

# **TABLE OF CONTENTS**

## **Chapter 1**

### **General orientation**

1.1	Introduction	1
1.2	Focus on the brain	3
1.3	Accelerated learning and multiple intelligences	5
1.4	The successful implementation of accelerated learning by means of MI	7
1.5	The relationship between MI and outcomes based education (OBE)	8
1.6	Current problems in education and the need for a better teaching approach	10
1.7	Research rationale	12
1.8	Problem statement	14
1.9	Research aims	14
1.10	Research design	15
	1.10.1 Research participants in the study	16
	1.10.2 Research methods	18
1.11	Chapter division	19

## **Chapter 2**

### **The application of accelerated learning techniques with special reference to multiple intelligences: A theoretical exposition**

2.1	Introduction	20
2.2	Intelligence defined	20
2.3	Theories of intelligence	22
	2.3.1 The theory of intelligence as intelligent quotient (IQ)	22
	2.3.2 The theory of emotional intelligence	23

2.3.3	Intelligence as the “g” factor	25
2.3.4	The Triarchic theory of human intelligence	25
2.3.5	Intelligence theory as seven or more distinct factors	25
2.4	Concerns about intelligence measurement	26
2.5	Accelerated learning	28
2.6	The theory of multiple intelligences	30
2.6.1	Background	30
2.6.2	Gardners’ view of intelligence	31
2.6.3	Criteria that an intelligence has to meet	31
2.6.4	The eight intelligences	35
2.6.4.1	Linguistic intelligence	35
2.6.4.2	Logical-mathematical intelligence	39
2.6.4.3	The musical intelligence	44
2.6.4.4	Spatial intelligence	49
2.6.4.5	Bodily-kinesthetic intelligence	53
2.6.4.6	The intrapersonal intelligence	57
2.6.4.7	The interpersonal intelligence	61
2.6.4.8	The naturalist intelligence	63
2.7	Summary	65

## **Chapter 3**

### **Research design and methodology**

3.1	Introduction	67
3.2	Research aims	67
3.3	Research design	68
3.4	Research methods	70
3.4.1	Selection of participants	71
3.4.2	Visit to the USA	74
3.5	Data collection	75
3.5.1	Computer generated brain profile assessment	75
3.5.2	Content analysis	77
3.5.3	Direct observation and participant observation	78

3.5.4	Field observations, field notes and supplementary techniques	81
3.5.5	Meetings	82
3.5.6	Reports (school records)	83
3.5.7	Questionnaires	83
3.6	Data processing	84
3.7	Validity	85
3.8	Ethical measures	86
3.9	Summary	88

## **Chapter 4**

### **Data analysis and interpretation**

4.1	Introduction	89
4.2	Preliminary observations and informal interviews at an MI school in the USA	90
4.2.1	The New City School	90
4.2.1.1	Background	90
4.2.1.2	Observations at New City School	91
4.3	Findings from a preliminary interview held at the Harvard Graduate School of Education	95
4.4	Results of the case study	97
4.4.1	Background to the case study undertaken in this project	97
4.4.2	Background to and results of the brain profile assessments	100
4.4.3	Content analysis of teachers' written preparation documents	106
4.4.4	Observation of lesson presentations	112
4.4.5	Observation of teachers' attitude	120
4.4.6	Regular meetings held with teachers	125
4.4.7	Analysis of the scholastic achievement of the learners	132
4.4.8	Presentation and analysis of the questionnaire data of the grade 8 participants	136

4.5	Challenges experienced in the implementation of an MI approach	141
4.6	Summary	144

## **Chapter 5**

### **Overview, conclusions and recommendations**

5.1	Introduction	147
5.2	Overview of the investigation	147
5.3	Limitations of the study	151
5.4	Conclusions of the study	152
	5.4.1 Conclusions drawn from the literature study	152
	5.4.2 Conclusions drawn from the case study	152
5.5	Recommendations	156
	5.5.1 Recommendations with regard to learners	156
	5.5.2 Recommendations with regards to the implementation of an MI approach in a school	156
5.6	Recommendations for further research	159
5.7	Conclusion	160

## **Bibliography**

### **Sources consulted**

### **LIST OF FIGURES**

Figure 2.1	The different parts of the brain	33
Figure 4.1	The single building of the New City School	91
Figure 4.2	The brain profile assessment results presented as an average for the whole class	101
Figure 4.3	A comparison between the brain profile assessment results of the learners and teachers	103
Figure 4.4	A comparison between learners and teachers' preferred learning styles	105

Figure 4.5	Teachers' compliance with expectations concerning their preparation	108
Figure 4.6	Teachers' performance in lesson presentations	116
Figure 4.7	Teachers' rating on attitude towards change in teaching style/approach	121
Figure 4.8	Teachers' rating of their observation of others and by others	123
Figure 4.9	General overview of the performance of all staff in terms of the assessed points of performance	124
Figure 4.10	Comparison of academic performance of a previous group of learners' mid year results	133
Figure 4.11	Academic results of grade 8 learner participants compared after one year of MI instruction	135

## **LIST OF TABLES**

Table 3.1	Advantages vs. disadvantages of observations	79
Table 4.1	Rubric used to assess teachers' performance in terms of preparation	107
Table 4.2	Rubric used for assessing teachers on lesson presentations while being observed by the researchers and fellow teachers	114
Table 4.3	Rubric used to measure teacher attitude in attempts to change teaching style/approach	121
Table 4.4	Rubric used to assess teachers' willingness to observe others and be observed by others	123

## **LIST OF ANNEXURES**

Annexure A	Application form used to select and appoint teachers at the New City School
Annexure B	Transcript of interview conducted with Julie Viens at the Harvard Graduate school of education

- Annexure C Brain profile assessment
- Annexure D Examples of how preparation forms changed over a period of time
- Annexure E Teachers observation sheet
- Annexure F Examples of a number of completed observation forms
- Annexure G Examples of agendas for teacher meetings
- Annexure H PowerPoint presentation on MI for teachers

# CHAPTER 1

## GENERAL ORIENTATION

### 1.1 Introduction

Education in South Africa has changed tremendously since the change of political rule after 1994. Because South Africa is a multiethnic, multicultural and multilingual country, most teachers find themselves in classrooms where children do not only differ in terms of race, sex and language but also in terms of intellectual ability, interest, aptitude, motivation and background. On top of that the Department of Education has introduced Outcomes-Based Education after decades of a content based approach. The change to an outcomes-based approach has according to Van der Horst and McDonald (2003:5) amongst others the following aims in mind:

- focusing on the learner and his/her needs,
- acknowledging and accommodating human diversity and learner differences,
- allowing all learners to achieve their full potential.

It is thus clear that today, more than ever before, South African teachers have to take into consideration the diversity of the learners they have to teach in one classroom. Convery and Coyle (1999:1) emphasise that any group of learners is made up of a number of very different individuals and that it is the teacher's responsibility to get to know these individuals very well in order to accommodate their differences when teaching.

According to Tomlinson and McTighe (2006:3) and Wise and Lovatt (2001:27;28), educators are all aware that the quality in any classroom evolves around the powerful knowledge transferal and acquisition for every teacher and learner. It does not matter however impressive our curriculum design, it will have to be implemented in diverse ways in response to learners'

diverse needs and combination of intelligences to ensure that deep learning takes place. It is thus not only about “what” the teacher is teaching but also “who” he is teaching in which way, “how” and “where and when”, that has to be considered. Tomlinson and McTighe (2006:23) state in this regard: “The curriculum plans we make will be energized and informed by the awareness of the people for whom they were designed.”

Teachers can therefore not claim that they are teaching effectively when they only attempt to complete a learning programme with no regard or time planned for varied learning needs. The mere fact that nobody - not even identical twins - is exactly the same implies that every child must be assisted to develop according to his or her own unique abilities and needs. Yet, in many South African schools learners are taught and tested according to a ‘one-size-fits-all’ approach as if they are all the same. If the teaching fraternity does not recognise this fact of endless variety in the classroom, education in this country will probably never reach the point where all children can realise their full potential through learning.

Principals and staff at any school where good education and profound learning is the first priority will agree that teachers and educationists all over the world are nowadays not only faced with the challenges of accommodating a diverse learner population by means of creative teaching methods, but also with the ultimate challenge of keeping in pace with the ever changing world of the children they teach as well as the information explosion characterising today’s world. As the world rapidly shifts from an economy based on labour and industry to one driven by knowledge and innovation, education systems all over the world aren’t keeping pace with the change, and it even seems as though some education systems are becoming dysfunctional in the process (Nadeau & McNicoll 2006:35; Smith 1998:16). Dr. Willard Daggett, the Director of International Centre for Leadership and Education, stated that the world our kids are going to live in is changing four times faster than our schools (Dryden & Vos, 2001: 102; Smith 1998: 21).



Today, the capacity to store all humanity's combined knowledge and wisdom and make it instantly available to anyone who wants it has already been achieved. It is therefore senseless to teach limited content to any number of children if they are not taught what to do with or how to use the information available. The words of Galileo Galilei were never so true than now: "You cannot teach people anything. You can only help them to discover it within themselves"(Kagan & Kagan 1998:4.62).

All of the above, coupled with the realisation of what is possible for the brains we are all blessed with, make teaching and learning the one single factor which can have a positive influence on the present scenario where all experience the explosion of information, the changing nature of the environment we live in and the consequent changing task of educators.

## **1.2 Focus on the brain**

Technology has made it possible today to know so much more about the brain and how it learns that we cannot ignore the gap that exists between this knowledge and present teaching approaches (Clark 1986:22; Smith 1998:18-20). Hart, as referred to by Sousa (2006:15) made the statement: "With our new knowledge of the brain, we are just dimly beginning to realise that we can now understand humans, including ourselves, as never before and that this is the greatest advance of the century, and quite possibly the most significant in all human history." This new information holds particularly far reaching implications for education in general.

Neuro-scientific research has proved it of the utmost importance that teachers study the human brain. Jensen (1995:13) states further that 90% of all books written about the human brain and how it learns have been written in the past ten years. He believes that a comprehensive knowledge of the brain will have a dramatic impact on a teacher's approach to teaching. No person in his right mind will take his most precious belonging and allow someone to "fix" it or to develop it further if that someone is not properly prepared and trained to do

the work. Yet, teachers, who work and train the brains of the children in their classes, very seldom know anything about their brains. The better teachers understand the brain, the better they will be able to educate, teach, develop and nurture the brain of every child.

One suspects that many teachers are teaching the young children of today to cope in a world they themselves grew up in, which no longer exists. This might be the reason for the children not coping or not being interested. Knowledge about the brain will surely help to bring about the necessary creative changes so desperately needed in education today. By attending to how the brain best functions and to the amazing possibilities of what might enhance that functioning in a learning situation, every student can become a more successful, effective learner (Clark 1986:24; Jensen 1995:20).

Today not one week will go by without the publishing of new research findings on how the brain works. Tony Buzan, as referred to by Dryden and Vos (2001:72), made the statement that “your brain is like a sleeping giant”. Although Buzan was seen as a particularly bright student in terms of his performance and education, he felt deprived because of the fact that he was never taught anything about his brain. “I never learnt how to use my head”. Buzan (Dryden & Vos 2001:72) has since written eight books on practical ways how to “use your head” to be used specifically by educators. Sousa (2006:10) agrees with Buzan that educators are not neuroscientists but they are members of the only profession whose job it is to change the human brain every day (Jensen 1995:22).

Sousa (2006:5) warns that educators will have to be very cautious in applying these findings to practice. The real fear from critics is that educators are not sufficiently trained to apply any of these findings in the classroom. Sousa suggests that teachers are exposed to reports from the neurosciences and also from the behavioural and cognitive sciences which are sufficiently reliable to inform educational practice. Teachers should engage in research in the classroom as well to determine the effectiveness of new strategies which arise from the research findings.

The concept of Accelerated learning (AL) which includes the theory of Multiple Intelligences (MI) as a way to accelerate learning originated from research evidence found in the neurosciences and established itself as a powerful educational concept to bring about a profound change in educational practices. This approach is a direct consequence of brain research and new knowledge gained from it.

### **1.3 Accelerated learning and multiple intelligences**

Accelerated learning (AL) is developed through information and evidence gathered by amongst others the neurosciences as stated above. It provides a systematic procedure for helping pupils more effectively to utilise and integrate their various sensory modes and contrasting cerebral functions (Entwistle 1987:100). The concept of AL attempts to give educators and learners a blueprint to teach and learn effectively. AL recognises that we are indeed individuals who all have a preferred style of learning that would fit our intelligence profile best. When you learn the techniques that fit your personal learning style and intelligence profile best, you will be learning in the way that is most natural for you. "Because it is natural, it is easier; because it is easier, it is faster. That is why we call it Accelerated Learning" (Rose & Nicholl 1997:19;).

Accelerated learning could not ignore the theory of Multiple Intelligences as described by Howard Gardner in his book *Frames of Mind* (1983) (McKee 2004:45). Gardner (1983) propagates the notion that everybody is blessed with multiple intelligences that cannot be tested, determined or measured by one standardised test like the Stanford Binet scale as has been done for the last century in most countries. Gardner opposed the psychological establishment of the time that relied on IQ only. He distinguishes eight domains of ability in his theory of multiple intelligences: linguistic/verbal, logical/mathematical, spatial, musical/rhythmic, physical/bodily-kinesthetic, interpersonal and intrapersonal, and naturalistic.

Gardner, as referred to by Smith (1998:152) explained that a full understanding of any concept of any complexity cannot be restricted to a single model of knowing or way of representation. Smith agrees with Gardner that it is imperative that teachers take individual differences amongst kids very seriously if they want all children to learn and understand and perform to their best potential. The theory of Multiple Intelligences is therefore constructively used to accelerate learning in all possible ways. The different intelligences are not only used as a point of departure in trying to explain certain concepts but also to develop the different intelligences optimally.

Accelerated learning has as its objective to involve the whole brain, which includes also the emotional brain especially to make learning more memorable. It further synchronises left and right brain activity through various planned activities like “brain gym” which is designed to do that. Accelerated learning mobilises all eight intelligences so that learning is available to every single individual (Rose & Nicholl 1997:43; Evans 2003). McKee (2004:45) explains that to achieve the set outcomes, teachers have to “... orchestrate a sequence of activities that will require the application of each intelligence by the learners if they are to successfully tackle each activity.”

It seems that MI is providing education with a rationale for doing what we know is good for kids. Kagan and Kagan (1998:xix) state in this regard that educators are gripped by a multiple intelligences approach primarily because it validates what educators know instinctively: students are intelligent in different ways.

The value of the new information in the field of education can not be underestimated. Change in the approach in the classroom (which is desperately needed in South African schools) is bound to have a lasting effect on education in general. It seems that MI provides the best possible option to bring about this change and to accelerate learning in the classroom.

## **1.4 The successful implementation of accelerated learning by means of MI**

Sir Christopher Ball, chancellor of the University of Derby in the UK, made a bold statement in the urgency of having to change course with educational reform when he said about accelerated learning: “Our aim is to change the culture. To persuade people that they should care about learning in the same way we are all gradually learning to care about the environment and our own health” (Rose & Nicholl 1997:368).

Success achieved by implementing MI at the McClearly School in Pittsburg Pennsylvania, embraced MI not for the sake of “doing the theory” but to enable students to produce their best work and to make it possible for students to draw on all their intelligences in ways that will advance their learning (Kornhaber, Fierros & Veenema 2004:42). At Searsport Elementary School in Maine, USA, the MI approach had a profound influence on how teachers think about their work and about their students. The purpose of MI in this school was not the theory but the use of the theory to reach most if not all the different learners in every class and to help them to produce quality work in an environment where they have much more advanced choices and freedom to demonstrate what they have learnt in various ways (Kornhaber, et al 2004:185). The National Assessment Policy in SA has exactly the same goals in mind namely to give all learners an opportunity to demonstrate their abilities and knowledge (learning) in a way that would suit their profile best. It is for that reason that the South African teacher is obliged to use other methods than a pencil and paper test to determine ability, skill and values in the knowledge learned (Kotze 2004:48).

The Cramlington Community High School in England is a good example of a school where the staff embarked on a Multiple Intelligences approach over a period of a few years although they are still bound to external examinations like the schools in South Africa. That did not influence their passion for the process of learning that could be changed through this approach to one of

enjoyment and where a balance could be found between knowledge and process (Wise & Lovatt 2001:27). Wise and Lovatt (2001:28) state further that it was not accelerated learning in their school that was the ultimate change – the change was brought about by the facilitation and development of MI. Accelerated learning when implemented by means of MI focuses on the deep learning that takes place and not only on shallow performance results.

In the school where the research had been done MI provided a framework for teachers to focus on the uniqueness of every individual they teach to inspire them to become independent learners with the capability and confidence to become lifelong learners. This is also in line with the National Curriculum Framework where it clearly states that life long learning is a priority where the uniqueness of the individual learner should be acknowledged and accommodated (Curriculum Development Working Group 1996:4).

