. Accordingly, the theory of justice there is another aspect that seems exclusively human; the possibility to decide what is right and justifiable or wrong or with other words the moral aspect of learning. Connected to this moral aspect (inter) subjectivity that is strongly related to 'the paradox of weltanschauung' comes into play. We all think to have our personal 'philosophy of life' and in a way, we all build on 'mental patterns' and 'personal visions' based in earlier observations and experiences in society. The personal observations we see through our colored lenses and interpret through already 'social constructed knowledge' based in experience, influence what we justify as being right or wrong. (Vermeulen,1995- 1998).

We can focus on the properties of thought, as suggested by intention and introspection connected to 'Weltanschauung' but how do we proceed this new knowledge? When it comes to experiences that, however vivid to yourself, are not assessable to other individuals, intriguing questions arise. It is easy to understand why one should be equipped to react to things in ones environment- how else would one survive. However if both, intelligence and (moral) expert reasoning in specific knowledge domains are developed through socially mediated cognitive activity, than the practical question still remains of how to ensure that these kind of interactions take place in schools. Moreover if we look from a multiple intelligent learning style perspective all pupils have personal educational needs (PEN). Farell(2005)distinguished between integration and inclusion. If we contrast the term integration, we will find that: while both terms are to do with the provision for students with SEN in mainstream schools, integration has been characterized as assuming that the mainstream school system remains the same but that extra arrangements are made to provide for peoples with SEN. If we accept this distinction, inclusion presents the aim to encourage schools to consider their structure, teaching approaches, pupil grouping and use of support. Moreover, educators have to do it so that the school responds to the perceived needs of all students. They should also focus on the qualities and learning styles that can help students to attain effective learning that motivates. Schools that have this approach focus on the vital signs to achieve goals in the zone of prior development (ZDP). Before we can focus on vital signs, we have to know what the vital signs are and we have to be sensitive for the personal needs in the ZDP of each student. According to this view every student has personal educational needs. Integration (social inclusion) would appear to support the growing capicity of attainment for students with and without a learning barrier or disability. I am conscious that this statement is a subject for discussion because there are children who have very specialized and multiple disabilities that need a standard of expert attention that, even with a backpack, is not realizable in the mainstream of primary and secondary education.

The liberal ideal of individual's right for self-determination is a condition for participation in a democratic school culture. In this involving culture, teachers will stimulate students to communicate their needs, they will listen carefully to understand the needs and they will assess vital signs, talents and qualities that can be helpful to overcome barriers for full participation. Because the goals for full participation, independency and self- determination have to be set 'on the road of living and learning' students need communicative competencies for self-advocacy that will give them a clear voice in the democratic discourse. It is important that we recognize that inclusive schools have to promote the development of these basic communicative competencies for self-determination and self-advocacy in all pupils. I feel that: "If pupils and parents are involved in the search 'how to learn best' and in the process to develop an Individual Development Plan (Dutch variation of IEP) then achievements can be noted and celebrated as well as any difficulties clarified and addressed. When addressing pupil participation in this way, pupils will be actively encouraged to track their own progress and record achievement within the program of action designed to meet their particular learning or behavioral difficulty will contributed to improved confidence and self-image. (Zhang & Sternberg,2005, Ahs,2001, Farell,2005, Backhaus and Liff,2007). This should

be one aspect of self-advocacy because self-advocacy should not only be about saying how one feels about the situation. (Siska,2006, Aspis,2002). Aspis (2002)in(Siska,2006) emphasizes the importance of action and the need to achieve real and long-lasting change.

3. Research methodology and research review.

Chapter 3: Research methodology and research review.

This chapter will give a critical review on my research in terms of methodology and research practice: methods used, data, data analysis, conclusions and critics that can be given.

3.1.Research methodology and research review

I begin this chapter with a review of some selected research paradigms and their methods and evaluate their importance for this research in general. The second part of this chapter will give a critical review on my research in terms of methodology and research practice: hypothesis, research questions, aims, analysis and validation, ethics, conclusions that can be drawn and criticisms that can be made.

Overview

3.1.1. Subject of research and methodology
- 3.1.2. Hypothesis and questions for research
- 3.1.3. Methods and instruments
- 3.1.4. Validation and Ethics
- 3.1.5. Conclusion

3.1.1. Subject of research and methodology

Education

The focus of my professional work is school improvement. Analysis, enquiry, design and implementation of inclusive educational approaches are in my view highly reciprocal, interactive creative processes. In these actual practices of educational change and development, schools are confronted with several problems for sustainable change that produce questions for research.

If we seek to implement inclusive collaborative, development-oriented and adaptive learning concepts in the mainstream of secondary education, we need to reflect critically on the outcomes and effects of these approaches in practice.

The first purpose of this action research project is to improve the practice, rather than to find truths, universal or particular.

The aims of research project are:
Raising consciousness of how students can, 'learn how to learn'.
Raising consciousness of (multiple) learning styles by the student.
Raising consciousness of personal (special) educational needs by the student.
Raising consciousness of (multiple) learning styles of students by teachers.
Raising consciousness of the personal educational needs of students by teachers
To find out how teachers can facilitate paths of learning that are more effective for the individual student in inclusive secondary education.

There are a lot of Modern and Post Modern Philosophies about the existence (or not) of 'the truth'. In respect of this discourse, my focus in this dissertation will be limited to a more or less pragmatic methodological view. I am aware that this limitation could be seen as only a fragment of 'truth'.

In a nutshell paradigms as positivism, relativism, realism and constructivism, etc have their own assumptions about the world, their own scientific method and their own view on the non existence of truth. Positivists have explanation (in a restricted manner) as a central aim. They add that: 'If you can relate an event, observations or other phenomenon to a general law then you have explained it.' (Robson,2002, 20). In contrast there are influential relativistic approaches which in their extreme form maintain that there is no external reality (or truth) independent of human consciousness; there are only different sets of meanings and classifications which people from different conceptual systems attach to the world. In this relativist view that include the 'interpretative', 'constructivist' and naturalist theories, reality can be constructed only by means of conceptual system (Robson,2002, 22) in a socio-cultural substratum of time. (Vygotsky 1978, 302) In contrast to relativism, realism has a long tradition in philosophy of science (Manicas 1987). At the heart of realism is the assumption that there is a reality, which exists independently of our awareness of it. (Denzin,2003, 270). For realists reality is an ontological question. (Denzin,2003, 270) From the pragmatist view of James, Pierce and Dewey a proposition 'is truth only if it works', hence the test is whether or not to carry

out worthwhile studies using qualitative and qualitative approaches side by side. (Robson 2004, 43) More broadly, the status of research as truth is the subject of considerable philosophical post-modern controversy, with other words: "How do we know what we believe we know" (Norton in Watslawick 1984, Harbers & de Vries 1984). We can interpret truth as a warranted belief thus a proposition is truth (provisionally) if it satisfied the relevant tests for the truth of proposition of its kind. (Hirst, Robson 2002) As stated before a tentative explanation can be useful as long as it usefully explains or predicts real world events. (Walford 1991,42)

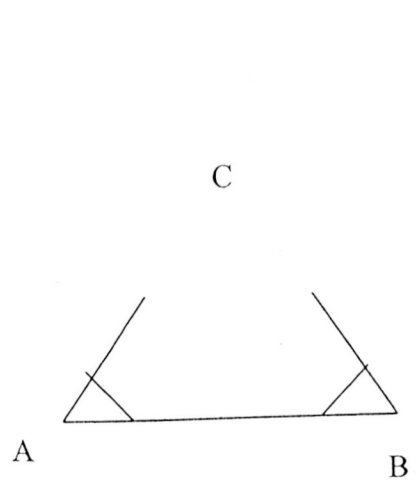
Combining scientific approaches in real world (action) research.

In 1994 we asked ourselves as researchers: "What would be the consequences of combining scientific approaches in action research?" (Vermeulen, 1996) According to Harré and Gillet (1994, 33) there was a need to see mental life as a dynamic activity of people who, from the possibilities they make available, attempt to fashion relatively integrated and coherent subjectivities for themselves. In that time we stated that the combination of an Interpretative realist approach and action research methods could be sufficient in settings where mental patterns and social (coping) mechanisms, that can block or promote change, have to be found (Boog&Vermeulen,1996). A difficult statement, because there were no universally agreed reasons to do so. In contrast v*arious* reasons had been advanced for the use of combined method triangulation, including increasing the concurrent convergent and construct validity of research, the ability to enhance the trustworthiness of an analysis by fullness, reducing bias, compensating for the weakness of one method through the strength of another.(Torrance (ed.),2004 Conrad &Taylor,2004). In 1998 we adopted the method of triangulation of quantitative and qualitative data in participative action research in education. (Vermeulen,1998). The most simple concept of triangulation involved a minimum of two vantage points or datasets to tell us something about a third phenomenon. We could determine the position of C if we could know the positions of A and B and also could know the interior angles (X and Y). In this case C is the unknown while A and B are our two different methods (see figure 1).

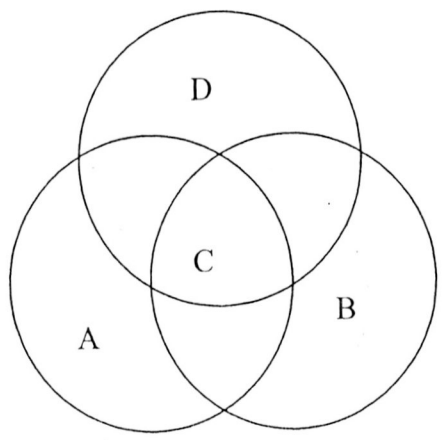
In this participative action research project: "Learning how to learn in secondary education" , an alternative view is used In this research program we need figures of what students experience as there learning styles (A) and how they articulate there personal educational needs connected to these insights (B). The data collection and analysis of the

first question (A) can be quantitative and random, but to answer the questions concerning the articulation of personal educational needs (B), we need qualitative methods. However, we will find and will analyse a lot of data: the first purpose of this action research project is to improve the practice, rather than to find truths, universal or particular.

Picture 3 A



1. Basic view on triangulation



2. Alternative view

(Figure 2) (Vermeulen 2005, 2007, Bell, 2001). A quantitative and random research approach can give valid evidence available in the sector A>C whereas a qualitative approach gives us the evidence in section B>C. The data found under A>C and the patterns found under B>C can be helpful to make the next step, to find solutions for the question: "How teachers can provide education that is suitable with the learning styles and personal educational needs of the students."

If we assume that neither quantitative nor qualitative methods give us a complete picture of our object of study than some of the objects of study (D) may be hidden to both perspectives.

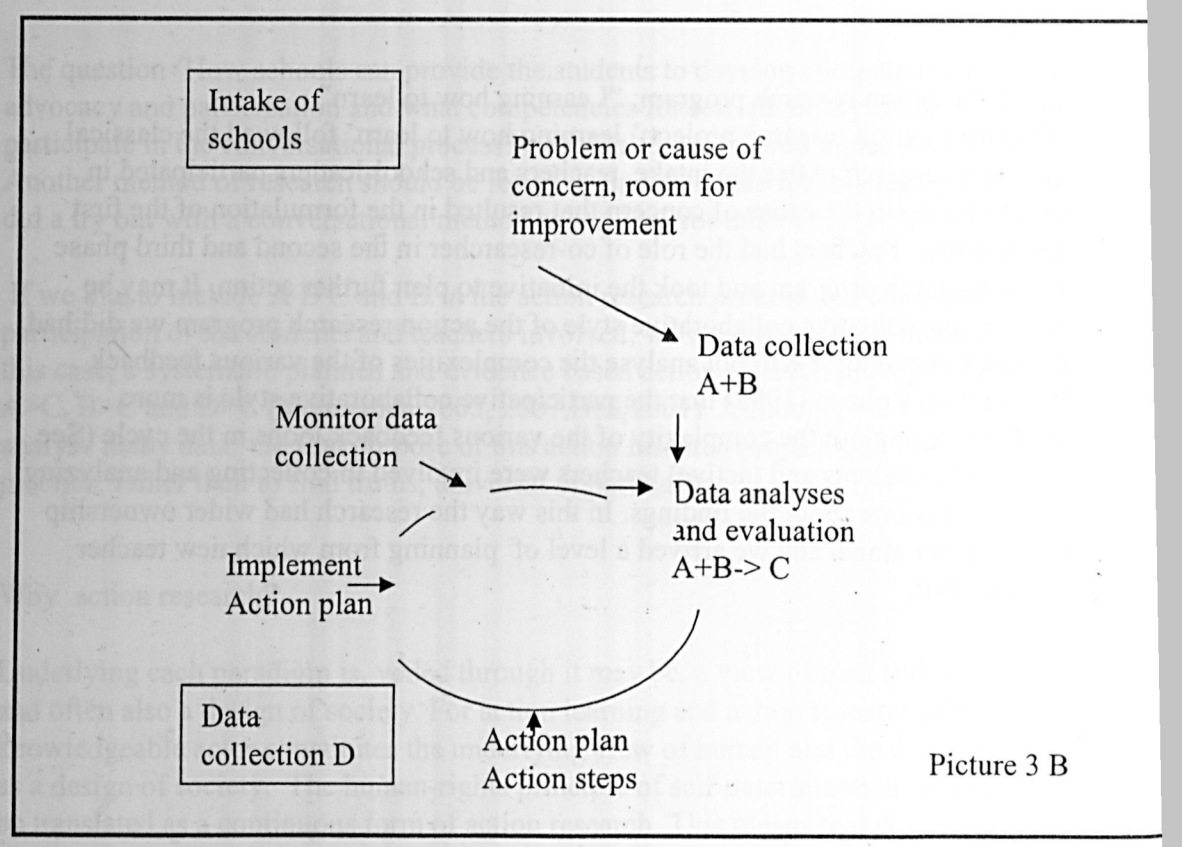
The question 'How schools can provide the students to develop competencies for self-advocacy and participation and what competencies for self-advocacy students need to participate in the conversational process?', couldn't be answered under A >C or B>C. Another method of research should be found to find evidence for this factor. For D we did a try out with a conversational method called ' mirror talks'.

If we like to include A B C and D in the action research process and stimulate active participation of the students and teachers involved, we need an all-over methodology. In this case, a systematic planned and evidence based action research process should include A>C, B>C and D>C (Vermeulen,2005, 2007,Bell,2001). Although, we will find and will analyse many data: the first purpose of this action research project is to improve the practice, rather than to find truths, universal or particular.

Why action research?

Underlying each paradigm is, veiled through it may be, a view of man and a worldview, and often also a design of society. For action learning and action research, the knowledgeable actor constitutes the underlying view of human and the democratic culture as a design of society. The human-rights principle of self-determination in education can be translated as a continuous form of action research. This means that education starts by making an inventory of needs of pupils to talk about topics important for them. The second step is to connect these needs with the professional task of the teacher to guide students in such a way that they become increasingly able to give meaning and shape to their own lives and the community they life in. By investigating the ongoing developments, the teachers and their trainers are able to improve their capacities to guide the peoples in an involving educational process. The action research method has proven a useful approach to planned change interventions in education, not only in small groups but also in large complex organizations. In my opinion action-learning cannot be separated from a cyclical process of action research in which the participants reflect on their situation and use adequate knowledge to arrive at autonomous choices regarding possible actions, in dialogue with others. (Vermeulen,1996, 71) Moreover, action research is a usefull methodology for educational change because it ignores the boundaries between disciplines when they restrict effective understanding and action and advocates crossing the boundary between academia and society as a basic principle of operation". (Denzin & Lincoln,2003/87.)

Overview of the action research program: "Learning how to learn".
The participative action research project:' learning how to learn' followed the classical cycle for action research. After the intake, teachers and school-leaders participated in workshops to focus on the cause of concern that resulted in the formulation of the first research questions. Teachers had the role of co-researcher in the second and third phase of the action research program and took the initiative to plan further action. It may be argued that the participative collaborative style of the action research program we did had a very complex character. I will not analyse the complexities of the various feedback loops. I agree with Robson (1993) that the participative collaborative style is more important than sorting out the complexity of the various feedback loops in the cycle (See picture: 4 x). The students and (active) teachers were involved in collecting and analyzing data and in discussions about the findings. In this way the research had wider ownership than the researcher alone, and we arrived a level of planning from which new teacher initiatives can start.



Picture 3 B

3.1.2. Hypothesis and questions for research

The hypothesis for this research program is threefold.
The research program: "Learning how to learn" will provide evidence for the first and second part of the hypothesis. Although two participating schools also focused on the

third part of the hypothesis, we conclude that this part of the hypothesis needs more time than available, to be tested. In the conclusion of the dissertation, I will give some hints for future research concerning this part of the hypothesis.

Hypothesis

1. Learning takes place in the students mind and all students have their own potential and unique way to learn within their zone of prior development
2. All students have multiple learning and thinking styles and unique talents.
3. All students have personal educational needs (PEN).

If teachers provide students with methods that facilitate the possibility to become aware of their own learning styles and personal educational needs (PEN) they will explore there learning and they can ask for learning possibilities (learning environment, setting, equipment, instruction and tutoring) that will increase the effectiveness of their learning.

The conversational process in which this learning takes place can promote the students competencies for self-advocacy. If students are aware of there personal learning styles and personal educational needs and develop the competence for self-advocacy they can become self-advocates in their own learning process.

Questions for research.

Concerning the competence of the student.
Can students recognize their personal learning styles?
Can students articulate their own learning style?
Can students recognize their own personal educational needs?
Can students articulate their personal learning needs?

Concerning the role that teachers play.
What can teachers do to activate the student to raise consciousness of their learning styles?
What can teachers do to activate the student to raise consciousness of their personal educational needs?
What can teachers do to provide the student to find paths of learning that are more effective?

How can the teacher provide students with methods that help them to become aware of their LS and PEN?

Concerning instruments
Which instruments and methods can facilitate the student's process to find out what learning-styles they have?
Which instruments and methods can facilitate the student's process to find out personal educational needs they have?
How can schools help students to develop competencies for self-advocacy and participation and what competencies for self-advocacy too students need to participate in the conversational process?'

Methods and instruments

Instruments LSI and MI-LS instrument for self-enquiry
The instruments developed are based on the 'Learning Style Inventory' (LSI) of KOLB (Appendix 3). Another instrument we developed for the students is based in the "Multiple Intelligence theory of Gardner" (See Appendix 4). Before we could start the quantitative part of the action research process, we did some pre-tests with students of two schools. We also did a try out in a workshop for a study group of school leaders and teachers from schools for secondary education who did not participate in the action research program as a whole. (Edu Delta College, Clusius College, Nova College)

During the pre tests of the instruments with students we learned that the language of the LSI assessment was on a high level, 25 % of the students of Pascal College did not understand 30 % of the text of the carts used in the LSI (Appendix 3+abcd). For PRO Rotterdam the score of failures was higher, 40% of the students had to sort out even more than 30% of the carts because the did not understand the text. Together with two language teachers we reshaped and reformulated the texts on the carts in a way so that most students could understand the message. We decided that in cases where students had a language problem (dyslexia or second language Dutch) they should be coached by another student. We learned that the conclusion made by Hattie and Timbery (2007) was helpful:

"…there are many possible ways for students to reduce the gap between current and desired understandings in response to feedback… (Hattie, Timberly, 2007).

We also conclude that the goal of both assessments had to be clear for the students, because we are more likely to increase effort when the goal is clear.

Picture 3 C

Post research of the quantitative part
To make the quantitative part as random as possible a post research questionnaire had to be filled out by the teachers in the action research program and by the control group. For the post research a questioner had to be filled in (Appendix 5).

Reliability of the instruments.
By repeating the LSI and MI-LS assessment in three schools we can conclude that the method of enquiry is repeatable. We have to find out what conclusions would be reached if the same student repeated the test after three weeks.
We need further investigation of LSI and MI-LS test and retest reliability before we can say something sensible about the reliability of these assessments for self-enquiry.

Because of it's clear implications for both; students awareness of learning styles and teachers management of the educational setting/ activating didactics for more effective learning, it is necessary to have better understanding of the underlying factors the LSI and MI-LS instruments taps in self-enquiry settings.

In contrast, the pre questionnaire (intake) and post questionnaire for the teachers are more reliable, that means that the conclusions had identical connotations, but the teacher sample variety cause problems because the samples were not all a-select and some were very small. (see The intake and post surveys were repeatable.

Methods and instrumentation of the qualitative part of research.

The qualitative part of the triangulation could be pictured as an exploratory study. We tried to explore ideas of the students personal educational needs (PEN) to discover the important underlying patterns, that should lead to the formation of more precise set of research questions for students personal or special educational needs. To achieve this goal we used video mediated interview data. During the LSI and MI-LS test sessions, we made video films of each session. During these sessions, the students reshaped their experience and new knowledge about their own learning styles in a peer-to-peer conversational process (Appendix 6). After the process of testing the teacher / co-researcher interviewed the students and they interviewed each other in a question based peer-coaching process during the tests. All these sessions are available on video film. To avoid bias the films are made by students or by a stand-alone video camera. (See appendix X DVD). For the analysis of the film and to find patterns a "Key stone mapping method" was useful. (Appendix 7). Using a qualitative method I don not pretend that the 'product' of analysis might be "truth" in the sense of 'value free objectivist science'. In my opinion the relative "truth" of the 'underlying patterns' found are MY work. I tried to do this research 'as objectivively as possible', and asked some colleagues to select the keystones for mapping. Even knowing, however that this should not transcend my personal interpretation. With other words, I do not believe that I can avoid bias in qualitative research, but I did the best I could

Mirror talks.

To find information and some answers to the question: The question 'How schools can provide the students to develop competencies for self-advocacy and participation and what competencies for self-advocacy students need to participate in the conversational process?' (D) we did some pre-research concerning a try- out with a conversational method called ' mirror talks' (Appendix X DVD). The mirror talks on video, together

with the video interviews during the tests and available school information provided evidence for the description of the three student cases. But we did not solve this problem, in contrast three new questions came up:
What are the competencies students need to be good self-advocates that can articulate their learning styles and personal learning needs.
How can teachers help students to develop these competencies? This part needs a follow up in future.
How can this development of students become connected to their individual development plan (IEP, IOP in Dutch, see Appendix 8).

Validation

"*Validity tells us whether an item measures or describes what it suppose to or describe*"

(Bell, 1999, p.104).

Validation principles used are triangulation for the total research process. For the quantitative part of the research, I assigned randomly. In this case sample variability could be a problem (Robson 1993, 2000). The three samples are small Regarding students the samples are A-select, the numbers are N=40, N=15, N= 20, including 12 students in the control group. The samples of teacher are even smaller. The numbers are N=4, N=2, N=2 for active teachers, N=7,N=8, N=8 for informed teachers and N=4, N=9, N=5 for the control group. The active teachers chose to participate. The informed teachers are part of the teachers team involved, they don't choose by them-selves, the control group is an A-select sample. The discrepancy between choice and A-select sampling creates 'difficulties' in the process of analysis.

We did pre and post surveys (for more information see 3.1.4. and Appendix 1+2)
The video recordings made were particularly useful. They show how the LSI and MI-LS test are carried out and how the equipment for self-enquiry of learning styles could be used.

The assessments and interviews/ video observations are made in the everyday context of education, the classroom. The conditions were natural for the activity that had to be assessed. In my opinion the method of qualitative interview/ video analysis could not be completely value free. However this method was helpful for the purpose. We found

important underlying patterns and we could discover new insights that will result in a follow up study and action (Handbook Research Methods in Education).

Ethically we used informed consent , parents had to be informed and all parents had to say yes. The school managers had to send letters to all parents. After all parents and students did agree with the ethical criteria and the protocol of the research program. In the research reports we had to use nick-names. Some film fragments could be used for presentation others not. In some schools we had to debrief the parents after the assessments. In other schools parents were informed by a personal letter and debriefed bij a written evaluation. The ethical part of research in education needs a lot of time.

Conclusion

In conclusion of this first part of the research chapter, I realize that doing multiple method triangulation in action research in the educational context is undoubtedly more complex than I could have imagined. Multiple method triangulation in action research is good for validation but it is a time consuming process.
However, we made a Pre start to inform the schools in December 2006 the limitation in time was a problem. We had to finish the research activities before summer holidays. After that finish only 4 weeks remained for analysis, action and evaluation. We did the analysis and action planning. The last two phases of the action research program, action and evaluation will follow at the start of the new academical year 2007-2008.
Working with informed consent in the school and the ethical part of research was the most time consuming part of this research project.

The video recordings made were particularly useful. They show how the LSI and MI-LS test are carried out and how the equipment for self-enquiry of learning styles could be used. For the quantitative analysis, the film material was the resource of interviews. We used them to find patterns. These patterns could be used for further action but should not be seen as objective evidence. Even if the students and teachers do the analysis themselves we cannot avoid bias, because the researchers are the interpreters of there own data.

4. Analysis

4. Analysis

This chapter will give a critical analysis of my research in terms of research practice: methods, data, data analysis and results. In the first section, I will concentrate on the population and on the results of quantitative research. In the second section, I will concentrate on the results of qualitative analysis done by students and teachers during the action research process. In this qualitative part, we focus on the outcomes of self-enquiry in 'peer-to-peer' interviews.

If psychological studies have demonstrated that both intelligence and expert reasoning in specific knowledge domains are developed through socially mediated reflective activity, than the practical question remains of how to ensure that these kinds of interactions take place in classrooms (Baker,Jensen,Kolb 2002, Shepard 2001). The first goal of these research activities is to introduce to explore how student's awareness of learning-styles can lead to the articulation of learning needs. A second goal is to explore how lessons learned from research can be applied to the task of educational change and reform.

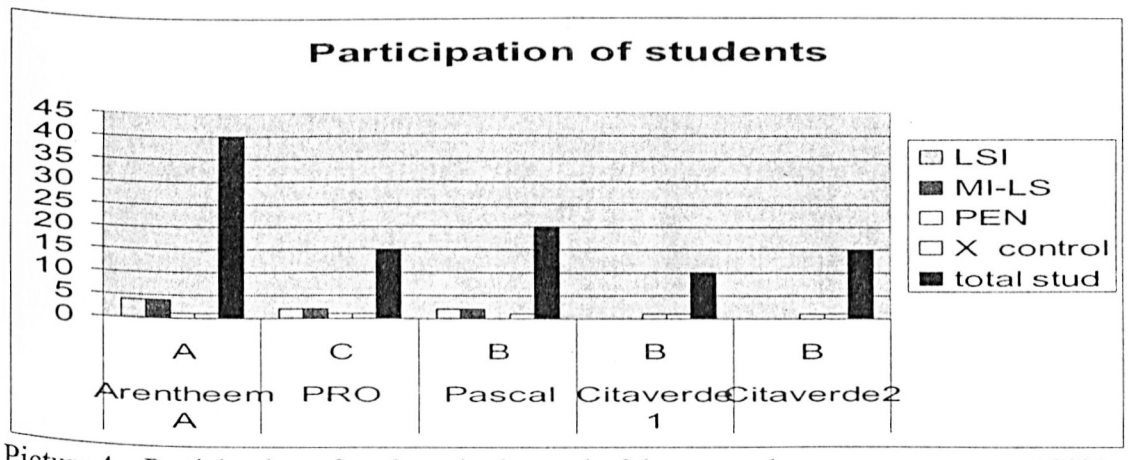
Content:

4.1. Quantitative research: data and analysis

The data and analysis of this research part are the result of self enquiry assessments for students based on the 'Learning Style Inventory' (LSI) (Appendix 3), Multiple Intelligent learning style test (See Appendix 4) and pre research (appendix 1) as well post research (appendix 5) done by the teachers.

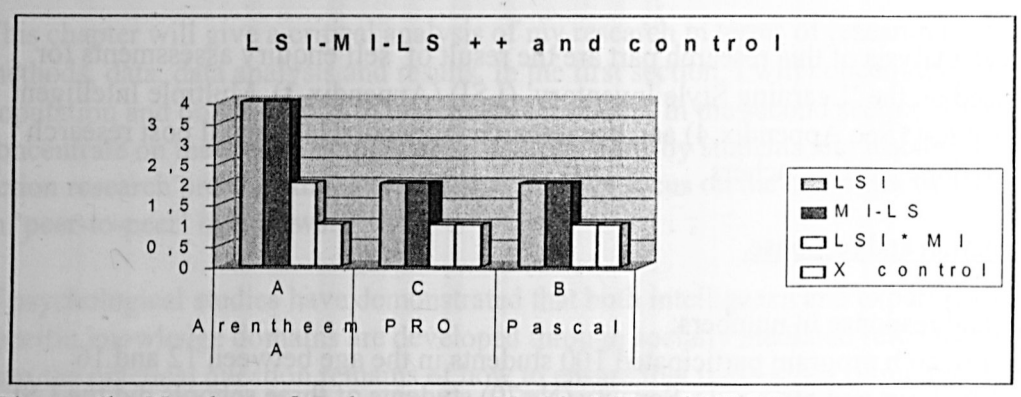
4.1.1. Population and response.

Population and response in numbers:
In the total research program participated 100 students in the age between 12 and 16 years old, 50% boys and 50% girls. Seventy (N=70) students of three schools did the LSI and MI-LS self-assessments. They participated in groups of four students. The groups were a-select sampled (see picture light bleu and light violet). There was a control group of 30 students, also a-select sampled. The response LSI and MI LS was 100%. Thirty (N=30) students of two schools participated in conversational settings for quantitative input focused on the articulation of learning needs.



Picture 4a. Participation of students in the total of the research program, response 100%.

Not all students did both assessments.
There were students who did the LSI assessment (see picture 3E bleu) There were students who did MI-LS assessment (see picture 3E violet) There were students who did both assessments (see picture 3E white) and there was a control group who did not participate in the LSI or MI-LS assessments (see picture 4b). All students answered the student questions (see Appendix 6) The samples of students who did both test (2x4 students, two schools) are too small to come to valid outcomes in a quantitative sense, although we found some interesting patterns (see chapter 4.2).



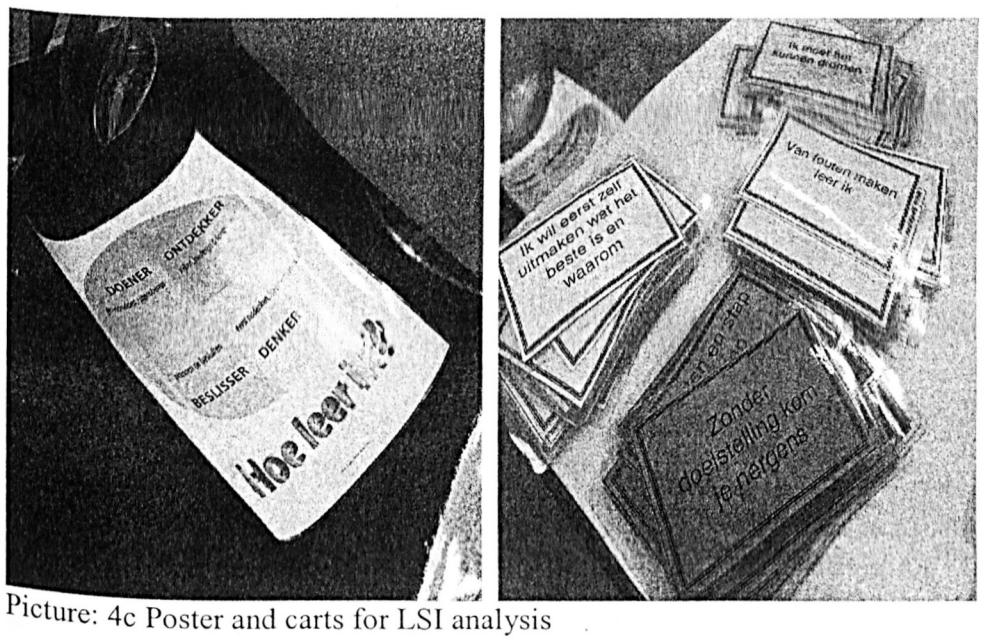
Picture 4b. Numbers of student groups N=4 in LSI and MI-LS tests

Participation of teachers.

If we look to the numbers of teachers involved in the research program we see that eight teachers (4 school managers and 4 teachers) were actively involved in a complete action research program. Twenty-two teachers did a workshop action research and participated in the intake. Twenty teachers received the post research questionnaire as a control-group; they did not participate in the workshops. In the post research, 100% of the active teachers filled in the post questionnaire. There were a small number of active teachers (response 100%) this in contrast to the group of informed teachers (response post 80%). The response on the post research of the control group was 50 %.

4.1.2 Learning styles assessments LSI/ MI-LS, data analyses

The instruments used for self-research are based on the 'Learning Style Inventory' (LSI) of KOLB and the "Multiple Intelligence theory of Gardner". Before we could start the quantitative part of the action research process, we did some pre-tests with students of two schools. We also did a try out in a workshop for a study group of school managers and teachers from not participating schools for secondary education (Edu Delta College Goes, Clusius College Purmerent, and Nova College Amsterdam).