### **1.5 The relationship between MI and Outcomes-Based Education (OBE)**

South Africa adopted an outcomes-based approach to teaching and learning in 1997. Outcomes-Based Education (OBE) focuses on the learning outcomes to be achieved rather than on the content to be learnt. According to Van der Horst and McDonald (1997:7), OBE is a learner-centred, results-orientated approach to learning. There is a clear relationship between Outcomes-Based Education (OBE) and MI as described by Van den Berg (2004:3; 143-144) and Ridge (1998). Outcomes-Based Education focuses on the total development of the learner - just like the theory of multiple intelligences - which is in contrast with the previous content based education system. The focus on total development becomes possible through clear predetermined outcomes which are to be developed. Learners should be able to achieve the predetermined outcome by the end of the lesson or unit of work. The ideal situation would be that learners should progress according to their own pace and at the same time they are exposed to multiple opportunities where they can show competency in achieving the outcomes. A consequence of this

situation would mean an expansion of learning opportunities as well as the development of more assessment opportunities as both the learning styles and intelligence profile of all learners are different.

The education system in South Africa has experienced a total transformation through the implementation and application of OBE in all schools. It is important to note that this change was not only politically driven but was also prompted by the educational changes all over the world (Du Toit & Du Toit 2004:3). Costa and Liebmann, as referred to by Du Toit and Du Toit (2004:3) stated seven years ago already that knowledge would double in less than five years – thereafter knowledge would double every 73 days. Educationalists had to find ways for learners to cope with the challenges of real life situations which the systems of the time did not provide any longer.

In a content based approach the focus is on the facts (content) of the knowledge, whereas in an OBE approach the focus is on the demonstration (process) of the knowledge, skills and values that the learner obtained in the learning process (Du Toit & Du Toit 2004:7).

The focus of OBE to concentrate on the development of the whole child fits in perfectly with the essence of the theory of Multiple Intelligences which is to acknowledge and to respect the many differences among people, the multiple variations in the ways that they learn, the different ways in which they can be assessed and the infinite number of ways in which they can leave their mark on the world (Armstrong 2000a:v).

The researcher made the conclusion that the assessment approach as introduced by the Department of Education through the implementation of OBE agrees in principle with Gardner's view as explained by Armstrong (2000b:2) that a learner cannot be taken out of his natural learning environment asking him to do isolated tasks he has never done before and then determine his success through that result. Hoerr (2000:14) points out that paper and pencil measures have their role, but they invariably limit the students' responses to only a few intelligences which is also not the only way

to determine a student's understanding. An outcomes-based assessment approach fits in perfectly with the basics of an MI approach.

## **1.6 Current problems in education and the need for a better teaching approach**

Taylor and Vinjevold (1999:131) who researched the South African Education system with the aim of finding solutions for the problems identified said in their report that teaching and learning in the majority of South African schools leaves much to be desired. Educational reform is no longer a mere possibility but an urgent obligation. Leaf (2005:10) states that the poor teaching educators expose learners to produces a generation of "educational casualties", which are people who have emerged from schools around us as uneducated, functionally illiterate, with no self-confidence or self-esteem.

Taylor and Vinjevold (1999:132) brought to the attention of policy makers the "gross inefficiency, maladministration and chaos" in South African schools. Attempts to improve teaching and learning have undergone a rapid metamorphosis over the previous five years but yet classroom practices left much to be desired. Although teachers showed some knowledge of the elements involved in lesson planning, the implementation was a totally different picture as observed in the classroom. Lessons were dominated by teacher talk and low-level questions; lessons generally had no structure and no activities were implemented which could promote higher order skills. No interaction between learners took place and making meaning of content was non-existent (Taylor & Vinjevold 1999:156).

Teachers should be aware of the ultimate impact a single lesson may have in the life of a child. Teachers should be able to imagine what can change if every minute of the six hours of every school day is used to change the learning environment into a place where learners want to be, where they feel safe, where they feel they belong, where they feel accepted for who they are with their unique set of intelligences, where they are given the freedom to



learn and explore and where teachers are not judgmental, where teachers do not label them according to their one test score or IQ or according to the one mistake they have made or the family they come from. Teachers are not always aware of the impact their teaching style, attitude and state of mind can have on the learners they teach. Chisholm, as referred to by Taylor and Vinjevold (1999:133) asserted that it was the system of values and approaches of fundamental pedagogics, which was very dominant in the pre-1994 era, that prevented the development of critical and innovative teaching strategies where learners could be recognised, their differences accommodated, and where they could be given the necessary space to grow into mature adults.

Being the principal of an independent school for 16 years, the researcher has over the years noted at staff and regional meetings with principals and teachers from other schools that teachers often feel that deep learning does not take place in the classroom. Teachers complain that they concentrate so much on the syllabus of content they have to complete by the end of the year and other disciplinary problems that they do not focus on **the learning** that should take place in the classroom. Somehow the focus of education has changed to a multitude of other problems in stead of focusing on finding new ways to enhance learning for today's generation. These problems can not be ignored but have to be seriously considered in an attempt to find a teaching model that would make a difference in the quality of learning. Accelerated learning with the focus on MI can contribute to a large extent in addressing these and other related problems. Silver, Strong and Perini (2000:108) state in this regard that a variety of strategies as catered for in an accelerated learning approach is one of the teachers' best means of reaching the full range of learners in any classroom and of making learning deep and memorable for all learners.

The researcher has experienced that the implementation of any new teaching approach or strategy is usually met with a lot of resistance from teachers as was also mentioned by Wise & Lovatt (2001:24-26) and Hoerr (2000:8-11). Experienced teachers do not want to be bothered with new or other teaching

approaches than those they are familiar with, especially if it is not tried and tested by well known academically outstanding schools in their own country.

Macdonald, as referred to by Taylor and Vinjevold (1999:135) found that teachers wanted to remain in their own, very confined comfort zones and they resorted to pedagogies which enabled them to strictly control pupil access to knowledge. She says further “Unsure of their own knowledge base, and either unable or unwilling to expand it, their teaching – by instinct or design – ensured that there was no danger of pupils venturing further and threatening the shaky foundations of their teachers”. It could therefore be said that there is a resistance to change in general, whether as an inborn human quality or as a result of acquired behaviour or teaching. Schmocker (2006:24) refers to the resistance to change as “professional privacy” where teachers consider themselves professionals who cannot be questioned or prescribed what to do and how to do it because of the fact that all learners, situations and learning material are different and therefore generalisations can not be made. On the basis of their professionalism, teachers claim that they should be left alone. The culture in most educational settings is also to blame because many instructional practices and preparation programmes for teachers are not reinforced or further developed once teachers have accepted positions in schools. Schmocker (2006:25) found that if we leave every instructional choice up to the individual teacher, then inferior practices will dominate in most schools.

The researcher was therefore very aware of the fact that teachers in the school of research but also in general (as discussed at several meetings with other principals about their own experiences concerning change) have a resistance to any form of change of approach.

## **1.7 Research rationale**

The researcher is of the opinion that there is now hope for improvement on poor performance which happened as a result of an educational approach of

the past with a very narrow-minded view which disregarded the multiplicity of any learner's intelligence and subsequent performance possibilities. The notion of multiple intelligences implies that there is something to work and strive for because learners no longer have to accept that they are limited by the outcome of a single IQ test which determined their future in the past. Learners need to be made aware of and taught how to value their own abilities and intelligences in order to become self confident and effective learners. Through the knowledge and application of this theory by educators, there is no limit to the possibilities which can be achieved by every individual.

There are many theories which give hope to teachers and learners. It is, however, a challenge to practically apply any theory in a real life situation with all the limitations intrinsic to the theory and the situation where it could be implemented. The accelerated learning approach with specific reference to MI is fortunately so well practiced in other countries with substantial empirical proof of possible success that it can be used as a model or starting point for implementation in South African schools.

A research project was envisaged through which it would be possible to detect the challenges and hurdles in implementing an MI approach in a South African school. The future of MI, like the future of any other theory of similar nature put in practice, will benefit from the successful implementation and research as reported here. From such research it will be possible to know whether it is possible for teachers to apply accelerated learning in the classroom with the same positive results as experienced from previous research in other countries and anticipated in South Africa. Such projects could be extended to all the classes at the particular school used for the research as far as possible to ultimately achieve the goal of an accelerated learning school where education in this way becomes a way of living. Only then can it be duplicated in other schools and possibly influence the training of educators in the future.

## 1.8 Problem statement

Accelerated learning and MI would surely also be able to contribute to successful teaching and learning in the South African classroom as has been done in classrooms all over the world as a result of the proven implementation record of this theory. Education in South Africa is unfortunately also subject to the burden of a variety of problems - as referred to in previous paragraphs - and will therefore undeniably experience a huge challenge with the successful implementation of any new strategy or theory. With reference to the challenges mentioned above, this study had in mind to identify the specific challenges in implementing an accelerated learning programme with a focus on MI in a South African school.

In the light of the preceding discussion, the key research problem was formulated as follows: *What are the challenges in implementing an accelerated learning programme with a focus on multiple intelligences in a South African school?*

The following sub questions facilitated the demarcation of the problem:

- What does an MI approach consist off?
- How should MI be implemented in the classroom? What is expected of the teachers and learners?
- What are the anticipated challenges, common phenomena and difficulty in process which could influence the successful implementation of the MI approach in South African schools?

## 1.9 Research aims

This study was designed to determine the process effectiveness in implementing an accelerated learning programme with a focus on multiple intelligences. The research aims were thus to:

1.9.1 Identify challenges and measures for best practice in implementing an MI approach. The researcher aimed to identify the most possible reason(s) why teachers do not want to get involved with new teaching approaches or why teachers do not cope with or follow through with new strategies which they became aware of.

1.9.2 Establish the extent to which the implementation process impacted on teachers and learners in either a positive or negative way.

## **1.10 Research design**

This study took the form of a case study where the researcher focused on the process of implementation of an accelerated learning approach in an ordinary classroom in a particular school. A case study refers to an in-depth analysis of a phenomenon and not to the number of people studied. “Exploratory case studies contribute to literature by building rich descriptions of complex situations and by giving directions for future research” (McMillan & Schumacher 2006:316). In this case study the researcher attempted to increase the understanding of a specific practice of which the results could be employed to design future processes and practices of implementation.

Case study research is particularly successful in bringing the reader to an understanding of a complex issue or object and can extend experience or add strength to what is already known through previous research. Social scientists and educationalists have made wide use of this qualitative research method for many years, particularly with small-scale research. Case studies are complex because they generally involve multiple sources of data and produce large amounts of data for analysis (Denscombe 2003:30-32).

The unit of analysis in the case study is typically a system of action rather than an individual or group of individuals. Case studies tend to focus on one or two issues which might be fundamental to the system being examined

(Tellis 1997:2). The problem in case studies according to Yin (Tellis 1997:2) is to establish meaning rather than location.

Case studies often come under scrutiny because research results could not be generalised or applied to any similar situation. It is also important to note that the role of the observer is that of “participant observer” where the observer is fully engaged in experiencing the project setting while at the same time trying to understand the setting through personal experience, observations and interactions and discussions with other participants. It is for this reason that the respondents who formed part of the study at times also acted as observers to give feedback from their point of view. In this way the validity and quality of the study were increased (Cohen, Manion & Morrison 2000:183; 187-188).

Mixed method research was also used as part of the case study. Qualitative as well as quantitative methods were applied to get the best possible advantage from the information collected. Qualitative data can be coded quantitatively as will be shown in chapter 4 where numerical values were assigned to qualitative observations. These values helped to achieve greater insight into the meaning of the data. Qualitative data is extremely varied in nature and includes any information gathered by the observer through interviews, observations, informal discussions and written documents. Qualitative researchers are concerned with the process and ask how people negotiate meaning. In qualitative research the data is analysed inductively (Bogdan & Biklen, 1998:6) in other words, the picture develops as the research proceeds.

#### **1.10.1 Research participants in the study**

- Teachers

The subjects of the study consisted of five selected teachers from one school who taught different subjects to a specific class of learners. The specific site and participants in this case study were preferred because they were appropriate for the research problem and purpose where the research focus was on complex micro processes (McMillan & Schumacher 2006:318). The

five teachers involved were invited to participate in this study and were considered to be a representative sample of the present staff. They had different personalities with different views on education; they were from different sexes, cultural, educational and language groups. They also differed in terms of training, experience, and employment time with the school. This selection of teachers was in line with McMillan and Schumacher's (2006:321) requirement of maximum sampling variation to obtain a variety of differences of perception about a specific topic.

To determine the impact of the new teaching approach on the teachers, continuous feedback sessions were held, questionnaires were completed, and the extent of the change that took place in the classroom, was observed.

For the purpose of this study the teachers are referred to as "he" to protect the confidentiality of data.

- Learners

The learners who formed part of the investigation were from one grade 8 class of 2004 from an Independent School near the town of Hammanskraal in Gauteng. The responses of this class to an accelerated learning approach as well as multiple intelligence instruction as a whole were observed and not as individuals selected in any way. This group represented the situation as it is experienced every year. The teachers represented the following Departments at the school: Sciences, Languages, Humanities, Commercials and Arts.

To determine the impact of the new teaching approach on the learners, the following were observed and evaluated:

- the general academic progress compared to previous progress
- advanced learning skills which should be displayed by the learners
- learners' enjoyment of classes
- enthusiasm for their work
- productive use of class time
- classroom behaviour

### 1.10.2 Research methods

Most qualitative researchers use a combination of data collection strategies to enhance the validity of the research (Kerfoot & Winberg 1997:61). The researcher had to evaluate the feasibility of data collection strategies as well as the ethical issues concerned and focused on the following when collecting data on the responses of the teachers:

- Formal and informal participant observation
- Personal interviews
- Field notes and self-reflection reports
- Planning forms
- Surveys
- Qualitative (open item) questionnaires
- Observations of presentations by co-educators
- Assessment results of learners (reports)
- Conduct reports of learners
- Multiple intelligence brain profiles of learners and educators

All the participants agreed to have a brain profile assessment done as developed by the company *Neurolink* (Immelman 2000:37) to learn more about themselves and especially about their own learning style preferences and prejudices which would obviously also influence their teaching style. *Neurolink* is an international consultancy firm in South Africa utilising the latest brain-based technologies and research to increase performance and maintain wellness in the workplace.

Teachers were guided and supported to acquire the necessary skills and knowledge to be able to apply the suggested methods successfully. Preparation forms and lesson observation forms were anticipated to be adapted to reflect MI practices implemented by every teacher.



## **1.11 Chapter division**

Chapter 1 is introduced with the background to the investigation. This is followed by a short explanation of the brain and new knowledge about the brain that became available during the last few years. The connection between Accelerated learning and MI, the relationship between MI and OBE as introduced in the South African classroom, the rationale of the research, as well as the aims, problem statement and research design are then introduced.

Chapter 2 is devoted to a discussion of intelligence, accelerated learning and the theories which contributed to the establishment of MI as well as the MI theory itself. Teaching strategies to promote each of the intelligences in class are also indicated.

Chapter 3 explains how the research is conducted and which research design was used to investigate the challenges associated with the implementation of accelerated learning with the focus on MI in a South African school.

Chapter 4 collates the gathered data and subsequently provides the data analysis and interpretation.

In Chapter 5 the researcher comes to conclusions and makes certain recommendations for education, policy and practice as well as for future research.

## **CHAPTER 2**

# **THE APPLICATION OF ACCELERATED LEARNING TECHNIQUES WITH SPECIAL REFERENCE TO MULTIPLE INTELLIGENCES: A THEORETICAL EXPOSITION**

### **2.1 Introduction**

The Learning Revolution model as illustrated by Dryden and Vos (2001:28) states that the “old school model is dead”. The Learning Revolution model is a catalyst to change the way we think, live, learn, work and act (Dryden & Vos 2001:16). The Learning Revolution model is about linking the marvels of brain research that became available recently with the power of instantly available information and knowledge. This model (Dryden & Vos 2001:121) acknowledges, amongst others, the existence of more than one type of intelligence and it holds the view that all people have different learning styles. We are all as unique in these aspects as our finger prints and it is time for schools and educators to consider that fact when teaching.

This chapter will describe the role of intelligence in the application of accelerated learning techniques, define intelligence by referring to the history of intelligence as a concept and how it developed over the last century. The measurement of intelligence as well as the common problems associated with the practice of measurement will be briefly discussed before the different theories associated with intelligence will get attention. Accelerated learning and the theory of Multiple Intelligences as created by Gardner, will lastly be elaborated on.