Picture: 4c Poster and carts for LSI analysis

Learning style Inventory.
Learning involves different activities: the learning process needs to be organized and steered; knowledge has to be absorbed, processed, and applied. Students develop different ways of doing this; everyone has his own learning style. Learning style based learning means that when learning you also pay attention to 'how you learn' and 'how you could improve your learning". Kolb developed a model for successful research. From dozens of well-known learning style aspects he chose two that appeared relevant:

- The dimension of learning from concrete experience versus learning from abstract concepts;
- The dimension of learning through active experience versus learning through reflective observation

- These two learning aspects reveal four learner types: the discoverer (or dreamer), the thinker, the decider, and the doer. Kolb developed a questionnaire to map people's learning styles (The Learning Style Inventory Test).

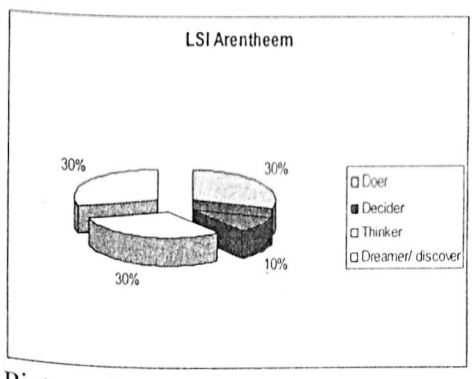
Instruments that measure multiple aspects of style like the LSI (Kolb,1979) or the Myers-Briggs Type Indicator (Myers,1992) and the Gregore style indicator (Gregore 1982) have been validated repeatly and show strong psychometric qualities (Joshua and Liff,2007). We did not find examples of LSI in Dutch. We had to translate the LSI. We did some pre-tests. However the outcomes the LSI research students did themselves had good effects on the students awareness of learning styles and personal learning needs in practice, we had to conclude that the quantitative evidence of this LSI research program although it shows interesting patterns should be seen as relative truth. We also concluded that the assessments need to be critically validated on a large population.

Picture: 4dTeachers workshop LSI pre test

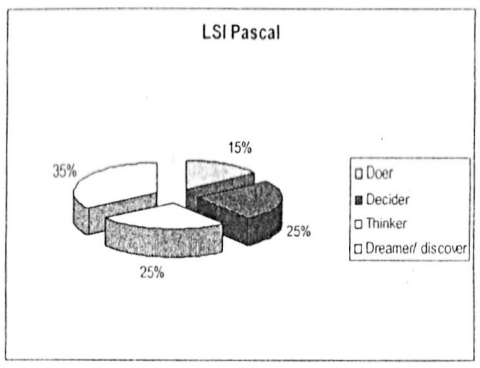
The practice of self-research

For students self-enquiry we developed a self-assessment based on the LSI. (See Appendix 3 a-d). Students had to reflect on recent learning experiences to find out how they learn. The students filled out questionnaires by themselves. In this process, a critical friend (other student) asked typical questions like: "Is this really how you learn?" "Is this especially for you? ""What is more special for you this or that (text on chart)?" And so on. In this process each student selected 10 criteria (charts) to find out what learning styles they use in the practice of learning. At the end of the self-research process each student filled out a questionnaire for analysis to find out what there learning styles are. In a conversational peer-to-peer process the students reflected their on their choices. They asked themselves what their personal needs are and what they like to develop better. They also had to articulate what learning settings, mentoring, didactics, materials, experiences; etc can make their learning more effective and successful.

Data Analysis of the LSI questionnaires (See Appendix 6 and 7).
What we found in analysis was that in Arentheem College (N=30) most students are a mix of the thinker, doer and discoverer/dreamer. Deciding took a lot of time, also during the assessment. Some students organized the carts and reorganized them, time after time, before they choose the first 30 charts and than the process started again. Although their peers asked them the coaching questions, they had to discuss every criterion before they could decide. After the analysis of all 40 LSI data questionnaires, we found 30% doer, 30% thinker, 30% discoverer/dreamer and 10 % decider. (See DVD, picture 4c and Appendix 8).



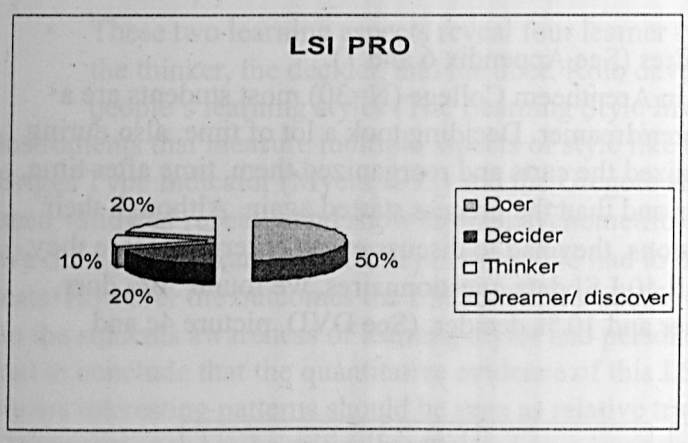
Picture 4e



Picture 4f

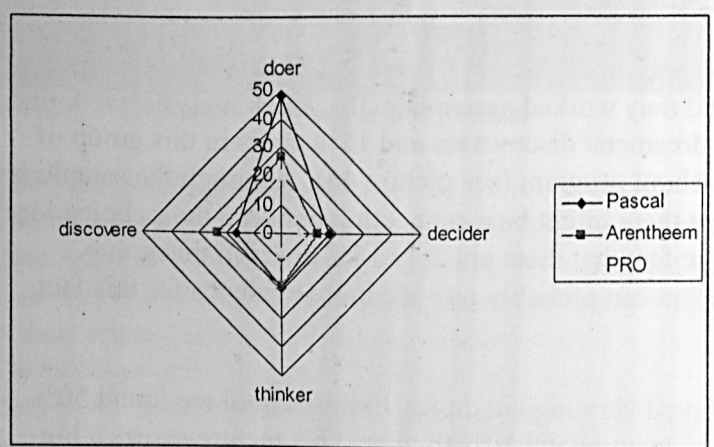
In contrast a part of the students of Pascal college (N = 30) where very quick in sorting the criteria carts. They made quick decisions. However, some Pascal students took time to find patterns and connections and they worked systematically. After analysis, we found 25% thinkers, 25% deciders, 35% dreamers/ discoverers and 15% doers in this group of students who follow a theoretical school program (see picture 4d). Although the sample is too small to make valid conclusions there might be a connection between their choice for a theoretical school program and the fact that there are only 15% doers in this group. Further research in a larger population can probably provide more evidence for this fact. (See picture 4f and Appendix 9)

The students of PRO Rotterdam scored very high in doing. In this school we found 50% doer, 20% decider, 20% discoverer/ dreamer and 10% thinker. This picture shows a big contrast with the score of Pascal students. This score is coherent with the learning style promoted by PRO education which is a very practical doer stream of secondary education in The Netherlands. However the sample for this analysis was very small (N=8) to small to come to validated conclusions. If we like to come to validated conclusions we need to do research on a larger population with the same instruments for LSI assessment.



Picture 4g

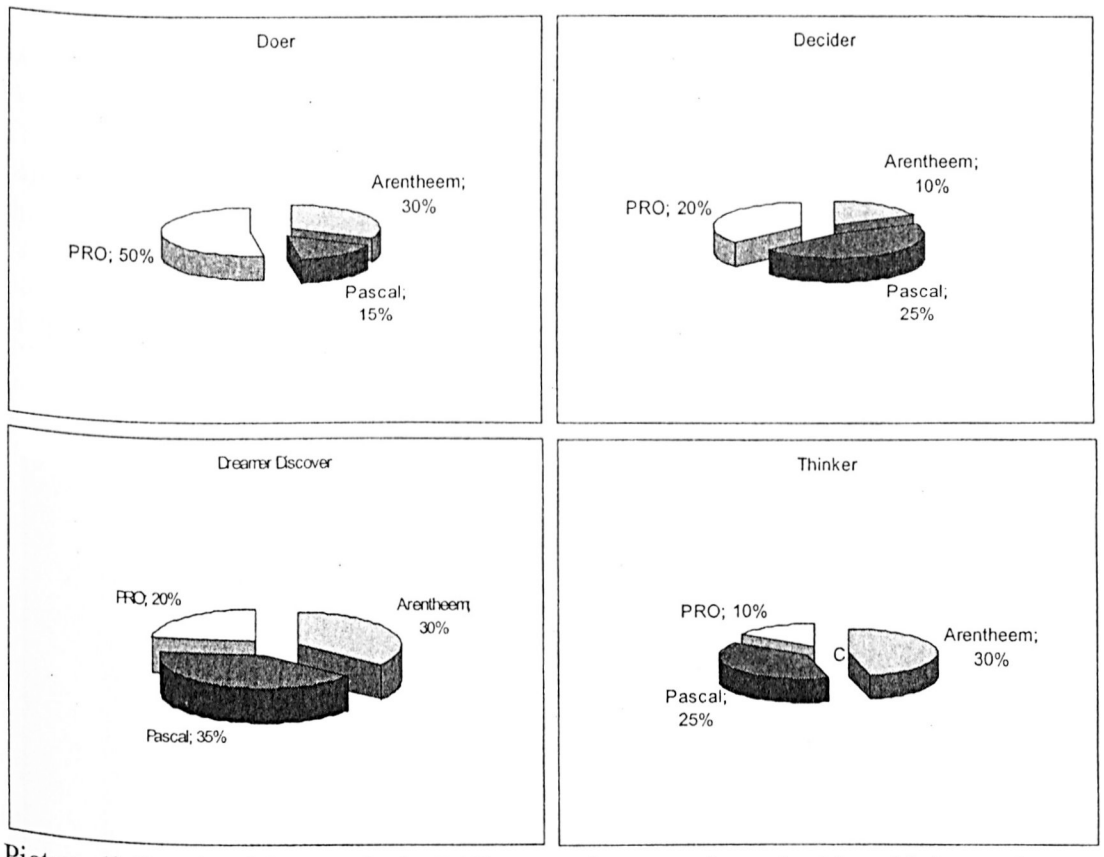
Thinker, doer, decider, discoverer/ dreamer.
In the evidence we found that students of the different schools had different characteristic learning styles that seemed to match with the demands of that particular school. If we look from the perspective of the three schools, we see the following co-relationship between the variables in learning style from the perspective of the four patterns: doer, decider, discoverer and thinker in the three schools.



Some conclusions can be easily made; although we have to conclude that these conclusions are relative, they are interesting as pre-research results.

We found the following differences in learning style from the perspective of the four patterns: doer, decider, discoverer and thinker in the three schools.(See pictures 4h)

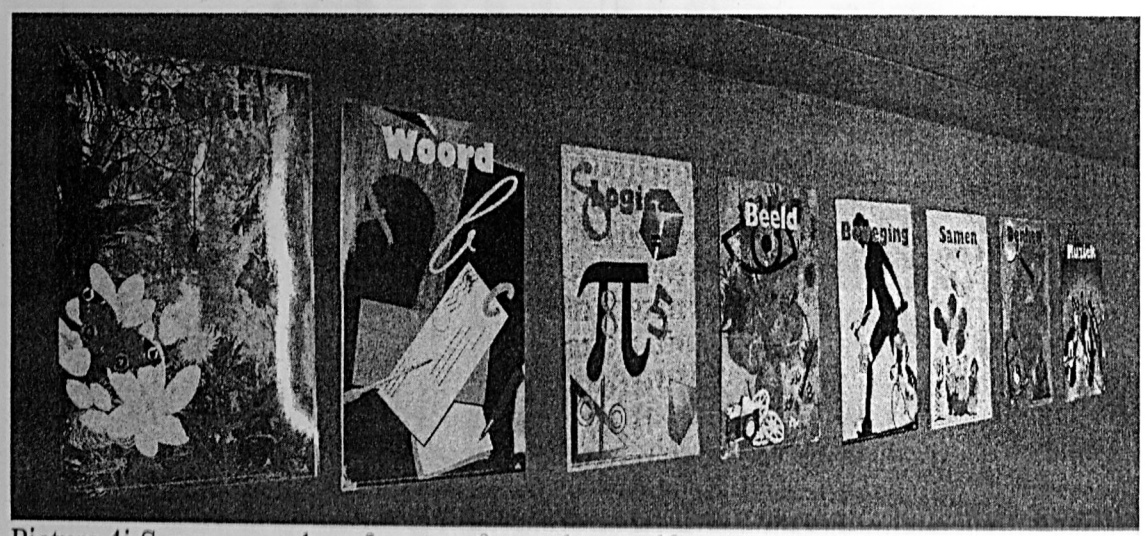
The pictures show that the doers can be found in PRO (50%) and Arentheem Gym + (30 %). This last score was unexpected by teachers who thought that most students in Gymnasium are thinkers and probably discoverers. If we look for deciders we find them in Pascal VMBO Theoretical stream, but there are also PRO students who are deciders. If we look for Discoverers / dreamers, we will find a lot of them in all three forms of education. If we look for thinkers we find most of them in Arentheem Gym + and in Pascal VMBO theoretical stream. In the follow up of the action research, we have to find out what learning environments and learning settings as well as what educational concepts and didactics can provide the students of a learning style suitable program.



Picture 4h Result of data analysis. Differences between doer, decider, thinker and dreamer/ discoverer in percentages for each school

Analysis of the Multiple Intelligence learning style self assessments (MI-LS).
The concept of multiple Intelligences assumes that there are various types of intelligence. In his basic study, Frames of mind: The theory of Multiple Intelligences Gardner (1983) describes seven Intelligences. Later in 1995, he added two more. Gardner describes intelligence as the ability to solve a problem or to adjust a result. He speaks of multiple intelligences since it assumes that there are various ways to be intelligent. The multiple intelligence approach takes the differences among students into account. Since each student has a personal style to solve problems, the multiple intelligence approach offers a specific alternative for each style. Gardner believes that the current approach to education is very limited in the regard, with the linguistic and logical- mathematical intelligences dominating to the detriment of the other six. By introducing multiple intelligences, teachers can enhance the uniqueness of each student.

For the students MI-LS self research we developed posters. Each poster contents one of the eight multiple learning styles (Gardner,1995). We started with a brainstorm for knowledge creation. After this informative part, we asked the students to review some situation in which they had learned something in the past week. They had the possibility to think about this situation and to write it in a log, or draw it in a mind map or to tell it to a peer. If they had the experience clearly in mind we asked them to stand behind the poster of a multiple intelligent learning style and tell the group why they choose this multiple Intelligence (MI). We asked the student to describe an experience to explain how useful these MI-LS were for his / her learning process. They also reflected on what other MI-learning styles they used. After this process the student chose there first learning style, this is the style they use mostly and like most.



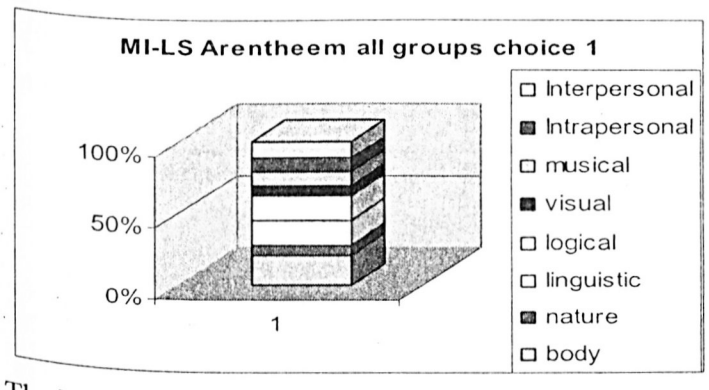
Picture 4i Some examples of posters for students self assessments MI-LS

In the follow-up students asked each other questions in a peer-to-peer setting. Questions like:

- When do you use this MI?
- For what content do you use this MI?
- How do you use this MI to learn your math, English language, science?
- Do you use this MI outside the school?
- Are there enough possibilities in this school to use this MI?
- Can teachers help you to use this MI better?

However, we had no time to analyze all peer-to-peer conversations; we realized that the peer-to-peer interviews might be a resource for research evidence. The student as a co-researcher is a relative new and in my view, this interesting matter might be a good resource for quantitative evidence and qualitative evidence as well.

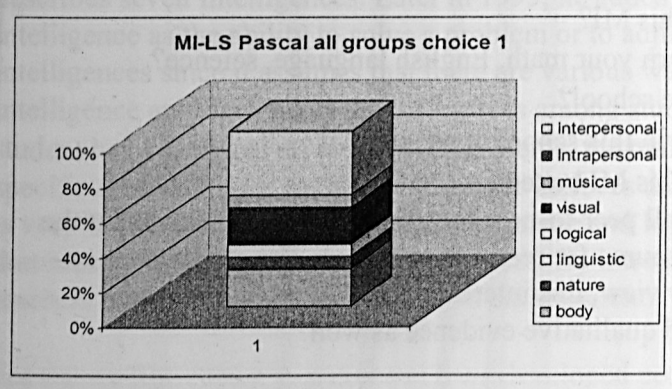
MI LS analysis.
We asked students what learning style they most prefer and use. (Picture 4h)
The outcome of the choice students made is on the total spectrum of MI. Almost twenty percent (20%) (N=30) of the students who did the MI-LS assessment in Arentheem prefer the physical- body- kinesthetic intelligence. Some of the students had more than one MI as their first choice, they could not choose one because, like one girl told us:
I use two MI's intertwined, I remember in pictures but I need words to learn from the pictures in my head; I describe what I see behind my eyes.



Picture 4j

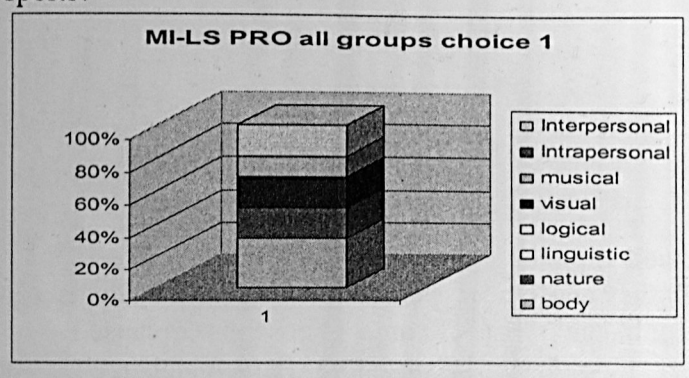
The Pascal students (N=14) showed another picture, more than 20% chose the inter-personal intelligence. If we asked why they chose Inter- personal intelligence, students gave answers like: "I need silence and I like thinking.", "I am a philosopher because I need to know why things happen." and "I look inside because I need to remember, otherwise I do not understand."

Almost 15 % chose the visual intelligence. Similar to Arentheem is the preference of the physical- body- kinesthetic component (more than 10% see picture 4k).



Picture 4k

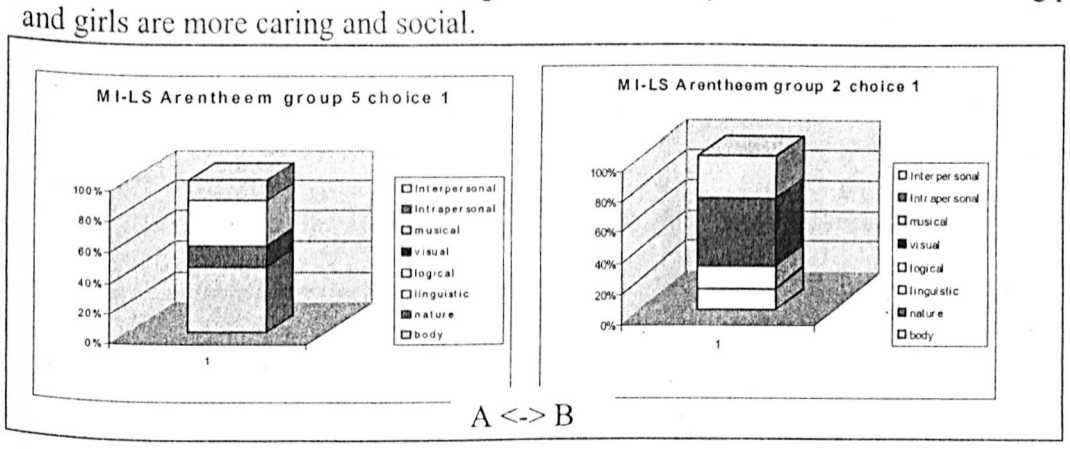
If we look to the PRO picture, we see some similarities between Pascal and PRO. The Linguistic Intelligence and the logical intelligence is no option in PRO. A very small percentage in Pascal chooses the logical intelligence. The visual intelligence and body / kinesthetic intelligence is prominent in both school groups. Moreover, the body-kinesthetic component is a prominent MI for the students in all three schools. In PRO this MI is the choice of more than 20% of the population (N=16). The question is why we find this similarity in the three schools. Can it be because the age group (12-16 years old) has a need for bodywork? Do they understand what the difference is between their need for bodywork and the body- kinesthetic learning style? These two questions are subject for research in future. What are the consequential actions in education if this trend would be similar in a second research project with a larger research population? Do we need didactics that give room for body experiences or should we schedule more time for sports?



Picture 4l

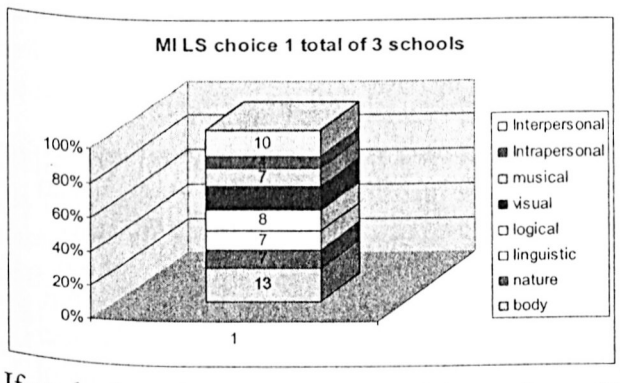
What we found in the analysis of the different student-groups (4 students) in Arentheem is a possible differentiation of the last trend.

In the Arentheem population of six research groups, we found some interesting differences. Two samples, 'a group of four boys and a group of four girls showed very different patterns. (See picture 4m) Although these samples were small, these scores might be the result of an error or is this evidence? Although we do not know, it would give a reason for further research because these pictures underline some general practical hypothesis teachers articulated during the research: Boys cannot sit still for a long period and girls are more caring and social.



Picture 4m Differences between boys (A) and girls (B) two examples

Last but not least the overview of the total group (picture 4l) shows their first choice: The - body- kinesthetic component is a prominent first choice (13%). Inter personal intelligence is the second choice (10%) The visual intelligence is the third choice for the first intelligence (9%). The percentage that choose logic is 8%, nature 7%, liguistic 7%, musical 7% and intrapersonal 4%.



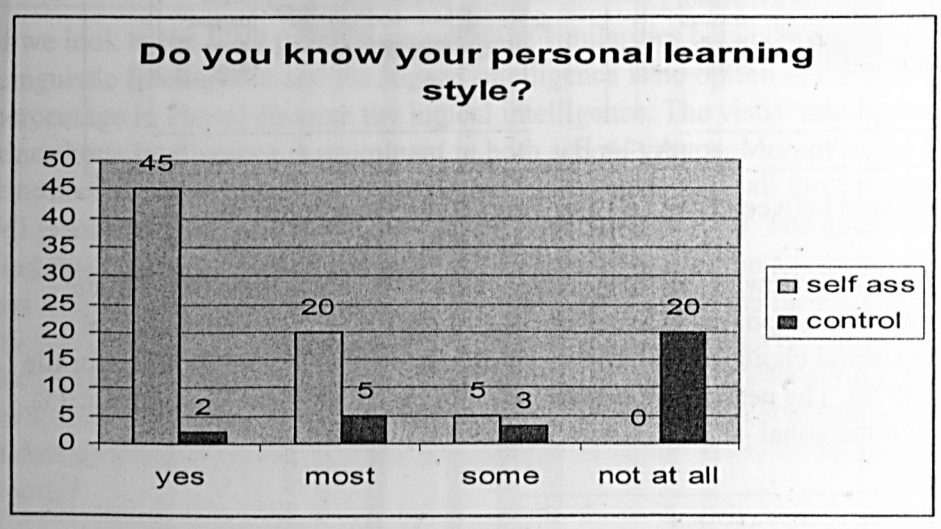
Picture 4n

If we look at the second choice of the students (See Appendix 16) we see a similar picture of the whole spectrum of multiple intelligences.

This observation underlines the statement of Howard Gardner that:

"The current approach to education is very limited in the regard, with the linguistic and logical- mathematical intelligences dominating to the detriment of the other six.

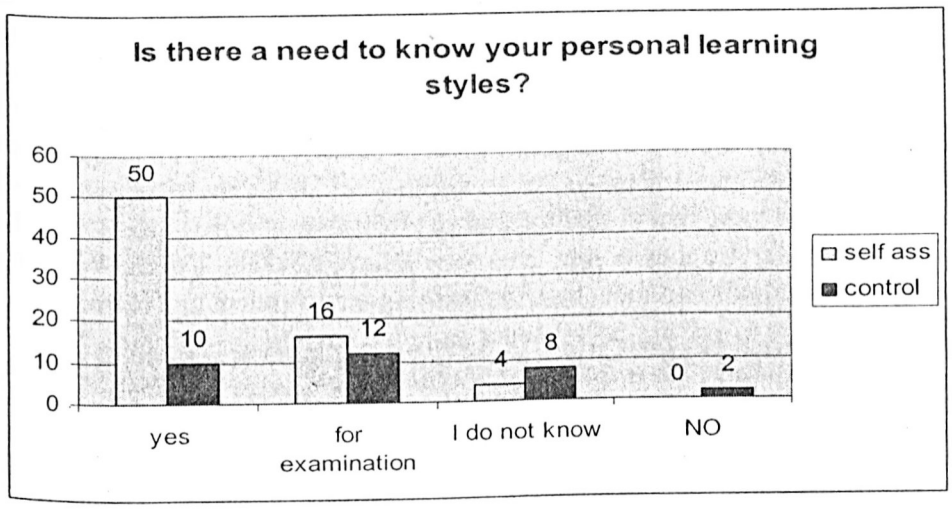
According the score of the intrapersonal Intelligence (4%), the development of intra-personal competencies needs extra attention. Moreover, I believe that this is a cause for sorrow. If we look to the recent development of individualism and disinterest for community-life in The Netherlands, we need intra-personal intelligent people. However, we should ask:" What conclusion we will find if we do the same research on a larger population. The assessments are repeatable but are they valid enough? Are the MI scores and as such the low intra-personal score stable?



Picture 4o

What did students find? From the seventy students who participated in the LSI self-research forty-five students think that they know what personal learning styles they have, twenty students answered that they know most of their learning styles, five students can recognize some of their learning styles. In contrast the control group of thirty students; twenty of the thirty students of the control-group do not know what learning styles the have. (See Picture 4m) In some respect the consistence and reliability of this part of the research is subject for discussion because there was no consistent procedure for the peer-to-peer interviews. In a future setting we have to develop questions as well as a protocol for the peer-to-peer interviews. The students have to be the owners of this protocol.

The following picture shows in what degree students think that there is a need to know their personal learning styles (See picture 4p) (Appendix 11)



Picture 4p

The method for peer-to-peer interview and the role of the student as a co-researcher in an action research program might be an interesting subject for future research.

4.1.3. Information from teachers during the intake and post research, data analysis

Post research of the quantitative part
To make the quantitative part as random as possible the teachers filled out a post research questionnaire. Three groups of teachers participated in the post-research survey. One group of teachers was actively involved in the action research, another group was informed and a third group of teachers was not informed and did not participate in the action research program (control group)

Reliability of the instruments.
By repeating the LSI and MI-LS assessment in three schools, we can conclude that the method of enquiry is repeatable. We have to find out what conclusions would be reached if the same student repeated the test after three weeks. We need further investigation in LSI and MI-LS test and retest reliability before we can say something sensible about the reliability of these assessments for self-enquiry. Because of its clear implications for both; students awareness of learning styles and teachers management of the educational setting for more effective and social learning, it is necessary to have better understanding of the underlying factors the LSI and MI-LS instruments taps in self-enquiry settings.

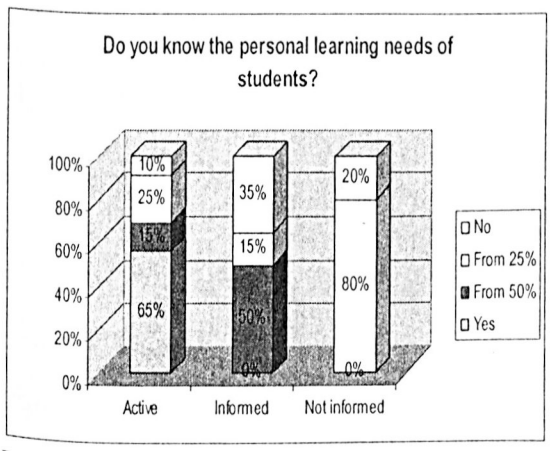
In contrast, the pre questionnaire (intake) and post questionnaire for the teachers are more reliable, that means that the conclusions had identical connotations, but the teacher sample variety cause problems because the samples were not all a-select and some were very small (active N=8)). The intake and post surveys are repeatable.

If we look to the pre and post research under teachers involved in the action research we see some interesting results. After doing and analyzing the LSI and MI-LS assessments almost eight teachers who participated as co-researchers in the action research program know what learning styles the students have. Moreover, they are doing the assessments with other students and with their school-team. Another effect is that more students tell their teachers what learning styles they prefer. This should have effects for the educational concept, the methods and didactics, the learning environment and learning settings. In contrast, we have to ask our-selves what more we have to do with the outcomes. Will students who have a low intrapersonal MI ask for more intra-personal skill development or for collaborative learning settings?

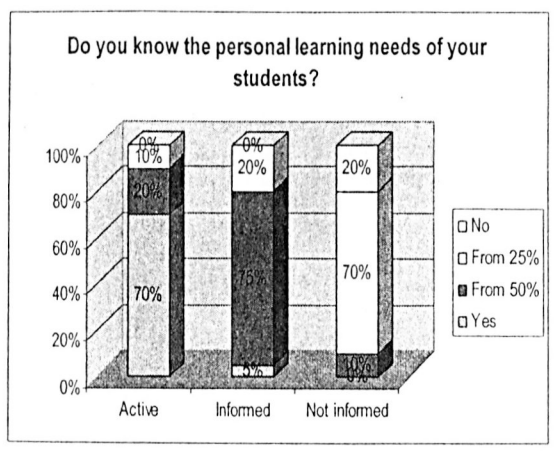
An interesting result of the post research is that the knowledge about learning needs was growing although this aspect was no part of the quantitative research it was a matter of concern in the total action research program. Moreover, in this case the control-group became more knowledgeable too. The teachers of the control-group were not involved in the action research but they are part of the team and were partners in conversations and IOP settings. IOP settings are settings in which teachers, experts, students (and in some cases parents) do enquiry to find out what is best for a student or group of students. The Individual development Plan (IOP See Appendix 28) has to direct the learning of the student. The Individual development plan (IOP) is relative new in the Netherlands, but many PRO schools start IOP procedures instead of the traditional individual educational plans (IEP).

What is the difference between IOP and IEP?
IEP is a means of ensuring a program is designed to meet the needs of the students. It provides the opportunity for learning of both parents and professionals to consider the learners educational developments, needs and programme. In contrast, IOP is a means for (self) empowerment and self-responsibility for the student.

IOP is a tool to ensure the student, his coach and the parents that all opportunities for learning (passions, talents, qualities, dreams, needs) of the student are visible. It provides the opportunity for learning; structured by clear learning lines for the student. The IEP team approach enables all members of the team perspectives to be considered with a focus on clear objectives and goals for the student, both in educational settings and within the wider community. The IOP approach enables the student perspectives and tools to focus on clear objectives related to his or her ZDP for learning in and outside the school. Moreover, the IOP direct the student's objectives for action. The student articulates the goals, the barriers and needs.



Picture 4q Intake



Picture 4r Post research

First conclusions

At the end of this quantitative part of chapter four, I conclude that:

The outcomes the LSI research students did have good effects on the student's awareness of learning styles and personal learning needs in practice. However the quantitative evidence of this LSI research program is based on small samples, we also concluded that the assessments need to be critically validated on a larger population. By repeating the LSI and MI-LS assessment in three schools, we can conclude that the method of enquiry is repeatable. We have to find out what conclusions would be reached if the same student repeated the test after three weeks. If we look to the graphs we can draw the following conclusions; The results of LSI show that the doer can be found in PRO (50%) and Arentheem Gym + (30 %). This last score was unexpected by teachers who thought that most students in Gymnasium are thinkers and probably discoverers. If we look for deciders we find them in Pascal VMBO Theoretical stream, but there are also PRO students who are deciders.