### **2.2 Intelligence defined**

The ancient Greek philosophers who lived in the sixth century B.C. already made contributions to defining intelligence. Plato said that intelligence is the ability to learn. Aristotle contemplated “quick wit” to be real intelligence while

Augustine was of the opinion that intelligence is something “good” people possess that would determine a person’s quality or value for his community. Intelligence according to Augustine would include a quickness of understanding (Sternberg 1988:24-25).

The Oxford Dictionary and Thesaurus (Tulloch, 1997:954) describes intelligence as: “1. mental character or disposition; 2. kind or degree of intelligence, brain capacity, intellect, wit, sense, judgment, acuity, rationality, IQ, understanding and mental age; 3. what is in the mind.” It is already clear from this explanation or description of intelligence that there is a wide variety of views contained in this concept. This explanation suggests that intelligence is inherited from the word “disposition” which usually refers to a genetically inherited quality or trait. It refers to the “capacity of the brain” which could contain all the possibilities not even discovered at this stage. It refers to sense and judgment which could refer to emotional intelligence which was not initially considered part of the intelligence quotient. It is clear from these descriptions that intelligence is not about test results in certain disciplines as it is commonly referred to.

In reading different views on intelligence, the question “What precisely is considered intelligent?” could be very relevant. It seems that intelligent behaviour in one situation is not necessarily also intelligent in another situation (Ridge 1998:34). One can replace “situation” with country, culture, ethnic grouping or community. A good example that comes to mind will be the intelligent behaviour of the Bushmen in the Kalahari. No other group of people would be able to survive the harsh conditions in the Kalahari and be able to have children and raise families like the Bushmen. They do not read or write and cannot operate the basic technological equipment that we consider as obvious helping aids but they are happy people who make a living and solve their own problems. Their intelligence, if measured according to the widely used and accepted IQ method, will be zero. According to the classification of people who score below certain numbers, all Bushmen would be labeled as morons. That outcome could surely not imply that Bushmen are not intelligent.

Kobus Neethling asks the question: “Who is the most intelligent: Michelangelo, Einstein, Edison or Walt Disney?” He answers his own question by explaining that your own opinion or perception of intelligence and your own interest in art, mathematics, medicine or commercial movies will most probably determine your answer (Neethling & Rutherford 2005:64).

## **2.3 Theories of intelligence**

### **2.3.1 The theory of intelligence as intelligent quotient (IQ)**

The concept of IQ originated when the French Government wanted to distinguish between intelligent and not so intelligent children, also seen as those who will be able to succeed academically and who will not. French psychologists Alfred Binet and Theodore Simon were commissioned by the minister of public instruction to develop these tests. Binet and Simon designed tasks to represent the level of performance that would be typical to a child of a certain age. The highest age level at which a child performed successfully was called his “mental age” (Cianciolo & Sternberg 2004:34).

According to Mwamwenda (2004:246) this test which is better known as the IQ test was to determine the sum of one’s total intelligence. It was believed that you are born with a certain set of qualities which include your intelligence which will remain static for the rest of your life. Most of the studies that gave rise to the IQ test were focused on the linguistic and logical-mathematical intelligence and it was referred to as the “g” factor or the general intelligence.

Many belief systems grew from this philosophy that intelligence can be measured in one way only and that a person is born gifted, average or retarded and nothing can change that scenario. We were all affected by this belief that became an educational dogma. Much of what happens in classrooms even today all over the world can be traced back to this assumption (Clark 1986:7). The fact that the fifth edition of the Stanford-Binet

Intelligence Scales was published in 2003, 98 years after the original, shows to what extent it is still used today (Cianciolo & Sternberg 2004:34).

Today we know from research that IQ is merely a numeric value which expressed the speed and power of a person's intelligent actions in answering particular questions in a specific test situation. The results of this test enabled people to compare children's test scores derived from that particular situation. This test could not closely predict the whole spectrum of possible intelligent behaviour of anybody writing the test. Howe, Professor of Psychology at Exeter University, is convinced that children can improve their intelligence through the skilled intervention of teachers. Howe built on the research done by Sternberg, Vygotsky and Feuerstein for over 50 years and thereby raised the hope for every child to improve or change his/her intelligence. Intelligence is not a fixed state of the mind but a cognitively modifiable concept (Smith 2003:17).

### **2.3.2 The theory of emotional intelligence**

Intelligence is the key concept in many disciplines but psychology deals with this aspect since the 1800's. Goleman (1996:42) points out that E.L. Thorndike, an eminent psychologist of the 1930s, who promulgated the notion of IQ, at that stage already acknowledged the "social" intelligence that would in itself be an aspect of a person's intelligence. He described it as "the ability to understand others and act wisely in human relations" although other theorists of the time pronounced social intelligence in an influential textbook on intelligence in 1960, as a "useless concept"

Goleman (1996:xi) argues that those who still subscribe to the narrow view of intelligence, namely that our destiny in life is largely fixed by the belief that IQ is a genetic given and cannot be changed by life experiences, ignore the unparalleled burst of scientific studies of emotion alone. The flood of neurobiological data lets us understand more clearly than ever before how the brain functions and what aspects play a role in intelligent behaviour. Goleman (1996:45) makes it clear that there is no single paper and pen test that can

produce an “emotional intelligence score” and states further that there may never be one.

Salovey as referred to by Goleman (1996:43) draws a parallel between Gardner’s personal intelligences in his basic definition of emotional intelligence. Salovey explains emotional intelligence in terms of five domains which include knowing one’s emotions, managing one’s emotions, motivating oneself, recognising emotions in others and handling relationships.

Gardner as referred to by Goleman (1996:41) confirmed that he was referring to emotions when contemplating his personal intelligences and more specifically the intrapersonal intelligence. He also admitted that he tended to view intelligence in a cognitive manner and focused therefore more on the awareness of mental processes concerned with emotions rather than the full range of emotional abilities.

Goleman (1996:78) argues that all teachers must have experienced the emotional upsets that interfered greatly in the mental life of their learners. Students who are anxious, angry or depressed don’t learn. Negative emotions are powerful and interfere with every attempt of teacher and learner to focus on the work at hand and nobody needs to understand how the brain works to experience that. It is a universal phenomenon often recognised by people who are not aware of all the theories about emotion or different intelligences. Good moods or states of mind on the other hand enhance the ability to think flexibly and makes it easier to find solutions to complex problems. The intellectual benefits that educators and learners can gain by knowing how a good feeling can be created can not be ignored in the classroom. Recent research has proved that people remember much better when they are in a good emotional state as a result of the chemicals and neurotransmitters released by the brain when it experiences pleasure (Goleman 1996:86). The fact that a person’s brain is physically responding to emotions and affected by the chemicals released as a result can no longer be ignored (LeDoux 1999:123-124).

### **2.3.3 Intelligence as the “g” factor**

Spearman (1927) a British psychologist as referred to by Sternberg and Grigorenko (2002:7) explained that all intelligent behaviour had one single factor in common and he called that the “general intellectual ability” known as ‘g’. Spearman (Sternberg & Grigorenko 2002:7) held the opinion that this “general intelligence” could be measured by every task in an intelligence test and he referred to this single mental capability as a generalised form of “mental energy”. It is also interesting to note that Spearman was more interested in what is common amongst the different intellectual capabilities than in what was unique.

### **2.3.4 The triarchic theory of human intelligence**

According to Sternberg (1988:72), intelligence is mental self management. He argues that people will always have to manage themselves mentally, so it does not really matter what word we use to describe that process, there will always be intelligence. Sternberg also supported the notion that there are many intelligences. Sternberg (1988:73) agreed with Gardner in the sense that different intelligences can be distinguished but disagreed that any intelligence could function independently and because of that a “general factor” of intelligence is always present in intelligent behaviour. Sternberg (1988:57) developed the Triarchic Theory of Intelligence, which contains three forms of intelligence, which was already a move towards acknowledging the multi facets of intelligence. He maintained that true intelligence has to do with the skills one needs in everyday situations. He felt that a “practical intelligence or common sense” and the ability to think in new ways are what make up intelligence.

### **2.3.5 Intelligence as seven or more distinct factors**

Thurstone, as referred to by Cianciolo and Sternberg (2004:6), strongly disagreed with Spearman and held the opinion that intelligence contains seven distinct factors of intelligence which are interrelated and they are:

“verbal comprehension, verbal fluency, number computation and problem solving, memory, perceptual speed, inductive reasoning and spatial visualisation”. Guilford (Cianciolo & Sternberg 2004:6) also opposed Spearman and argued that intelligence comprises of more than 120 distinct abilities. He increased these distinct abilities later to 150 and then to 180 in his latest revisions. He made a valuable contribution to the idea that there exist multiple intellectual capabilities and that people can have different combinations of these identified abilities. Guilford as referred to by Cianciolo and Sternberg (2004:6) started to highlight the interdependence of intellectual factors and paved the way for thinking about intelligence way beyond any one test to determine the level of intelligence. He pointed out that people who seem to act intelligently in one situation may act very unintelligently in another. He also cautioned people not to label someone as dull, average or brilliant after one encounter – intelligence is much more complex to allow that.

## **2.4 Concerns about intelligence measurement**

Many psychologists like Wechsler, Terman, Otis and Galton contributed towards devising other, or changing the available intelligence tests for purposes other than school or educational placement. After World War 1, these tests were used to match people with a particular intellectual ability to certain occupations (Cianciolo & Sternberg 2004:37). Cianciolo and Sternberg (2004:55) further refer to Carroll who indicated that many people had concerns that the tests created to measure intelligence were actually measuring the knowledge of the dominant culture. The concerns then were almost the same as the concern experienced today by many educationalists known by the researcher that children who performed poorly on these IQ tests could mistakenly be placed in classes for children with learning disabilities or classes for retarded children whereas there could be cultural bias present in either the testing itself or the interpretation of the test results. In the same way children could be recommended a specific direction of study as a result of their IQ scores without taking other factors such as aptitude and interest into consideration. Cianciolo and Sternberg (2004:55) note that the controversy



over IQ testing that began in the 1920's is still going strong today. Fortunately the test theory led many theorists to profound thinking about the IQ test phenomenon. It is also as a result of the many concerns, disagreements and different views amongst the theorists that the use of intelligence testing has remarkably been reduced (Cianciolo & Sternberg 2004:55).

Academic success does not imply success in life. There are, however, situations where the IQ score can be used as an indication of success in those particular circumstances. Today most psychologists, neuro-scientists and educationalists agree that IQ could never be used to indicate the sum total of an individual's intelligence; it can be useful, however, to predict success when students are tested in similar material in a similar situation. Goleman, as referred to by Dryden and Vos (2001:140), is of the opinion that at its best IQ contributes not more than 20% to success in life which leaves 80% to other factors to influence success. "Other factors" according to Goleman would be emotional intelligent factors.

It is against this background that Howard Gardner and his co-workers as well as many teachers and educationalists found it very difficult to accept the fact that children have to accept their IQ score as the only indication of what they might achieve in life as IQ testing was - at that stage - considered the only way to determine what to expect from whom (Armstrong 2000b:1).

Gardner could not accept the IQ movement because of his own experience while researching human cognition. He completed his PhD in 1971 and his dissertation was on "Style sensitivity in children". He was convinced that the human brain possesses a set of relatively autonomous intelligences and not something that can be referred to as a single intelligence. The intelligences which he defined in 1983 are: linguistic, logical-mathematical, musical, bodily-kinesthetic, interpersonal, intrapersonal and spatial. He added one intelligence in his book *Intelligence reframed: Multiple Intelligence for the 21st century* (1999) namely the naturalist intelligence and spoke about a possible ninth intelligence namely the existential intelligence. His theory suggests that individuals perceive the world in at least eight different and equally important

ways. Gardner contemplates that every person uses these intelligences in different and varying combinations to learn what is expected of them to learn according to their environment, culture, social circumstances and curricula.

## **2.5 Accelerated learning**

Accelerated learning takes as its foundation the evidence gathered by the neurosciences as well as the cognitive and developmental psychology (Maples 1994:5).

According to Rose and Nicholl (1997:20) and Maples (1994:19) accelerated learning draws from research "...from that of the Bulgarian educational psychiatrist Lozanov to Harvard educator Gardner". It also draws on studies of neuroscientist Roger Sperry and neurobiologist Gerald Edelman. It takes into account practical experiences of innovative school teachers, college lecturers, trainers, business men and entrepreneurs (Rose & Nicholl 1997:20). AL embraces Gardner's theory of MI in that it claims that each of us has an individual preferred way of learning that suits us best. Teaching that is in line with an individual's preferred way of learning and strong intelligence will contribute to accelerated learning.

AL is aimed at teaching the whole person. In an accelerated learning programme the learners are therefore continuously confronted with vast amounts of information where they have to involve mind, body, emotions and spirit to be able to make sense and find meaning in what is learned. Accelerated learning also includes sessions of relaxation to allow consolidation of learned material to take place and to be stored in memory (Rose & Nicholl 1997:43).

Accelerated learning entails eight stages which should be considered when teaching a lesson or a series of lessons (Evans 2003). Evans (2003) explains these stages as follows:

- 1 Consider the environment and ensure a positive learning climate.
- 2 Connect the learning which is about to take place with learners' previous experiences. A brief starter activity is used to do this.
- 3 Give learners the "big picture".
- 4 Clearly indicate the expected outcomes of the lesson.
- 5 Give the necessary teacher input. Learners' various learning styles should be catered for.
- 6 The main learner activity should be designed, whenever possible to allow learners to use and develop their multiple intelligences.
- 7 Learners should get the opportunity to demonstrate what they have learned.
- 8 Revise the lesson.

Also refer to Appendix H in which AL is discussed and illustrated in detail

Evans (2003) explains that where it is not possible to cater for all learning styles and intelligences within a given lesson, the teacher should plan to redress the balance in other lessons in the sequence.

Rose and Nicholl (1997:18) promulgate the need for accelerated learning to master the accelerated change like it is happening at the moment. Accelerated learning refers to the ability to absorb and understand new information quickly but also to retain that information. AL also refers to life long learning while having fun and enjoyment in gaining new knowledge and insights at every age. That is why learning *how* to learn is so vital.

It is clear that accelerated learning was born out of decades of work and research from very different disciplines. The conclusion drawn by the researcher is that accelerated learning would include any approach or theory that would contribute towards the better understanding of knowledge and the maintaining of the information learnt through various methods. Although Lozanov's theory of Suggestopedia, various memory techniques, chunking and other methods all form part of an accelerated learning programme (De Porter 2001; McKee 2004), this study only focused on the role that MI plays in the implementation of accelerated learning.

## **2.6 The Theory of Multiple Intelligences (MI)**

### **2.6.1 Background**

Howard Gardner adopted a revolutionary stance on intelligence. Gardner's theory states that there are at least eight intelligences which are independent from each other and each can function according to its own individual set of rules. These intelligences interact on a continuous basis with each other in all different learning situations and can therefore be considered interdependent. He further believes that these intelligences are present in all humans although some may feature more dominantly as a result of genetic factors inherited, but also as a result of the educational and cultural setting in which the person grows up (Gardner 2000). The exciting part of his theory is the fact that all humans can strive to develop all these intelligences optimally in their own unique situations. No human is burdened with a cast in stone intelligence which cannot change no matter what – as believed in the past (Smith 2002: 2).

What makes the theory of Gardner even more credible and relevant is the fact that he surveyed such a wide variety of sources as has never been done before in investigating the concept of intelligence (Armstrong 2000b:3). Gardner did not only observe the different kinds of skills and abilities in normal children, but also in a situation where many of the original skills broke down under a form of brain damage. It is here where he could determine that some abilities were destroyed, in isolation from other abilities like when someone suffers from a stroke. The person could lose his ability to use his hand for writing but could still be able to speak or the other way round. He investigated other special populations as well, namely prodigies, idiot savants, autistic children and children with learning disabilities. The cognitive profiles of all these children were extremely difficult to explain in terms of a unitary view of intelligence. He further examined cognition in dramatically different cultures. Gardner (1993:8-9) and his co-workers considered two kinds of psychological

evidence; correlations among a variety of psychological tests and the results of efforts of skills training – in other words will a person who is trained in mathematics automatically enhance other abilities like music or will training in music enhance mathematical skills.

### **2.6.2 Gardner's view of intelligence**

After having interpreted the vast amount of data recovered from all the sources, Gardner uncovered and described the initial seven intelligences with the proviso that the seven can change to eight or more. The point he wanted to make is that intellect does not equal one aspect of a person's abilities but a multiple of intelligences make a person's intellect (Gardner 1993:9).

To be able to understand how Howard Gardner arrived at his conclusion why each of the intelligences which will be described below is considered an intelligence in its own right, one has to look at his definition of an intelligence. Intelligence is according to Gardner (1993:60):

- the ability to create an effective product or offer a service that is valued in a culture
- a set of skills that make it possible for a person to solve problems in life
- the potential for finding or creating solutions for problems, which involves gathering new knowledge (Gardner 1993:60).