If we look for Discoverers / dreamers, we will find a lot of them in all three forms of education. If we look for thinkers we find most of them in Arentheem Gym + and in Pascal VMBO theoretical stream. In the follow up of the action research, we have to find out what learning environments and learning settings as well as what educational concepts and didactics can provide the students of a learning style suitable program. Although the sample is too small to make valid conclusions there might be a connection between there choice for a theoretical school program and the fact that there are only 15% doers in the Pascal group. Further research in a larger population can probably provide more evidence for this fact. However, we have to conclude that these conclusions are relative, they are interesting as pre-research results that can set an research agenda in the futur.

Picture: peer-to-peer interview

The results of the MI-LS assessments show interesting trends. However, we had no time to analyze all peer-to-peer conversations; we realized that the peer-to-peer interviews might be a resource for research evidence. The student as a co-researcher is a relative new and in my view, this interesting matter might be a good resource for quantitative evidence and qualitative evidence as well. The method for peer-to-peer interview and the role of the student as a co-researcher in an action research program might be an interesting subject for future research.

4.2. Qualitative research: Methods, data and analysis

In this qualitative part, we focus on student participation and teacher participation in research, which means that both student's self-enquiry and teachers learning points are the centre of the action learning process. The first goal of these research activities is to introduce some methods for peer-to-peer self-assessment to consider attempts to define personal learning-styles. The second goal is to explore how student's awareness of learning-styles can lead to the articulation of their learning needs. A third goal is to explore lessons learned from research on learning styles and educational needs can be applied to the task of educational change and reform. In the conclusion, we will look for similarities and differences in the quantitative data and qualitative data.

Content:

4.2. Qualitative research: Methods, data and analysis

Because our focus is on processes that occur in educational situations the setting for student's learning style- self-enquiry assessments is the classroom or the learning center of the schools involved. The method we introduced to the students called peer-to-peer interview or research counseling was developed for emancipatory self-research (Boog & Vermeulen, 1993,1996). With two perspectives for social mediation (Salomon and Perkins 1998) we organized the qualitative research settings and the analysis. To facilitate the process of social mediation of individual learning we organized 'one- to-one', 'peer-to-peer' interview interactions. One student interviewed another student who did one of the learning style assessments. After the interview, the students filled in a form and a matrix for analysis. To facilitate the social mediation as participatory knowledge construction, students worked in one-to-one self-research, research groups (4 or 5 students) and in mirror-talk, settings (see CD ROM for examples). The notion: "Social mediation of Participatory knowledge construction", suggest that cognitive processes can be socially mediated but that these same processes, under the right conditions might proceed without mediation. In the conclusion of this section (4.2.1)I will highlight this fact. A second assumption has fallen on the learners learning, without recognition that the facilitating peer also may learn (Salomon and Perkins 1998).

4.2.1. Learning styles quantitative data analysis.

Qualitative learning style analysis 'peer-to-peer'.

After they did the LSI and MI LS 3 groups of 4 to 5 students participated in the follow-up. In this part of the research project, students interviewed and coached each other in 'one-to-one', 'peer to peer' settings. According Kolb & Fry (1975) secondary school students may have already begun to develop specialized preferences and abilities in their learning style, in later years of secondary school and beyond the individual begins to make choices, which will significantly shape the course of their development. The choices an individual makes in this process tend to have an accentuating, self-fullfilling quality that promotes specialization (Kolb & Fry, 1975). The students involved in the self-assessments are in the first years of the secondary school. If students are more aware of their learning styles they probably could be more open for the possibilities of choice. That's the reason that we involved groups of students of all three schools in the qualitative learning style analysis. For this analysis they used their experience with the two learning style assessments they did. Most students point out that they have more than one learning style in the sense of LSI and they use the multiple intelligence index to point out when and how they use this style.

The central question was:
In which category of the LSI do you use your multiple intelligences?

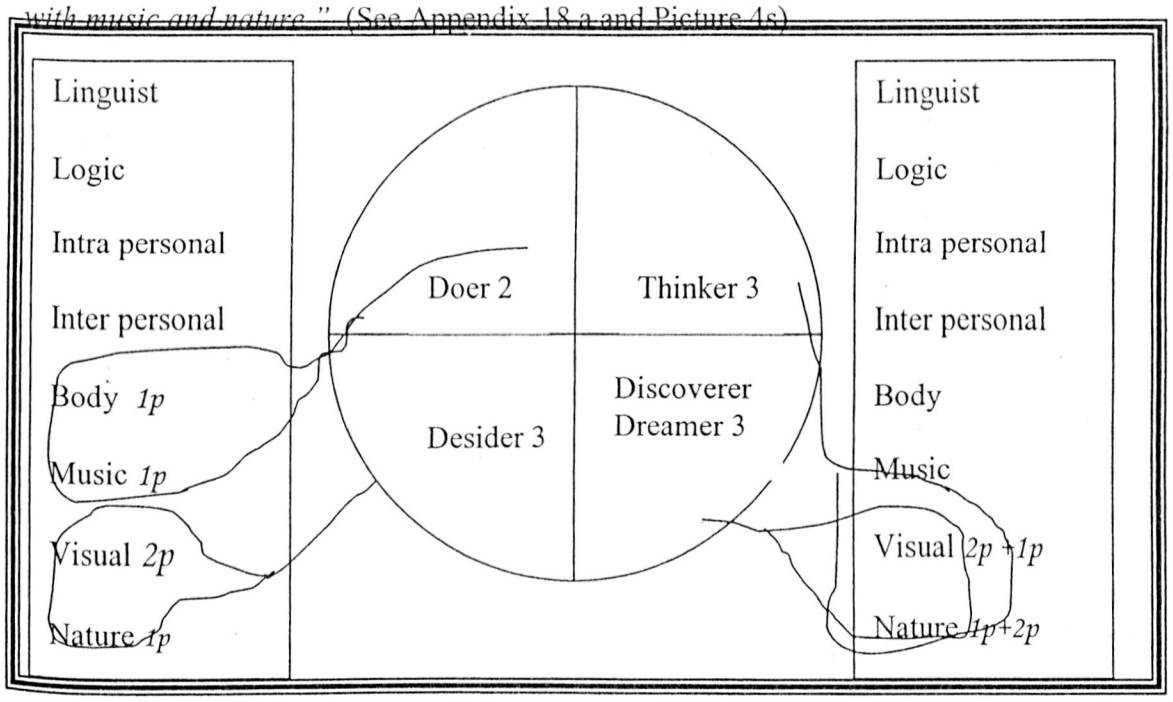
Varied examples:

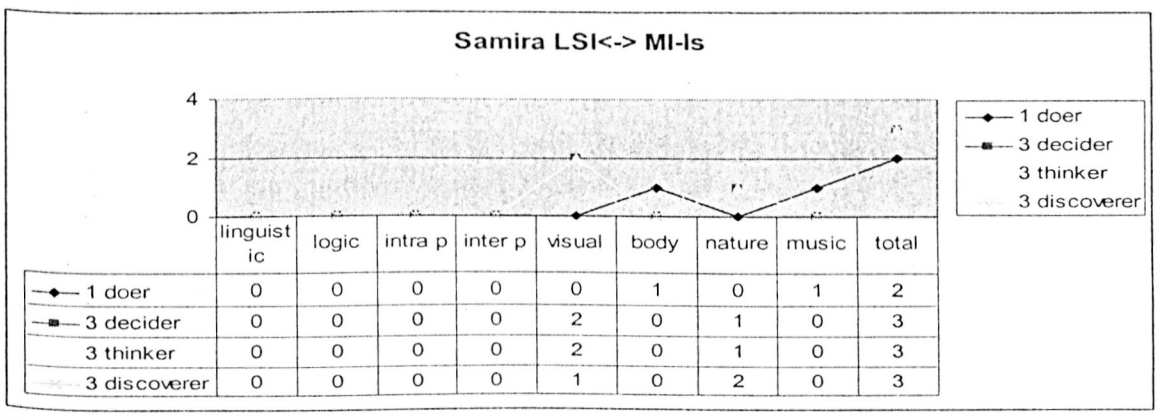
Research questions:
In which categories do you use your multiple intelligence talent (MI-LS)?
Do you use it as a doer(accommodator) , a thinker (assimilator), a decider (converger) or a discoverer / dreamer (diverger)?

The students did the analysis themselves. For the analysis we developed an instrument. Some students made mistakes. They did not count to 10. We did not sort out the mistakes. One example of an analysis with a mistake is the example Samira who had to count to ten but counts eleven. (See Appendix 18 a and Picture 4s).

Examples:

Samira (Arentheem College) says I use: *"Body: most in doing sports, that's doing. Nature for thinking. I think in natural categories that's how I learn things. Nature also for deciding; if I understand the nature of things I can decide. I think in films, pictures and structures; I see what I know. Visual is thinking. Music is a need for me, music is everywhere, music is my fantasy, I discover the world with music and nature."* (See Appendix 18 a and Picture 4s)





	linguistic	logic	intra p	inter p	visual	body	nature	music	total
1 doer	0	0	0	0	0	1	0	1	2
3 decider	0	0	0	0	2	0	1	0	3
3 thinker	0	0	0	0	2	0	1	0	3
3 discoverer	0	0	0	0	1	0	2	0	3

Pictures 4s

Some other examples of results of 'peer- to- peer' interviews. (Appendix 18, 19, and 20)

Joep (Arentheem college) says:
I like doing things, I like to do experiments in nature but also physics and learn because everything has a cause a logic, if I see the logic I can understand and hold it in mind. After doing I look back and think, for thinking I use logic (graphs, tables, formulas) and words. I read a lot especially science fiction.
To discover new ideas I use logic.
I am no decider, why should I, everything is fine.

Lia (Arentheem college) says:
Thinking: I see pictures in my head, I see a story as a film.
I have to find words to tell others what I see.
That's doing. I also make music that's doing.
If I help others with there math I learn what I explain, thats discovering.
I write songs by music that's discovering.
I like to dance and learn from dance, that's discovering and doing.

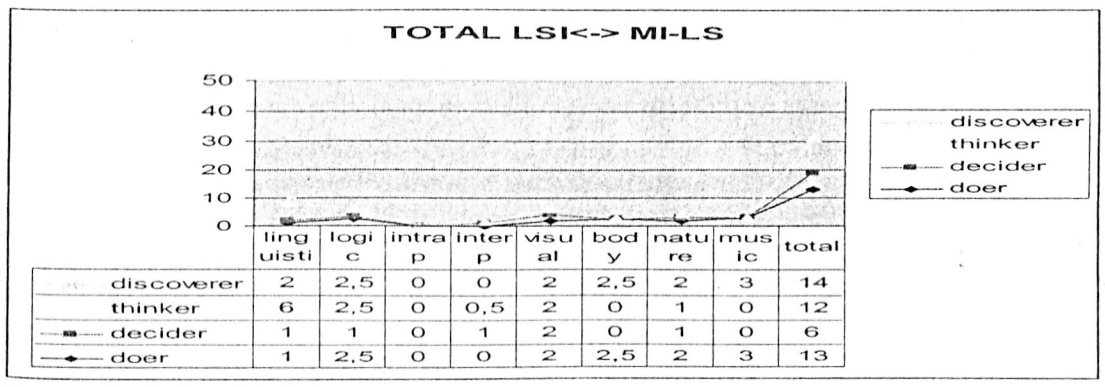
Gull (Pascal College) answers:
I am a doer. If I can exercise I can think and learn. I learn by experiment by doing things, sometimes I make bad errors. I learn from trail and error. I use exercise and music, also for discovering, I use the computer to discover and I play keyboard. To decide I write in words.

Tyler (Pascal College) answers:
I learn by exercise in nature. If you observe dogs, horses and even people you can learn a lot. I like to do try outs and experiments in sport. I am a doer and I am a thinker.
I like sports. I can't concentrate longer than 15 minutes.
I have to decide by myself
I think in words and in natural orders.

Jeremy (PRO) answers:
I am good in putting things apart and making step by step plans, after that I take decisions. I am a decider. I like group work and group project work.
I am the leader of a student work group for cooking. I am a doer too. I like cooking and food. I am a doer too. If we have to do a cooking job, we discuss and I decide and organize. I have a bad problem with language. I can only read but only simple receipts. I have the same problem with reading numbers. I like sports, especially football.

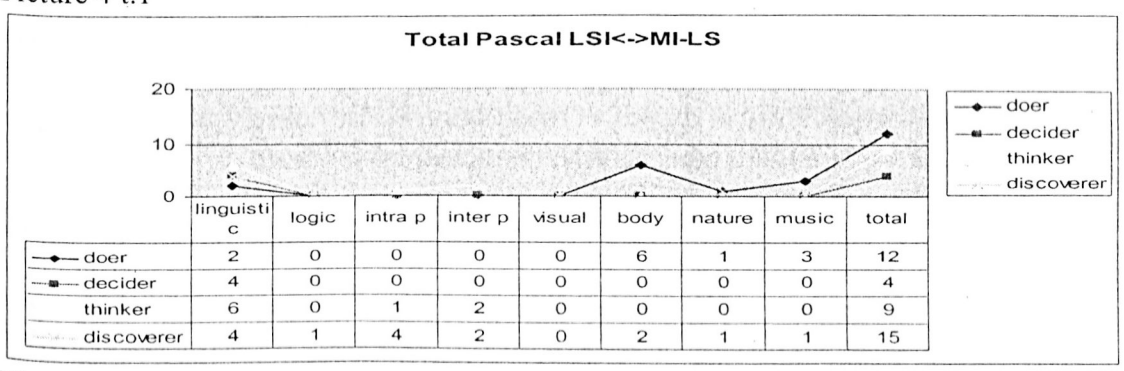
Lesley answers:
Nature is my thing. I am a doer. I like sport and music too. I like trees and dogs and cats and birds especially birds. I like to care for trees and birds. I tell others how they can care for them. I like to become a guide in nature or a safeguard for trees and birds.

Three pictures of the results of three schools:



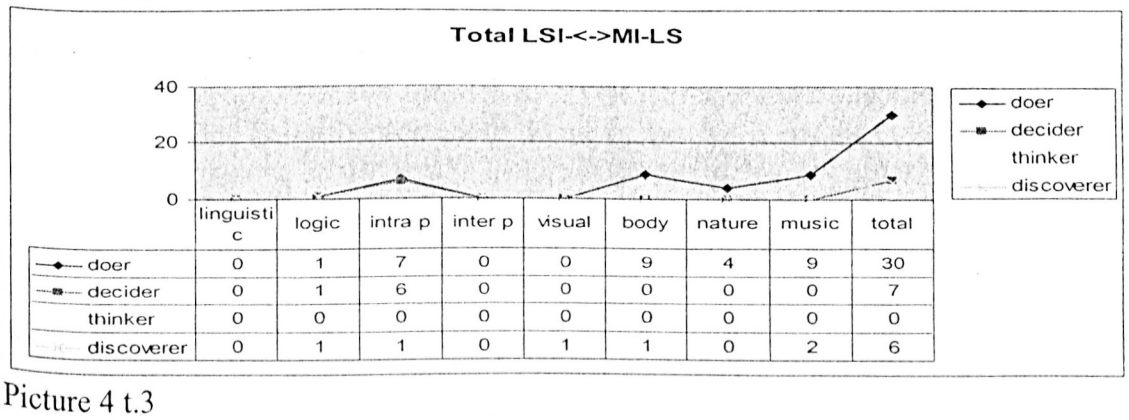
	linguisti	logic	intra p	inter p	visual	body	nature	music	total
discoverer	2	2,5	0	0	2	2,5	2	3	14
thinker	6	2,5	0	0,5	2	0	1	0	12
decider	1	1	0	1	2	0	1	0	6
doer	1	2,5	0	0	2	2,5	2	3	13

Picture 4 t.1



	linguistic	logic	intra p	inter p	visual	body	nature	music	total
doer	2	0	0	0	0	6	1	3	12
decider	4	0	0	0	0	0	0	0	4
thinker	6	0	1	2	0	0	0	0	9
discoverer	4	1	4	2	0	2	1	1	15

Picture 4 t.2



	linguistic	logic	intra p	inter p	visual	body	nature	music	total
doer	0	1	7	0	0	9	4	9	30
decider	0	1	6	0	0	0	0	0	7
thinker	0	0	0	0	0	0	0	0	0
discoverer	0	1	1	0	1	1	0	2	6

Picture 4 t.3

If we take a look to the pictures/ graphs of the three schools involved we see some significant differences.

- **In the Arentheem** group (N=5) the discoverers / dreamers is the prominent learning style. In the talks we found many Gym+ students who told us that they are very good in fantasy and that the like imaginative actions. These students like to look from different perspectives and look for relationships between phenomena. They are very open in their conversations and emotion play a role in the process. A lot of them told us that they are interested in music, art and history, but in science and physics.
- The second group in Arentheem are the thinkers, the assimilators who like abstract conceptualization of theoretical models, these more inductive thinkers have two favorite MI-LS, language and logic, some of them were very extroverted and social, others more introvert and philosophical. If we look to the results of quantitative research, we see a difference. In the total population, we find a third prominent group (30%) doers/ accommodators. This can be a result of a variety problem because the sample (5) is very small.
- **In the Pascal group** (N=4) the doer and discoverer are both prominent. Although this contradicts the result of analysis in the total population of Arentheem (see chapter 3), it was a resource for specific analysis. Moreover, in this group of four students the doers-discoverers described their competencies in working with concrete experience, active experimentation and reflective observation.
- In both schools, we found students who like situations in which only one single correct answer, solution has to be found. They make decisions and choices for what is best, what questions have to be solved and how they can do this in a simple way. They use analytic, mostly hypothetical-deductive reasoning to decide what to do. We found similar numbers of this learning style in the assessment results. (see chapter 3)
- **In the PRO group**, we found many doers. Students in the Netherlands are selected by testing (CITO-tests) at the end of the primary school; this can be the cause of this result. PRO is practical education, if the child has (only) practical competencies and a test result for IQ (TIQ) between 40 and 82 the parents will receive a PRO advice. If we look to the MI of the doers, we find one very prominent MI. If we look to the result of the LSI and MI-LS assessments of the total population (see Chapter 3) we can conclude that the result of the qualitative research is congruent with the result of the quantitative research data.

In The Netherlands and probably in a lot of other countries where students are regularly tested for a specialized school advice, students will early become specialized in their learning style. They might be not happen by there own choice but directed by tests who are mostly directed by their weaknesses in relation to the scale of what ' should be normal' for this level of education.

In PRO we found students who have very specific talents for nature, music, cooking and so on. Most of these students have learning-difficulties. Some of them had a low TIQ (behind 40-82) others not. One of the students was very happy with his choice for PRO. Other students told us that the school does not anticipate in the direction of their learning style preference and is not helpful in the development of their talent and ambition. The result is de-moralization, learned helplessness a 'motivational deficit' (Covington, 1998), that is the belief that one is unable to control events for lack of ability. Although all three schools are inclusive schools in the sense that students with a learning difficulty are welcome, the schools differ in the cognitive sense of IQ ability. Another difference could be found in self- concept scores in general, but particularly in the academical realm, despite general reluctance to acknowledge their abilities.

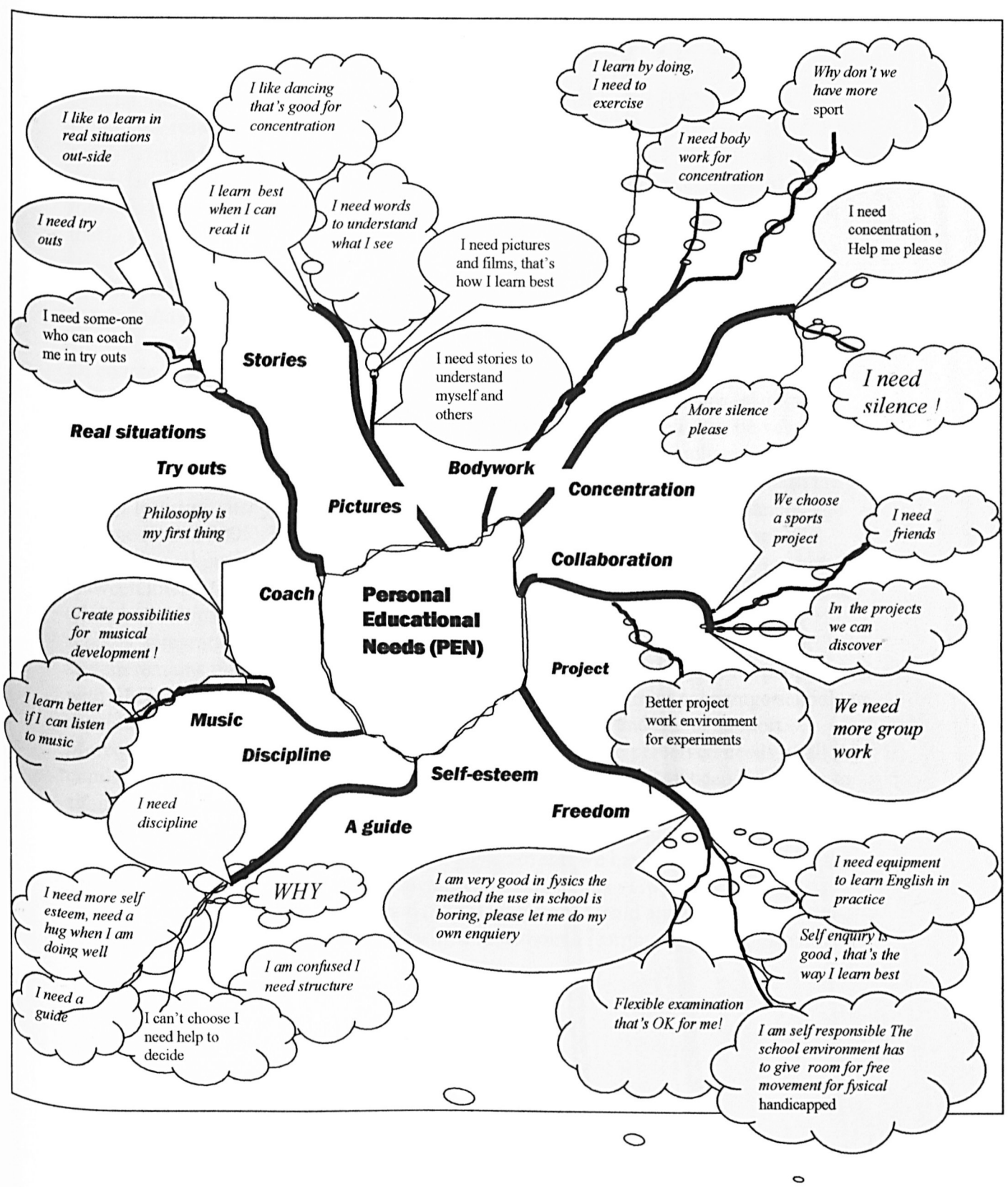
I feel that we (experts, students, parents and teachers) should be aware of the learning style preferences, multiple intelligences, talents and self-concepts of students in the early years of secondary education. We have to start before the stage that the individual begins to make choices, which will significantly shape the course of their development. However, the choices an individual makes in this process tend to have an accentuating, self-fulfilling quality we should try to create chances for talent in the process of choice. The students involved in the LSI and MI-LS self-assessments are in the first years of the mainstream of secondary education. If students are more aware of their learning-style they might be more open for the possibilities of choice. I fully agree with the argument of Reid and Stro focus on the students learning preferences in actual learning situations. Even if it may not be a precise or infallible measure, it should raise more consciousness for the learners understanding, their own best way to learn (Reid,1999, Strnadova.I, 2004).

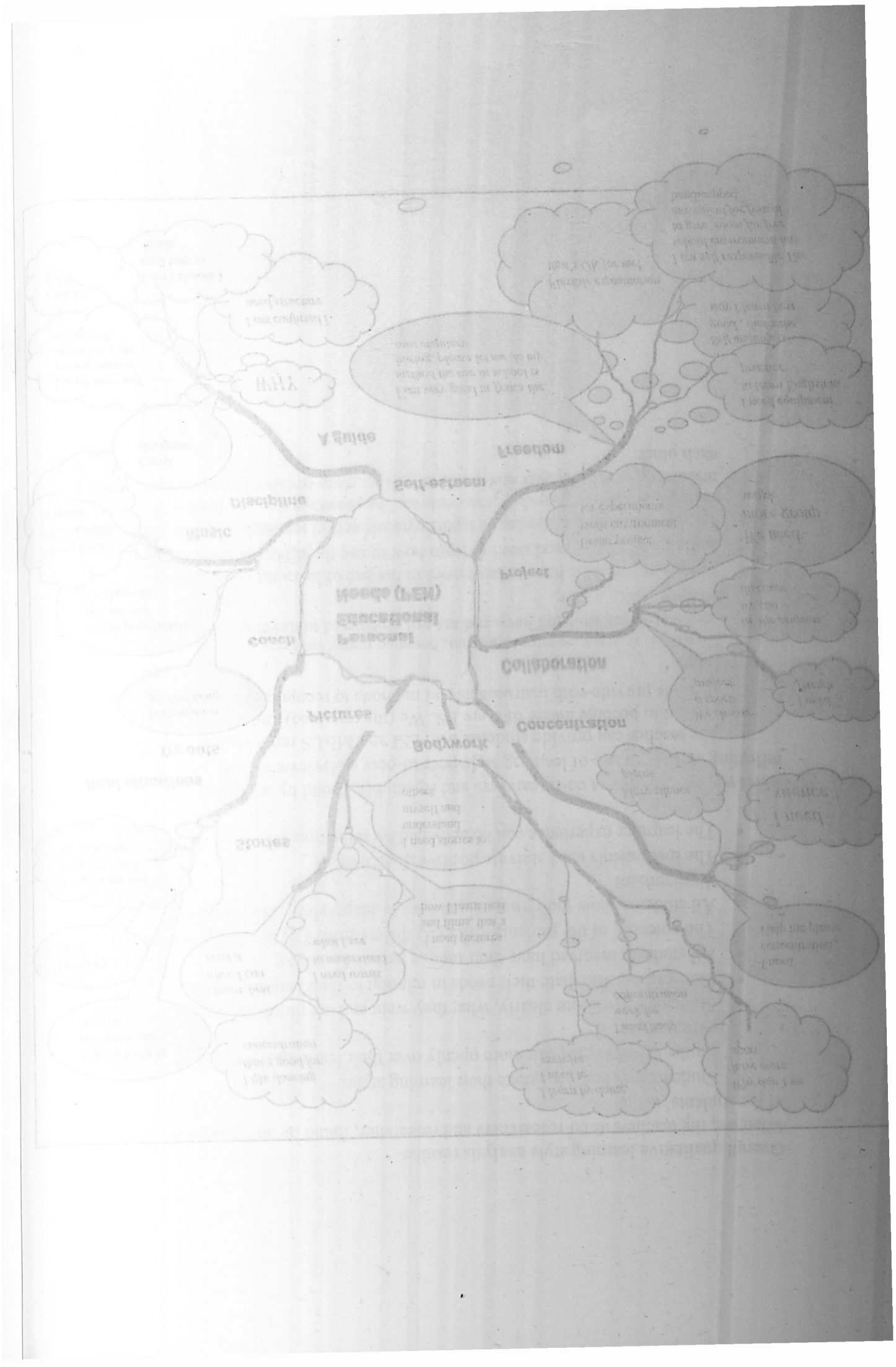
Overall qualitative learning style analysis results:
What we, the teachers as co-researchers and researcher, found by analyzing the 'analysis of the students' is that:

- Students involved recognize their learning styles
- Students involved speak more openly over their learning styles and there future perspectives
- Students know more clearly, what they want and are more motivated.
- Students can articulate their needs in relation to their learning styles
- All students involved have their unique paths of learning
- The potential of the students differ (IQ differs from TIQ 62- TIQ 140) but
- All students show their own unique way to adapt within their zone of prior development
- The instruments used activate positive participation
- The learning experience can be activated by reflection

What we, the teachers as co-researchers and researcher, found by analyzing of and reflecting on the process of learning style peer-to-peer interviews is that:

- The teacher can provide students with LSI and MI-LS methods that help the student to become aware of there LS. We (the involved) know now how we can students provide with instruments and methods to recognize their own learning-styles.
- However, it is not as simple as that, because many teachers have no idea of what learning styles students have and are not motivated to develop this knowledge and practice.
- Moreover, teachers have to be trained in the use of learning styles in their educational context and need to learn how to use the different instruments.
- The best context for training is a participative action research program that starts with workshops to introduce the content. The reason is that the in an action research process teachers and students will be more involved and can learn from each other.


Personal Educational Needs (PEN)
Stories
Real situations
Try outs
Pictures
Bodywork
Concentration
Coach
Collaboration
Project
Music
Discipline
Self-esteem
A guide
Freedom
I like to learn in real situations out-side
I like dancing that's good for concentration
I learn by doing, I need to exercise
Why don't we have more sport
I need body work for concentration
I need try outs
I learn best when I can read it
I need words to understand what I see
I need pictures and films, that's how I learn best
I need concentration , Help me please
I need some-one who can coach me in try outs
I need stories to understand myself and others
More silence please
I need silence !
Philosophy is my first thing
We choose a sports project
I need friends
Create possibilities for musical development !
In the projects we can discover
I learn better if I can listen to music
Better project work environment for experiments
We need more group work
I need discipline
WHY
I need more self esteem, need a hug when I am doing well
I am very good in fysics the method the use in school is boring, please let me do my own enquiery
I need equipment to learn English in practice
Self enquiry is good , that's the way I learn best
I am confused I need structure
I need a guide
I can't choose I need help to decide
Flexible examination that's OK for me!
I am self responsible The school environment has to give room for free movement for fysical handicapped



4.2.2. Personal Educational needs (PEN), patterns, methods, video mediated

Special Educational Needs (SEN) or Personal Educational Needs (PEN).
Before the results of the group analysis can be presented we need to be more clear about the difference between SEN and PEN in the context of the inclusive mainstream for secondary education. The notion of Special Educational Needs has been carried forward into subsequent legislation including the Educational Act 1996 where the definition is that:

"A child has special educational needs..... if he has a learning difficulty which calls for special educational provision to made for him" (Educational Act 1996, section 312)

Of course, a student may be very able in one aspect such as physical education, but have difficulties in relation to another area of learning such as literacy, perhaps leading to a judgment that he/she has SEN such as dyslexia. Furthermore, a pupil may be very able in some school subjects but have behavioral, emotional and social difficulties constituting a SEN. Occasionally, a pupil with SEN such as autism may have a particular skill in the area of learning, such as drawing, music or logic at the level that is higher than the age average (Farell 2005). However if we look from a multiple intelligent learning style perspective all pupils have personal educational needs (PEN). Farell 2005 distinguish between integration and inclusion. If we contrast the term integration, we will find that: while both terms are to do with the provision for peoples with SEN in mainstream schools, integration has been characterized as assuming that the mainstream school system remains the same but that extra arrangements are made to provide for peoples with SEN. If we accept this distinction, inclusion present the aim to encourage schools to consider their structure, teaching approaches, pupil grouping and use of support. Moreover, they have to do it so that the school responds to the perceived needs of all its pupils. They should also focus on the qualities and learning styles that can help them to attain learning that is more effective. Schools that have this approach focus on the vital signs to achieve goals in the zone of prior development (ZDP). Before we can focus on vital signs, we have to know what the vital signs are and we have to be sensitive for the personal needs in the ZDP of each student. According to this view, every student has personal educational needs. Integration (social inclusion) would appear to support the possibilities of attainment for students with and without a learning barrier or disability.

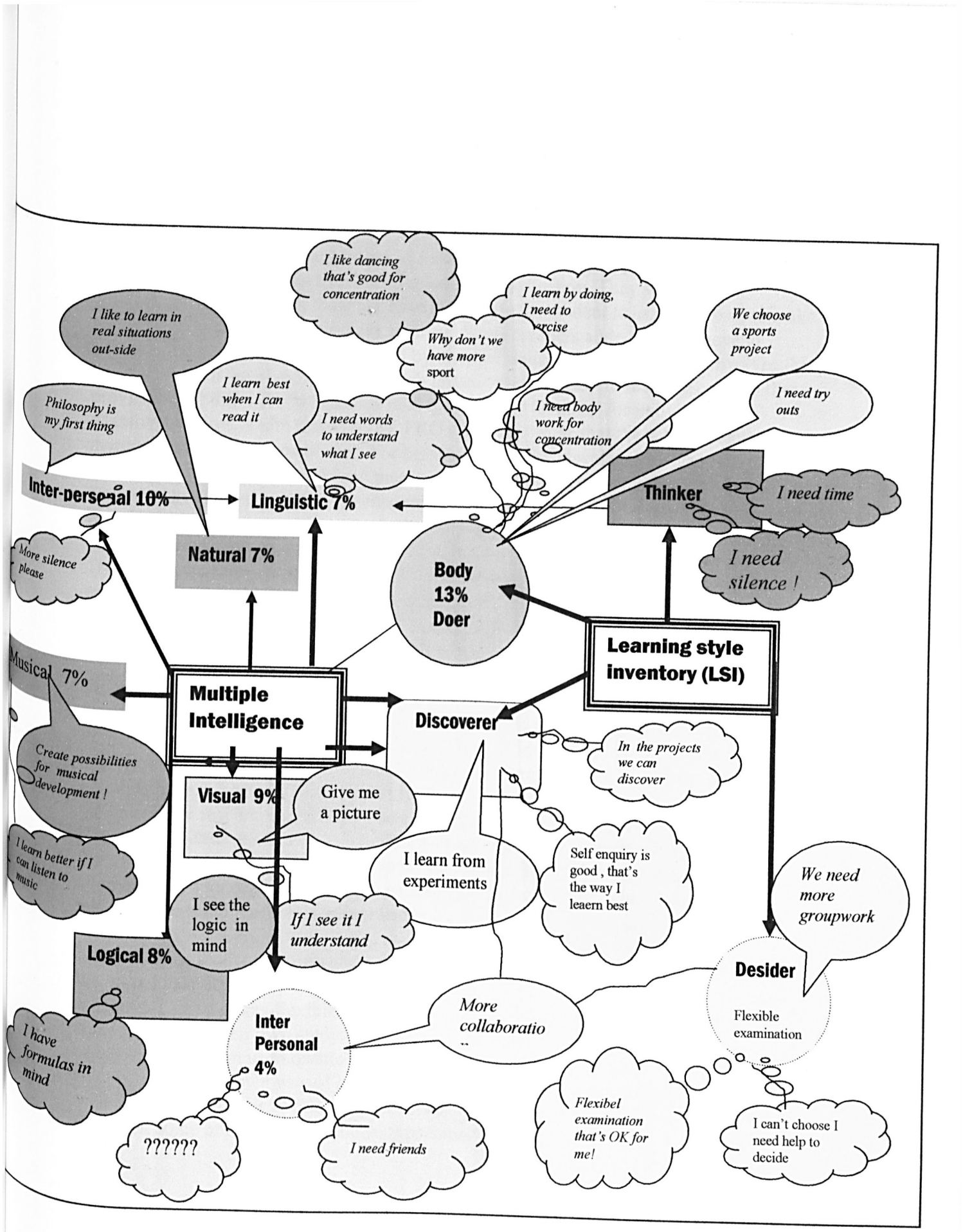
The results of the video mediated conversational processes.

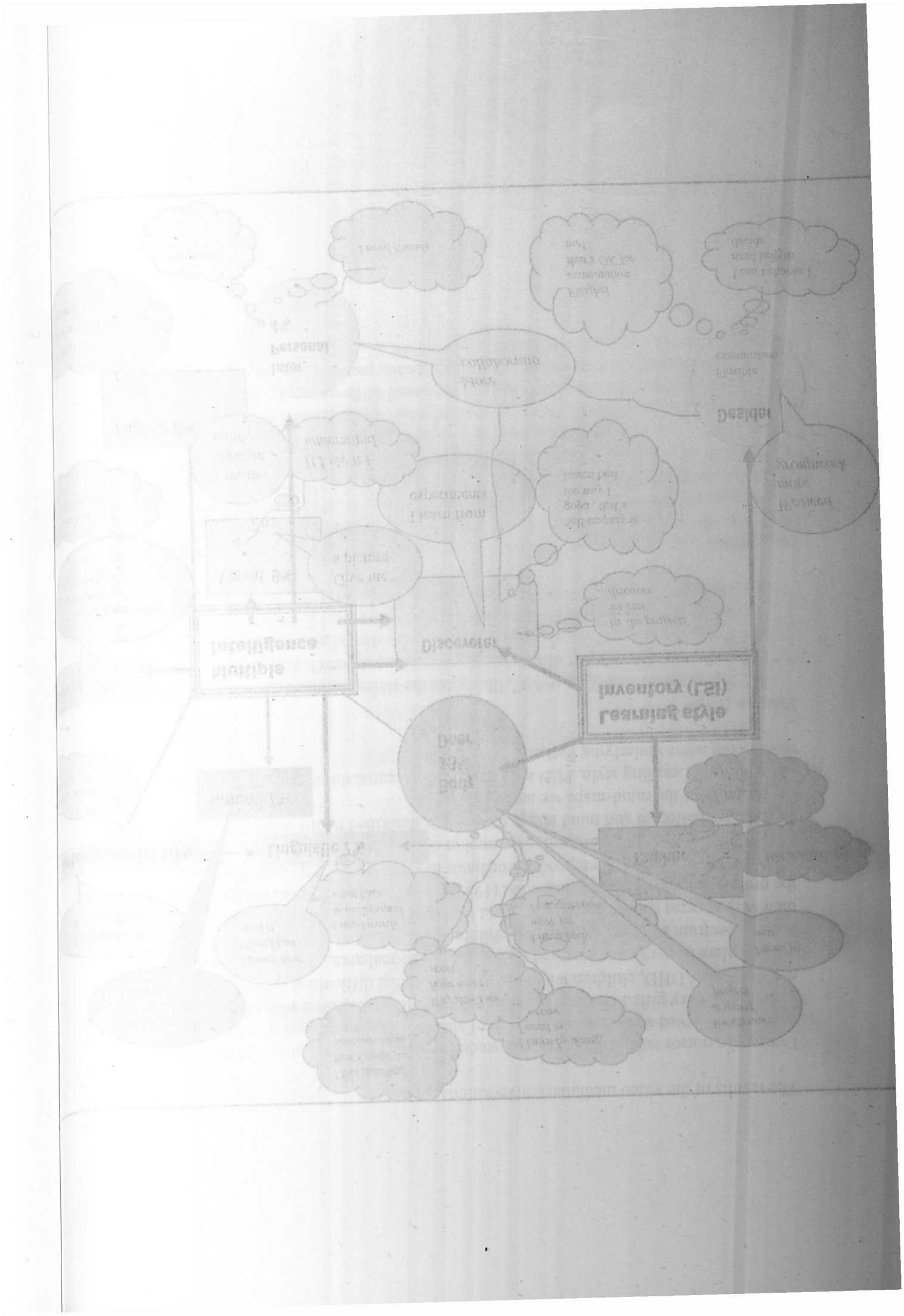
During the mirror talks and group-talks students spoke about their personal educational needs. We worked with A-select samples of students. In the conversational processes participated very gifted children and poor gifted children, children with SEN such as dyslexia and ADHD, children with emotional and social difficulties, children with a special talent or particular practical skill in the vocational area, children with SEN in the autism spectrum and very harmonious children participated too. The students spoke about their very diverse needs. We tried to avoid bias in filming and asked the students to film the process. According Given and Reid (1999) we indicated that observation can be interactive. We asked an independent mediator to guide the conversational process of the mirror-talks. Co-researchers and the researcher did the analysis of the video films. In this process, we collected and mind mapped the needs described by the students. For the construction of the mind-maps we used three keys.
The keys are: Learning style, PEN and Advice. We created three central Patterns and worked out some underlying Patterns.

Patterns found:

- The pattern " Learning styles", illustrates the statements students articulate during the conversational part of the participative action research program.
- The pattern "PEN" illustrates the personal educational needs students articulated during the conversational part of the participative action research program
- The pattern " Advice" shows the advices students give to their teachers.

Most of the aspects articulated by students concerning their learning styles are high lighted in the first and second section of this chapter. In this part of the chapter I will concentrate on the whole system. Seen from the perspective of systems thinking; the key to seeing reality systemically means, seeing circles of influence rather than straight lines. Every circle tells a story. By tracing the flows of influence, you can see patterns that repeat themselves, time after time, making situations better or worse. (Senge,1990,1994) In this section we will discuss two groups of patterns: 'personal educational needs' (PEN) and 'students advice'.As a result of analysis we found different needs: the need for self esteem, collaboration, concentration, discipline, music, pictures, stories, try outs, a guide, coaching, freedom, projects, body-work.


I like dancing that's good for concentration
I like to learn in real situations out-side
I learn by doing, I need to
Why don't we have more sport
We choose a sports project
I need try outs
I learn best when I can read it
I need words to understand what I see
I need body work for concentration
Philosophy is my first thing
Inter-personal 10%
Linguistic 7%
Thinker
I need time
I need silence !
More silence please
Natural 7%
Body 13% Doer
Learning style inventory (LSI)
Musical 7%
Multiple Intelligence
Discoverer
In the projects we can discover
Create possibilities for musical development !
Visual 9%
Give me a picture
I learn better if I can listen to music
I learn from experiments
Self enquiry is good , that's the way I leaern best
We need more groupwork
I see the logic in mind
If I see it I understand
Logical 8%
Desider
Flexible examination
I have formulas in mind
Inter Personal 4%
More collaboratio
??????
I need friends
Flexibel examination that's OK for me!
I can't choose I need help to decide



Active didactics

At the end of the project teachers asked for training to develop opportunities and new ways to involving students by experimentation and reflection. They stated that collaboration is important, didactics have to activate the student to ask questions, to make choices and to take the initiative for enquiry. Some teachers added that the have to organize the possibilities students need by the facilitation of a structure that involves the student. Schools involved in this research project tend to work in 'learning centers' that provide possibilities for 'workshops' and 'projects' or 'actions' for individual and adaptive learning. Team managers of PRO and Gym+ state that the students have to be involved in the development of IEP or better in Individual development plans (IEP). The achievements have to be noted and pictured by the student in the students port folio. Students have to become actively encouraged to track their own processes.
In contrast to what we see in many Inclusive schools in the Netherlands, where individual education plans (IEP's) are developed for, and not with the pupils and parents. The plans are made for the remedial teachers, care services and therapist and have no active implications as a plan of action for the pupils (age 12 to 16 year) themselves. The voice and observations of the 'disabled' young person has only low impact or no impact in the development of IEP's in these Dutch schools. (See Appendix 28 IOP)

The coach or tutor and the student need time to reflect, they can use the port folio, for these reflections on learning processes and the products of learning activities (results). Particular learning difficulties and also behavioral difficulties need to become objects for reflection and action (plan for a week or longer). These vision and the educational concepts have to be in the minds of the teaching staff. Some teachers who were active in the project are real architects and owners of this new educational practice, but there are also many teachers who told us about there struggle. For some these changes are a cause for stress. In contrast, the students adapted very quick. They try to understand the new approach and a lot of them gave their criticisms and ideas. Some schools used mirror talks to understand what the students needs are.

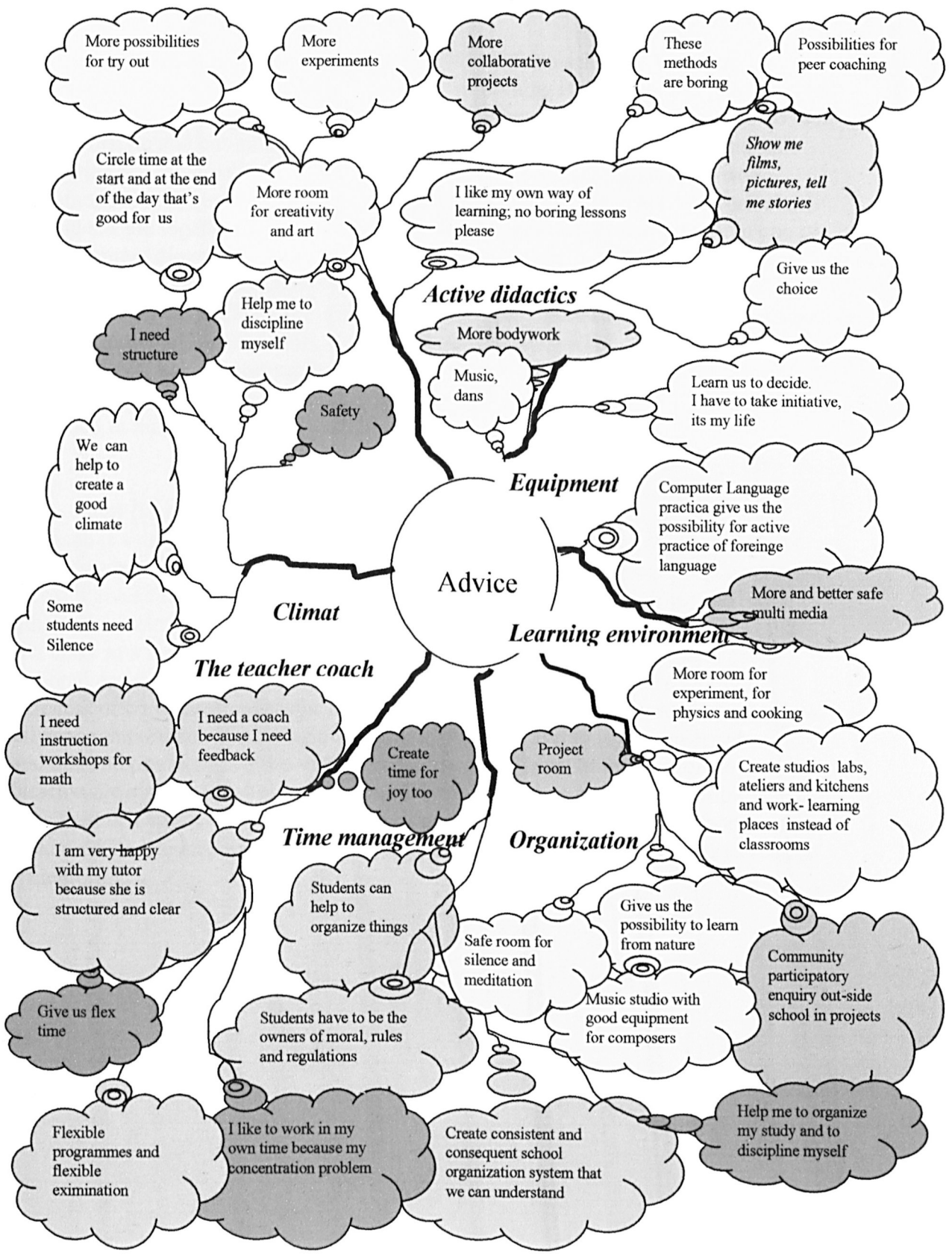
State policy in the Netherlands also adapt to the new concepts of learning. At the start of the school year 2006-2007 students have the possibility to make there own examination schedule. This so-called flexible examination promotes the students to make authentic choices and plan their own study. Voices of students show needs like: "Help me to concentrate", "Learn us to decide", "I have to take initiative, its my life", "I need silence", "I like my own way of learning" and "More collaborative projects" have to be seen in the light of the struggle of 'New reform in Dutch education'. (See picture 4 u). However, some of the needs can be very personal as well.

Learning environment, equipment, organization

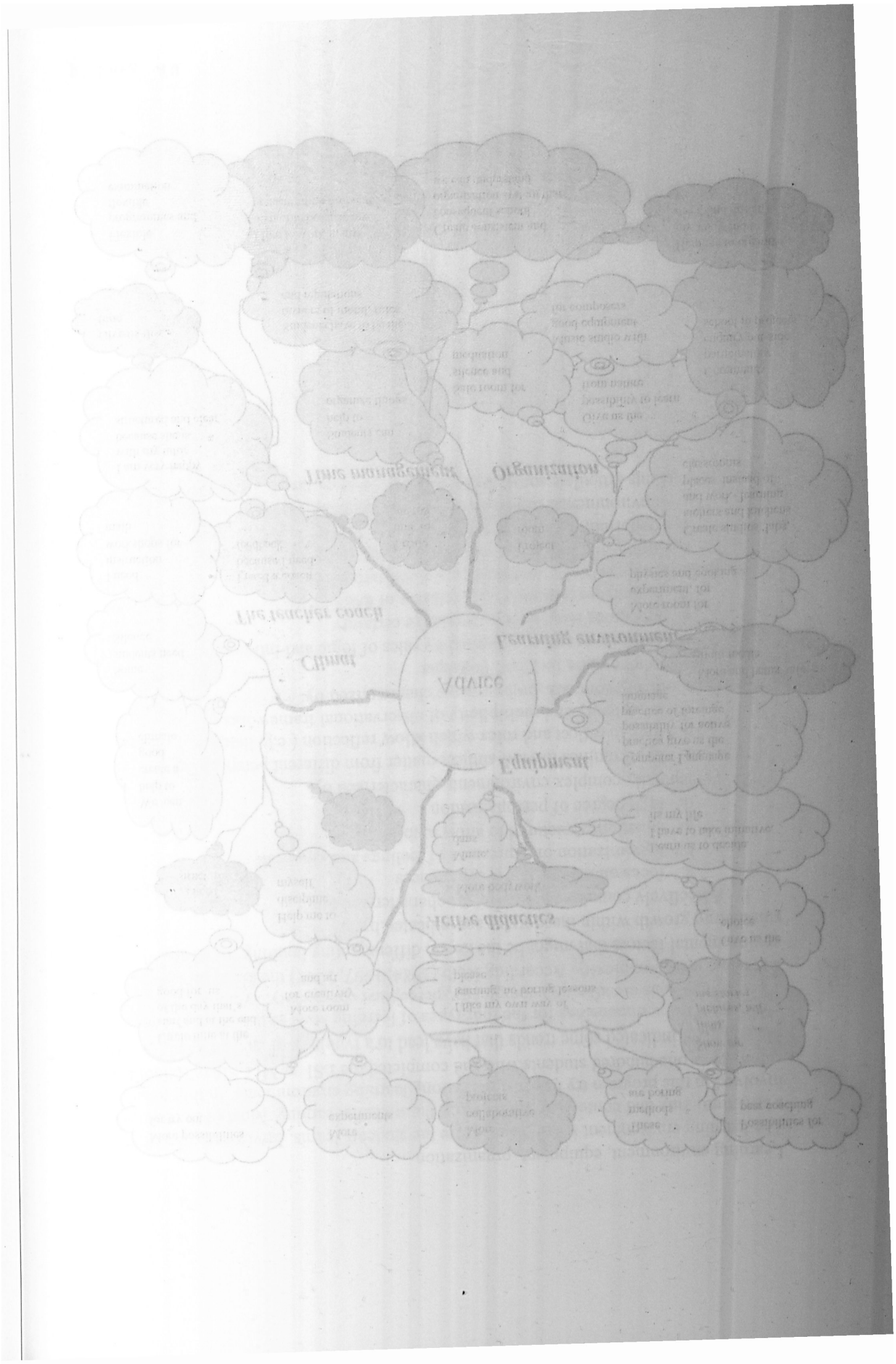
The learning environment is the place where the students learns. Environments can have a structuralizing and contextual influence on the students learning. Most of the schools involved in this program try to construct 'strong learning environments' in this sense. A survey over one hundred students who had completed the LSI at MIT Sloan school for Management indicated some trends that have lead to a typology of environments in terms of personal grow dimensions for the four types of learning style as described before. These dimensions are affective complexity, perceptual complexity, symbolic complexity and behavioral complexity. According Kolb (1984, 1997, 2002) the kinds of environmental factors that might be the key in differentiating learning styles and stimulating growth within these styles are indicated by:

1. Affectively complex environments, characterized by:
    a. focus on here and now experiences
    b. legitimization of expression of feelings and emotions
    c. situations structured to allow ambiguity
    d. high degree of personalization
2. Perceptually complex environments characterized by:
    a. opportunities to view subject matter from different perspectives
    b. time to reflect and roles which allow reflection (e.g. listener, observer)
    c. complexity and multiplicity of observational frameworks
3. Symbolically complex environments characterized by:
    a. emphasis on recall of concepts
    b. thinking or acting governed by rules of logic and influence
    c. situations structured to maximize certainty
    d. authorities respected as caretakers of knowledge
4. Behaviorally complex environments characterized by:
    a. responsibility for setting own learning goals
    b. opportunities for real risk taking
    c. environmental responses contingent upon self-initiated action.

The needs students articulate speak for themselves. (See picture 4 u).


Advice
Active didactics
Equipment
Learning environment
Organization
Time management
Climat
The teacher coach
More possibilities for try out
More experiments
More collaborative projects
These methods are boring
Possibilities for peer coaching
Circle time at the start and at the end of the day that's good for us
More room for creativity and art
I like my own way of learning; no boring lessons please
Show me films, pictures, tell me stories
Give us the choice
Help me to discipline myself
I need structure
More bodywork
Music, dans
Learn us to decide. I have to take initiative, its my life
Safety
We can help to create a good climate
Computer Language practica give us the possibility for active practice of foreinge language
More and better safe multi media
Some students need Silence
I need instruction workshops for math
I need a coach because I need feedback
Create time for joy too
Project room
More room for experiment, for physics and cooking
Create studios labs, ateliers and kitchens and work- learning places instead of classrooms
I am very happy with my tutor because she is structured and clear
Students can help to organize things
Safe room for silence and meditation
Give us the possibility to learn from nature
Community participatory enquiry out-side school in projects
Music studio with good equipment for composers
Give us flex time
Students have to be the owners of moral, rules and regulations
Flexible programmes and flexible eximination
I like to work in my own time because my concentration problem
Create consistent and consequent school organization system that we can understand
Help me to organize my study and to discipline myself

Picture 44



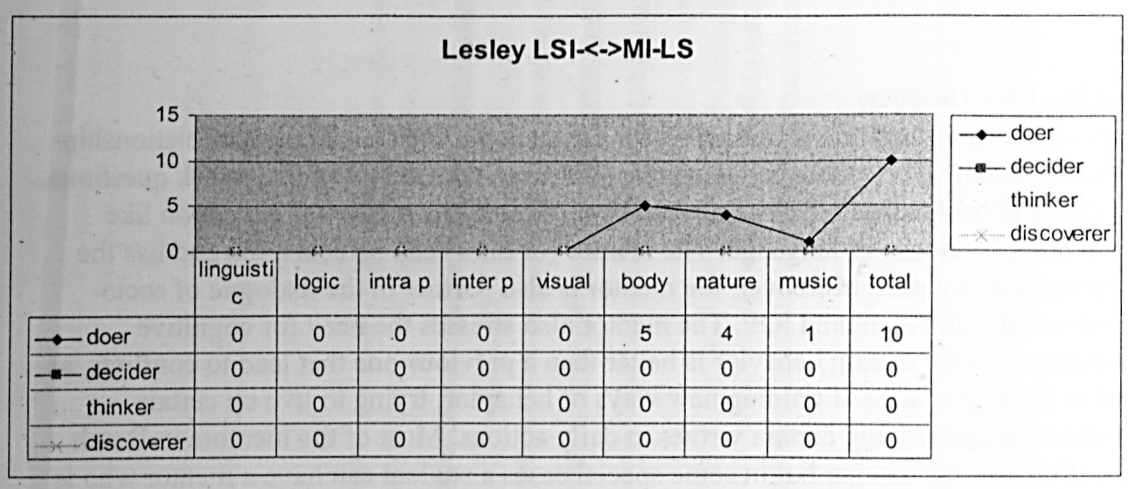
Time management causes a lot of problems in 'New reform schools'. There are no traditional timetables anymore. In Arentheem; the morning is filled with 'circle time' and question directed instruction workshops' and in the afternoon students are free to do their project work (in and out-side the school building). In Pascal college the students start together in their 'student team' and finish together too, however the students work autonomous on the content and in the context they planned by themselves (week plan). The students are together in the learn and work centre and can choose to work in one of the four content directed learning corners or to participate in an instruction workshop. The teachers are available to coach the student. The student takes the initiative and can ask the coach for help. CITA Verde and PRO college are more structured, they work in 90 or 120 minute blocks and work also with instruction lessons of 45 minutes. In all five schools students have to contact their coach, mentor or tutor one or two hours a week. Voices of students and also some needs students articulate (See Picture 4 u) should be understood in this light.

Coach – tutor (teacher)

The coach is a critical friend and guide for the student. The coach builds a relationship with the student. The coach stimulates the student to take initiative and to ask questions, the coach gives feedback. The coach can be an expert in a matter for education like mathematics, science or language. The mentor (or tutor) can be coach too and has the same tasks as a coach. Moreover, the mentor is also partner in the dialogue of socio-emotional development and IOP. The mentor also stresses the need for cognitive awareness of why certain behavior is better than a previous one that lead to conflicts, as well as the importance of training new ways of behavior, trying to live up certain standards and practicing certain virtues in daily actions. Most of the mentors in Dutch education are also teacher but in some special cases a student can have a mentor who is specialized in a special aspect of pedagogy, psychology or psycho-therapy, body-work and so on. The need for self-esteem (See appendix 22) has to be understood as a request for mentoring.

4.2.3. Case studies.

As a finishing touch for research I selected 3 students for a case describtion.
Case 1
L (nickname Lesley), is a student of PRO Rotterdam
L's history is described as a boy with a special passion for animals especially birds.
L's TIQ= 62, the diagnose is a cognitive disability. L is fear-full and introvert and some-times impulsive and overcompensating. L comes from a labor family and lives in a part of Rotterdam that is a traditional living environment for people who work in the harbor. L is a big boy (1.90 meter). L has two brothers. The school advise is PRO. During the peer to peer interviews L answers:
Nature is my thing. I am a doer. I like sport and music too. I like trees and dogs and cats and birds especially birds. I like to care for trees and birds. I tell others how they can care for them. I like to become a guide in nature or a safeguard for trees and birds.

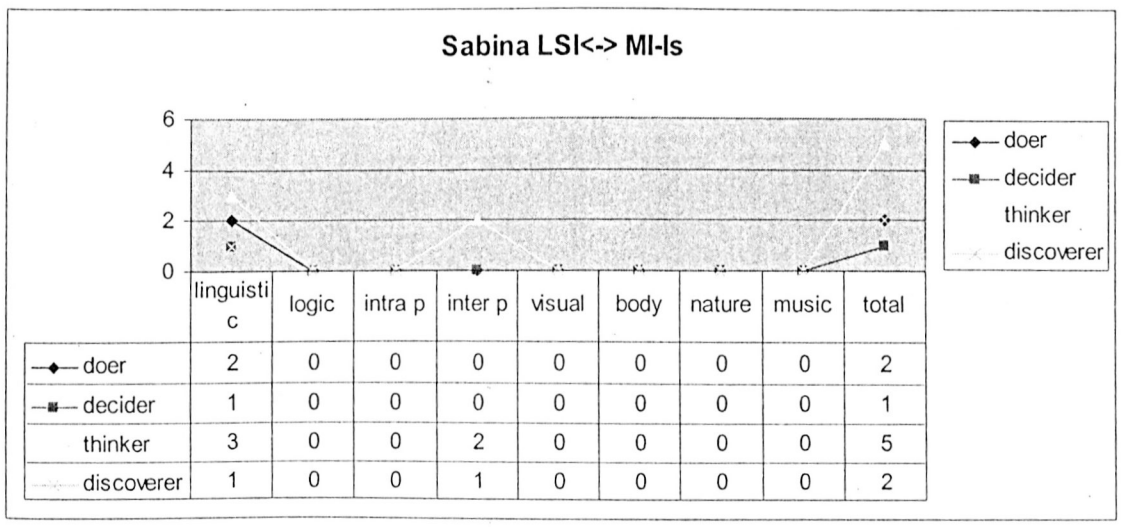


	linguistic	logic	intra p	inter p	visual	body	nature	music	total
doer	0	0	0	0	0	5	4	1	10
decider	0	0	0	0	0	0	0	0	0
thinker	0	0	0	0	0	0	0	0	0
discoverer	0	0	0	0	0	0	0	0	0

Picture 4 v

His mentor points out that:
L is not motivated to do his reading- writing, math and science exercises. He can write but do not like writing. He makes a mess in exercises like cooking and techniques. However he is very motivated in learning facts about animals and has the motivation to write names of birds and likes to know more about biology matters. Since the beginning of the school year 2006-2007 Jeremy works in an 'animal care centre'. He is very good with the animals (cats, dogs) but he is a cause of problematic situations because he do not adapt to the rules and regulations of the centre. L himself tells: I try to do my very best, but people do not understand me.

Cases 2
S (nickname Sabina) is a student of Pascal College.
S. comes from a multiple problem family; she lives in another family since 01-02-04
S. is a victim of child abuse, she has problems with food. S was very introverted during the last two years she has two very good friends who have a positive influence. In the peer-to-peer talks, S was very open; she told her story and informed us how she deals with some personal problems. S is a thinker and has a deductive linguistic way of learning. During the peer-to-peer interview, S. answers:
I am a thinker. I need silence to think. I think in words. I write what I decide. I discover by reading books. I write, writing is doing for me. I like to sit alone in nature to think inside my head to know what to do.



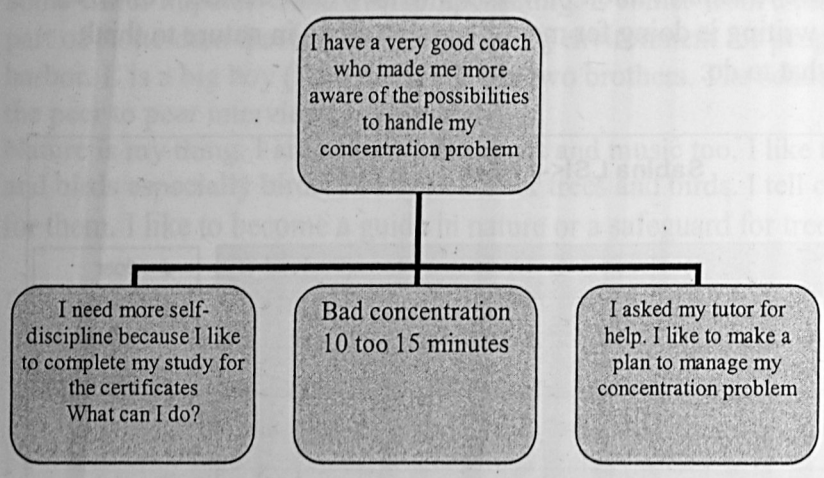
	linguistic	logic	intra p	inter p	visual	body	nature	music	total
doer	2	0	0	0	0	0	0	0	2
decider	1	0	0	0	0	0	0	0	1
thinker	3	0	0	2	0	0	0	0	5
discoverer	1	0	0	1	0	0	0	0	2

Picture 4 w

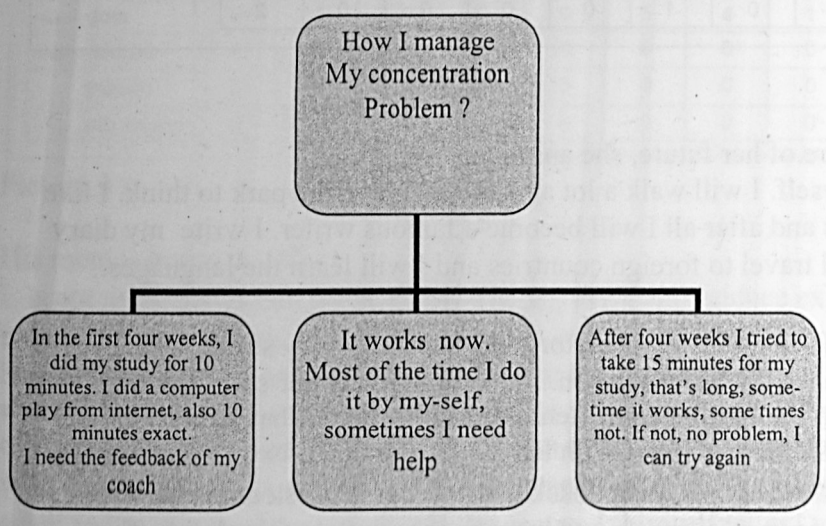
If I ask her to give a picture of her future, she answers:
I like to have a flat for myself. I will walk a lot and sit outside in the park to think. I like the sun. I will write books and after all I will become a famous writer. I write my diary every day. In future, I will travel to foreign countries and I will learn the languages.

S's mentor points out: S has a problematic history, but she has a very strong will. She needs lots of time and silence for concentration. She can organize her-self very well. If she is confused or afraid she has the competence to ask for help. That's fine. Her girl friends are very helpful. She is very good with language. She needs extra coaching for the exact matters. Sabina needs positive feedback because her self-esteem is very low. Because that shee needs positive feedback and hugs,but she never will ask for. (See Appendix 25)

Case 3.
Markus (nickname) is a student of Cite Verde college. (See Attachment 26)
Marcus is a pictured as an optimistic and enthusiastic boy. He has a lot of energy, sometimes a bit too active. Marcus himself told us that he has problems with concentration. It is hard for him to concentrate for more than 10 minutes. Marcus is intelligent (IQ120). His school results are normal > good, however he needs more structure, self-esteem and self-accountability. During the mirror talks M told us about his concentration problem. He also told us that he found a solution. We asked Markus to map his problem for analysis.