### **2.6.3 Criteria that an intelligence has to meet**

Gardner as referred to by Kagan and Kagan (1998:3.4), Armstrong (2000b:4) and Christison (1998) also specified eight criteria that a possible intelligence had to meet before it could be accepted as a real intelligence. He also referred to these criteria as "signs or considerations" to determine intelligence. The possible or candidate intelligence had to meet most of these criteria (Kagan & Kagan 1998:3.4):

- Potential isolation by brain damage
- The existence of idiot savants, prodigies, and other exceptional individuals

- An identifiable core operation or set of operations
- A distinctive developmental history, along with a definable set of expert “end-state” performances
- An evolutionary history and evolutionary plausibility
- Support from experimental psychological tasks
- Support from psychometric findings
- Susceptibility to encoding in a symbol system

Recent discoveries about the brain have important implications for teaching. Several universities have established dedicated research centres to examine how discoveries in neuroscience can affect educational practice (Sousa 2006:6)

Gardner’s theory forces one to look at the brain in a different way. “As we continue to develop a more scientifically based understanding about today’s novel brain, we must decide how this knowledge should change what we do in the classroom” (Sousa 2006:30).

Before an explanation is given of the different intelligences, it is necessary to look at a drawing of the brain whereby the different areas can be identified to be able to associate these with the different intelligences.

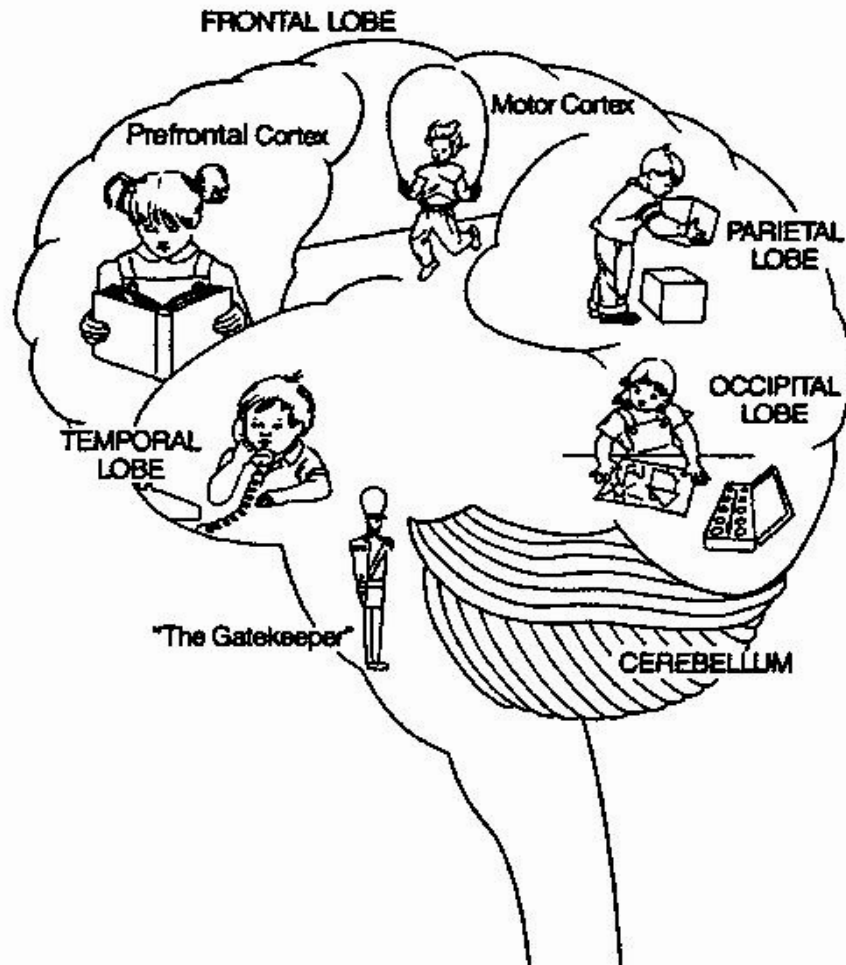


Figure 1: The different parts of the brain (Dryden & Vos 2001:122).

The different parts of the brain are often referred to in the discussion of Gardner's theory and therefore warrant an explanation:

- The prefrontal cortex: At the front of the brain are the frontal lobes and the part just behind the forehead is the prefrontal cortex. These lobes deal with planning, problem solving and higher order thinking. This part also contains our personality.
- The motor cortex is situated between the parietal and frontal lobes spanning across the top of the brain from ear to ear and controls body movement activity.

- The temporal lobe is situated above the ears and it deals with sound, music, face and object recognition. It holds the speech centre in the brain mostly on the left side of the brain.
- The parietal lobe is situated near the top of the brain and deals mainly with spatial orientation, calculations and certain types of recognition.
- The occipital lobe holds the centre for visual processing.
- The cerebellum is situated right behind the brainstem and plays a central part in posture and balance. It also performs learned functions that are used like habits (things one does without active concentration like riding a bicycle).
- The gatekeeper or brain stem is the part that relays messages to and from the brain. Most of the body nerves that go to the brain end in the brainstem. Vital body functions such as heartbeat and respiration are monitored here.

The discussion of the multiple intelligences will mostly be based on Gardner's book "Frames of mind" (1983) where he uncovered and discussed these for the first time. Where other sources were used to extend the discussion, these will be mentioned as such. In reading many books and articles about multiple intelligences, the researcher found that most refer to Gardner (1983) as the original source.

It is important, however, to note that Gardner indicated that the number of different intelligences is not so important but rather the notion that intelligence is multiple and not dependent on a general factor "g" (Armstrong 2000b:10). People differ in terms of their profiles of intelligences and not because some possess one or more intelligences (Kornhaber et al 2004:6). Everybody has an element of all the intelligences in a greater or lesser degree, which together form their intelligence profile that will be described here.

It is important to note that it is possible to improve and develop each of the intelligences. Gardner (as quoted by Checkley 2004:3) states in this regard: "We can all better teach of the intelligences. ... Teachers have to help



students use their combination of intelligences to be successful in school.” Haggerty (1995:50) holds the same opinion as can be seen from the following statement made by him: “MI theory challenges teachers to devise ways of teaching that take advantage of students’ strengths and help them compensate for or shore up their weaknesses.” In the following discussion of each of the intelligences activities that could be used in the classroom to develop the particular intelligence will also be indicated.

#### **2.6.4 The eight intelligences**

##### ***2.6.4.1 Linguistic intelligence***

A specific area of the brain, also known as the ‘Broca’s area’, is responsible for the forming and processing of words and sentences (Gardner 1993:51). This left temporal lobe, will, when injured, produce language impairments. It is important to note, however, that if a large area of the left hemisphere of the brain is badly damaged or even removed during the first year of life, a child will still be able to speak well. Early life in the brain is so dynamic and language so important that it will develop in the right hemisphere of the brain. Gardner (1993:85) observed that those children exposed to such damage later on in their lives, compromised the visual and spatial function usually localised in the right hemisphere. They were also a little inferior to those who had the use of their left hemisphere in tasks of speech and they didn’t learn new material as rapidly as their left hemisphere counterparts.

It is believed that the gift of language is universal in all cultures and the acquisition of language is remarkably constant in different cultures. Even deaf people in communities where no specific sign language is taught, will invent their own sign language to express themselves in such a way that they will be understood by the other people close to them in that community. This makes the linguistic intelligence the most widely shared intelligence across all human species. It is also the most widely researched and studied intelligence.

Gardner (1993:78) singled out four aspects of the linguistic intelligence as the most important factors in human society:

1. Rhetorical aspect: This aspect contains the ability of people to use language to convince or influence other people to their point of view. Political leaders would be a good example of people who have developed this aspect to the fullest. It would be an omission to leave out the three year old who can as convincingly move his mother to give him his way after an initial refusal to do so.
2. Mnemonic potential: Language gives one the ability to remember things that will be used again to find your way, to follow a certain route, to be able to play a certain game and so on.
3. Role of explanation: Language, written and spoken, stays the most important way of conveying information, explaining certain concepts, giving oral instructions and supplying metaphors to explain even the most complex scientific problems.
4. Role to reflect: Language is used to reflect upon everything we do and have done to be able to improve or develop further.

It is important to mention that a dictionary contains all the words and a textbook on verse contains all the instructions of how to write poetry but there is nothing available to replace that inner feeling, or intuitive ability which some expert poets possess to be able to know how to arrange the words the verses and the rhythm. Poetry is therefore seen as a probable intuitive knowledge of form – something genetic (Gardner 1993:83).

According to Sousa (2006:24), the brains of all children have a specific period during which it is more receptive of new learned information. He refers to this period as the “windows of opportunity” and contemplates that children’s brains respond to the spoken word (language) best between birth and 12 years. If a child does not hear a word by the age of 12, the person will most likely not learn a language at all. He argues that the brain cells assigned to learn a language will then die down or the cells will take over other tasks.

The researcher of this study has experienced that the linguistic intelligence is further developed in the classroom where learners are expected to report back on what they have learnt in one of many different linguistic ways like an oral presentation, written essays, reports and summaries. Ray (2004:15-16) points out that this intelligence is also further developed when children learn foreign languages, explore the different genres of writing and when they are allowed to define what is achievable on their own terms; then teachers realise that almost anything is possible for the learners.

It is also easy to find proof of positive feedback about the development of this intelligence as most feedback takes place in the form of written reports.

The Linguistic Intelligence is also very important where other skills are concerned. It provides a way of expressing thoughts generated through other intelligences. The development of the interpersonal intelligence is for instance very dependent on the control of the linguistic intelligence, especially verbal communication. The linguistic intelligence is the one most intertwined with other intelligences (Kagan & Kagan 1998:4.6). Some or most of our thinking takes place in non-verbal language, only to find a way of expression later on in verbal or written language. It is therefore clear that the linguistic intelligence is of the utmost importance in learning but it will not have full meaning without the merging with other intelligences. It is further important that the linguistic intelligence, although at its most receptive during the first years, can be developed to an advanced stage of using it. The brain has the capacity to develop the language skill in the right hemisphere of the brain during brain damage in the left hemisphere where the linguistic abilities are originally seated. Linguistic intelligence according to Gardner should, however, never be considered more important than any other intelligence. The continuous interaction of the different intelligences should always be acknowledged in all learning situations (Gardner 1993:98).

The researcher came to the conclusion that language, and therefore the linguistic intelligence, which includes the oral or spoken word as well as the written word, is highly valued in most societies. Logical mathematical forms of

intelligence seem to be considered on the same level of importance and it might be that this is the reason for these two intelligences to have overshadowed the world of intelligence for such a long time. The learners with a high linguistic intelligence have always been advantaged over the others who might have very strong visual/spatial or any other intelligence. This is also why the concept of intelligence should be clearly understood because in the past this intelligence formed part of the favoured IQ and that was the only intelligence teachers considered when teaching and assessing. Most teachers are bound to always fall back on the use of this most common scholastic intelligence. It would, however, be foolish not to develop this intelligence as far as possible as experience has shown that most learners have to complete some or other form of linguistic examinations to be able to move on to the next level academically.

#### The linguistic intelligence in the classroom

The linguistic intelligence is optimally used in a school situation. Those who are strong in this intelligence will automatically feel comfortable and most probably will also do well in the traditional school setup where teachers do most of the talking and learners the listening. The linguistically strong student enjoys reading, writing, speaking and also listening. Children with a strong linguistic intelligence will learn best by listening to an oral presentation given by the teacher who is knowledgeable about the topic (Kagan & Kagan 1998:4.5). Other activities which can be employed to further develop the linguistic intelligence are: story telling, telling and understanding of jokes, creative writing, peer teaching, dramatising, computer instruction or reading programmes, story books (listen to and read the same story), word puzzles and other word games like scrabble. (Chapman 1993:32). McKee (2004:48) mentions writing, rewriting, describing, translating, rhyming, talking, acting and composing as activities that will help to switch on the linguistic intelligence.

The challenge in the classroom situation according to the view of the researcher would be to reduce the dependency on the use of the linguistic intelligence only and to give students opportunities to use intelligences other

than the linguistic intelligence to prove their knowledge or competency in any subject matter because all learners have different intelligences. In using other intelligences more learners will be catered for, but it should never be to the detriment of the linguistic or any other intelligence.

Teachers should be made aware of and guided to use other forms of expression to give all learners a fair chance to express their understanding of a specific topic or concept. A good example would be to allow a learner to draw a picture, mind map or flow chart that would depict all the elements of a prescribed work in terms of the story line in the English class in stead of only writing it down as the practice is.

#### ***2.6.4.2 Logical-mathematical intelligence***

It is interesting that for the logical-mathematical intelligence there is no specific area in the brain which can be isolated in terms of logical-mathematical abilities and functions like with the linguistic intelligence. It is, however, possible to experience a particular breakdown of the logical-mathematical ability. Gardner and his co-workers reached what he called “a fragile consensus” that the left parietal lobes, and the temporal and occipital areas adjacent to them may be of special importance to the logical-mathematical intelligence. The logical-mathematical intelligence does further compare positively with most other criteria of an “autonomous intelligence” (Gardner 1993:158).

The logical-mathematical intelligence does not emerge from the auditory/oral sphere as is the case with the linguistic and musical intelligences. The logical-mathematical intelligence has as its basis for existence, the world of objects. This form of thought develops from observing objects to making statements about them, to act upon the statements and then to forming relations between actions. The ultimate form of expression of a strongly developed logical-mathematical intelligence happens in science. Scientists are driven to solve problems and look for simple solutions to complex problems. Many science-related disciplines depend on mathematical concepts and calculations to

solve their problems. A good example is the NASA space station which could never develop new strategies to enter space without extra-ordinary mathematical calculations. Mathematics and logic explore the relations among symbols in the abstract world but science applies these in the external world which can be seen and experienced by people (Kagan & Kagan 1998:4.15).

Gardner acknowledges the work of Jean Piaget in that he builds on the research done by this developmental psychologist. Piaget said that all knowledge – with specific reference to logical-mathematical knowledge, emanates from one's actions upon the world (Gardner 1993:131).

Once a child can distinguish the permanence of objects - at about 18 months - he can think or refer to them in their absence. Before then any object which is removed from his sight does not exist in his mind. Thereafter a child's ability to differentiate among objects, to be able to group things of colour and shape and size, develops rapidly. At the age of six to seven the child has mastered the processes to determine quantity, and so more and more complex operations become possible. By the same token the child should be able to use the same processes or operations in his daily life to do everyday tasks like playing a game, following instructions to make something or using money to buy from a store (Gardner 1993:130). What is important here is the fact that Piaget believes as a result of research and analysis that logical-mathematical reasoning begins in the handling of objects. These actions can then later be done mentally and so it will become internalised. The child will then later on be able to think and reason about these objects without handling them physically and yet arrive at the same conclusion. These mental operations or processes become more and more a habit and something that he does not have to think about any more but can still do (Gardner 1993:131). Sousa (2006:25) refers to the "windows of opportunity" as the time any child is most receptive of new information. According to him the Logical Mathematical window of opportunity spans between birth and age four.

It is important for educators to know that the normal child becomes capable of formal mental operations during the early years of adolescence. Gardner

(1993:133) recons that the sequence of development according to Piaget from sensory-motor actions to concrete formal operations is the best worked out course of growth in all of developmental psychology. Piaget believes that the logical-mathematical thought is the “glue that holds together all cognition” (Gardner 1993:133).

Children show signs of operational intelligence far earlier than Piaget had suggested and his findings are further mainly applicable to the mainstream of middle-class people in a Western society. These developmental stages are less relevant to individuals of traditional cultures where children are exposed to a totally different culture where different norms and values exist (Gardner 1993:134). According to Gardner (1993:135), mathematicians like Quine, Whitehead and Russel agree that it is very difficult to draw a line between logic and mathematics. They rather indicate that logic is the basis of all mathematical statements. Logic leads in other words to mathematics.

With reference to Gardner’s definition of intelligence, it is very easy to see the “products fashioned by individuals” (Gardner 1993:136) gifted in language, art and music which are readily available to the public at large to see, while in mathematics the opposite is true. Most of us can only admire the work of the mathematicians knowing that it has great value for a community but not being able to appreciate the innate nature.

Adler as referred to by Gardner (1993:138) is of the opinion that the powers of mathematicians are rarely visible in other spheres of life. A mathematician is seldom talented in law or finance. What motivates mathematicians is the possibility that they may discover a new sequence or create a result that is entirely new to the world. Hardy, another renowned mathematician as referred to by Gardner (1993:139) made the statement that mathematicians as a class of their own are not particularly known for their general ability or versatility. It would therefore also be futile for a real mathematician to attempt any other mediocre work than doing what will distinguish him from all others in his field of expertise.

The world of the mathematician is far removed from that of the social individual. One has to concentrate for many hours where it is not conducive for others to interfere. Social contact in this situation is therefore of little or no importance as is language. It is suggested that if the concentration is demanding and stressful in an isolated situation, the rewards are high in quality. Solving a very difficult and complicated problem is a very special reward for a mathematician (Gardner 1993:141).