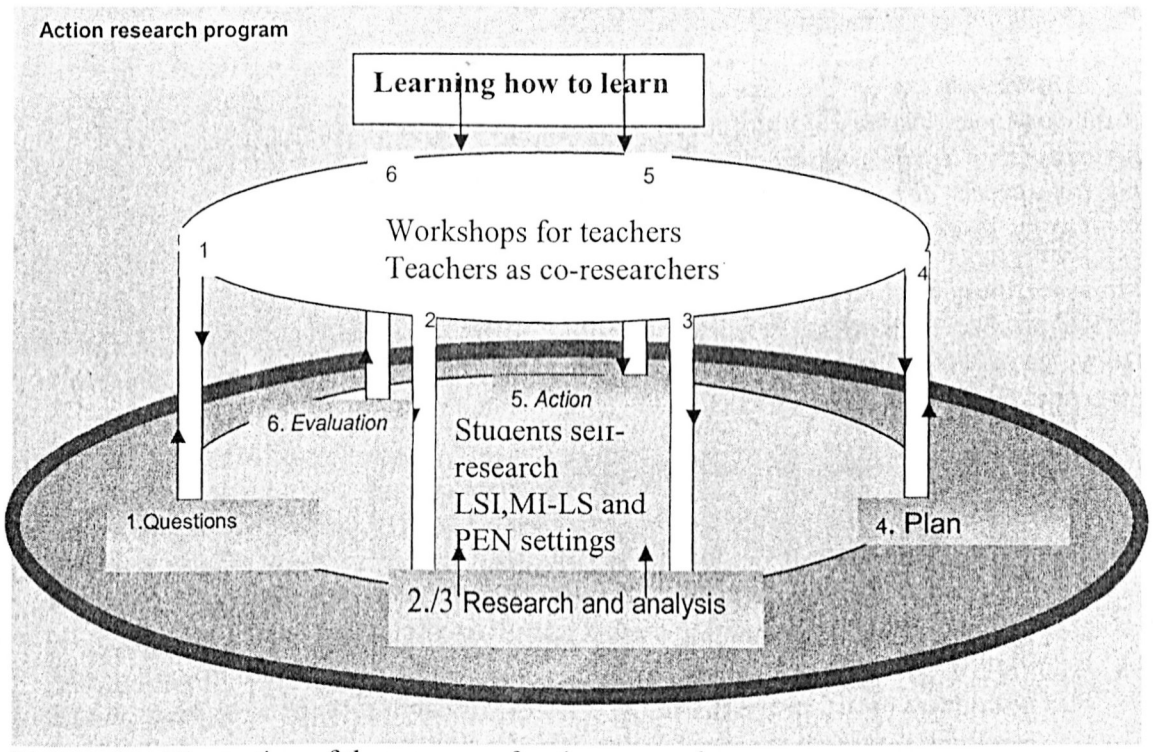


He told us that he probably had found a solution for his problem, but that it needs a lot of time. Moreover he told us that he became a little bit more self-discipline this year.



4.2.4. The complexity of action research, mirror talks and selfadvocacy

. The complexity of action research



Picture 4 x: Illustration of the process of action research

It may be argued that the participative collaborative style of the action research program we did had a very complex character. I will not analyze the complexities of the various feedback loops. I agree with Robson (1993) that the participative collaborative style is more important than sorting out the complexity of the various feedback loops in the cycle (See picture: four x). The students and (active) teachers were involved in collecting and analyzing data and in discussions about the findings. In this way, the research had wider ownership and we arrived at a level of planning from which new teacher initiatives can start. Those initiatives focus on 'learning style self assessments, mirror talks, IOP participation, active didactics for more effective education' and 'how the teacher can adapt too the learning styles of his/her students'. In this process that will continue after this dissertation, the research questions have to be reshaped and re-formulated in informal and formal discussions during AR workshops. As a follow up for PRO, we started a huge AR project. We (Pauline Klein, Dhyan Vermeulen) did intakes with 39 schools (managers, in-service trainers and teachers/mentors).

In this follow-up research for PRO the individual development plan (IOP) is the 'central topic'. The initial thoughts for this topic IOP came up in discussions with school managers and teachers during the conference of the Dutch league for PRO Education „ May 2007. The school managers think that an action research project will be a helpful tool for participative and collaborative IOP implementation.However; if we take the action research way of thinking seriously, we should not predict the outcomes of the action research in the schools before we made a real start. According Cohen and Manion:

' ....essentially in and on- the- spot procedure designed to deal with a concrete problem located in an immediate situation... ideally, the step by step process is constantly motivated over varied periods of time and by a variety of mechanisms, so that the ensuring feedback may be translated into adjustments, directional changes, redefinitions, as necessary, so as to bring lasting benefit to the ongoing process itself rather than to some future occasion... (Cohen & Manion 1994, 192)

Moreover, the new action research practices in the schools should give us images of 'new paths' for IOP practice. Although we found new questions and analysed many data: the first purpose of this action research project was to improve the practice, rather than to find truths, universal or particular. (Griffiths and Davies 1993, 45)

Concerning the hypothesis active teachers found that:

- they can give them the possibility to become aware of their own learning styles and personal educational needs (PEN).
- students involved in the participative action research asked for improvement of the learning environment, the learning settings, equipment, coaching and tutoring.
- the conversational processes in the different research settings were very fruitful.
- they think that there is a need to promote the students competencies for self-advocacy.

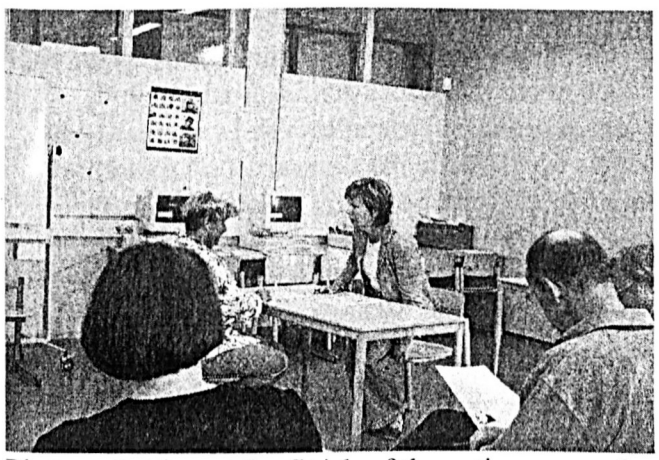
They became aware that:

- Student's can become aware of their own learning styles
- Student's are in search for balance.
- Students can become aware of their personal educational needs and their special educational needs too
- Many students could articulate their LS and PEN/SEN and asked for help
- Students are very open in their argumentation
- Students can develop the competence for self-advocacy
- Students can become self-advocates in there own learning process.

The finish.

Picture: AR presentation of a school-leader

At the end of the AR programs teachers interviewed each-other to find out what they learned: after all, all together they had more questions than answers, the cycle of action research might never come to an end. One of the school-leaders concludes that:
"However, the teacher / coach and teacher / mentor has to develop the competence to activate the students in 'learning to learn better', we (teachers, school-leaders) have to improve education in a more collaborative, participative and adaptive direction."
" How do we do that?" , " What do we need to learn?"That might be new subjects for further research.



Picture: Setting at the finish of the action research progam 2007

Mirror talks and selfadvocacy

Mirror talks.
To find information and some answers for the question: The question 'How schools can provide the students to develop competencies for self-advocacy and participation and what competencies for self-advocacy students need to participate in the conversational process?'; we did some pre-research concerning a try out with a conversational method called ' mirror talks' (Appendix X DVD). Mirror talk is a conversational method developed to care for quality in health care practices in hospitals. Dimph Rubbens (2007) was the first person who did a 'try out' with mirror talks in educational settings.
Mirror talks are based in the concept for conversational learning. According the statement of Nonaka, we state that:

"Although ideas are formed in the minds of individuals, interaction between individuals typically plays a critical role in developing these ideas." (Nonoka 1994)

His premise is that it is the "continual dialogue" between explicit and tacit knowledge, which drives the creation of new ideas, concepts, and good practices. (Baker, Jensen& Kolb,2002, Nonoka,1994) This distinction between explicit and tacit knowledge is fundamental to conversational learning. (Brown & Duquid,1991, 2000, Lave & Wenger 1991, Polanyi,1966, Wikström & Norman,1994, Baker, Jensen & Kolb,2002).

In coherence to the ideas of Nonoca, we used mirror talks to make tacit knowledge explicit in this action research process. I asked Dimph Rubbens to mediate the mirror talks because it has to be a 'relative neutral mediator' who leads the process. Dimph was not involved in the research process. It was good to have this mediator because is would prevent us from bias. Moreover, we learned that this lady is excellent in asking questions to students. Students became very motivated to tell their story and ideas and to give critical arguments for their choices. During the mirror talks students sit in mirror setting, a half circle. The teachers and school-leaders take seats in the same setting behind the students. The mediator ask question. The subject of questioning is a given theme; the context and content have to be clear. In our case: the first theme was, personal learning needs (PEN), the context 'the learning center', the content ICT. The second theme was flexible examination, context Montessori HAVO, content; how do you choose between the different school subjects. After half an hour the setting will change in a full circle (see picture 4 z 2). The teachers who wrote there questions during the first half hour, ask questions. Students can answer the questions.

The protocol for mirror talks is very strict. Students have to set the tone. Teachers can only ask questions for understanding. The students are free to speak; they never can be judged or restricted in their voice. Their voice cannot be used against them. The mediator is the caretaker of the protocol. After one hour the students will go. The teachers and school managers will continue the talk for one hour more. The will reflect on the input of student talk and they have a constructive dialogue concerning the plan of action that will follow to guaranty the result for qualitative better education

Some conclusions of teachers during this process were:

- Advices students brought in can be practiced
- Students behave as adults in this setting
- Students ask for structure
- We need to give more possibilities for choice
- We have to provide students with a variation of didactical workforms, equipment and learning settings
- We have to provide more variability and choice in the ICT learning centers
- We have to listen to students because the have the capacity to find words for what the can and what they need to learn better
- Most students like flexible examination, they make there own choice and plan their path
- Some students can not make a choice they need a guide

Learners can develop awareness about there unique path. During the mirror talks and 'peer-to-peer' and group dialogues students can develop consciousness over our own unique path. This is what we can explain as ' learning how to learn better' . In the process of participative action research students and teachers became involved in a process in which meta- cognition about students own unique path of learning and acting could be developed.

The mirror talks on video, together with the video interviews during the tests and available school information provided evidence for the description of the personal learning styles and personal educational needs. However, there are students who did not give voice; they remain in silence for half an hour.
New questions came up:

- What are the skills students need to be good self-advocates
- How can teachers help students to develop these skills?
- How can the conversational development of students become part of the educational program?
- How can we connect the competence for self-advocacy to the IOP learning lines?

(See Appendix 28)

5. Conclusion

5. Conclusion

Content:

5.1 A critical evaluation

5.2 Implications and possible areas of further inquiry

5.3 The consequences for my professional and personal development

5.1. A critical evaluation

The topic of this dissertation is "Learning how to learn in inclusive secondary education."

The central subject of this dissertation is the facilitation of processes in which students develop awareness of their own learning-styles and educational needs. In my opinion, awareness of learning-styles and awareness of personal educational needs by students and teachers should lead to educational programmes, environments, settings and facilitations that promote more effective and joyful learning for all students.

Processes in musical and other creative activities, and, quite possible, processes involved in knowing oneself and other persons merit the modifier cognitive (Gardner,1983 pp 53). I therefore agree with Gardner and believe that adequate models of human thought will have to incorporate aspects of biological systems (for example, processes of organic differentiation or fusion) as well as aspects of mechanical systems (the operation of electronic circuits or networks). However, in my view, I see a third field of human thought, that is the influence of complex environments (images, representations and collaborative interactions). In connection to the possibility of choice and the competence to chose, we need to develop new deep knowledge and tasks to participate in this technically high-developed world. Accordingly, the theory of justice an aspect that seems exclusive human incorporated in this field is the possibility to decide what is right and justifiable or wrong, with other words the moral aspect of human thought. We can focus on the properties of thought, as suggested by intention and introspection connected to our worldview but how do we proceed this new knowledge? When it comes to experiences that, however vivid to yourself, are not assessable to other individuals, intriguing questions arise. It is easy to understand why one should be equipped to react to things in ones environment. It is not easy to understand why one should develop meta-cognitive thought and moral expert reasoning. However if both, intelligence and (moral) expert reasoning in specific knowledge domains are developed through socially mediated cognitive activity, than the practical question still remains of how to ensure that these kind of interactions take place in schools.

The most important aspects of this research project are on the meta-cognitive level. Self-enquiry, self-assessment and conversational learning are socially mediated cognitive

activities. In its ideal form, self-assessment can serve social and motivational purposes and improves cognitive performance. Engaging students in LSI and MI-LS self-enquiry make them aware of there own learning styles and educational needs, moreover it increases the students responsibility for there own learning. The methods used in this action research program were collaborative. In addition to students in the reflective assessment settings, these situations create possibilities for feedback. Moreover, students who participated in the peer-to-peer conversational settings showed increasing skills in the articulation of their learning needs and learning goals.

In addition to the use of self- assessment as a method for monitoring and promotion of the individual students 'learning to learn' processes, the results of this enquiry can give input to set an agenda for the examination and improvement of new educational practices. By repeating the 'learning style Inventory self-assessment (LSI) and the 'multiple Intelligent learning style self-assessment (MI-LS) in three schools, we can conclude that the method of enquiry is repeatable. We have to find out what conclusions would be reached if the same student repeated the test after three weeks. We need further investigation in LSI and MI-LS test and retest reliability before we can say something sensible about the reliability of these assessments for self-enquiry. Because of its clear implications for both; students awareness of learning styles and teachers management of the educational setting for more effective and social learning, it is necessary to have better understanding of the underlying factors the LSI and MI-LS instruments taps in self-enquiry settings.

According the methodology, I realized that doing multiple method triangulation in an action research project in the educational context is undoubtedly more complex than I could image. Multiple method triangulations in action research are good for validation but it is a time consuming process. Contemporary theory asks not only, "Does the test measure what it purports to measure? But it also asks," Does its use produce effects as intended" (Shepard,2004). If formative use of self-assessments for students is claimed to improve student's consciousness and students learning, is this claim warranted? To find out how things work we must conduct a long term study on a larger population. To conduct these new studies we will start repeatedly. If we not assume that findings from previous research studies can be generalized across paradigms, we have to find schools who work from a similar focus. The focus of the schools who participated in this project: "Learning how to learn", are in a process of reform inspired by cognitive, constructivist vision. Follow up research will proceed in this area.

5.2 Implications and possible areas of further inquiry

On the methodological level, I found several reasons for further enquiry. As discussed in the section above we have to do further research to warrant the claim that the use of "self-assessments like LSI and MI-LS can improve students consciousness and students learning." From the seventy students who participated in the LSI self-research forty-five students think that they know what personal learning styles they have, twenty students answered that they know most of their learning styles, five students can recognize some of their learning styles. In contrast the control group of thirty students; twenty of the thirty students of the control-group do not know what learning styles the have. In some respect the consistence and reliability of this part of the research is subject for discussion because there was no consistent procedure for the peer-to-peer interviews. In future settings we (students, teacher-co-researchers and scientific researcher) have to develop questions as well as a protocol for the peer-to-peer interviews. The students have to be the owners of this protocol. What we, the teachers as co-researchers and researcher, found in the qualitative analysis of the students' is that:

- Students involved recognize their learning styles
- Students involved speak more openly over their learning styles and there future perspectives
- Students know more clearly, what they want and are more motivated.
- Students can articulate their needs in relation to their learning styles
- All students involved have their unique paths of learning
- The potential of the students differ (IQ differs from TIQ 62- TIQ 140) but
- All students show their own unique way to adapt within their zone of prior development
- The instruments used activate positive participation
- Learning from learning experience can be activated by reflection

We noticed that students can articulate their needs in relation to their learning styles
An interesting result of the post research is that the knowledge about learning needs of the teachers was growing although this aspect was no part of the quantitative research it was a matter of concern in the total action research program. Moreover, in this case the control-group became more knowledgeable too. The teachers of the control-group were not involved in the action research but they are part of the team and were partners in conversations with students concerning there individual development plan (IOP).
IOP settings are settings in which teachers, experts, students (and in some cases parents) do enquiry to find out what is best for a student. The Individual development Plan (IOP See Appendix 28) has to direct the learning of the student. The Individual development plan (IOP) is relative new in the Netherlands, but many PRO schools start IOP procedures instead of the traditional individual educational plans (IEP). IOP is a tool to ensure the student, his coach and the parents that all opportunities for learning (passions, talents, qualities, dreams, needs) of the student are visible. It provides the opportunity for learning; structured by clear learning lines for the student. The IOP approach enables the student to create perspectives and tools to focus on clear objectives for learning in and outside the school. Moreover, the IOP direct the student's objectives for action. The student articulates the goals, the barriers and needs. Nevertheless, teachers have to be

trained in guiding students in IOP processes. Teachers have to learn how they can adapt to the learning styles and special educational needs of students and how they can stimulate the student to articulate their needs and barriers for learning. Teachers have to learn how the can stimulate the use of self- assessment instruments like LSI and MI-LS. This is a possible area for further enquiry in the future.

In contrast, it may be argued that the participative collaborative style of the action research program we did had a very complex character. I did not analyze the complexities of the various feedback loops. I agree with Robson (1993) that the participative collaborative style is more important than sorting out the complexity of the various feedback loops in the cycle (See picture: 4 x). The students and the teachers as co-researchers were involved in collecting and analyzing data and in discussions about the findings. In this way, the research had wider ownership than if the researcher had done the enquiry in her own. We did arrive on a level of planning from which new teacher initiatives will start. Those initiatives for future research will focus on 'learning style self-assessments, mirror talks, IOP participation, active didactics for more effective education' and 'how the teacher can adapt too the learning-styles of students'. In this process that will continue after this dissertation, the research questions have to be reshaped and re-formulated in informal and formal discussions during AR workshops. We already have planned these processes in several schools for inclusive secondary education. To start this follow up we did the intakes in 39 schools in the Netherlands. The initial thought for this follow up project that will focus on activating didactics in relation to IOP, came up in discussions with school leaders and teachers during the workshops we did in conferences organized by the Dutch league for PRO Education May 2007.

5.3 The consequences for my professional and personal development

In this section I try to articulate the consequences of this study for my professional and personal development as such and the implications this study has for socially mediated meta cognitive thought and inspiration. I will complete this dissertation with a statement.

In front of the finish of this dissertation, I have the same feeling as I experienced during the last 50 meters of a marathon, long ago. There is only one thing in my mind that's the content of the dissertation. That is: "Here and now, I have to do the best I can." Nevertheless, on the road this Erasmus Mundus MA study enriched my current professional practice, insights and motivation for further research in several ways. This EM MA SEN process of learning by reflection offered me the possibility to connect my insights from before with actual new theories and practical experience. To have the blessing to combine work and action research with study has made the Erasmus Mundus MA study a remarkable period of my life. In the process from practice to theory, and from theory to practice I could develop deep knowledge and insights from a Meta perspective that mediated my focus for dissertation and the focus for a new research practice. Concerning reflection activities on 'learn to learn' processes in teamwork, group reflection, peer to peer feedback and action research processes I acknowledged my own special education needs and developed more understanding for the needs of others. Because of this experience, I have more (research) questions and a better scientific focus than ever before. These questions will direct my action research practice for a PHD study. I am conscious of the fact that the research we did is not more as an example that might be transferable in the Dutch context of education. In a follow-up study I will try to concentrate on the possibilities for transfer to the European context.

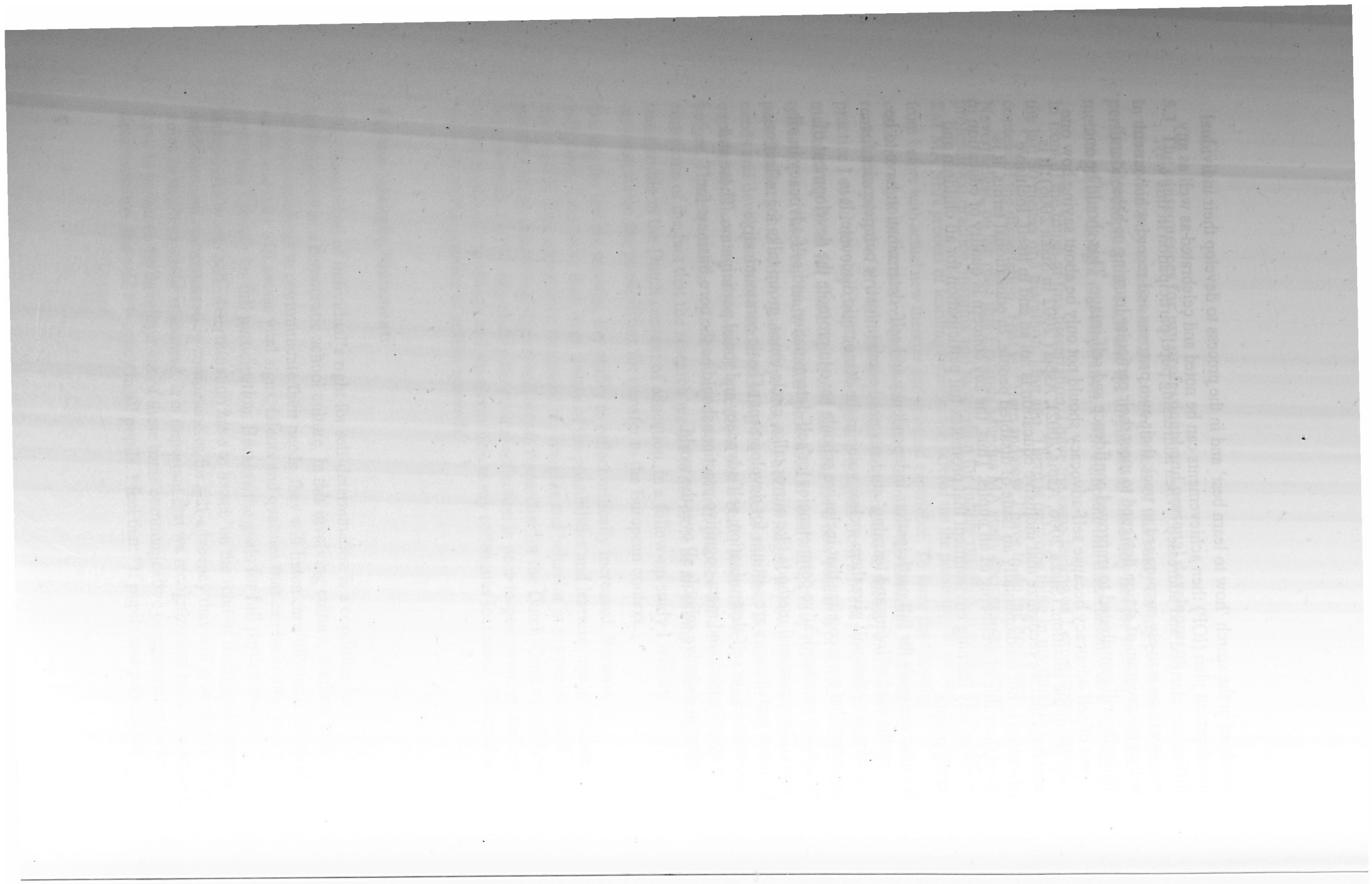
During the last six months, my ability to reflect critically increased. Because of reflection, I am more than ever, aware of the possibilities and learning needs of others and myself. This experience increased my insights and behavior in my professional practice as an educational expert and action researcher for the Dutch Centre for School Improvement (APS). My ability for critical reflection in peer-to-peer relations and my ability to provide feedback and dissemination to my colleagues increased. I learned a lot more about the practice of action research.

Further thought, Statement:

The liberal ideal of individual's right for self-determination is a condition for participation in a democratic school culture. In this involving culture, teachers will stimulate students to communicate their needs, they will listen carefully to understand the needs and they will assess vital signs, talents and qualities that can be helpful to overcome barriers for full participation. Because the goals for full participation, independency and self- determination have to be set 'on the road of living and learning' students need communicative competencies for self-advocacy that will give them a clear voice in the democratic discourse. It is important that we recognize that inclusive schools have to promote the development of these basic communicative competencies for self-determination and self-advocacy in all pupils. I feel that: "If pupils and parents are

involved in the search 'how to learn best' and in the process to develop their individual development plan (IOP) then achievements can be noted and celebrated as well as any difficulties clarified and addressed. When addressing pupil participation in this way, pupils will be actively encouraged to track their own progress and record achievement within the program of action designed to meet their particular learning or behavioural difficulty will contributed to improved confidence and self-image. This should be one aspect of self-advocacy because self-advocacy should not only be about saying how one feels about the situation. (Siska, 2006, Aspis, 2002). Aspis (2002 in Siska 2006): It is important that we recognize that inclusive education is not an end in itself. Inclusive education is not fundamentally an issue of disabled people. In educational terms, it is about the value of wellbeing of all pupils. Thus, the key concern is quality of education in an effectively learning environment that promotes full participation for all children and young people.

Because the goals for full participation, independency and self- determination have to be set 'on the road of living and learning' students need communicative competencies for self-advocacy that will give them a clear voice in the democratic discourse. It is important that we recognize that inclusive schools have to promote the development of these basic communicative competencies for self-determination and self-advocacy in all pupils. Conversational methods like mirror talks, circle-times, group talks for reflection, dialogue, and discours are settings for development of basic communicative competencies for self-determination, self-advocacy and social participation. These and other socially mediated meta-cognitive practices should be the core-business for education in inclusive schools all over the world.



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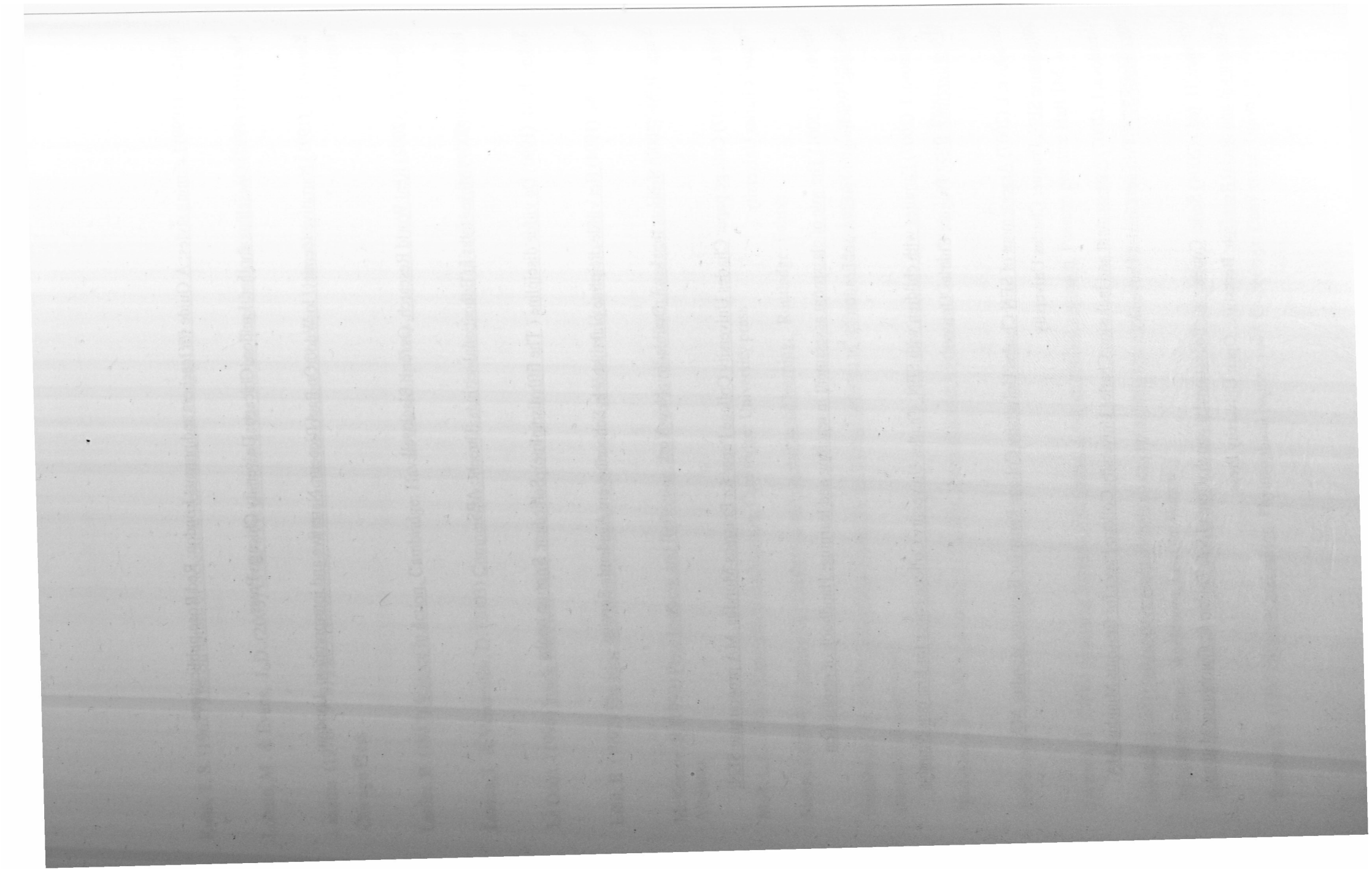

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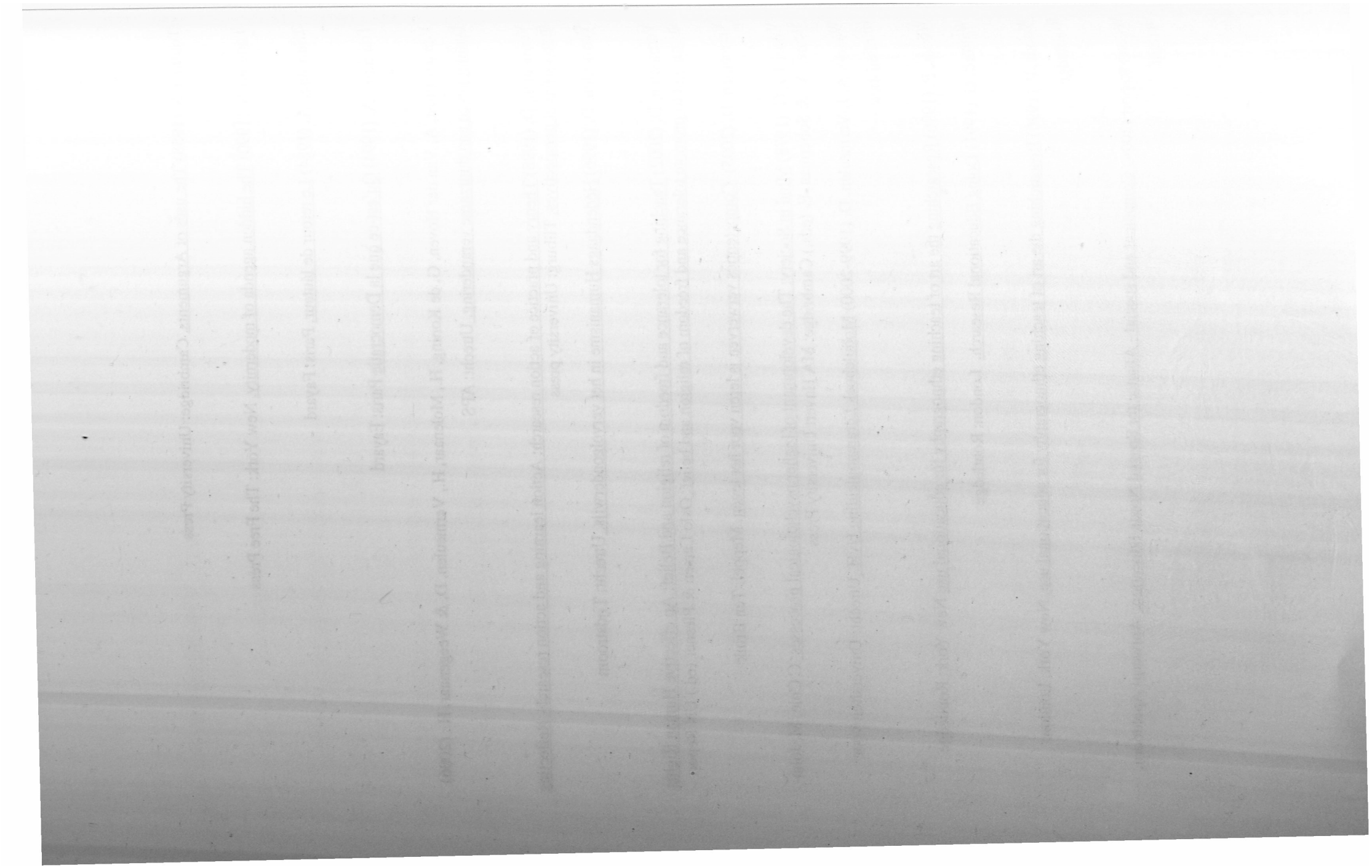

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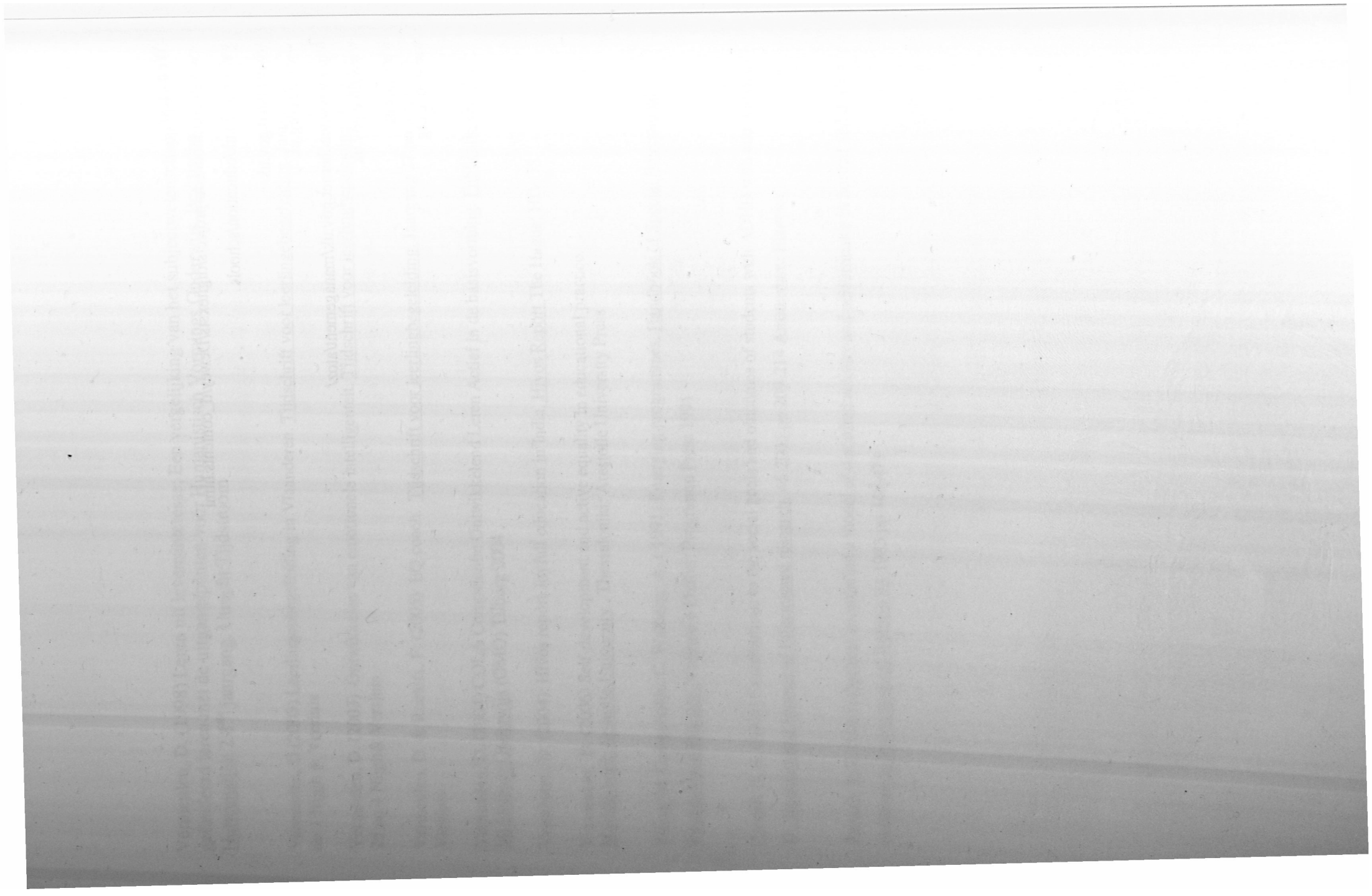


Appendix 1.

Learning styles and personal learning needs of students. (Questions for intake)

Do you know the personal learning styles of your students?

YES all	From more than 50%	Less than 25 %	No not at all

Do you take this knowledge of personal learning styles of students into account in your lessons?

YES always	More than 50% of the lessons	Less than 25% of the lessons	NEVER

Do you know the personal learning needs of your students?

YES all	From more than 50%	Less than 25 %	Not at all

Are there IOP's or IEP's for students?

YES for all	Yes for most, more than 50%	Only for students with a back pack.	Not at all

Do students need to develop the competence to articulate their personal learning needs?

Yes always	If possible	No need	Not at all

School:

Functie:

Vakinhoud:

Opmerkingen:

Appendix 2.

Learning styles and personal learning needs of students. (Questions for post analysis)

Do you know the personal learning styles of your students?

YES all	From more than 50%	Less than 25 %	No not at all

Do you take this knowledge of personal learning styles of students into account in your lessons?

YES always	More than 50% of the lessons	Less than 25% of the lessons	NEVER

Do you know the personal learning needs of your students?

YES all	From more than 50%	Less than 25 %	Not at all

Are there IOP's or IEP's for students?

YES for all	Yes for most, more than 50%	Only for students with a back pack.	Not at all

Do students need to develop the competence to articulate their personal learning needs?

Yes always	If possible	No need	Not at all

School:

Functie:

Vakinhoud:

Opmerkingen:

Appendix 3.

LSI Instrument for students.

To develop consciousness about their own learning styles students did two tests by themselves and took part in peer to peer conversations to find relevant examples of their learning styles and connected personal learning needs. One of the instruments was a translation of the LSI. Each group of students used a big poster and carts. The had to find 10 carts.

Picture of the poster in Dutch.
In English: How do I learn?
Thinker, decider, doer, dreamer/discoverer.

The carts are visible under Appendix 3a,3b,3c.

A4

Ik wil eerst zelf uitmaken wat het beste is en waarom	Wat logisch is snap ik
Ik moet eerst begrijpen hoe iets werkt	Ik wil weten wat het systeem is
Ik moet eerst weten wat het doel achter het project is	Ik moet eerst een analyse maken
Ik moet eerst weten wat het beste model is voor ik begin	Ik zoek eerst uitvoerig naar informatie

Appendix 5

Learning styles and personal learning needs of students. (Post)

Do you know the personal learning styles of your students?

YES all	From more than 50%	Less than 25 %	No not at all

Do you take this knowledge of personal learning styles of students into account in your lessons?

YES always	More than 50% of the lessons	Less than 25% of the lessons	NEVER

Which learning styles do you observe?

Do students know and do they tell you which learningstyles they prefer?

YES	More than 50 % do	Les than 25% do	NO never

Is there a need for learning style based education?

YES	More than 50% of the time	Some-times. Less than 25% of time	NO

Should students be conscious about there own learning styles?

YES always	Should be good	In special cases	NOT at all

Why?

Do you know the personal learning needs of your students?

YES all	From more than 50%	Less than 25 %	Not at all

Is there a need to for learning needs based education?

YES from all	Yes from more than 50%	Less than 25%	Not at all

Why?

Do students need to develop the competence to articulate their personal learning needs?

Yes always	If possible	No need	Not at all

School:

Functie:

Vakinhoud:

Opmerkingen:

Ik wil eerst zelf uitmaken wat het beste is en waarom	Wat logisch is snap ik
Ik moet eerst begrijpen hoe iets werkt	Ik wil weten wat het systeem is
Ik moet eerst weten wat het doel achter het project is	Ik moet eerst een analyse maken
Ik moet eerst weten wat het beste model is voor ik begin	Ik zoek eerst uitvoerig naar informatie

Appendix 6 example Mart

Doer	How many carts in pink 4	% 40
Thinker	How many carts in yellow 1	% 10
Decider	How many carts in bleu	%
Dreamer Discoverer	How many carts in orange 5	% 50

Appendix 7

Doer	How many carts in pink	%
Thinker	How many carts in yellow	%
Decider	How many carts in bleu	%
Dreamer Discoverer	How many carts in orange	%

Doer	Decider	Thinker	Dreamer/ discover
3	1	3	3
4	0	3	3
2	3	3	2
1	3	3	3
6	1	1	2
4	0	1	5
2	3	2	3
4	2	2	2
26	13	18	23

Appendix 8 Arentheem

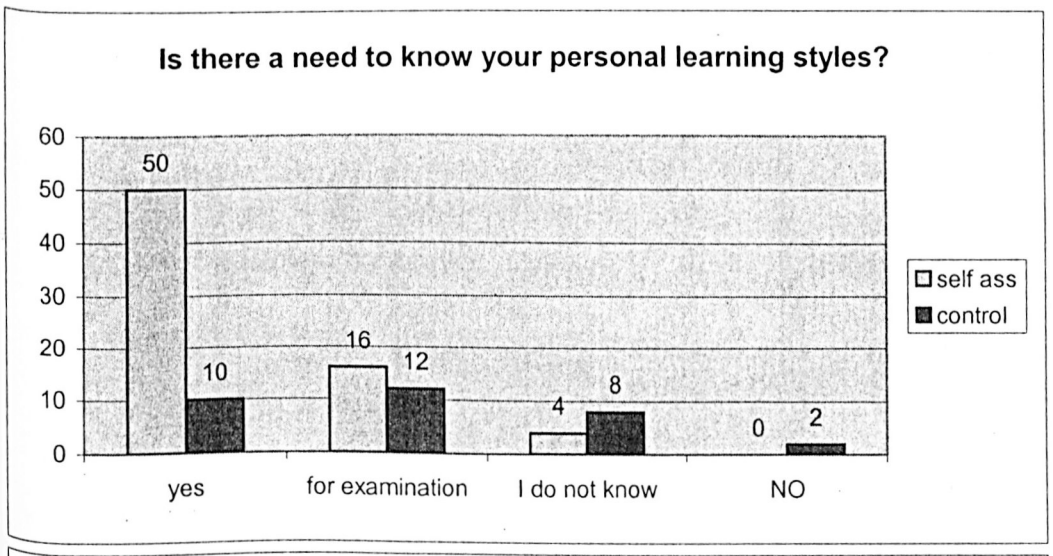
Appendix 9

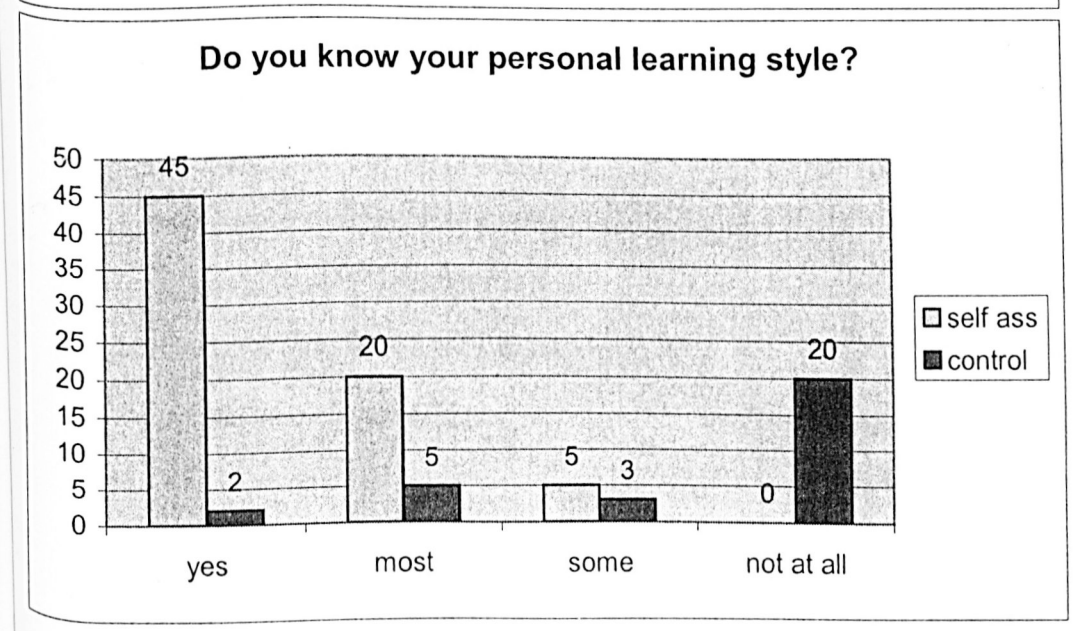
Do you know your personal learning styles?

group	yes	most	some	not at all
self ass	45	20	5	0
control	2	5	3	20

Is there a need to know your personal learning styles?

group	yes	for examin	I do not kn	NO
self ass	50	16	4	0
control	10	12	8	2





body	nature	linguistic	logical	visual	musical	Intrapersor	Interpersonal	
1	0	1	2	0	0	1	1	girls, boys

body	nature	linguistic	logical	visual	musical	Intrapersor	Interpersonal	
0	0	1	1	0	0	3	2	girls4

body	nature	linguistic	logical	visual	musical	Intrapersor	Interpersor	girls4
0	0	0	1	0	2	0	1	

body	nature	linguistic	logical	visual	musical	Intrapersor	Interpersor	boys3 girl1
1	1	0	0	3	0	0	0	

body	nature	linguistic	logical	visual	musical	Intrapersor	Interpersor	boys 5
3	1	2	0	0	1	0	0	

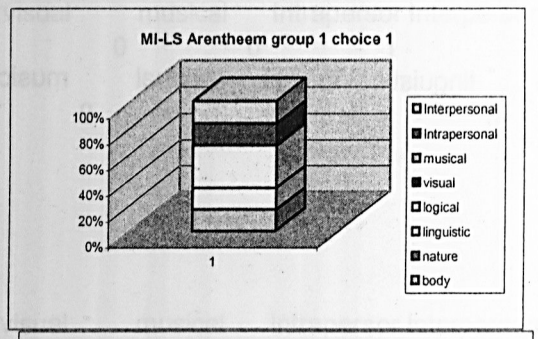
body	nature	linguistic	logical	visual	musical	Intrapersor	Interpersonal
9	3	7	7	3	4	4	5

A 10

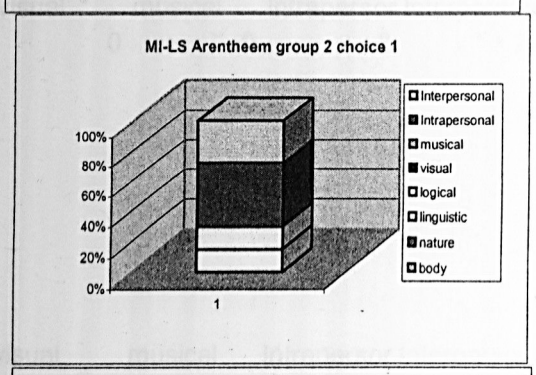
body	nature	linguistic	logical	visual	musical	Intrapersor	Interpersor	girls3	boy1
1	0	3	3	0	1	1	0		

A10

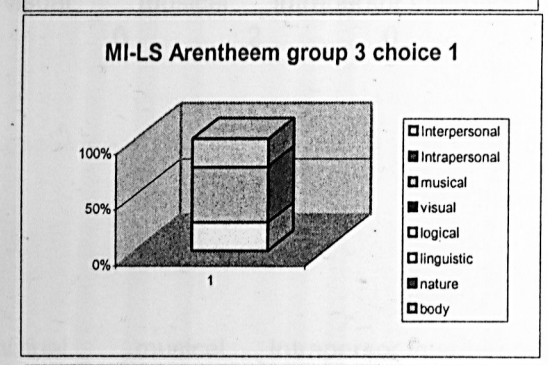
Arentheem 1 choice 1



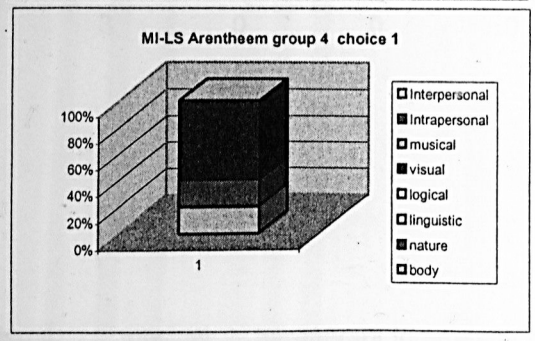
Arentheem 2 choice 1



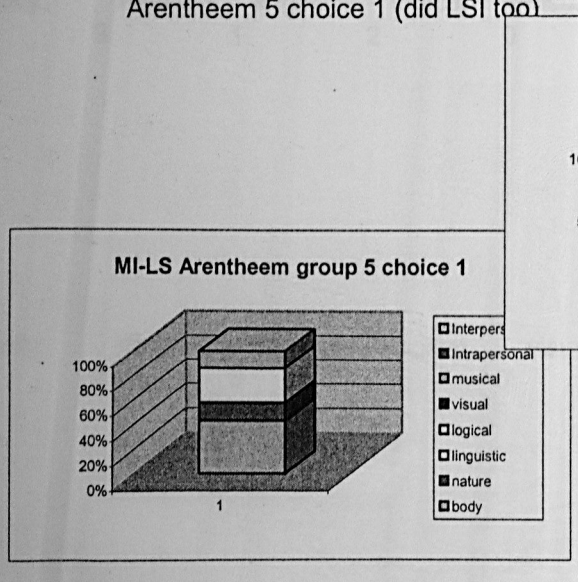
Arentheem 3 choice 1

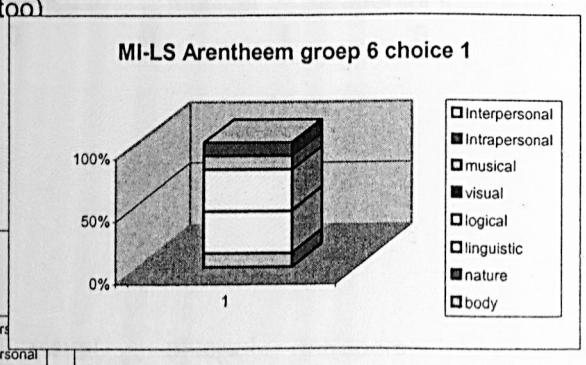


Arentheem 4 choice 1

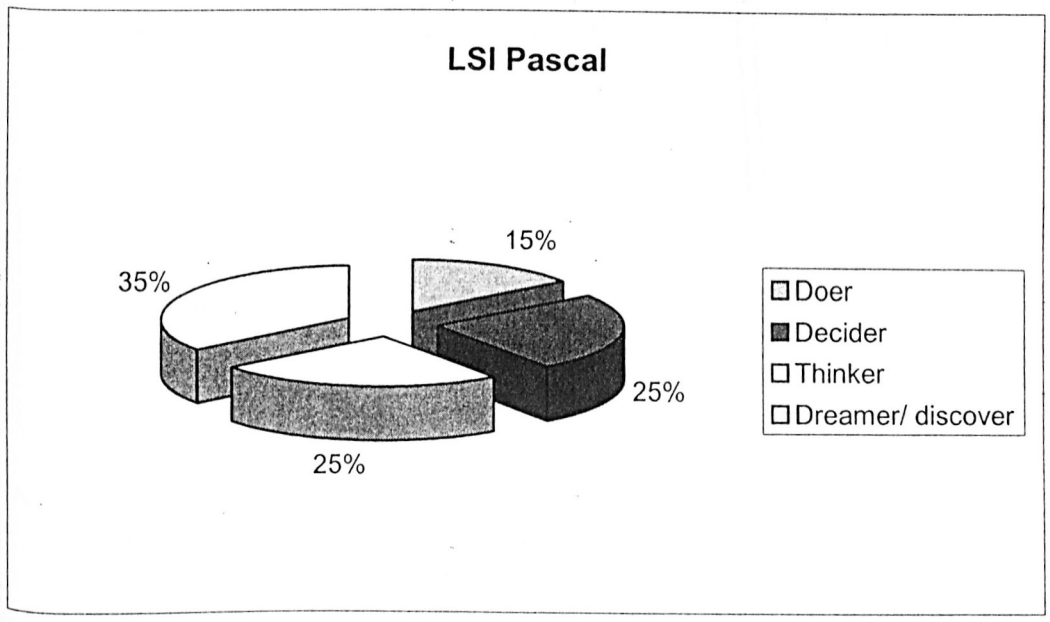


Arentheem 5 choice 1 (did LSI too)



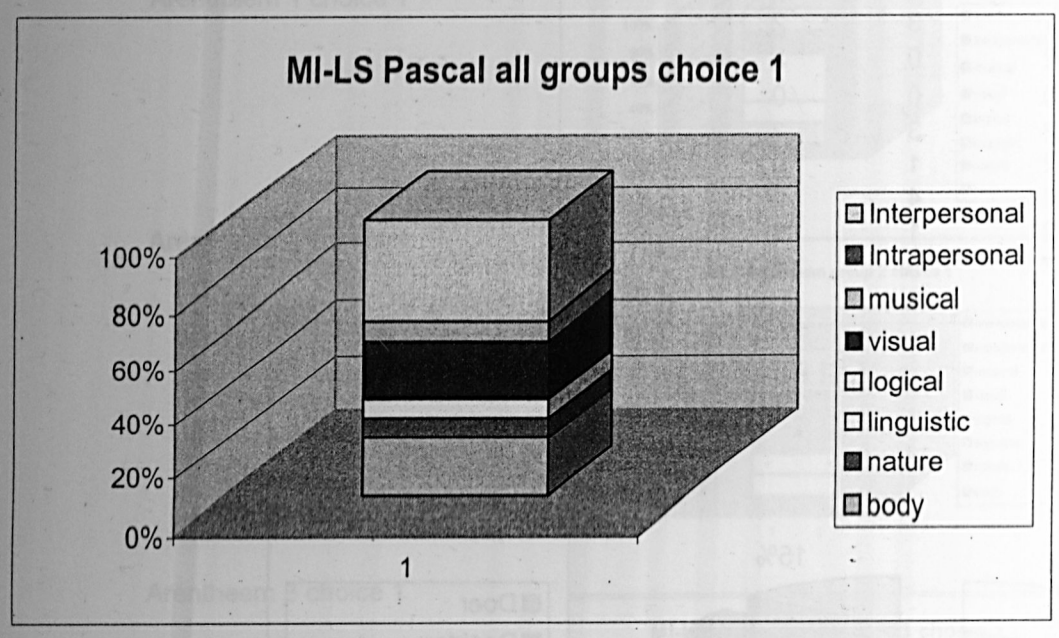


Doer	Decider	Thinker	Dreamer/ discover
3	5	5	7
5	1	2	2
4	1	3	2
5	2	0	3
10	0	0	0
3	2	3	2
7	2	1	0
4	2	4	0
7	2	1	0
48	17	19	16



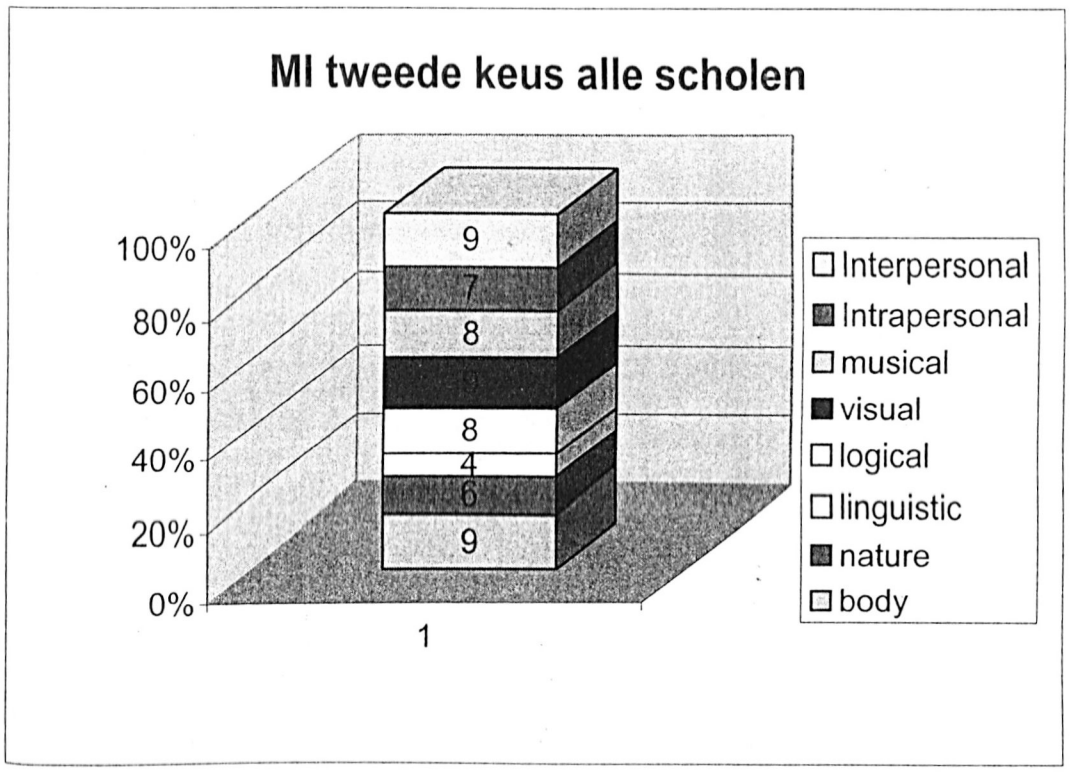
Appendix 9

body	nature	linguistic	logical	visual	musical	Intrapersor	Interpersonal
3	1	0	1	3	1	0	5



Appendix Pascal Total 12

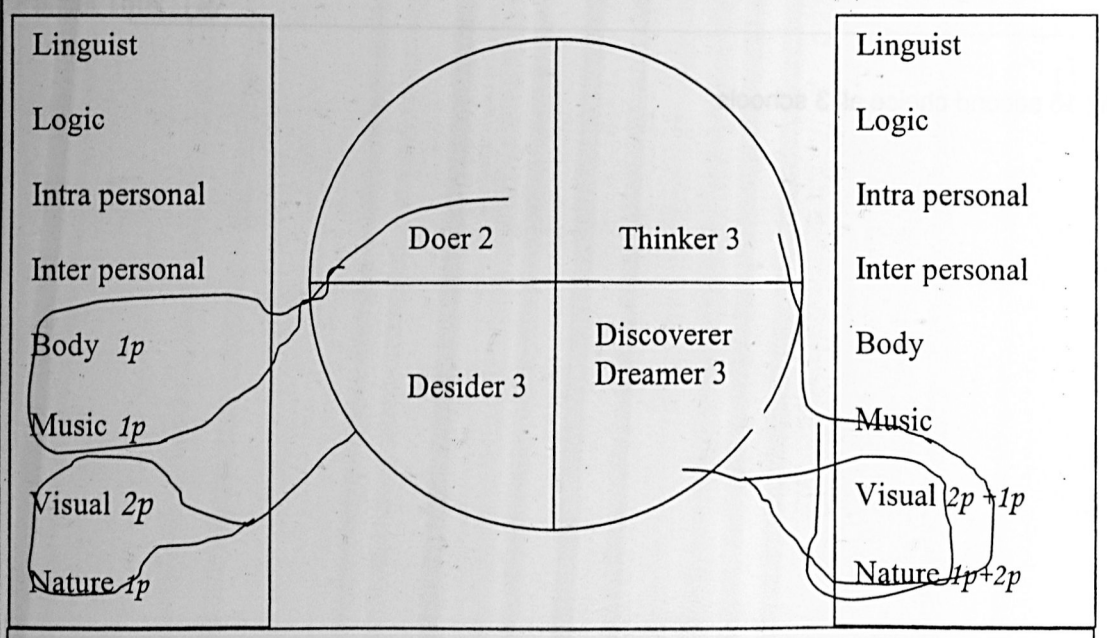
body	nature	linguistic	logical	visual	musical	Intrapersor	Interpersonal
9	6	4	8	9	8	7	9



Appendix ~~15~~ 14 second choice all 3 schools

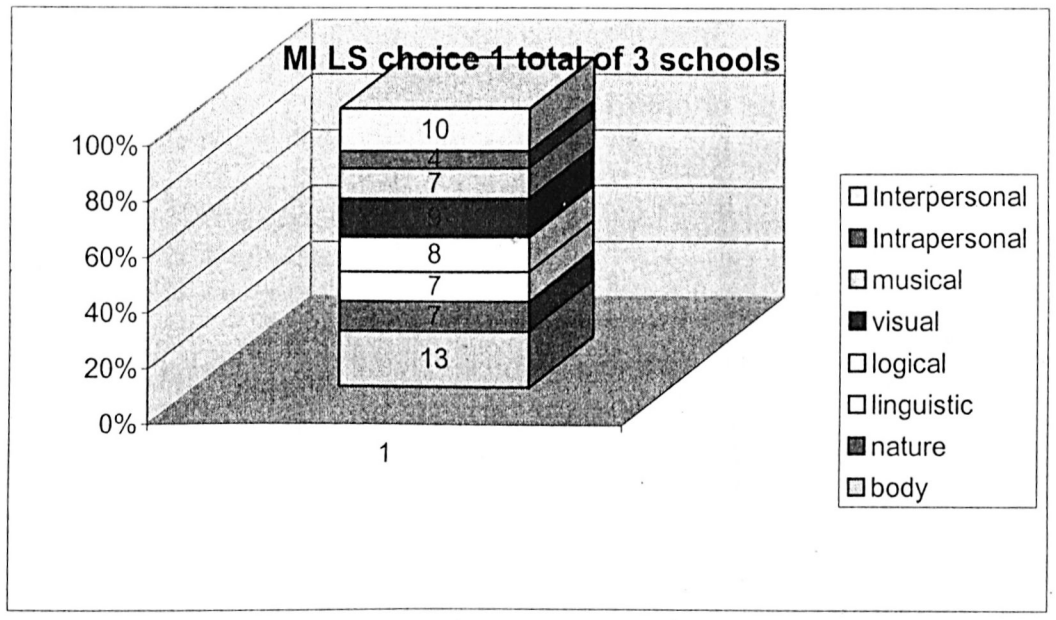
Appendix 18
Example: Samira -> peer Arien (after all they made a mistake- and took the mistake in the analysis.)

My learning styles:
Samira (Arentheem College) says: *" Body: most in doing sports, that's doing. Nature for thinking. I think in natural categories that's how I learn things. Nature also for deciding; if I understand the nature of things I can decide. I think in films, pictures and structures; I see what I know. Visual is thinking. Music is a need for me, music is everywhere, music is my fantasy, I discover the world with music and nature."*



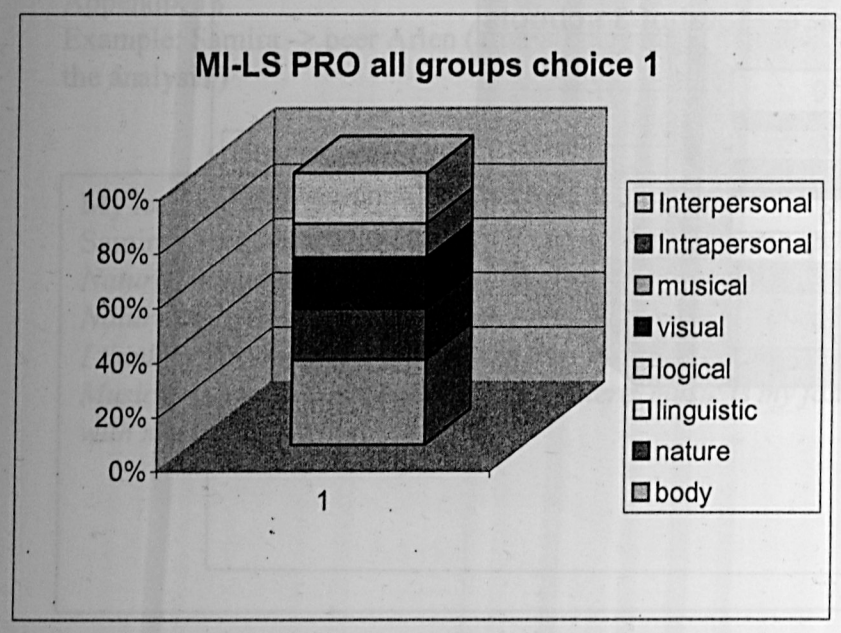
In which categories do you use your multiple intelligence talent (MI-LS)?
Do you use it as a doer, a thinker, a decider or a discoverer?
You have 10 points, give points to what you choose.

body nature linguistic logical visual musical Intrapersor Interpersonal
13 7 7 8 9 7 4 10



Appendix 15 total of 3 schools

body	nature	linguistic	logical	visual	musical	Intrapersor	Interpersonal
5	3	0	0	3	2	0	3



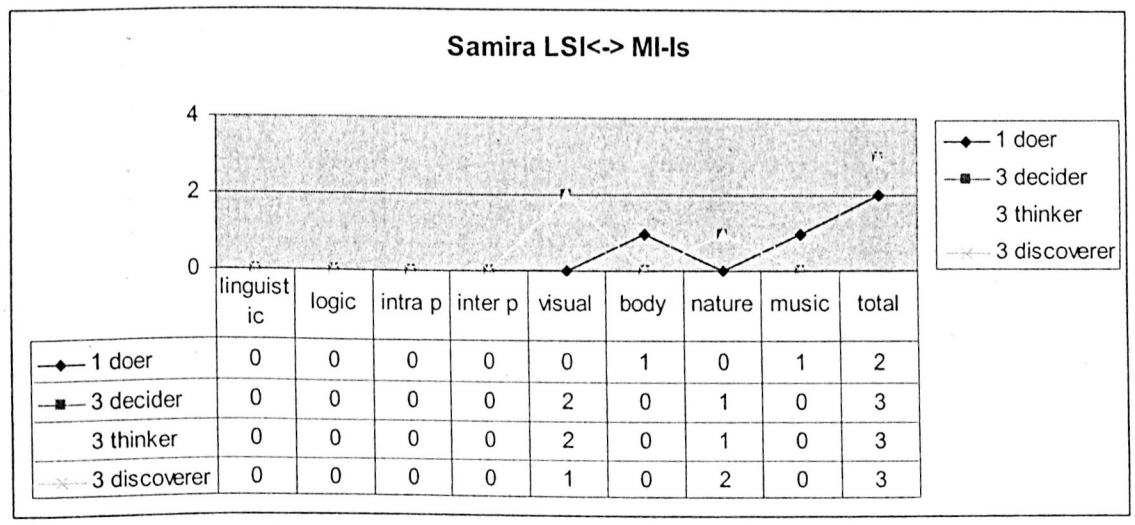
Appendix 14 Pro total

Appendix 16- 18
Qualitative research, peer to peer interviews.