Kagan and Kagan (1998:4.14) mentioned that the curiosity so much needed by mathematicians generally dies off when you grow up. He made the statement that by the age of 25-30 the major work of a mathematician is over. Very little is accomplished after that time. This idea is in contrast to what is found in other domains of intelligence like the emotional intelligences where the height of performance can be seen in the fifth or sixth decade of an individual's life (Kagan & Kagan 1998:4.14).

The logic-mathematical intelligence is not dependent on any external stimuli to be challenged but rather to internal stimuli like thinking about patterns and possible relationships that may lead to something new. Abstract thinking or higher order mathematical reasoning, does not emanate from any external stimuli and that may also be the reason why this intelligence can not be located in a specific place in the brain. Gardner pointed out that electrophysiological studies, conducted during higher order mathematical activity, confirmed that patterns changed so fast and in such a complex manner that it was not possible to localise activity (Kagan & Kagan 1998:4.14).

For the real logic-mathematically inclined, the developments of mathematical skills are so important that they will grow and develop even without any instruction from teachers. Kagan and Kagan (1998:4.14) is of the opinion that most extra-ordinary scientists were extra-ordinary mathematicians of whom Einstein and Newton are good examples. It is certainly necessary to expose students to rich experiences of intense repeated and different kinds of observations to foster a need for wanting to know more.



## The logical-mathematical intelligence in the classroom

Students who have this intelligence as part of their personal strengths learn best by being confronted with problems and opportunities to analyse. They are usually very inquisitive; love to do all sorts of experiments to arrive at a conclusion.

The logical-mathematical intelligence can be further developed by exposing learners to numerous opportunities where they were given problems to solve, do their own experiments, make predictions and test them, classify and categorise information and discover relationships (Armstrong 1994:29; Van den Berg 2004:154). According to McKee (2004:48), logical-mathematical intelligence is switched on every time learners are expected to calculate, reason, estimate, prioritise, create goals or objectives, generate lists, support their case with a rationale, justify their position, or add, subtract, multiply and divide.

This intelligence, like many others, can be further developed through any subject field. Even a subject like Travel and Tourism which is usually looked at as the subject where no need for a mathematical intelligence exists, provides opportunities for writing steps to arrive at a destination, depict the sequence of traveling to different places at the most favourable cost at certain times of the year taking all monetary systems into consideration. In this discipline patterns and functions of tourism were identified and discussed to arrive at new solutions to existing problems. Statistics of typical movement of tourists in a country can be compared and analysed to prevent crime, improve infrastructure or improve road networks.

### **2.6.4.3 The musical intelligence**

Scientific evidence compounds educationalists to preserve the arts (music and visual arts) in schools as a result of the positive impact it has on learning, brain development and growth (Sousa 2006:190).

The musical intelligence is the one intelligence which is the earliest visible in a child's life. No one could determine just how early and why this intelligence would manifest so early. The majority of musical capacities and especially the most important which is the sensitivity to pitch are localised in the right hemisphere of the brain. According to research findings, Sousa (2006:221) suggests that the brain's response to music is innate and has strong biological roots which are in agreement with the findings of Gardner as mentioned below. Researchers have proved that infants of as young as three months can respond to a certain song in a certain way (Sousa 2006:221). An injury to the right frontal or temporal lobes will cause an extreme difficulty to distinguish between tones and to reproduce them correctly. Appreciation of music will also be affected when the person is affected by a disease of the right hemisphere. The ability to perceive and criticise musical performances also seems to rely on the right hemisphere structures of the brain although certain musicians had difficulties to perform after an injury to the left temporal lobe (Gardner 1993:118).

Music activates more than the right brain. Music causes emotional responses from the listener and stimulates the limbic system in the brain which is also the part responsible for long-term memory. According to Jensen, (1995:219) Dr. Robert Monroe, engineer and founder of the Monroe Institute, has produced audiotapes with specific beat and rhythmic patterns to help the left and right hemisphere of the brain to work together to effect optimal concentration, learning and memory. He has thousands of learners with success stories as part of his research findings. Halpern, as referred to by Jensen (1995:219), stated that the absence of art and music "can retard brain development in children". He is absolutely convinced after years of study that music should be an essential part in any school's curriculum. He also proved

through research that exposure to specific kinds of music causes a remarkable improvement in mathematics, reading and the sciences (Jensen 1995:220, 2004:19). There is clear evidence that music affects brain waves and our physiological states. Lozanov, (Maples 1994:19) a Bulgarian physician psychiatrist and educational researcher, developed a teaching and learning theory in the 1960s called suggestopedia. Lozanov's theory and practices at the time triggered the accelerated learning movement and according to Maples, (1994:59) Lozanov chose Baroque music from the period 1600-1825 for a specific reason: he found that it produces the right frequencies and sounds which harmonise the function of the body and the brain. If used correctly, listening to this music will improve the alpha levels in the brain and improve memory and recall on a much higher level than without the music (Maples 1994:59). Lozanov (Dryden & Vos 2001:180) further suggests specific music for each of the phases of the accelerated learning process. A lesson should start with introductory music which will relax the learners to achieve the optimum state for learning. The second phase where the new information must be learned should be accompanied by "active concert" like Beethoven's Concerto for Violin and Orchestra in D major. The last phase when the information must be moved into long-term memory should be accompanied by "passive concert" like The Water Music of Händel.

Children will achieve the ultimate form of expression of this intelligence in completely different ways. The Japanese Suzuki Talent Education project proved that children from the age of two years can be taught to play a musical instrument like the violin with technical precision whereas another child with no formal training will be able to sit down and play his own composition on the piano (Gardner 1993:99). There are also those children who can hear a song once and be able to repeat it by singing it flawlessly without accompaniment. These examples represent a number of children who were observed and proved the existence of these phenomena (Kagan & Kagan 1998:4.25). These examples also show that the musical intelligence can well be inherited as a talent but it surely can be learnt as well.

According to a National Broadcasting Corporation TV show of September 1994 as mentioned by Jensen (1995:217), learners increased their spatial learning, memory and reasoning abilities after having listened to selected compositions of Mozart during active or passive learning (Jensen 1995:217). Evidence was also gathered at the Centre for the Neurobiology of Learning and Memory in California, that students, who listened for 10 minutes to certain pieces of Mozart's music, raised their test scores in spatial and abstract reasoning (Jensen 1995:218).

Sessions, an American composer of the 20<sup>th</sup> century, as referred to by Gardner (1993:100), holds the opinion that a composer of music only writes what comes up in his head in the form of musical imagination; a musical rhythm or a melody. Wagner considers composing as something as natural as a cow producing milk (Gardner 1993:100; Kagan & Kagan 1998:4.23). Other composers like Igor Stravinsky agree with Sessions that composing music has nothing to do with words and is a pure act of doing (Gardner 1993:103). They could not describe any part of the process of composing as something they could express in words. Their thinking was in symbols and not words. To the same extent they would not have been able to have done any composing if they were given numbers to do it. One would think that auditory ability is crucial for musical ability but it was proved not to be the case as deaf individuals could appreciate the rhythmic tones of music (Kagan & Kagan 1998:4.24).

Tony Melendez, a man born without arms, had an inborn "feeling" to create sounds and music as he described it during a CNN interview (7 April 2005) as observed by the researcher. Music was so part of his being that he managed to play his own compositions on a guitar with his feet in a very short period of time without making use of writing or any other ability but a music ability. He said on the CNN programme that he only had tones and rhythms in his head that he wanted to give expression to. He therefore had to use his legs and feet and toes to do just that.

It is therefore clear that the musical intelligence has a variety of ways of expression. All skills needed in expressing music are linked with each other. These skills, however, differ from each other. Someone who can appreciate the beauty of being emotionally touched by a composition does not necessarily have the composer's innate structure of knowing how to arrange the melody or tones to achieve that level of expression. Research has proved that even the most disabled could appreciate something of the structure of music (Gardner 1993:107).

The development of musical competence happens from a very early age where children sing and babble and imitate sounds and tones made by the people around them. This happens with an astonishing accuracy. It has been claimed by authorities in this field that infants as young as two months are able to match pitch, loudness and melodies of their mother's songs and by four months they can also match rhythmic structure. Children of this age are predisposed to pick up aspects of music more than the core properties of speech (Gardner 1993:108). What is interesting is that the ability to create new unfamiliar tones disappears by the age of three to four when the typical cultural tunes will take over. After the age of seven little further musical development takes place except for the increase in knowledge about music where most learn the ability to read music and how to play an instrument.

Music literacy is viewed very different in different cultures and therefore important to mention as it has a significant impact on the musical intelligence (Armstrong 2003:26). There are extreme cases like the Anang tribe in Nigeria (Gardner 1993:109) who introduce their new born babies to music and dance from the age of one week. These children join groups where they learn basic cultural singing and dancing and playing of instruments by the age of two. They can sing hundreds of songs and play several instruments and perform various dances by the age of five. The anthropologists, who studied this group according to Gardner, claim that they have never had a "non-musical" member in that tribe. The Venda people in Limpopo start early with movement but they do not attempt to sing. In China and Japan musical competence is highly prized. Children are expected to perform well in playing different

instruments as well as be proficient in singing (Gardner 1993:110). The great master Suzuki has shown that children can play many instruments from as early as two years of age although very few of them go on to make music a career (Gardner 1993:373). These examples suggest that musical ability is not only about inherited talent but it is an intelligence which is very susceptible to cultural stimulation and training. When one looks at families like Bach, Mozart or Haydn one does admit the genetic factors in talent but should also keep environmental factors in mind. They were surrounded with music all day from birth (Gardner 1993:108-113).

Children learn up to the age of nine in a very spontaneous way and also use their musical skill and talent without much ado. After this age a more sustained effort has to be put in to further develop the musical skill and ability. Children then have to make choices to practice or to play with friends (Gardner 1993:111). It is at this stage where music in the life of a child experiences its own crisis and if they can overcome that, the next crisis will appear during adolescence when the youngster has to decide whether music is so important that he would want to make a career of it and is prepared to sacrifice time, effort and money to achieve that. Motivation, personality and character are elements that play a crucial role in the continuation or further development of the musical ability (Gardner 1993:111).

The musical intelligence in the classroom

An important research finding known as the “Mozart effect” has profound educational benefits also in an ordinary classroom. Shaw as referred to by Sousa (2006:224) found that there is a neurological basis for the “Mozart effect” which suggests that passive listening to the Mozart sonata K.448 stimulates spatial thinking, as well as the parts of the brain that are responsible for memory recall and visual imagery. Other music was found to have activated only the auditory cortex and not the frontal cortex where higher order thinking takes place. Teachers should use the right music in their classes to get attention in order to promote a specific topic, to activate the

alpha state of the brain and to make teachers and learners aware of the impact of certain types of music on their whole being.

Activities which can be implemented in the class to develop the musical intelligence can at the same time affect the development of other intelligences. Students can make up a rap song in the science class which can depict all the elements in the periodic table. In this way they will better remember it. The teacher can also employ the following examples of activities to develop the musical intelligence or use the musical intelligence of a learner to learn subject content: Create and use songs, cheers, jingles and poems, listen to tonal patterns, try music and dance of different cultures, move to the beat chanting learned material and create dances that illustrate concepts (Armstrong 1994:30; Van den Berg 2004:157). McKee (2004:48) lists the following activities suitable for developing the musical intelligence in the classroom: composing your own verses to a well-known tune or writing a song, utilising rhythm and using harmony, rhyme and melody.

#### ***2.6.4.4 Spatial intelligence***

Spatial intelligence includes the abilities to perceive the visual world accurately and to be able to reproduce, re-create, change or “modify it as a result of ones own initial perception” in absence of the original stimuli/view. It must be clear that the spatial intelligence is also a combination of different abilities. One is tempted to refer to the spatial intelligence as visual-spatial as it is mostly linked to a representation of stimuli which can be seen with the eyes. It is, however, not only connected to visual stimuli as that would exclude the blind person who surely can have a very advanced form of spatial intelligence.

Spatial intelligence has more to do with the recognition of form or object in the concrete world. The spatial intelligence is, however, also important in abstract thinking, reasoning and imaging. A good example would be the tension, balance and composition seen in different works of art like paintings or works of sculpture. The central role of spatial intelligence in the visual arts speaks

for itself. It is said that Leonardo da Vinci would be so taken up by the particular looks of an individual that he would follow him around for a whole day and study him to such an extent that he would be able draw him as if he were present (Kagan & Kagan 1998:4.18).

In many scientific theories we find images used by the scientists themselves to explain the concept or theory they developed (Gardner 1993:177). The psychologist Rudolf Arnheim as referred to by Gardner (1993:178) went so far as to say that without visual and spatial imagery, truly productive thinking is not possible. He is of the opinion that language is of secondary importance in productive thinking. Spatial intelligence is therefore as important as the linguistic intelligence. Good examples of the value of the spatial intelligence would be Thomas Edison, who invented the light bulb and kept all his books with sketches of his ideas. Charles Darwin, the creator of the evolution theory, also had books full of sketches of trees. Leonardo da Vinci was a great artist but also left notebooks full of sketches and ideas of possible inventions which he never got around in doing (Armstrong 2003:66). To explain the importance of spatial intelligence in a more abstract way, chess is a good example. Chess players possess the ability to anticipate moves as well as the consequences of those moves. Gardner (1993:193) referred to G.Kasparov who found that with every move any combination of at least five moves “is carried out in ones head”. Again memory plays an important role here.

The spatial intelligence is localised in the right hemisphere of the brain and more particularly the posterior portions of the right hemisphere (Gardner 1993:177). Gardner is positive that apart from the linguistic intelligence, more has been established about the spatial intelligence in the brain than any other intelligence. Someone with damage to the right hemisphere will have difficulty to find his way around a site, will not easily recognise faces or scenes and fine details will not be noticed. What is also interesting is that individuals with right hemisphere damage will pay little attention to the space to their left. They will also have difficulty in making drawings (Gardner 1993:182). The other area in the brain which plays an important role in remembering spatial locations is the frontal lobes. Memory is a crucial capacity in spatial intelligence.



The existence of idiot savants with almost exclusively a spatial intelligence is a clear indication that this intelligence does exist in isolation from other intelligences. Gardner (1993:189) refers to Nadia, an autistic child of four years old, who could draw like a skilled artist with the finest of detail with almost no other ability present or visible.

The spatial intelligence is very important in our society. Without a well developed spatial intelligence, not a sculpture, artist, mathematician, geologist or taxi driver would survive. Spatial knowledge serves a variety of scientific goals. As a way of capturing information it helps to focus thinking, as well as to solve problems (Gardner 1993:190).

The spatial intelligence can be observed in all cultures. All people seem to be able to find their way around the area where they live and work, they are involved in some form of entertainment and play some sports. The different spatial abilities can be mentioned from the fine details noticed by the Bushmen who can tell from one single spoor of an antelope how big it was, how fast it traveled, what sex it was and in what mood it was when passing, to the Eskimo who finds his way in a clueless world according to our perception (Gardner 1993:201). The Eskimos live in an environment where it must be extremely difficult to survive as they always have to be on the lookout for cracks in the ice and no road signs to warn them of "potholes". An interesting test result indicates that 60% Eskimo children tested very high in ability on a spatial intelligence test in comparison with only 10% of Caucasian children who are not that intensely aware of their immediate environment (Gardner 1993:204). This intelligence clearly develops according to the challenges in the environment where you will find yourself in.

The most interesting research finding which is also in line with the belief that the brain never stops to develop, is the finding that the spatial intelligence gets better with age and does not drop in performance like the logical-mathematical and bodily-kinesthetic intelligences. Individuals with a highly

developed spatial intelligence perform with a continued and even an enhanced performance towards old age (Gardner 1993:205).

### The spatial intelligence in the classroom

Maples (1994:67) speaks of “visual orchestration” when he refers to the methods people can use to influence learning or sending messages in a non-obtrusive way or directly as needed. A good example would be a welcoming sign on the classroom door with the personalised names of the learners about to enter. Subject materials displayed in the classroom will be observed by students and taken in on a subconscious level. It will be even more effective if these materials can be moved to different spots to prevent them from becoming invisible to the unconscious eye (Brearly 2001:10). The use of colour, size, symbols together with movement and sound, will all help to make visual learning more successful.

Teachers have to think differently about assessment in the sense of not only accepting writing as proof of certain content knowledge. A good example of using the spatial intelligence to prove knowledge, is the ability of a child to draw a poem or short story with pictures that would depict all the elements needed to show that the storyline is well known.

Learners in the mathematics class can make posters with cartoon pictures showing their knowledge of a certain topic. They can draw a map of the school grounds by measuring every distance in real terms and reduce it in relation to the paper they work on. Learners should be taught to study and summarise through the use of mind maps as explained by Caviglioli and Harris (2003). The list of activities that could be used to switch on the visual/spatial intelligence presented by McKee (2004:48) includes the following: drawing, sketching, colouring, mind mapping, flowcharting, pinpointing, painting, visualising, imagining and daydreaming.

All classroom walls can be decorated with learners' work which has to "speak" to other learners. An exhibition could be arranged to display the visual presentations of the different ways in which students learn.

#### **2.6.4.5 Bodily-kinesthetic intelligence**

The skilled use of one's body is as old as human nature itself. The Greeks were the first to seek harmony between body and mind and believed to train both to complement each other. We often use the expression "body language" which shows without going into any details that there is a language spoken without words through the use of one's body. It is also true in our own and many other cultures that a bodily intelligence was never rated as important as a logical-mathematical or linguistic intelligence and therefore this intelligence didn't get much attention (Gardner 1993:208).

Bodily-kinesthetic intelligence is identified as a separate intelligence as research has found that individuals who lost all verbal and logical capacities could still carry out highly skilled motor activities without hesitation. One capacity of the body which seems to be restricted to the human is the capacity of dominance. The body most of the times seems to have one side of the body ruling the other side. One limb tends to be dominant and the one hand, foot, eye will play a leading role in all activities. The left hemisphere seems to play a more dominant role in motor activities where most language capacities will also be stored for most normal individuals. Brain damage to the left hemisphere will then cause selective impairment to gross and fine motor skills of limbs to the right side of the body. It only becomes really visible after brain damage to those parts (Gardner 1993:213).

The use of dance is the most widely used capacity of the bodily-kinesthetic intelligence and applied in most cultures. Dance is used as a social activity, an activity to express feeling or religious beliefs, or to convey certain messages. Some people see it as a way to release tension, or use it as ways to evoke sexuality. There are literally hundreds of possible uses of dance which are not further described here. It is important to note, however, that the

aims and the character of the dance differ hugely across cultures. An American dancer, Paul Taylor, contended that one is able to derive a dance vocabulary from the combination of different qualities of dance like speed, direction, distance, intensity, spatial relations, the personality of the dancer as well as spacing and time. Music is further singled out as the one most important partner in dance which will influence the dance (Gardner 1993:225). According to Gardner (1993:227), Cunningham, who researched dance in its purest forms is of the opinion that dance does not need music to reach an ultimate form. Dance without music is the only opportunity to observe the bodily intelligence in its purest form without being influenced by external factors.

Another form of expressing the bodily intelligence would be the actor and more specifically the mimic actor. This activity needs other skills. One must be able to observe detail and then recreate the scene with the necessary accuracy. The whole body becomes alert and not only sight and memory. John Martin, a performing arts student, is of the opinion that we are all equipped with a sixth sense of kinesthetics (Gardner 1993:229).

Athletics is another domain where one can observe highly developed bodily intelligence. It is also an activity which is highly valued in our own culture and also in many cultures around the world. Athletics allow the individual to use his bodily intelligence to entertain, to challenge his own abilities and see how far it can be stretched but also for own pleasure and more importantly to serve a career. Many other abilities like power, speed, accuracy and teamwork are developed to achieve the highest sport in the athletics sphere. Athletes in different sporting codes need different bodily attributes to be able to excel in that sport. For some sports you can use your inherited attributes such as a tall or short or heavily built or very lean body, but the sense of timing, coordination and rhythm are developed through practicing skill and perseverance. Some people ascribe outstanding performance in athletics to instinct while no athlete has ever claimed superiority without a huge input of effort and skill. Thomas Edison rightfully remarked: "Genius is one percent inspiration and ninety nine percent perspiration" (Kagan & Kagan 1998:4.29).

A good example here would be the golfer Tiger Woods who held his first club at the age of six months. He was barely a year old when his father introduced him to his first lesson in how to swing a club. He was exposed to in depth training since his second year. He was a star by the time he turned five. The rest of his career and achievements are history (Kagan & Kagan 1998:4.28).

It is also interesting to realise how people's bodies from different parts of the world develop in different ways to accommodate the environment they live in. The previously mentioned example of the Anang tribe is relevant here as well. Strong bodies are needed to do the daily chores of the people in that area. They need to walk long distances and carry heavy loads, therefore nature has it that they have strong bodies to be able to cope with that. The Balinese children learn from the elders by doing what they do. Very limited linguistics is used in the education process. They tend to have a very well balanced kinesthetic awareness and ability (Gardner 1993:236).

The bodily-kinesthetic intelligence is the last of the three object-related intelligences with the logic-mathematical and visual-spatial as the others.

The body is, however, more than just a mere object. It is also the container and carrier of the self. It houses the most inner thoughts, ideas, feelings and conception of the self which will play a great role in his interaction with the world around and his physical appearance will also determine how others will perceive and treat him. This experience will either help him to accept himself and think of his own body as special or reject the body he is in (Gardner 1993:237).

The bodily-kinesthetic intelligence in the classroom

Confucius said in 479 B.C. "I hear and I forget. I see and I remember. I do and I understand" (Kagan & Kagan 1998:4.29). Magnesen as referred to by Dryden and Vos (2001:100) has provided one of the most used models in education where he states that we learn only 10% of what we read, 20% of

what we hear, 30% of what we see, 50% of what we hear and see, 70% of what we say and 90% of what we say and do.

The bodily-kinesthetic intelligence is much underrated in the learning environment in comparison with the benefits it can provide when developing it to the fullest. Children who are allowed to move their bodies around in a skipping game to learn the multiplication tables, will have fun and learn at the same time while they might not have wanted to sit down quietly, memorising multiplication tables. There are many bodily kinesthetic activities which promote deep learning, it is more about the teacher who should make a complete mind shift towards accepting that a classroom can not always be the quiet, orderly place it used to be. There is increasing evidence that many underachieving boys are kinesthetic learners who are expected to conform to a linguistic teaching style (Brearly 2001:11)

Brain Gym activities can have a dramatically positive influence on the class, both emotionally and cognitively (Brearly 2001:11). Brain gym is a series of safe natural movements that enhance learning by addressing the sensory elements involved in the integration of new ideas. Brain gym brings more play, movement, pleasure and success into the learning process (Dennison & Dennison 1989:10-12). Cohen and Goldsmith (2003:1) explain that normal brain activity in the classroom requires efficient communication among all the different parts of the brain. When information cannot flow freely because of some blockages (which can be stress) no learning will take place. It is therefore essential that teachers are aware of and understand the role of bodily movement and more specifically the right type of movement in the classroom as you will find in brain gym activities that will release the stress and allow the information to flow freely to the processing and memory centres of the brain.

When children go to school for the first time, there is a specific programme included in the curriculum to develop their fine motor and gross motor skills. Equal time should be spent on this bodily development as with other facets of learning like linguistic activities. They have to learn how to use their hands

and their fingers to write and to pick up and hold small objects. This skill is further developed when you learn to play the piano with detailed precision or when you learn to type on a computer (Kagan & Kagan 1998: 4.32).

Acting, dancing, role play, puppet shows, designing and building are all activities often used in the classroom to get children to engage physically in the lesson. The teachers can teach a whole class to use kinesthetic symbols to connect content with movement. Teachers also have to be made aware that most learners have a kinesthetically preferred learning style and would therefore learn more by involving their bodily intelligence. More activities to include the bodily-kinesthetic intelligence would be field trips, activity centres, co-operative learning, brain gym and outdoor education (Chapman 1993:139). According to McKee (2004:48) any kind of “hands-on” activity would relate to this intelligence.

#### **2.6.4.6 The intrapersonal intelligence**

In Gardner’s original work in 1983 “Frames of Mind” he explained the intra-personal and the inter-personal intelligences under one heading namely the ‘personal intelligences’. For the purpose of this study his later version *Multiple Intelligences: The Theory in Practice* (1993) will be used where he spoke of the two separate intelligences as they are known and used today.

It is interesting to note that the personal intelligences were ignored in almost all cases of the study of human cognition (Gardner 1993:242).

According to Goleman (1995:41), the emphasis on cognitive psychology was the result of the fact that emotional intelligence was never recognised as a science because it could not be studied objectively from the outside with scientific accuracy. This was a view held by most behaviourists like Skinner who dominated academic psychology for a very long period of time before the 1960s. Gardner also admitted that he looked at emotions in a cognitive way. He focused on thoughts about feelings and not so much about the feelings themselves. Gardner (Goleman 1995:41) nevertheless explained to Goleman

that he was talking about emotion when he first wrote about the personal intelligences. Gardner (Goleman 1995:42) always maintained that all intelligences are equally important, but admitted to Goleman that in the day to day world no intelligence is more important than the personal intelligences.

According to Kagan and Kagan (1998:4.55) we use our intrapersonal intelligence to “think in, with and about internal feelings, moods and states of mind”. Gardner (1993:240) says that the central role of this intelligence is the fact that it gives you access to your own feelings about life and serves as the center of a human’s information-processing capacities.

For the purpose of this study it is important to take note of the development of the personal intelligences - which includes the intra-personal as well as the inter-personal intelligences - as it is these intelligences that play a profound role in self esteem which is one of the most difficult aspects the school has to deal with.

During the first years it is known from experience that a child forms an intuitive bond with the mother or caretaker. This is an indispensable part of normal growth and childhood. It is known from experience that the absence of such bonds cause difficulty for such a child to relate to others or to develop the ability to get to know himself or others (Gardner 1993:244).

During the second year a child starts to respond to his name and views himself as a separate person. During the next three years the child’s brain develops so fast that he actually undergoes an “intellectual revolution” (Gardner 1993:247). An important intrapersonal facet which is confirmed during this stage is his sexual identity. During this stage the child is still very egocentric in his actions and thinking, thus quite insensitive to other’s feelings and focused on his own wants and needs. By the time of school-going age the child forms self-knowledge from his own experiences with things he can do. This stage is vitally important in the formation of his intrapersonal intelligence as his actions are driven by his own feeling of competence or feeling inadequate when he does not manage to get things right (Gardner 1993:249).



During middle childhood a child will often make premature judgments of himself mostly as a result of negative interpersonal encounters with others. When a child fails during this period to establish successful interpersonal relationships, he tends to become very alone and that may force or distort his own intrapersonal thought patterns (Gardner 1993:250).

During adolescence the child wants to feel appreciated and loved. The child's own perceptions, of whether he is loved or not, will gradually form his intrapersonal view. During this time the child is supposed to achieve a stage where he will mature in his knowledge of and about himself. The extreme difficulty during this stage is the problem to distinguish between the pressures of the social environment and the child coming to terms with his own personal feelings, motivations or desires that would direct his actions.

Children with a high intrapersonal intelligence learn best through introspection, reflection and self talk. It is with this knowledge of oneself that it becomes possible for the individual to control emotions like anger, fear or any other extreme emotion. Kagan and Kagan (2000:4.46) explains that the intrapersonal intelligence is not only about attention to inner stimuli, but also about the way in which one will respond to such stimuli that will help develop a true knowledge about oneself and in fact it will develop a true sense of who we are. According to Kagan and Kagan (2000:4.46) recent evidence indicates that the development of the intrapersonal intelligence is fundamental for academic success.

Erikson, as referred to by Brearly (2001:50), explained that there are eight stages of emotional growth and that every person needs to develop successfully through each of these stages to be able to be successful in the next stage. The first stage of emotional growth in the life of a child can be used as an example to explain the necessity to fully achieve maturity in each stage to successfully move into the next stage. A baby of less than one year needs to learn to trust his mother for his basic needs. When he is hungry he is fed, when he is cold or wet he is made comfortable. The trust develops in

response to the successful provision in his basic needs. Should that not happen, the child will suffer emotional turmoil as well as physical problems which can be severe. This subsequent condition is widely documented as “marasmus” and is particularly present in orphans in war zones (Brearly 2001:50).

Dr. Thomas Hoerr from the New City School in America does not hesitate to say that the intrapersonal intelligence is the key intelligence as far as he is concerned. He explained to the researcher that if you are aware of a weakness in yourself, you will know that you either need to do something to improve the situation or you need to avoid a situation where you need to use that weakness. The other side of the coin is that if you are **not** aware of the weakness you will not know what to improve or what to avoid and you will always make the same mistakes not even knowing that you actually embarrass yourself by making those mistakes. “More than any other intelligence, a strong intrapersonal intelligence positions us for success; conversely a weak intrapersonal intelligence likely means that we will meet frustration and failure” (Hoerr 2000:43).

#### The intrapersonal intelligence in the classroom

Reflection strategies are the most powerful way to be confronted with ones own feelings, emotions, goals, dreams and ambitions. It is a way to better understand and know yourself as an individual but also as a person who is part of a group. Strategies used in the classroom are journal reflections, and also mere “think time” when teachers deliberately give learners 30 seconds to think before they are allowed to share their thoughts with a partner and then answer. According to Armstrong (1994:31) and Van den Berg (2004:162-163) the following activities are also valid: individual planning, discussing own emotions and moods and doing self-assessment. The following activities also appear on McKee’s (2004:48) list: meditating, reflecting, associating, imagining, valuing and evaluating.

There are also “corners” which can be created in the classroom and resource centres where learners may select to go to in “isolation” to focus on whatever area they choose to.

#### **2.6.4.7 The interpersonal intelligence**

Thorndike, as referred to by Goleman (1995:42), who was very influential in propagating the notion of IQ in the 1920's -1930's, made a public statement indicating that there is one aspect of emotional intelligence that could be considered part of a person's IQ and that is the ability to understand others and to act wisely in human relations.

From the researcher's experience with company officials who come to school to interview possible future employees, it is clear that success in life in this instance will begin with a good or “impressive” interview as seen through the eyes of the decision makers. The first interview and the ability of a learner to relate to others and communicate well, will lead to an opportunity like studying with a bursary. One needs a well developed interpersonal intelligence to be able to pass this first test and not the mathematical mind or high IQ as formerly believed. It is important to remember that most positions are won by an interview – an interpersonal challenge.

The person who is labeled with a strong interpersonal intelligence is the one who enjoys the company of others, who relates well with other people, who usually gets along well and easily acts as a leader for other people. This intelligence is indirectly promoted by the new OBE system in South Africa where group work is the order of the day. The classes became noisier and learners now have the opportunity to discuss all new learning material with their friends as a matter of instruction. It is not a sin anymore to speak to your friend next to you in the classroom, in fact groups get now assessed. You can now get exactly the same mark for an assignment if you and your friend worked closely together.

Gardner (1993:241) referred to the interpersonal intelligence first as part of the “personal” intelligences. He is of the opinion that the one turns inwards (the intrapersonal) and the other outwards which is the interpersonal intelligence. The central ability developed through this intelligence is the ability to identify the differences in people that one comes in contact with for who they really are. People with a strong interpersonal intelligence further have the ability to sense the moods of other people, to know what will excite them or make them sad. For a teacher it will be the ability to know what will motivate a child to excel in life. Advanced forms of interpersonal intelligence are usually prevalent in political or religious leaders who will inspire millions of people to follow them. We have a very good example of such a leader in Nelson Mandela. The interpersonal intelligence in us will always focus on people around us, trying to distinguish between others’ feelings, moods behaviours and actions. It is also this observation of other people that helps us to judge our own behaviour and build our knowledge of others as well as that of ourselves. The personal intelligences are dependent on each other as with all the other intelligences (Gardner 1993:242).

In the view of the researcher, development of the interpersonal intelligence, should be done with the full consideration of the cultural background and traditions of an individual in the group. It is a very important factor in trying to understand, establish and manage good interpersonal relationships. What is a common action or reaction in one culture can be an insult in another. In the experience of the researcher it is important to know that most children from the Nguni descent are taught not to look a senior person in the eye. To do that would be an insult, a display of disrespect and a challenge to that person. In the Western civilisation it means that the person has something to hide if he can not look you straight in the eye. In the classroom situation where teachers and learners come from such a variety of cultural backgrounds, one should be especially cautious not to offend each other rather than to facilitate learning through actions or ways of communication with others. Insensitivity towards cultural beliefs and practices will surely not build or develop the interpersonal intelligence.

## The interpersonal intelligence in the classroom

The school-aged child learns in school to relate in a more flexible manner to others as he starts to feel rejected when other children do not approve of his behaviour. He begins to understand then that he also needs to respond in an acceptable way in others' eyes to experience the feeling of acceptance and belonging. During the primary school years the child engages in much more social activity and that is a natural way in which a child learns that other people matter. It is during this time that children would play, pretending to be someone else. During this type of play they actually learn to interact with the significant "other". The danger during this period is that when a child fails to establish an effective friendly relationship with his peers that he may accept feelings of being inadequate, helpless or unworthy of happiness. These feelings of rejection and the inability to make friends may be so overwhelming that it can blur the child's inner feelings and self esteem and eventually hinders learning from taking place (Goleman 1995:266).