In this part of the research project the students interviewed each other.
The central question was:
In which category of the LSI do you use your multiple intelligences?

Samira, Joep, Robin, Mette and Lia: Arentheem College gives the following answer if we ask the question:
In which categories do you use your multiple intelligence talent (MI-LS)?
Do you use it as a doer, a thinker, a decider or a discoverer?

Samira says:
Body most in doing sports, that's doing.
Nature for thinking, I think in natural categories that's how I learn things.
Nature also for deciding, if I understand the nature of things I can decide.
I think in films, pictures and structures, I see what I know. Visual is thinking.
Music is a need for me, music is everywhere, music is my fantasy, I discover the world with music and nature. See picture 4.X

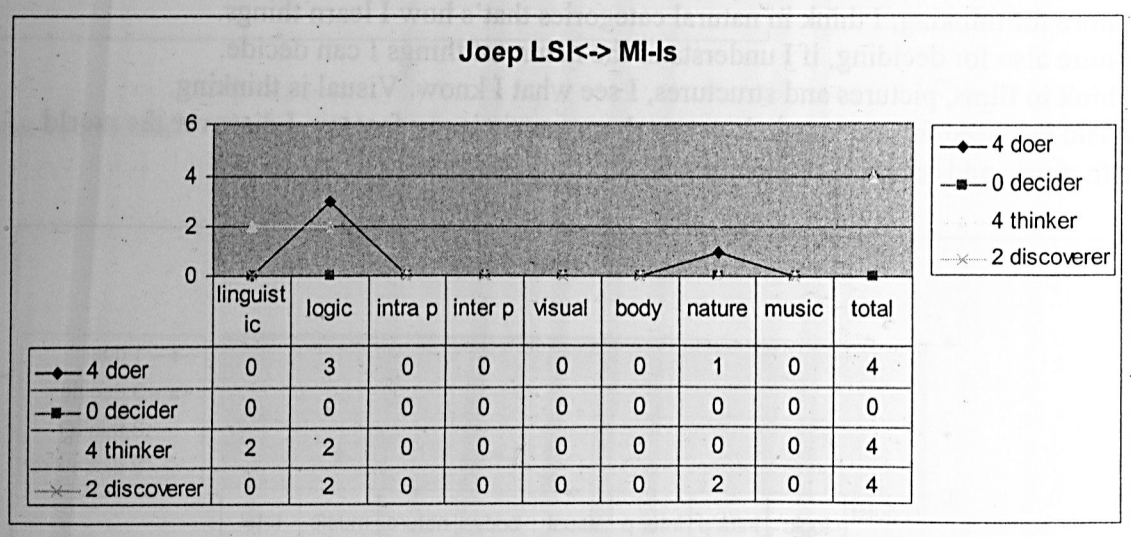


	linguistic	logic	intra p	inter p	visual	body	nature	music	total
1 doer	0	0	0	0	0	1	0	1	2
3 decider	0	0	0	0	2	0	1	0	3
3 thinker	0	0	0	0	2	0	1	0	3
3 discoverer	0	0	0	0	1	0	2	0	3

Picture 4 X

Joep says:

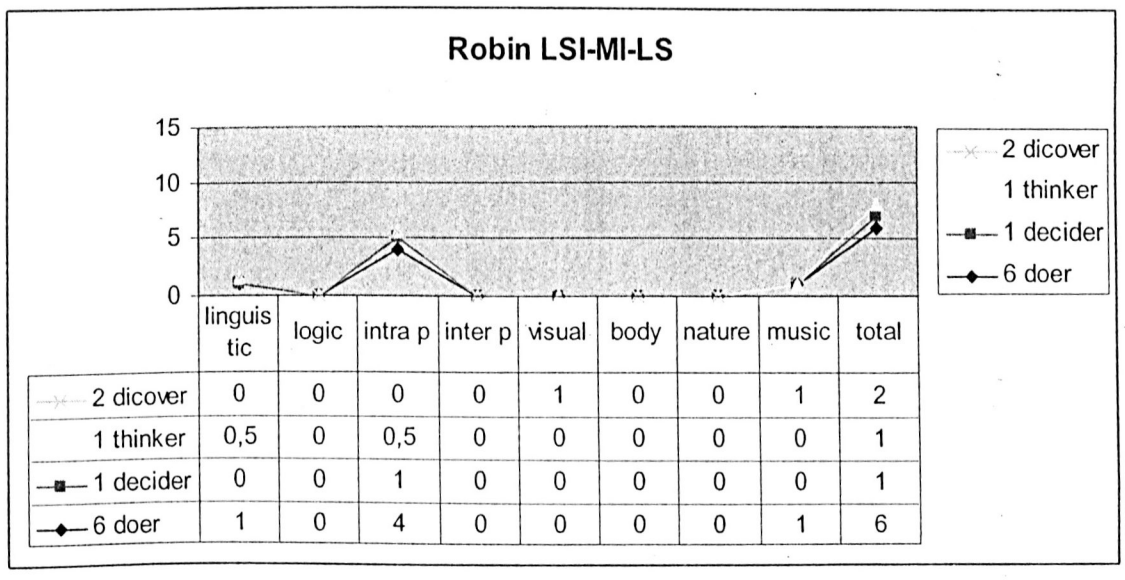
I like doing things, I like to do experiments in nature but also physics and learn because everything has a cause a logic, if I see the logic I can understand and hold it in mind.
After doing I look back and think, for thinking I use logic (graphs, tables, formulas) and words. I read a lot especially science and fiction.
To discover new ideas I use logic.
I am no decider, why should I everything is fine.



	linguistic	logic	intra p	inter p	visual	body	nature	music	total
4 doer	0	3	0	0	0	0	1	0	4
0 decider	0	0	0	0	0	0	0	0	0
4 thinker	2	2	0	0	0	0	0	0	4
2 discoverer	0	2	0	0	0	0	2	0	4

Robin says:

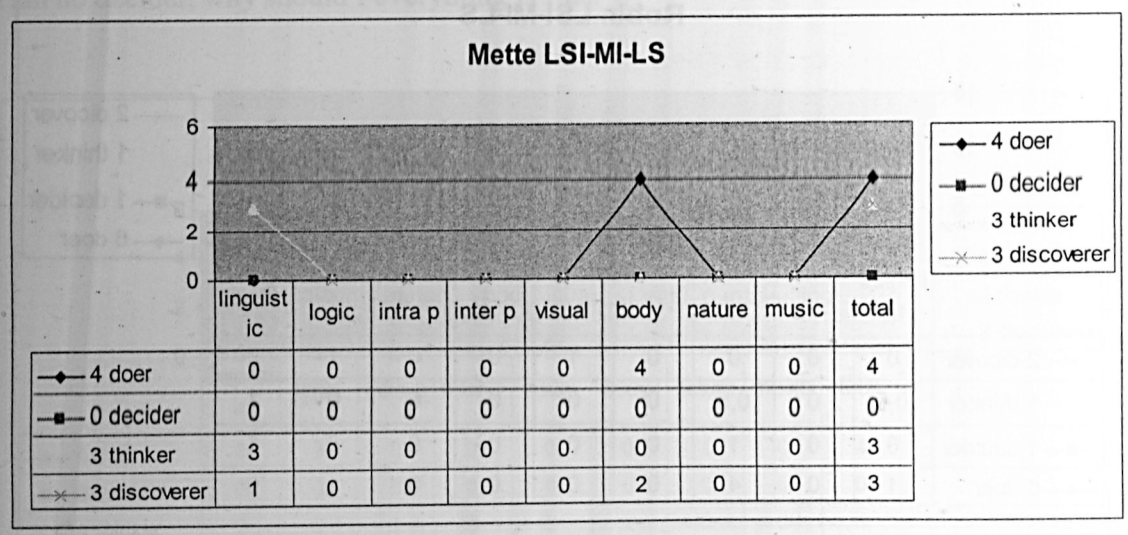
I am a doer but also a talker, I love to work in collaborative projects.
I think in words and pictures, I like reading. If I have to take decisions, I first ask my friends for advice.
I like to discover the world of music and art.



	linguistic	logic	intra p	inter p	visual	body	nature	music	total
2 dicover	0	0	0	0	1	0	0	1	2
1 thinker	0,5	0	0,5	0	0	0	0	0	1
1 decider	0	0	1	0	0	0	0	0	1
6 doer	1	0	4	0	0	0	0	1	6

Mette says:

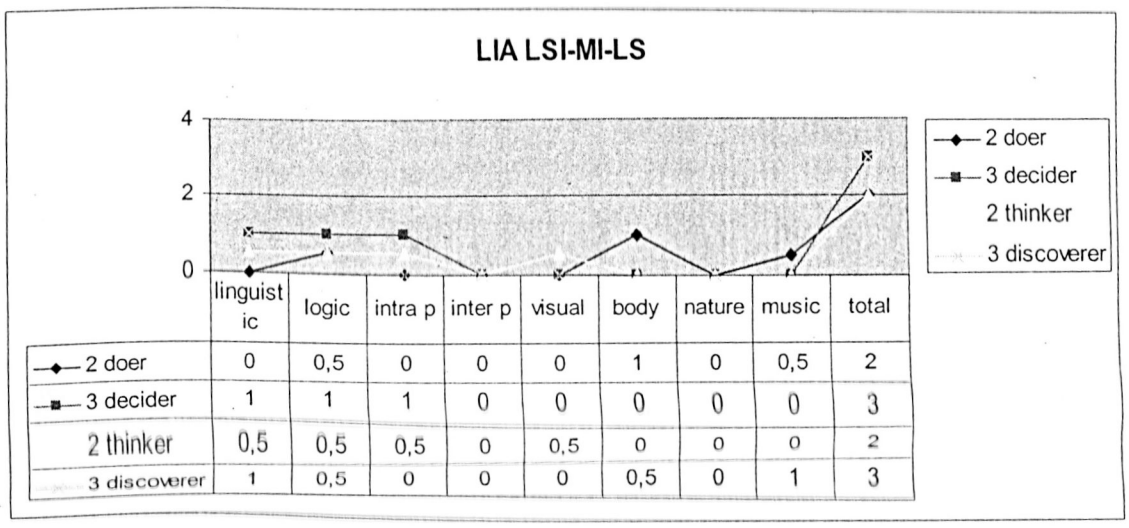
I learn from books and from the computer in words. I am a tester- doer.
I like to test to try out and discover what I learn. I write what I find out.
I think in words and discover.



	linguistic	logic	intra p	inter p	visual	body	nature	music	total
4 doer	0	0	0	0	0	4	0	0	4
0 decider	0	0	0	0	0	0	0	0	0
3 thinker	3	0	0	0	0	0	0	0	3
3 discoverer	1	0	0	0	0	2	0	0	3

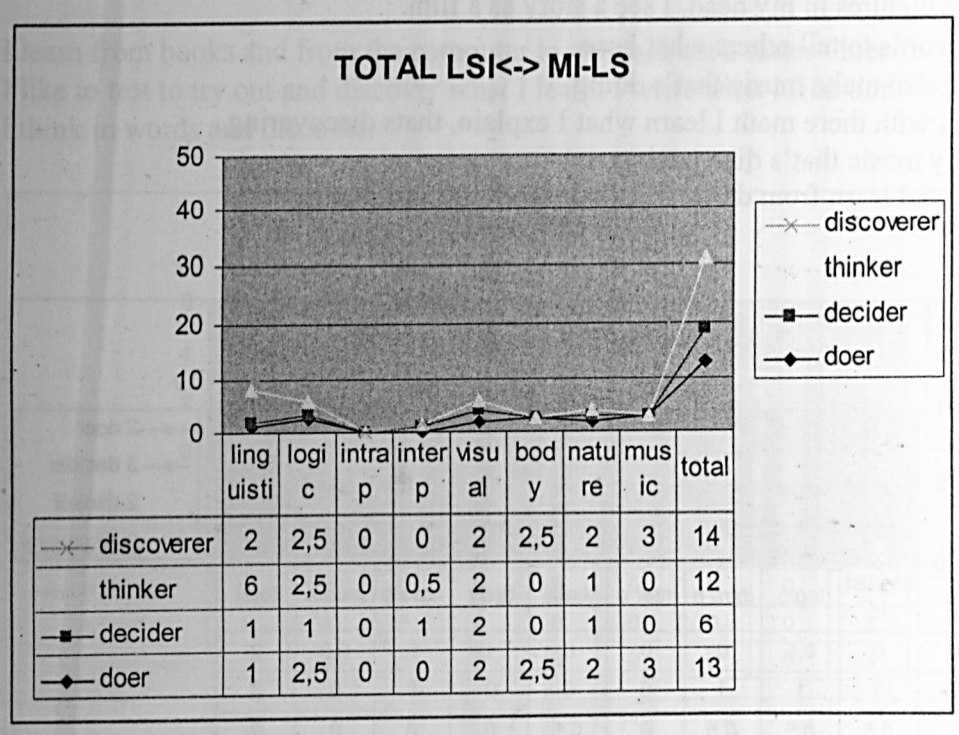
Lia says:

Thinking: I see pictures in my head, I see a story as a film.
I have to find words to tell others what I see.
That's doing. I also make music that's doing.
If I help others with there math I learn what I explain, thats discovering.
I write songs by music that's discovering.
I like to dance and learn from dance, that's discovering and doing.



	linguistic	logic	intra p	inter p	visual	body	nature	music	total
2 doer	0	0,5	0	0	0	1	0	0,5	2
3 decider	1	1	1	0	0	0	0	0	3
2 thinker	0,5	0,5	0,5	0	0,5	0	0	0	2
3 discoverer	1	0,5	0	0	0	0,5	0	1	3

Picture Total score of this group of five Arentheem



	linguisti	logic	intrap	interp	visual	body	nature	music	total
discoverer	2	2,5	0	0	2	2,5	2	3	14
thinker	6	2,5	0	0,5	2	0	1	0	12
decider	1	1	0	1	2	0	1	0	6
doer	1	2,5	0	0	2	2,5	2	3	13

Post research teachers Intake N=32 ɔendix 17

1 Do you know the personal learningstyles of your students?

	active formed	formed				
Yes	70%	0%	0%			
50% + More	20%	25%	0%			
25% + More	10%	55%	50%			
NO	0	20%	50%			
Total	100%	100%	100%			

2 Do you take this knowledge of personal learning styles of students into account in your les

	Active formed	formed				
Yes	70%	0%	0%			
If possible	20%	40%	10%			
Sometimes	10%	25%	20%			
NO	0%	35%	80%			
Total	100%	100%	110%			

3 Do students tell you which learningstyle they prefer?

	Active formed	formed				
Yes all	0%	0%	0%			
50% +	50%	10%	0%			
25%+ 50-	35%	55%	20%			
NO	15%	35%	80%			
totaal	100%	100%	100%			

4 Are there IOP's or IEP's for students?

	Active formed	formed				
yes	0%	0%	0%			
for some	100%	75%	80%			
don't know	0%	25%	20%			
no	0%	0%	0%			
totaal	100%	100%	100%			

5 Do you know the personal needs of students?

	Active formed	formed				
Yes	65%	0%	0%			
From 50%	15%	50%	0%			
From 25%	25%	15%	80%			
No	10%	35%	20%			
totaal	115%	100%	100%			

6 Do you take the personal learning needs of students into account in your lessons?

	Informed formed							
always	40%	0%	0%					
if possible	25%	45%	0%					
If needed	35%	30%	100%					
no	0%	25%	0%					
totaal	100%	100%	100%					

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Post research teachers N=32 Appendix 18

1 Do you know the personal learningstyles of your students?

	active	formed	formed			
Yes	100%	50%	0%			
50% + More	0	30%	0%			
25% + More	0	20%	50%			
NO	0	0%	50%			
Total	100%	100%	100%			

2 Do you take this knowledge of personal learning styles of students into account in your les

	Active	formed	formed			
Yes	100%	60%	50%			
If possible	0%	40%	50%			
Sometimes	0%	0%	0%			
NO	0%	0%	0%			
Total	100%	100%	100%			

3 Do students tell you which learningstyle they prefer?

	Active	formed	formed			
Yes all	0%	0%	0%			
50% +	80%	80%	60%			
25%+ 50-	20%	15%	20%			
NO	0%	5%	20%			
totaal	100%	100%	100%			

4 Are there IOP's or IEP's for students?

	Active	formed	formed			
yes	0%	0%	0%			
for some	100%	100%	80%			
don't know	0%	0%	20%			
no	0%	0%	0%			
totaal	100%	100%	100%			

5 Do you know the personal needs of students?

	Active	formed	formed			
Yes	70%	5%	0%			
From 50%	20%	75%	0%			
From 25%	10%	20%	80%			
No	0%	0%	20%			
totaal	100%	100%	100%			

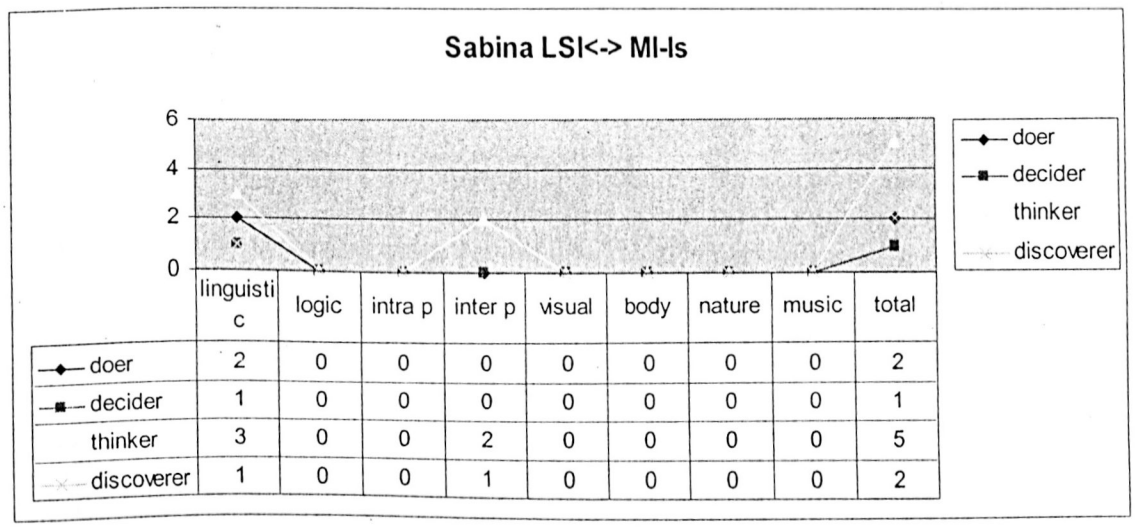
6 Do you take the personal learning needs of students into account in your lessons?

	Informed formed		
always	75%	24%	0%
if possible	25%	76%	0%
If needed	0%	0%	100%
no	0%	0%	0%
totaal	100%	100%	100%

Appendix 19
Qualitative research, peer to peer intervieuws.

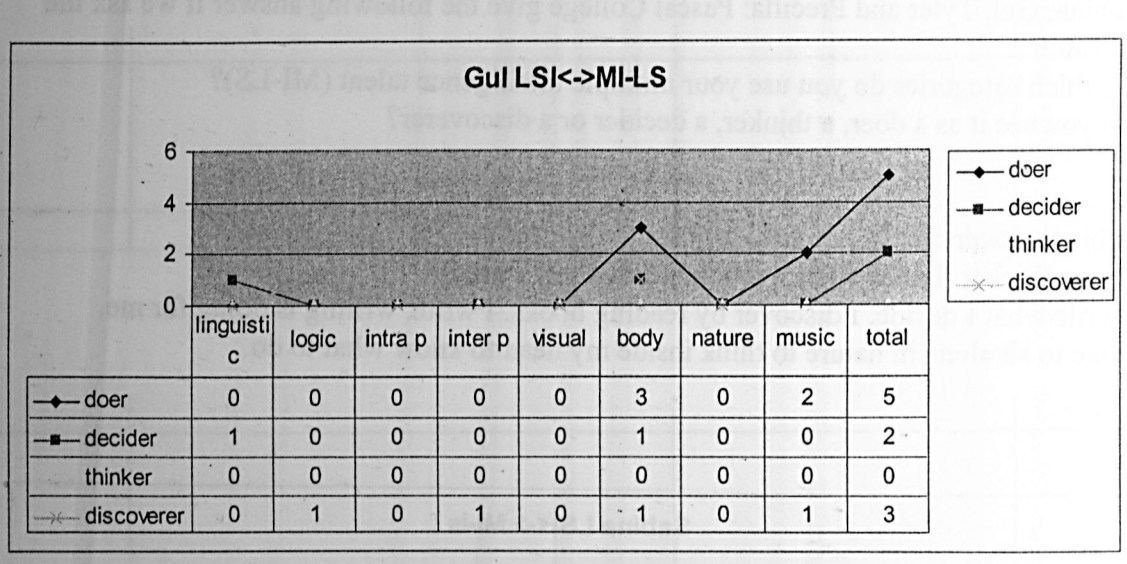
In this part of the research project the students interviewed each other.
The central question was:
In which category of the LSI do you use your multiple intelligences?
Sabina, Gul, Tyler and Precilla: Pascal College give the following answer if we ask the question:
In which categories do you use your multiple intelligence talent (MI-LS)?
Do you use it as a doer, a thinker, a decider or a discoverer?

Sabina answers:
I am a thinker. I need silence to think. I think in words.
I write what I decide. I discover by reading books. I write, writing is doing for me.
I like to sit alone in nature to think inside my head to know what to do.



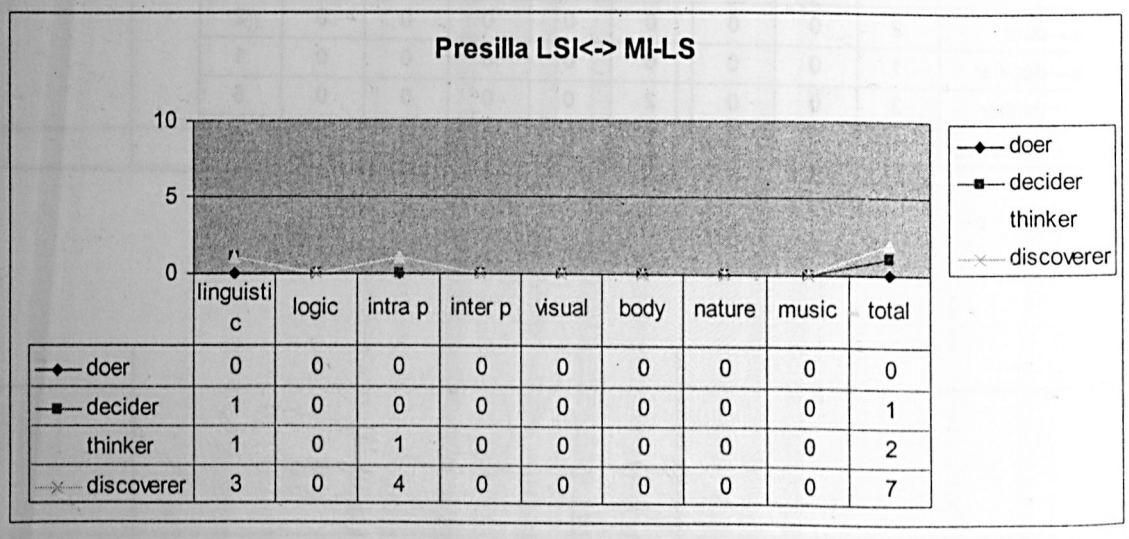
	linguistic	logic	intra p	inter p	visual	body	nature	music	total
doer	2	0	0	0	0	0	0	0	2
decider	1	0	0	0	0	0	0	0	1
thinker	3	0	0	2	0	0	0	0	5
discoverer	1	0	0	1	0	0	0	0	2

Gull answeres:
I am a doer. If I can exercise I can think and learn. I learn by experiment by doing things, sometimes I make bad errors. I learn from trail and error. I use exercise and music, also for discovering, I use the computer to discover and I play keybord. To decide I write in words.



	linguistic	logic	intra p	inter p	visual	body	nature	music	total
doer	0	0	0	0	0	3	0	2	5
decider	1	0	0	0	0	1	0	0	2
thinker	0	0	0	0	0	0	0	0	0
discoverer	0	1	0	1	0	1	0	1	3

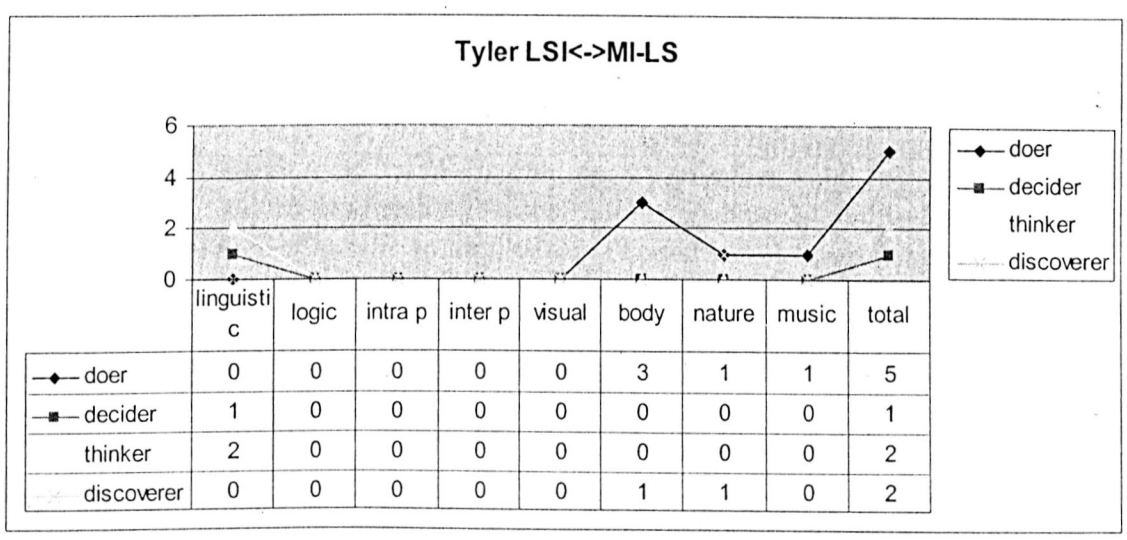
Presilla answeres:
I am a thinker. I like to be alone for thinking. Otherwise I will be stressed and I can't concentrate if there is noice. I like music, its good against stress. I use words to think . I like to work in collaborative projects. If I can tell my ideas I discover. I am a discoverer too.



	linguistic	logic	intra p	inter p	visual	body	nature	music	total
doer	0	0	0	0	0	0	0	0	0
decider	1	0	0	0	0	0	0	0	1
thinker	1	0	1	0	0	0	0	0	2
discoverer	3	0	4	0	0	0	0	0	7

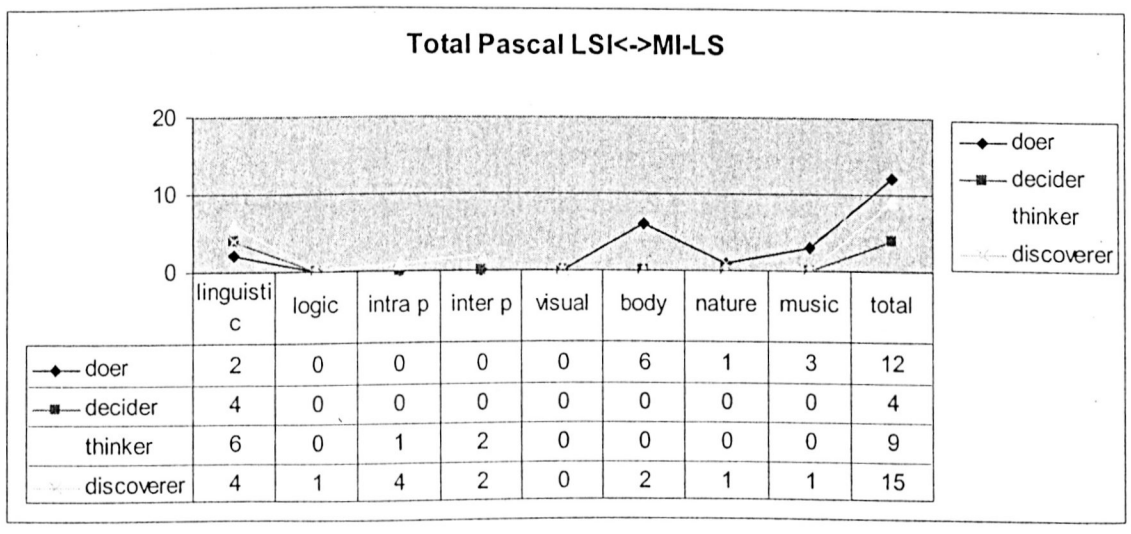
Tyler answeres:

I learn by exercise in nature. If you observe dogs, horses and even people you can learn a lot. I like to do try outs and experiments in sport. I am a doer and I am a thinker.
I like sports. I can't consentrate longer than 15 minutes.
I have to decide by myself
I think in words and in natural ordening



	linguistic	logic	intra p	inter p	visual	body	nature	music	total
doer	0	0	0	0	0	3	1	1	5
decider	1	0	0	0	0	0	0	0	1
thinker	2	0	0	0	0	0	0	0	2
discoverer	0	0	0	0	0	1	1	0	2

Total



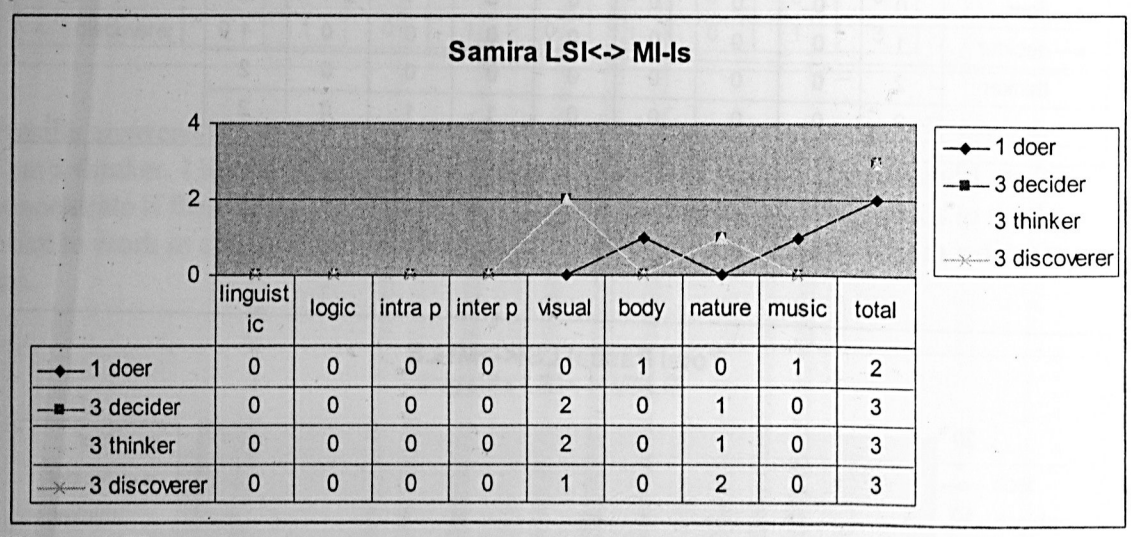
	linguistic	logic	intra p	inter p	visual	body	nature	music	total
doer	2	0	0	0	0	6	1	3	12
decider	4	0	0	0	0	0	0	0	4
thinker	6	0	1	2	0	0	0	0	9
discoverer	4	1	4	2	0	2	1	1	15

Appendix
Qualitative research, peer to peer intervieuws.