Since co-operative learning became a trend in education, the interpersonal intelligence came to the forefront and was greatly promoted with different group work activities like "jigsaw" and "numbered heads together", amongst others where everybody in each group had a specific task and the others were dependent on them for their learning. Armstrong (1994:31) and Van den Berg (2004:161) suggest the following activities to facilitate this intelligence: group activities, listening to each other's stories and poems, debating, helping each other to solve problems and doing peer-assessment.

### ***2.6.4.8 The naturalist intelligence***

This intelligence did not form part of the first set of intelligences as described by Gardner but he had already considered the possibility. He said from the beginning that if there could be seven intelligences, there could be more. He needed to do more research to be able to classify this intelligence according to his criteria of what constitutes an intelligence. Gardner added this intelligence to his list in 1996 (Campbell 1997).

People with a strong naturalist intelligence will have an innate attraction towards most aspects of nature. That would include a love for plants, animals, rocks or soil and anything else that one would consider as nature. The naturalist has the ability to have real empathy with nature, whether it is with an animal or a plant. The naturalist will see life from the point of view of the animal or plant. The person with a strong naturalist intelligence will also possess the ability to observe very carefully and also to collect, group and analyse. These individuals have a passion and understanding for nature. It is important, however, that this intelligence, like most others can be learned. The ability to identify and classify plants and animals seems to be the most important and that can be taught and learned.

According to Campbell (1997:1) this intelligence has to do with a profound understanding, observing and organising patterns in the natural environment. Anyone who works, for example, as a molecular biologist or a traditional herbalist, could be classified as a naturalist.

Hoerr writes that the evolutionist, Charles Darwin, must have been the greatest of naturalists. His theory of evolution demonstrates a brilliant ability to identify and classify insects, birds, fish and mammals. This theory was ranked as perhaps the major intellectual contribution of the nineteenth century (Hoerr 2002:1).

Our environment looks quite different from how it was at the turn of the nineteenth century. The children we teach spend even their holidays in air conditioned buildings or in front of the television. The opportunities for them to develop their naturalist intelligence is quite limited and left to the school to develop. Fortunately certain aspects of the naturalist intelligence can still be developed by identifying, categorising and classifying other objects than birds or insects. The naturalist intelligence is, however, not only about classification and analysis but also about the ability to adapt and survive in one's environment. The naturalist intelligence enables us to use the information that

we gather through our senses, to discriminate and recognise differences in weather patterns, clouds, winds and other indications of what is to come.

The Polynesian islanders move in boats from island to island because they know and understand the ocean, the currents and the sky. They pass on the knowledge from generation to generation. They also have an intuition that is further developed through experience (Chapman 1993:156).

Children and grown-ups with pets will testify to the enormous calming effect they will experience by touching and feeling the fur and the body of their beloved animal. They are able to sense their needs and can derive great pleasure from caring for them.

The naturalist intelligence in the classroom

The earth sciences like Geography and the biological science teach to the natural intelligence and provide many opportunities for the learner in the classroom to explore this intelligence.

In view of the extent of urbanization in the twenty-first century, educators can make a special effort to expose children to the natural environment through field trips and designing lesson plans where the identification of leaves, trees and insects are part of the learning material. The naturalist intelligence offers a richness of opportunities for our children to develop in a country like South Africa where nature is one of our biggest assets. Van den Berg (2004:160) suggests inter alia the following activities that would enhance the naturalistic intelligence: recognise and classify fauna and flora, undertaking field trips and taking pictures of nature that could be used in the classroom.

## **2.7 Summary**

The MI theory is the first theory after the IQ movement that gives learners the hope they need to survive in an educational system where IQ used to set the

pace for many years. Intelligence was initially regarded very narrowly and it was believed that every person is born with set abilities. IQ tests were used to measure intelligence and to attach a numerical value to it. Various concerns about the use of tests to measure intelligence were however, expressed and psychologists such as Gardner found it difficult to accept that an IQ score is the only indication of what a learner might achieve in life. Gardner instead adopted a revolutionary stance on intelligence and described it as multi-faceted. The intelligences which he defined in 1983 are: linguistic, logical-mathematical, musical, bodily-kinesthetic, interpersonal, intrapersonal and spatial. He added one intelligence in his book *Intelligence reframed: Multiple Intelligence for the 21st century (1999)* namely the naturalist intelligence.

Accelerated learning which acknowledges the fact that the whole learner should be taught and that each and every person has a preferred learning style makes use of the theory of MI to accelerate learning in the classroom. Various ways in which each of the intelligences could be facilitated in the classroom, were also discussed in this chapter.

The next chapter focuses on the research design of a case study on the implementation of AL through MI in a particular South African school.



## **CHAPTER 3**

### **RESEARCH DESIGN AND METHODOLOGY**

#### **3.1 Introduction**

The previous chapter presented a literature review that focused on the theoretical foundations of accelerated learning and MI. Special attention was given to the eight intelligences and the type of activities that could be used in classrooms to facilitate each of the intelligences. This chapter outlines the processes used to conduct the research and gather relevant data. Comprehensive reading, training and a firm understanding as well as a willingness to experiment with teaching strategies underpinned by MI by the researcher as well as the teaching staff involved in the research were regarded as a prerequisite for the success of the research project. The research was conducted by means of a case study with elements of action research in the school where the researcher is employed.

Section 3.2 of this chapter describes the aims for the research. Section 3.3 contains the detailed description of the research design as well as the reasons for using a qualitative approach with elements of action research and mixed method designs. Section 3.4 describes the different methods applied in order to gather the data relevant for this study. Participant selection is also discussed in this section. Section 3.5 gives an explanation of how data were collected and in section 3.6 the processes followed to analyse the data are described. Section 3.7 deals with the validity of the research and in section 3.8 ethical values and why these are important to be considered in a study of this nature are discussed. The chapter is concluded with a short summary (section 3.9).

#### **3.2 Research aims**

The researcher has personally experienced extreme difficulty in previous places of employment where new curricula or new approaches to teaching strategies had to be employed. This was also true of colleagues who

experienced the same resistance by their teaching staff to new approaches, theories or strategies in the classroom. It is as a result of these personal experiences that the research aim was conceptualised as follows:

- The first research aim was to identify the challenges and measures for best practice in implementing an MI approach in the classroom. The researcher aimed at identifying main challenges in overcoming teacher resistance and other problems encountered with the implementation of an MI teaching approach in a South African school.
- The second research aim was to establish the extent to which the implementation process impacted on teachers and learners in either a positive or negative way.

### **3.3 Research design**

A case study design as a form of a qualitative research approach was decided upon. The case study design makes it possible for the researcher to study a specific phenomenon in depth. The case study design is not aimed at the number of participants but at the detail, in depth knowledge, validity and applicability of the phenomenon (Cohen et al 2000:181-183).

According to Johnson and Christenson (2004:376) cases typically involve a child with a learning disability, a learner with a special need or a language arts classroom, while Leedy and Ormrod (2005:135) and Creswell (2003:15) explain that a case study entails an in depth study for a defined period of time of a particular individual or multiple individuals, programme, event or process. Tellis (1997:10) holds the opinion that a case study is an ideal method to employ when a holistic, in depth investigation is needed (like the one done by the researcher of this study). He points out that it is further designed to bring out the details from the viewpoint of the participants. It also tends to be selective focusing on one or two issues that are fundamental to the system being examined (Tellis 1997:2). Ellet (2007:13) explains that all cases have a common purpose and that is to “represent reality, to convey a situation with all

the irrelevancies, sideshows, misconceptions, and little information or an overwhelming amount of it”.

Qualitative studies such as the case study make it possible to gain detailed descriptions of processes and practices as well as attitudes and level of commitment which are not easily quantifiable concepts (Denscombe 2003:30-31). The case study in question aimed at gaining an understanding of the educators’ attitudes and commitment towards implementing an MI teaching approach and to making learning enjoyable and really worthy of the effort of all learners and teachers.

Gillham (2000:1) defines a case study by explaining that it is:

- a unit of human activity embedded in the real world;
- a study which can only be studied or understood in context;
- a scenario which exists in the here and now;
- a situation that merges in with its context so that precise boundaries are difficult to draw.

Hamel, Dufair and Fortin (1993:1) make it very clear that the term case study refers to an approach rather than a method and that case studies employ various methods. The case study approach is further typically used where action research as a method is employed in classrooms and schools where performance measurement is possible. Studies that involve the research participants as an integral part of the study are referred to as action research, also called participatory research (Mouton 2001:150). Mouton (2001:151) points out that action research has as its basis a very specific commitment to the empowerment of participants to be able to change the conditions where the research takes place. In this sense elements of action research was a key feature of the case study, which focused pertinently on the empowerment of teachers to meet the challenges (of whatever kind) in implementing MI in their classrooms.

Leedy and Ormrod (2005:108) define action research as follows: “A type of applied research that focuses on finding a solution to a local problem in a local setting. For example a teacher investigates whether a new spelling program she has adopted leads to improvement in her students’ achievement scores.” One of the aims of this research project was to investigate to extent to which the implementation of an MI approach to teaching impacted on teachers and learners.

### **3.4 Research methods**

In a case study the researcher has to investigate, research and explore the research question by using a variety of methods and approaches until a profound understanding of the topic is achieved (McMillan & Schumacher 2006:26;28). There are no prescribed or specific methods suggested that should be used. Some methods are more commonly used as befits the nature of and applicability to the study, like unstructured interviewing, direct observation and field notes (ibid.). According to Leedy and Ormrod (2005:135) case studies often include observations, documents (e.g. newspaper articles), past records (e.g. previous test scores), and audiovisual materials (e.g. photographs, videotapes and audiotapes). It is also quite possible and lately also more common to use quantitative approaches to study cases which is made possible through the application of new technology (Trochim & Donnelly 2007:148).

In their explanation of the place of theory and the literature review in the qualitative approach to research, Fouché and Delport (2002:268) state that theory and literature review often play a minor role in case studies and that these aspects might in some cases even be completely absent from this type of research.

The researcher has applied a variety of methods during the course of this study. Most of the information gathered was based on qualitative methods like interviews, observations, text analysis, field notes and open-ended

questionnaires. It was, however, also necessary to compare academic results. The researcher therefore presented the quantitative results in graphs to make it possible to compare the results.

The researcher also visited several schools in the USA where MI had been implemented many years ago by observing the classes and having in depth discussions with the principal and staff. Examples of MI schools could only be found in the USA where the environment, learning and teaching culture, as well as appointment of staff, staff training and staff development differ markedly from circumstances and practices in South Africa.

Although more than one school were visited, this study reports only on information gathered through interviews and observations at one such school in the USA. The researcher also paid a visit to the Harvard Graduate School of Education where Professor Howard Gardner was the Dean of the Faculty. A semi-structured interview was held with one of the lecturers in the Faculty (refer to section 3.4.2).

#### **3.4.1 Selection of participants**

The researcher used the situation as it presented itself at the school of employment. The school is an independent school situated on farm land and which opened in 1992 as an attempt to offer a route to quality education for the people in the Hammanskraal area who suffered from poor education in the previous political era. It quickly grew from 220 learners in 1992 to 1007 learners in 2007 ranging from grade 00 to grade 12. The researcher is the principal of the school and started the school in this capacity. Five teachers and one grade 8 class from this school formed part of the research.

- **Five selected teachers**

The teachers who participated in the case study were purposively selected to represent the different departments and therefore the different subjects (learning areas). This was done because different subjects are generally

associated with the different intelligences as a result of the nature of the subjects. They were further also chosen because of the variety and differentiation they represented amongst the staff of the particular school in terms of age, culture, sex and number of years of teaching experience and so on as also described in the next paragraphs. The participating teachers were all known to the researcher for different periods of time ranging from one year to twelve years.

The researcher's knowledge of the participants in terms of their personalities, work ethics and creativity, willingness to change and to experiment was a very important factor in their selection to participate. It should also be kept in mind that the personal experience and view of the researcher could on the other hand, have been subjective and therefore biased to some degree.

It was important to ensure that the variety of school subjects (learning areas) was included in the study because of the fact that the teachers from certain departments (like mathematics) tend to be skeptical about any new or different form of teaching and learning methods and theories. The researcher knows from experience that teachers easily doubt or even condemn the value of any alternative approach before it has been implemented as seen with the big uproar amongst educators in South Africa after the implementation of the Outcomes-Based Approach to teaching and assessment. It was also important for the research that the findings could be applied to a variety of learning areas and not only to certain subjects like the languages or content subjects like Geography or Economics.

Another aspect that was considered in the selection of staff to participate in the research, was the trend that the more experienced a teacher is in terms of years of teaching experience (even if they only repeated the same approach over and over again without improving the results) the less they are willing to participate in any new strategy application. The experience of the researcher after having been in the position of principal for 16 years, is that teachers generally have an attitude of "we know what works and what not" and they do not want to be bothered with more work and new designs that would expect

them to commit more time and effort to planning and preparation. The selected teachers are referred to as “he” for the sake of this study although the group consisted of two males and three females.

**Teacher A:** With 12 years teaching experience teacher A was very eager to know about other approaches and keen to learn through and from others. Teacher A wanted to develop further in his profession and wanted to develop further in presenting the subject Arts and Culture in a more creative way.

**Teacher B:** Very suspicious of the invitation to participate in the research but did not really have something to lose in joining the group. Not particularly for or against change in approach. He taught Natural Science as well as Human and Social Science and has 5 years teaching experience.

**Teacher C:** Did not know anything about multiple intelligences and was fairly new on the staff with 14 years teaching experience. Teacher C was open and receptive to new ideas. He made the change from a government school in a rural area to improve himself on all levels of the profession. He was responsible for teaching commercial subjects.

**Teacher D:** Agreed to be part of the exercise but did not want to have more work to do. Teacher D was a very experienced teacher with 20 years experience and did not believe in any new “gimmicks” that did not bring about profound change. He attended previous training in the application of multiple intelligence techniques and taught Mathematics.

**Teacher E:** Knew a little about multiple intelligences but thought the approach could make a difference for teachers and children. He had attended previous training and already applied certain outcomes-based techniques in his classroom which supported the accelerated learning techniques well. Teacher E was well experienced with 17 years teaching experience and taught English.

- **The Grade 8a class of 2004**

The researcher purposively selected a grade 8 class because of the fact that it was the only class being taught by all the teachers who participated in the research. It was also the opportune grade to select in the high school because

they would still be doing all the same subjects in grade 9 and that would benefit the comparison of results. The higher grades select their subjects from a group of fifteen subjects which would have made it very difficult to include that many staff for the purpose of this research.

### **3.4.2 Visits to the USA**

- **Visit to the New City School in the USA**

Contact was made with the principal of New City School after having read and used his book (Hoerr 2000) to help implement MI at the school where the research took place. Hoerr made it his business to help schools transform to MI schools and received about a thousand visitors per year at his school. The researcher was invited to spend a week at New City School in the classes of MI experienced teachers. It was allowed to take photos and videos of lessons presented to use as examples for the staff involved in the research project. Permission was granted to attend meetings, speak to parents, staff and learners while visiting classes or thereafter. These data were gathered in an informal way.

Videos and learning support materials could be shared with the participants of the study as motivation that this specific approach could be implemented successfully in practice.

- **Visit to the Harvard Graduate School of Education**

Contact was made with the Education Department at Harvard University with the hope that the researcher could speak to the pioneer of MI, Professor Howard Gardner himself. Unfortunately that was not possible and an interview (captured on tape) with a staff member at the Faculty was conducted.



### **3.5 Data collection**

Lechunga (2006:50) is of the opinion that a case study should use as many sources as possible to collect data where relevant to the case study. Qualitative methods are not limited by fixed questions or predetermined analysis. Each of the participants in the case study is part of the research and they also provide their own interpretation of the environment they are exposed to as part of the study. Part of the evidence that will be presented in this study is based on the personal experience and evidence the participants added to their own views and opinions and interpreted and analysed by the researcher.

#### **3.5.1 Computer generated brain profile assessments**

The researcher completed a course at *Neurolink* to be able to serve as a “Brain profile assessor” in preparation of the research project. *Neurolink* is the name of a company that created the software to conduct brain profile assessments. This skill was to be used towards establishing the brain profiles, with specific reference to the presence of multiple intelligences, of the individual teachers as well as the learners involved through the application of a computer software programme. The course material presented by *Neurolink* included a spectrum of brain based research findings as well as an exposition of the physiology of the brain. It further contained a brief outline of well known learning problems and common deficiencies prevalent in poor performing learners. It also touched on the different learning style preferences of teachers and learners.

Many psychologists did the *Neurolink* course with the aim of helping children to assess and identify their learning problems. The researcher was of the opinion that this profile assessment could help children and staff to identify their dominant intelligences and to know how to work on their latent or underdeveloped intelligences to ultimately develop to their fullest potential.