In this part of the research project the students interviewed each other.
The central question was:
In which category of the LSI do you use your multiple intelligences?

Samira: Arentheem College gives the following answer if we ask the question:
In which categories do you use your multiple intelligence talent (MI-LS)?
Do you use it as a doer, a thinker, a decider or a discoverer?

Samira says:
Body most in doing sports, that's doing.
Nature for thinking, I think in natural categories that's how I learn things.
Nature also for deciding, if I understand the nature of things I can decide.
I think in films, pictures and structures, I see what I know. Visual is thinking.
Music is a need for me, music is everywhere, music is my fantasy, I discover the world with music and nature. See picture 4.X



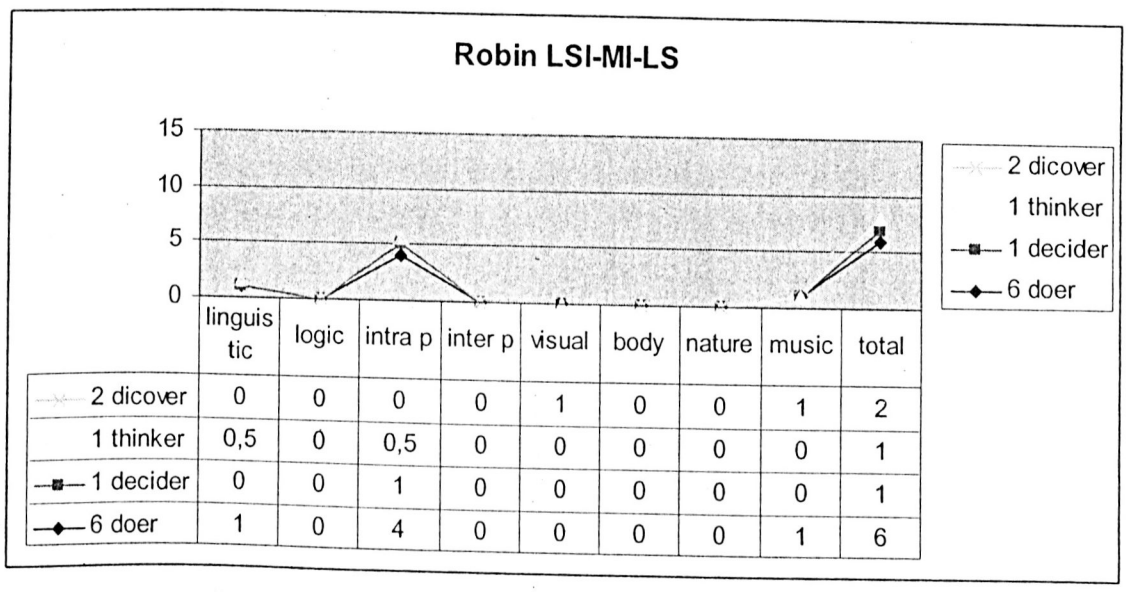
	linguistic	logic	intra p	inter p	visual	body	nature	music	total
1 doer	0	0	0	0	0	1	0	1	2
3 decider	0	0	0	0	2	0	1	0	3
3 thinker	0	0	0	0	2	0	1	0	3
3 discoverer	0	0	0	0	1	0	2	0	3

Picture 4 X

Joep says
I like doing things, I like to do experiments in nature but also physics and learn because everything has a cause a logic, if I see the logic I can understand and hold it in mind.
After doing I look back and think, for thinking I use logic (graphs, tables, formulas) and words. I read a lot especially science and fiction.
To discover new ideas I use logic.
I am no decider, why should I everything is fine.

Robin says:

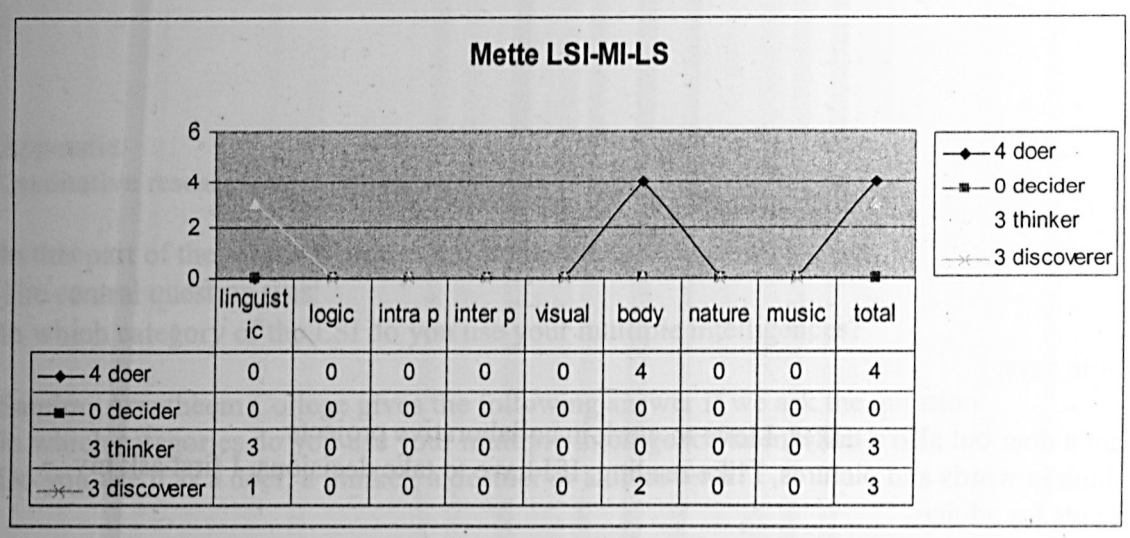
I am a doer but also a talker, I love to work in collaborative projects.
I think in words and pictures, I like reading. If I have to take decisions, I first ask my friends for advice.
I like to discover the world of music and art.



	linguistic	logic	intra p	inter p	visual	body	nature	music	total
2 dicover	0	0	0	0	1	0	0	1	2
1 thinker	0,5	0	0,5	0	0	0	0	0	1
1 decider	0	0	1	0	0	0	0	0	1
6 doer	1	0	4	0	0	0	0	1	6

Mette says:

I learn from books and from the computer in words. I am a tester- doer.
I like to test to try out and discover what I learn. I write what I find out.
I think in words and discover.



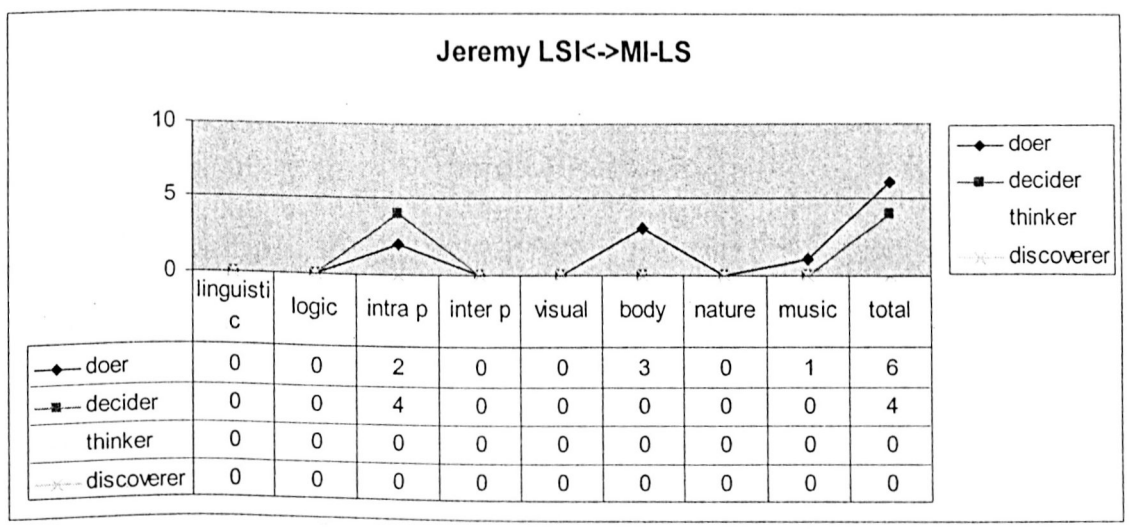
	linguistic	logic	intra p	inter p	visual	body	nature	music	total
4 doer	0	0	0	0	0	4	0	0	4
0 decider	0	0	0	0	0	0	0	0	0
3 thinker	3	0	0	0	0	0	0	0	3
3 discoverer	1	0	0	0	0	2	0	0	3

Appendix 20
Qualitative research, peer to peer intervieuws.

In this part of the research project the students interviewed each other.
The central question was:
In which category of the LSI do you use your multiple intelligences?

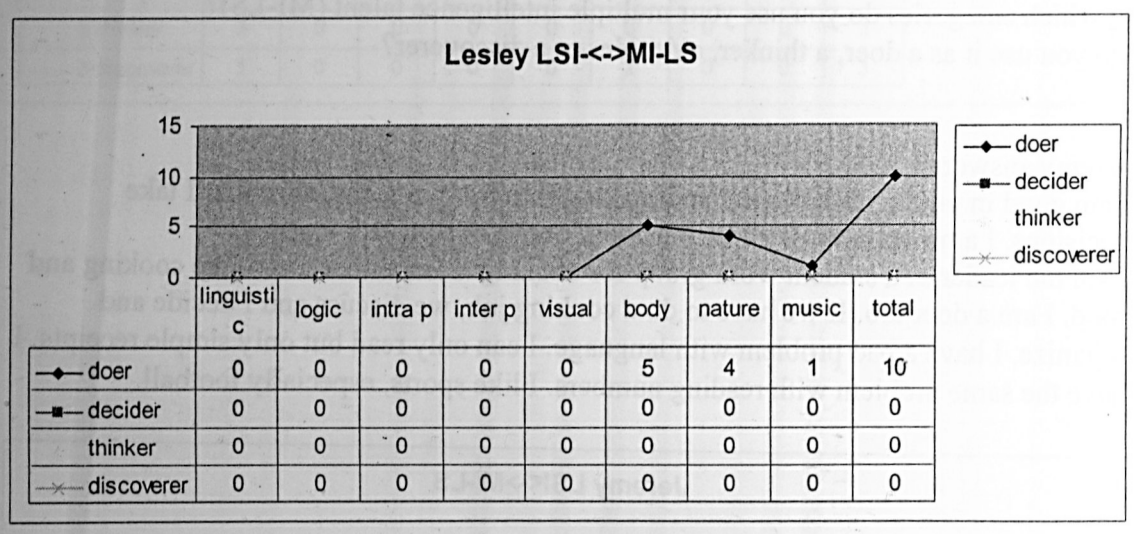
Jeremy, Lesley, Anna and Mariska: PRO Rotterdam give the following answer if we ask the question:
In which categories do you use your multiple intelligence talent (MI-LS)?
Do you use it as a doer, a thinker, a decider or a discoverer?

Jeremy answers:
I am good in putting things apart and making step by step plans, after that I take decisions. I am a decider. I like group work and group project work.
I am the leader of a student work group for cooking. I am a doer too. I like cooking and food. I am a doer too. If we have to do a cooking job, we discuss and I decide and organize. I have a bad problem with language. I can only read but only simple receipts. I have the same problem with reading numbers. I like sports, especially football.



	linguistic	logic	intra p	inter p	visual	body	nature	music	total
doer	0	0	2	0	0	3	0	1	6
decider	0	0	4	0	0	0	0	0	4
thinker	0	0	0	0	0	0	0	0	0
discoverer	0	0	0	0	0	0	0	0	0

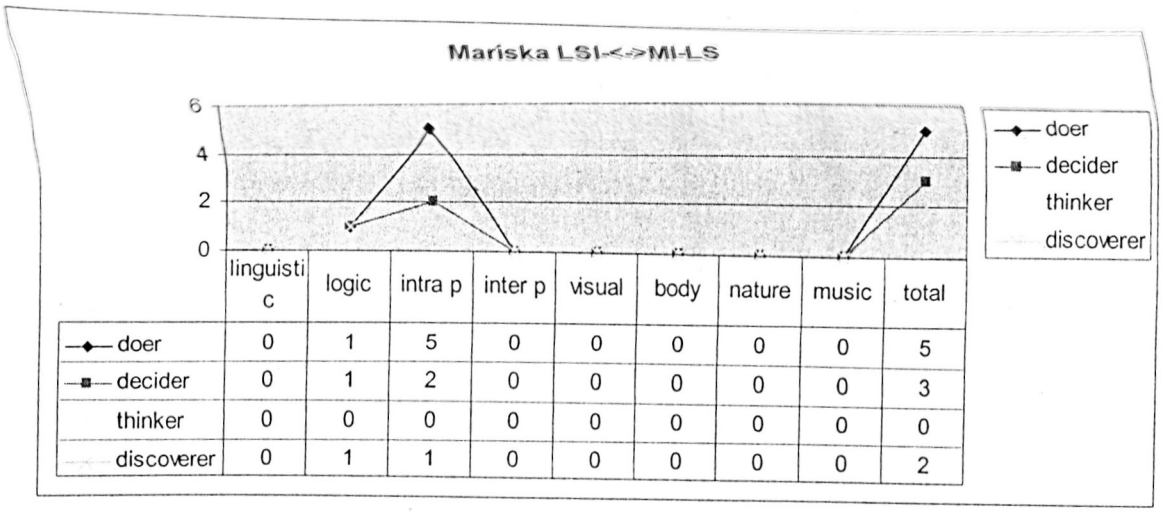
Lesley answers:
Nature is my thing. I am a doer. I like sport and music too. I like threes and dogs and cats and birds especially birds. I like to care for threes and birds. I tell others how they can care for them. I like to become a guide in nature or a safeguard for trees and birds.



	linguistic	logic	intra p	inter p	visual	body	nature	music	total
doer	0	0	0	0	0	5	4	1	10
decider	0	0	0	0	0	0	0	0	0
thinker	0	0	0	0	0	0	0	0	0
discoverer	0	0	0	0	0	0	0	0	0

Mariska answers:

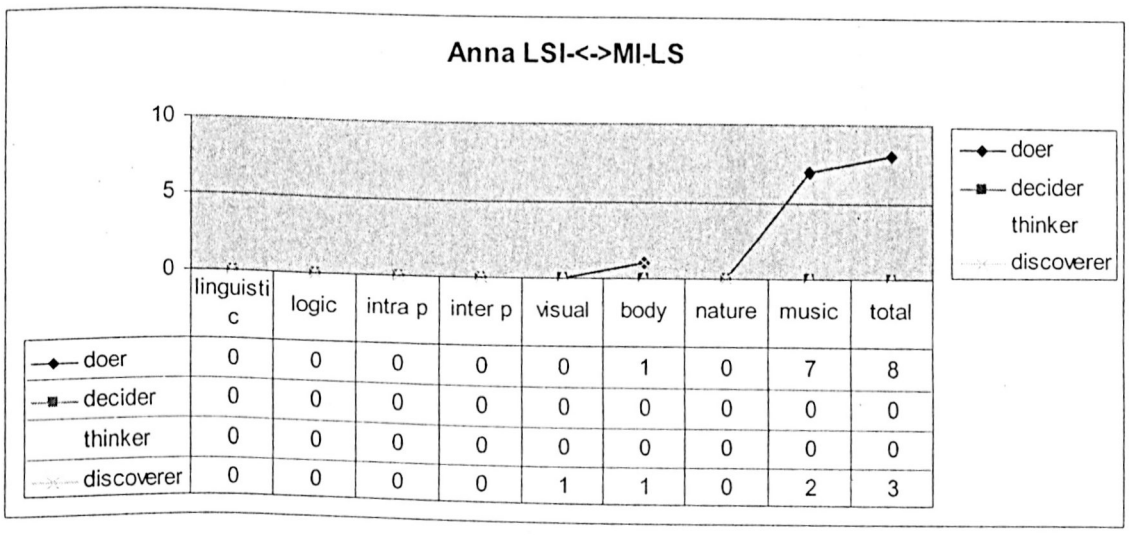
I can count, I can think in numbers. I am a doer. Like to work in a supermarked. I work for my supermarked certificate. I like plays and traveling, I am a little bit discoverer but I have problems with reading maps. I like people and I am a very good helper. I have a lot of friends.



	linguistic	logic	intra p	inter p	visual	body	nature	music	total
doer	0	1	5	0	0	0	0	0	5
decider	0	1	2	0	0	0	0	0	3
thinker	0	0	0	0	0	0	0	0	0
discoverer	0	1	1	0	0	0	0	0	2

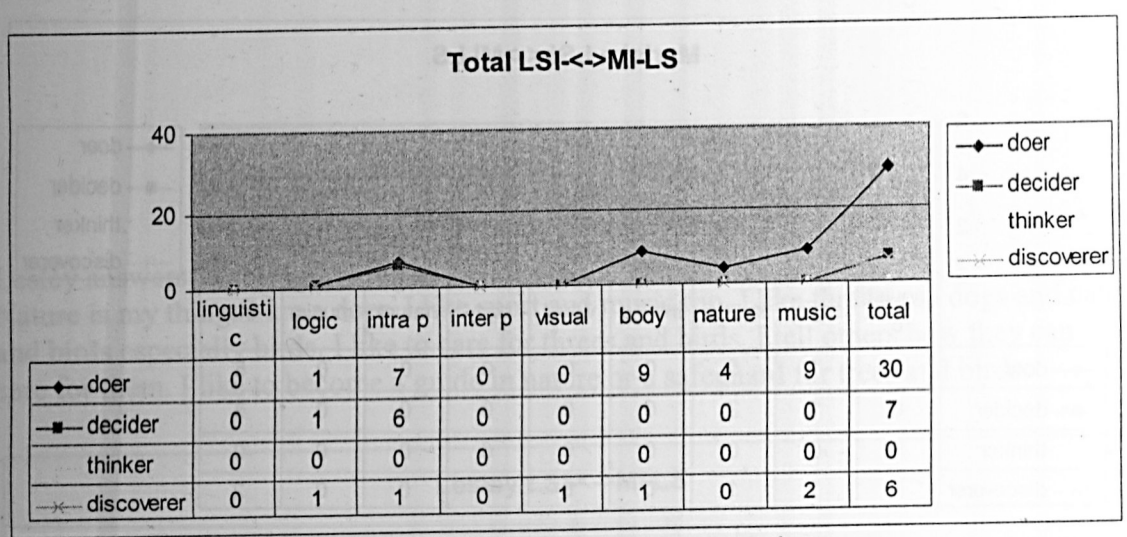
Anna answers:

I like music. I play piano and guitar and flute. I have music lessons 3 times a week and I sing in a chor. I am a very bad reader and I have bad problems with math. No I don't like sports, but I can dance. I have no friends. I think I am a dreamer, I have a lot of fantasy, I can draw and make my own music. Is that a discoverer too?



	linguistic	logic	intra p	inter p	visual	body	nature	music	total
doer	0	0	0	0	0	1	0	7	8
decider	0	0	0	0	0	0	0	0	0
thinker	0	0	0	0	0	0	0	0	0
discoverer	0	0	0	0	1	1	0	2	3

Total of 4 students



	linguistic	logic	intra p	inter p	visual	body	nature	music	total
doer	0	1	7	0	0	9	4	9	30
decider	0	1	6	0	0	0	0	0	7
thinker	0	0	0	0	0	0	0	0	0
discoverer	0	1	1	0	1	1	0	2	6

Appendix 24 Casus: Lesley X

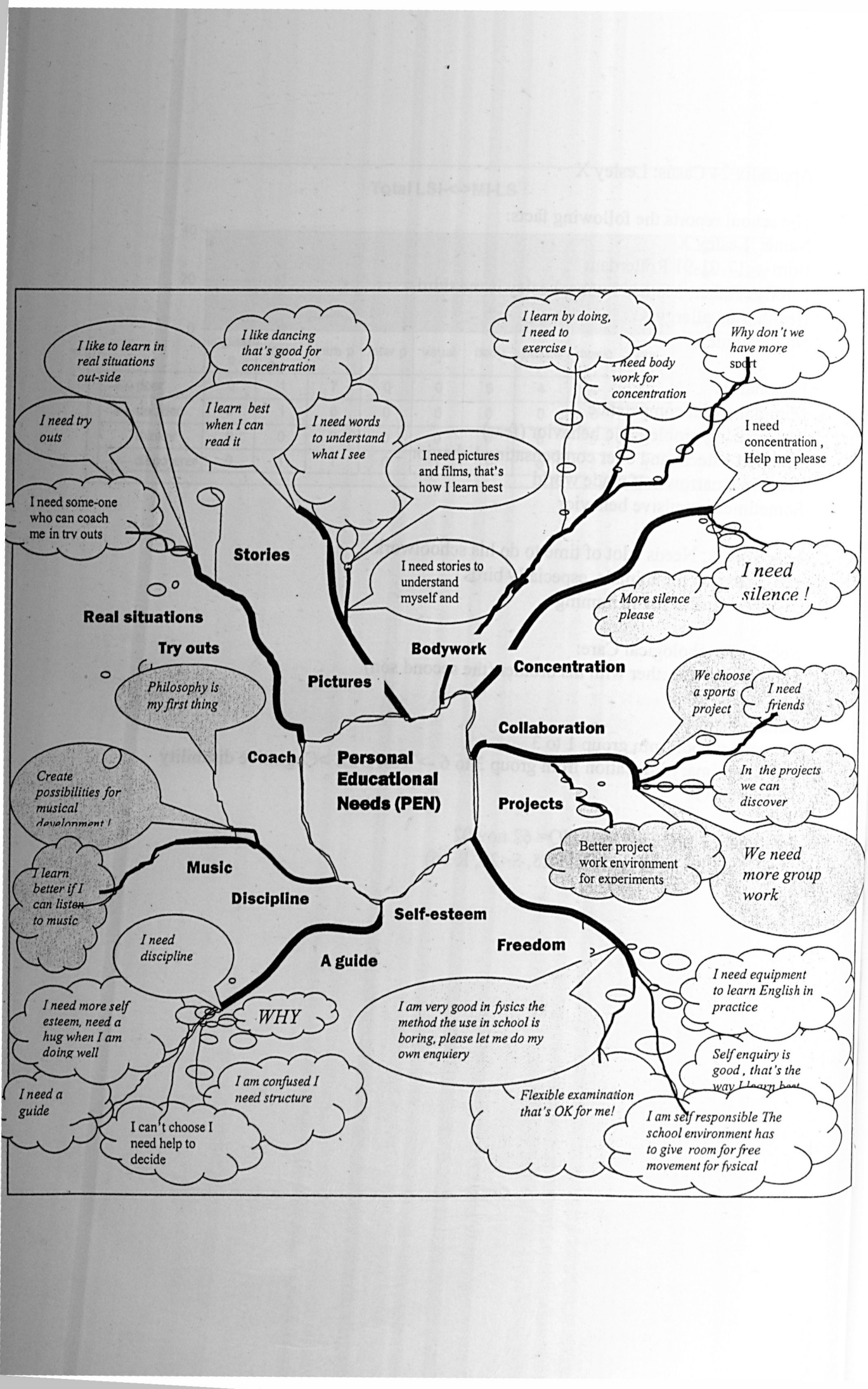
The school reports the following facts:
Name: Lesley X
Born : 17-01-91 Rotterdam
Family: Father, Mother 3 sons, Lesley is the third
Health: Sun allergy
No medicine

Personality:
Minimal social competence
Internalizing problematic behavior (fear)
Low self-esteem and over compensating behavior
Lives in a narrow self made world
Sometimes impulsive behavior

Schoolwork: Needs a lot of time to do his schoolwork
Has a passion for animals, especially birds
Two certificates for swimming

Social –Psychological Care:
Is in therapy together with his brother (the second son)

School history
Primary school from group 1 to 3
Special primary Education from group 3 to 6 -> Test DLE >Cognitive disability
Advice PRO
Tests:
Intelligence IBO Diff test TIQ= 62 nov 02
DLE TDLE= 53 (TL 25, BL<25, S<20, R 16)


Personal Educational Needs (PEN)
Stories
Real situations
Try outs
Pictures
Coach
Music
Discipline
Self-esteem
A guide
Freedom
Bodywork
Concentration
Collaboration
Projects
I like to learn in real situations out-side
I like dancing that's good for concentration
I need try outs
I learn best when I can read it
I need words to understand what I see
I need pictures and films, that's how I learn best
I need some-one who can coach me in try outs
I need stories to understand myself and
Philosophy is my first thing
Create possibilities for musical development !
I learn better if I can listen to music
I need discipline
I need more self esteem, need a hug when I am doing well
I need a guide
WHY
I am confused I need structure
I can't choose I need help to decide
I learn by doing, I need to exercise
Why don't we have more sport
I need body work for concentration
I need concentration , Help me please
More silence please
I need silence !
We choose a sports project
I need friends
In the projects we can discover
Better project work environment for experiments
We need more group work
I need equipment to learn English in practice
I am very good in fysics the method the use in school is boring, please let me do my own enquiery
Self enquiry is good , that's the
Flexible examination that's OK for me!
I am self responsible The school environment has to give room for free movement for fysical

Appendix 25 Casus: Sabina X

The school reports the following facts:
Name: Sabina X
Born : 20-01-93 Zaandam
Family: Father, Mother, 1 daughter and two sons Sabina is the first.
Multiple probems: Father Alcohol, Mother Drugs, Abuse
Lives in another family wit two girls since 01-02-04
Health: Problems with food (anorexia?)
No medicine, once a week to the medical centre for diet therapy

Personality:
Internalizing problematic behavior (fear and very introvert)
Low self-esteem.
Last year more open, made new friends in the group (Y and Y)

Schoolwork:
Good in language, weak in exact matters: 15-12-06

Test Dutch	>	8-9 (very good)
Test English	>	8 (good)
Test French	>	7-8
Mathamatics	>	2 failed
Physics	>	4 failed
Biology	>	6
Science	>	6
ICT	>	5
CKV (arts)	>	5

(In the Netherlands children score on a scale between 1 and 10)

Social –Psychological Care: Victum of child abuse (father)
Is in therapy 2 times a week. (backpack)
Needs extra social emotional coaching (mentor A.X)

School history
Primary school from group 1 to 8
Secondary education advice HAVO (problems)
Secondary education VMBO Basis Kader (no practical ambition)
Secondary education VMBO TL (Pascal)

Tests:
Intelligence IBO Diff test TIQ= 82 febr. 03

Appendix 26 Casus: Marcus X

The school reports the following facts:
Name: Marcus X
Born : 12- 04-94 Roermond
Family: Father, Mother 2 sons, 2 daughters. Marcus is the 4the child.
Father has a farm, mother works in health care.
Health: normal
No medicine

Personality:
Optimistic boy.
Has a lot of energy, some-times a bit to active.
Enthusiast and social, some times stressed
Short concentration time-scale
Sometimes impulsive

Schoolwork:
School results are normal > good
Needs more self discipline
Jumps from one thing to another
Tractor Certificate
Three certificates for swimming

School history
Primary school from group 1 to 8
School advice HAVO
HAVO- VWO (1 year)
VMBO 3 years
MBO niveau 3

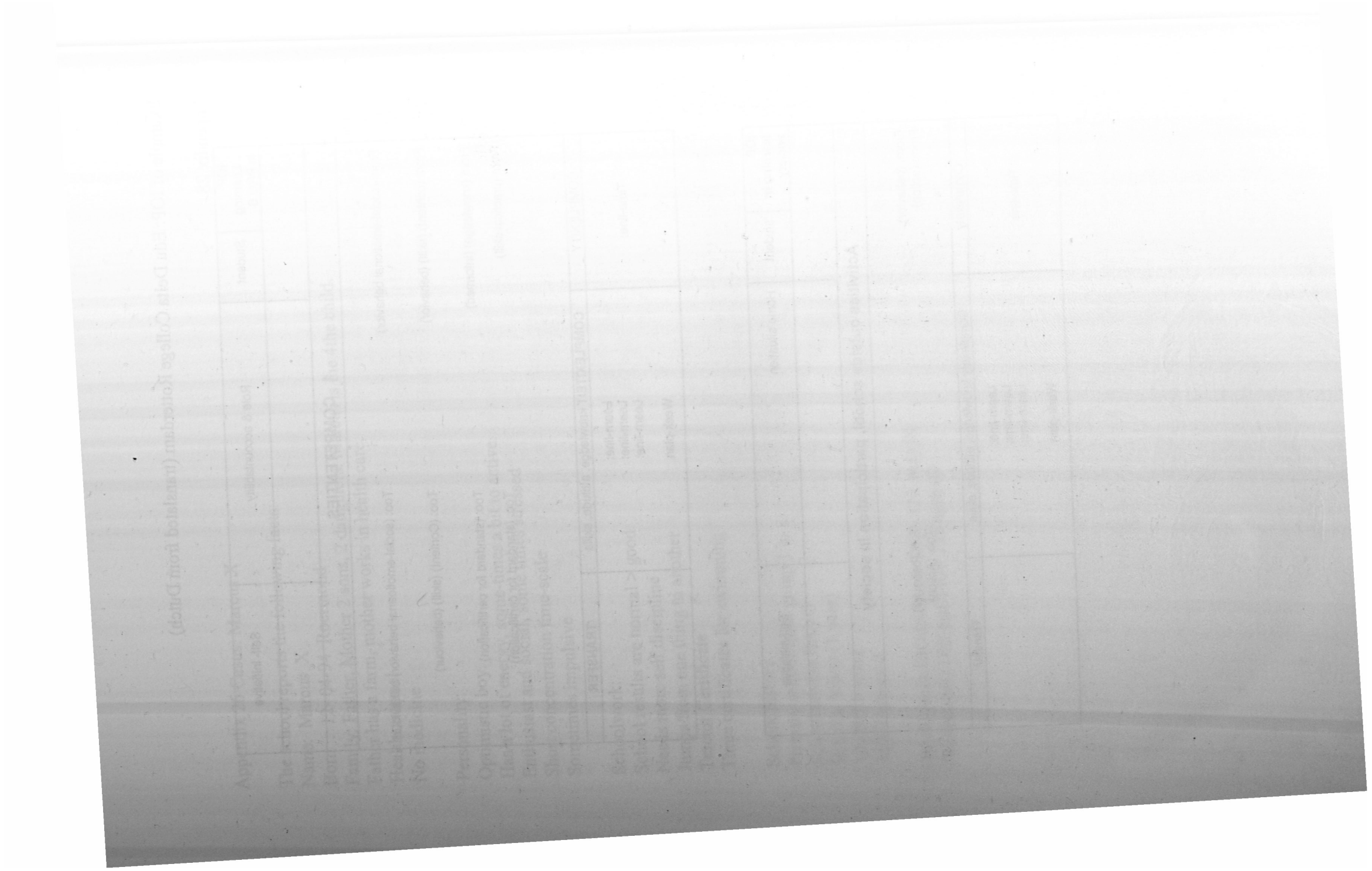
Intelligence IBO Diff test TIQ= 120 may 01
Re-test IBO Diff test TIO= 118 april 03

Example of IOP: Edu Delta College Rotterdam (translated from Dutch)

Appendix 28

IOP Learning in PRO B	Student	Role & accountability	Self- initiative
1 COMPETENTIES			
From (social-emotional behavior) From (content) (skill) (behavior) From (knowledge) (informed) From (practical skill)		Too: (social-emotioanal behavior) behaviour) Too: (Content) (skill) (behaviour) Too: (standard for certification) Too: (standard for certification)	
COMPLEXITY	**COMPLEXITEIT** knowledge, attitude, skills		**TRANSFER**
Time-line:	Learn-line: Learn-line: Learn-line: Week-plan		

IOP learning in society	student	Home situation	Self-initiative
Activities outside school, participation in society			
From: (behavior) From: (action)		Too: (behavior) Too: (Action)	
Complexety	Complexety knowledge, attitude, skills		Transfer
Time-line	Learn-line: Learn-line: Learn-line: Week-plan		



A 29

De stem van de leerling → The voice of the student

Spiegelgesprek → mirror talk

In een spiegelgesprek houden leerlingen, docenten en schoolleiding elkaar figuurlijk een spiegel voor op basis van ervaringen en deskundigheid. Het spiegelgesprek is een vorm van kwaliteitstoetsing waarbij leerlingen, docenten en schoolleiding indirect met elkaar in gesprek gaan over kwaliteit.

In de eerste ronde praten leerlingen in een kring, onder leiding van een ervaren gespreksleider over de ervaren kwaliteit . Om de kring van leerlingen heen zitten de docenten en schoolleiding. Hun taak is luisteren en zwijgen.

In de tweede ronde is de situatie omgekeerd. Op basis van de uitgesproken ervaringen van leerlingen praten de docenten en schoolleiding over twee dingen:
- waarom is het onderwijs zo ingericht zoals de leerlingen ervaren?
- wat zou er eventueel anders kunnen?
De leerlingen luisteren dit keer.

Een spiegelgesprek levert de organisatie het volgende op:
- inzicht in de ervaringen van leerlingen;
- inzicht in het imago van de organisatie;
- Ideeën voor kwaliteitsverbetering.