The researcher was of the opinion that the brain profile assessments would be particularly helpful for the teachers as a measure to help them have insight into their own preferences and prejudices or to make them aware of their own weaknesses and their learning and teaching styles in comparison to that of the learners. The researcher considered these profiles to be of great value in helping the teachers to have a better understanding of the learners they teach. It was also hoped that the teachers would, as a result of the outcome of these assessments, be more willing to change their approach to the learners.

Every teacher and learner had to undergo a brain profile assessment on a computer which would determine his/her individual proclivity towards certain intelligences, learning styles and other traits like stress levels, eating habits and the like.

The outcomes of the brain profiles are expressed in numerical values and could therefore be compared with each other to determine any similarities or differences amongst teachers and learners.

The brain profile assessment was designed in such a way that the person would answer all questions electronically by means of making a choice between “yes” and “no” or, amongst others, choose one answer which mostly describes them out of a possibility of 3 or 5 answers. The researcher sat next to the person while doing the brain profile assessment to ascertain that the questions and possible answers were interpreted in the correct manner.

The computer generated report would indicate inter alia the following traits:

- Brain dominance (left or right brain dominant)
- Bilateral or homo lateral brain functioning
- Performance mode (expressive, emotional or receptive learner)
- Learning style (kinesthetic, visual or auditory preferred learning style expressed in the form of a percentage)
- Natural learning capacities (This would include the assessment of the learner’s multiple intelligences)

- Learning skills evident in the learner
- Stress situation
- Health (whether a learner practices a healthy lifestyle)
- Fitness (whether a learner lives an active and healthy life style)

These traits were not equally relevant to the study of a multiple intelligence approach in a classroom as discussed in chapter 4.

### **3.5.2 Content analysis**

Krippendorff as referred to by Trochim and Donnelly (2007:151) states that content analysis “is the systematic analysis of text”. The major purpose of this method would be to identify patterns in text. This broad type of analysis also includes the following types of analysis:

- Thematic analysis of text where the main idea in the document is identified and described. The documents would include literally any kind of text eg. field notes, articles and organisational memos, minutes of meetings.
- Indexing where key words are identified which would not include all the nonessential words like “is”, “was”, and “of”. The researcher did not make use of any indexing through computer or other automated methods. The key words always coming up at meetings and mentioned in memos were already an indication of common challenges.
- Quantitative descriptive analysis where the purpose is to describe special features of the text quantitatively. A good example is where more than one teacher would describe the pitfalls of implementing a specific strategy. When reference to time or the shortage of time or the length of the period is mentioned time and again, it can be singled out as a possible determining factor in the context of the possible challenges faced by a MI approach as a result of its repetitive use in all discussions, reflection reports and observation feedback.

Planning and preparation forms formed part of the documents used for content analysis. The planning and preparation of lessons form a valuable part of the MSC (most significant change-see also p. 83) technique, where the participants describe the most significant change they have experienced as a result of the programme they had been exposed to. Intervention took place in the sense that a lesson planning and preparation form was designed and suggested by the researcher, discussed by the teachers and implemented with the hope of a gradual change in how lessons will be approached in the application of MI principles in the classroom.

The teachers had to hand in their planning on a weekly basis in written form as agreed and their commitment to the due dates, format of their planning as well as the inclusion of MI principles in their planning were evaluated by the researcher. A rubric was developed to assess these documents. The quality of the planning and lesson preparation was assessed by the researcher by making a qualitative judgement in terms of new ideas implemented in each lesson, the number of intelligences addressed in the different lessons over a week and also by teachers attending the discussion with the researcher before implementation of the planning.

The number of times each teacher handed in the preparation form on time was recorded as an indication of their commitment to the process of implementing MI in their classrooms. This was shown in a graph to point out the different levels of commitment as maintained by the different teachers.

### **3.5.3 Direct observation and participant observation**

Gillham (2000:49) describes observation as a data gathering method which can be used in a variety of ways. Observations can be employed as part of a multi-method approach where different kinds of evidence, gathered in different ways, but bearing on the same points, contribute to the validity of the study. Observations can also be used as the main technique when the purpose is explanatory description; when you describe what you see and explain it.

Gillham (2000:49) warns, however that observation requires discipline and concentration.

Observation is the most popular form of data gathering by researchers when programmes, processes or behaviours are studied. It is important that the researcher follows the basic rules for observation while in the act. During observation the researcher should only note what is observed without interpreting or evaluating what is observed. It is also important to try and be as objective as possible in the description of events while observations are carefully noted in as much detail as possible (Kerfoot & Winberg 1997:62).

Tellis (1997:7) explains that a direct observation is made when the researcher visits the specific site where the activity is about to happen to gather data. Without any interference the researcher will record the activities as they happen. A disadvantage of this method is the possibility of the researcher's own opinion and bias to influence what is really observed. What the researcher will report is the experience according to his view. That is not always the most objective way of reporting any event and it could thus be contaminated with bias.

The advantages and disadvantages of observation as explained by Gillham (2000:46-47) can be summarised as follows:

*Table 3.1: Advantages vs disadvantages of the observations*

Advantages of observations	Disadvantages of observations
➤ Provide direct information about behaviour of individuals and groups in a real life setting	➤ Expensive and time consuming
➤ Permit observer to enter into and understand the situation/context	➤ Need well-qualified, highly trained observers
➤ Provide good opportunities for identifying unanticipated outcomes	➤ Presence of the researcher may affect behaviour of participants
➤ Exist in natural, unstructured and	➤ Selective perception/involvement of observer may distort data
	➤ Observer has little control over

flexible setting	situation ➤ Data from observations are difficult to collate and analyse
------------------	--

Bogan et al (1992) as referred to by Kerfoot and Winberg (1997:81) explain the aims of observation as a technique for data collection as follows:

- To increase your ability to describe before evaluating. Often the meaning of what you are seeing emerges much further down the line.
- To create a higher level of self-consciousness about your own values and perspectives.
- To encourage you to see more clearly the perspectives of others in different roles in the institution or organisation.

Direct participant observation played a very important role in the study. Observation and consequent discussion of observed phenomena influenced the progress and process of the study. All participants agreed on one lesson observation form which would be used by every teacher when visiting another teacher's class and observing another teacher while teaching to also help them become more critical of their own teaching. The observation form changed over time as a result of the discussions with teachers after lesson observations. Teachers pointed out which parts of observation were too time consuming or too complicated to complete in the time available for an observation.

The notes made during the classroom observations were structured in the "observation form" (rubric) to guide the inexperienced observer to look at the important aspects of lesson presentation and evaluation and also to learn from another presenter. It was also important to get an observation report from another point of view than that of the researcher.

Teachers were made aware of non-verbal cues and especially tacit knowledge which were demonstrated during the course of the lessons.

McMillan and Schumacher (2006:347) point out that listening is a very demanding task where the observer has to take on the role of the presenter to really understand the thoughts and content of the presenter's perceptions.

#### **3.5.4 Field observations, field notes and supplementary techniques**

*Field observation* is a qualitative method which is fundamental to all qualitative research. Field observation includes an eyewitness account of the everyday activities of all the participants in the study (McMillan & Schumacher 2006:358). Strydom (2002:278) prefers the term *participant observation* to *observation* or *field observation* because "... all forms of observation are basically similar and depend to a greater or lesser extent on participation, thus necessitating contact with the subjects observed".

Field observations are detailed descriptive recordings of the people involved, their actions and reactions to events which are presented as field notes. The researcher noted down (made field notes) the responses to topic discussions at the weekly meetings with her interpretation of the body language experienced, the tone of voice and the general behaviour of the participants in the study during the discussions. The context of the meetings was always included in the field notes.

*The supplementary techniques* as described by McMillan and Schumacher (2006:359) which were employed during the study were the use of visual techniques and analysis of non-verbal communication. Visual techniques involved the presentation of photos and videos of classes where an MI approach was followed (New City School in America). These were compared with the classrooms used by the teachers who were part of the study.

Analysis of *nonverbal communication* is important in most qualitative studies (McMillan & Schumacher 2006:359) as was the case in this study. A good example in this research was the teachers' immediate or initial response to certain ideas like the introduction of brain gym in all classes before the lesson started. Brain gym is a physical activity which some teachers felt

uncomfortable with. The teachers could have felt exposed by moving outside their comfort zones and they showed their discontent. These unspoken messages sent by teachers were already a very good indication to the researcher if brain gym would be implemented or not. The researcher could then make sure to attend the class of the teacher who sent the nonverbal messages of “not likely in my class”. The researcher kept meticulous field notes of all such non-verbal communication.

### **3.5.5 Meetings**

Another data collection technique used to gain a better understanding of the problem, programme and process took the form of regular meetings with the research participants. These meetings had many advantages of which the stimulation of ideas, sharing of common problems and focusing on possible solutions contributed most to the successful implementation of the study. The researcher acted as the facilitator by posing questions, facilitating the discussions and observing verbal and nonverbal responses of the participants.

The weekly meetings held by the researcher with the selected group of teachers contributed to a better understanding of the implementation process as it was during these sessions that the participants had the courage to say how they felt, shared examples of new approaches used in their classes and also where they shared their problems experienced with the hope that some of the others had a solution.

Many different activities as suggested by the researcher were discussed during these meetings and participants could voice their attitude and commitment towards some of these ideas. The researcher compiled an agenda for the meetings according to experiences of the previous week. Notes were taken during these meetings, new suggestions were made and it was at these meetings where a possible change in course was decided and possible solutions discussed where problems were experienced.



The researcher gave the participants a reflective observation sheet at set intervals where the participants could note down their experiences and voice their concerns in an anonymous way if they so preferred. They never minded to add their names to the self reflection report.

### **3.5.6 Reports (school records)**

The researcher had the *academic reports* where the academic results of the grade 8a class were recorded to her avail as a point of departure before any of the MI approaches had been implemented. The researcher also had access to all reports of previous grade 8 learners who were not exposed to MI in the classroom. The school reports were compiled by the teachers through the application of ordinary formative and summative assessment as prescribed by the Department of Education. The learners in the grade 8a class were compared with the performance of the learners in previous years to determine if the group could be considered an ordinary group that would display more or less the same patterns of those learners of previous years. This comparison was very broad as the variables were so many that it was difficult to conduct a detailed comparison.

The researcher was mainly interested in determining the extent of performance increase of the same class after a period of MI instruction in comparison with the previous terms. This was important for the continued motivation of the staff to stay committed to the study by experiencing progress in the process of learning.

### **3.5.7 Questionnaires**

Trochim and Donnelly (2007:148) point out that qualitative case studies can sometimes become a form of intervention as well as evaluation. Dart and Davies as referred to by Trochim and Donnelly (2007:148) refer to the “Most Significant Change” (MSC) technique where the participants in a study describe the most significant change they have experienced in a given period as a result of the program. This aspect of a case study is especially applicable

to understanding processes as they unfold during change. It is also common that a programme of this nature includes both quantitative and qualitative indicators.

The researcher used open ended questions in the form of a questionnaire where learners could explain their views on the process of implementing MI in the classroom. The answers to these very basic questions were quantified through the coding of data to determine how many teachers and learners shared the same views (Kerfoot & Winberg 1997:85).

### **3.6 Data processing**

Trochim and Donnelly (2007:284) consider data processing as a form of data reduction. The goal of data analysis is to convert all information gathered in some way to gain understanding from it. Raw data have to be summarised, or reduced into manageable chunks to ultimately answer the research questions.

*Open coding* was used by the researcher to review the raw data and identify key aspects that could be used to explain certain processes. It was also used to form categories where data could be grouped. Open coding was used at length during observation and analysis of observation field notes of the participants and researcher (Trochim & Donnelly 2007:285). The researcher used the open coding process extensively as there was a vast amount of observation notes, planning and preparation forms and focus group interviews which had to be broken down into manageable sections to be interpreted.

*Constant comparison* is according to Trochim and Donnelly (2007:285) the process whereby the researcher continuously sorts and contrasts participants' behaviour and responses. This in turn stimulates different comparison processes. The process of introducing the MI approach was mostly informed by the continuous comparison of participants' views, experiences and challenges in implementing the approach. It was particularly important to understand how the different personalities, learning areas and learners would

respond to the new approach to be able to predict future possible implementation by another group of participants. The biggest advantage of constant comparison is the possibility of gaining a much more profound understanding of the phenomenon as it manifests in the research.

Kerfoot and Winberg (1997:97) suggest that a researcher uses *triangulation* as a way to quality check the data processing process. Triangulation occurs when the researcher uses at least three data sources to gather information on the same topic like it was done in this research through interviews, observations, lesson plans and field notes. The main idea is to get a multiplicity of perspectives or views on the same events, activities or behaviours.

### **3.7 Validity**

Wickham, Bailey and Cooper (2000:15) point out that data collected in any research needs to be valid. The data gathered should match the research question and the researcher should ascertain that the data are accurate. In a case study, it is not about the numbers of people involved in the data collection but the richness and trustworthiness of the data collected. Gillham (2000:27) reminds us that human intelligence is by its nature selective and therefore the researcher should acknowledge her own preferences and prejudices. Not only what you *expect* to find, but also what you *want* to find form part of any researcher's approach. It was therefore important for the researcher to constantly scrutinise and challenge herself to maintain the intended integrity of the study.

In this research the trustworthiness of the data was determined by the fact that the researcher was personally involved in most of the data collected. The data were mostly gathered through personal interviews, personal and participant observation and mostly through first hand experiences.

What people said what they did and what they produced through their actions were all evidence that were used as the foundation of the analyses and also the supporting information that determined the outcome of the study. Gillham (2000:25) points out that there are fraudulent researchers who “construct” a study without sufficient data and such “studies” would obviously lack integrity and trustworthiness. It must be noted, however, that interpreting research data requires more than only good intentions – it requires discipline and concentration.

### **3.8 Ethical measures**

Legal and ethical issues can easily impose limitations on any research, especially in educational research where the focus is on human beings in a certain personal, social and political setting. Discomfort of participants, limitations as a result of certain laws and getting consent from certain participants to conduct a study could influence the outcome or even beginning of a research project (McMillan & Schumacher 2006:16).

Kerfoot and Winberg (1997:32) suggest that a researcher should follow the following ethical guidelines when conducting research:

- Make sure to get the consent of the people who will participate in the research.
- Always consider the confidentiality of people involved by not making specific names and other confidential information public without their expressed permission or requests to do so.
- Always treat the people you work with, with the necessary dignity and respect
- Be open and honest in your communication with them and stick to your word at all times. Explain the process of the research with all the necessary details and then do it in the manner agreed or explained to them.

- It would be considered unethical if the researcher would discuss the research findings with other people and not with the people directly involved with the study.

Ethical values were considered profoundly during the research project. A good example would be the initial process as discussed and decided upon by all the participant teachers. This had to change as a result of ethical concerns. At first only one grade 8 class was going to be exposed to the MI approach in the classroom. The researcher wanted to use the 'Randomized Pretest-Posttest Comparison Group Design' as described by McMillan and Schumacher (2006:269). As a result of participant feedback and discussion with the study leaders on the ethical questions that arose in the application of the approach to one class only where teachers had experienced a profound change in the response of learners to the MI approach, they could not deprive other learners of the same approach without feeling they were disadvantaged. The researcher had to change course by allowing the participant teachers to teach all the classes they had to teach with an MI approach. The teachers could then teach any class according to their view of what is the best for the class. The performance of the participating learners could therefore only be compared with their own previous performance (before the application of MI) and not with the performance of other learners taught by the same teachers in a different (the conventional) way. The teachers considered the practice of teaching in a 'non MI' fashion as unethical due to their own experience of its advantages in the classroom.

Consent of everyone involved in the research was obtained and the research process was explained to them before the research commenced. The researcher had to take special care not to be biased in the course of the study because of her own preference and personal beliefs in terms of brain based learning and the MI approach. It was a challenge for the researcher to keep an objective view of all participants notwithstanding their own personalities, views and possible negative perceptions or views towards the MI approach.

### **3.9 Summary**

In this chapter the methodology used in the study to determine the possible answers to the research questions was discussed. It was explained that the researcher had to change approach at the beginning of the study due to ethical considerations and a collaborative decision by all participants.

The research design took the form of a case study in which action research was done. A variety of research methods such as focus group interviews, observations and open item questionnaires were used to collect data. Participant selection and the data analysis processes were also explained.

In the next chapter a synopsis of the data gathered as well data analysis and interpretation is provided.

# **CHAPTER 4**

## **DATA ANALYSIS AND INTERPRETATION**

### **Introduction**

The previous chapter was used to elaborate on the research design employed in this study to gather and interpret information. The research design focused on a case study approach with elements of action research to examine in as much detail as possible a real life situation where an accelerated learning approach was implemented in the school where the researcher was employed.

In this chapter an account is provided of the findings from the empirical phase of the study in which various research methods were used to collect data. The researcher made preliminary visits to the New City School in America where an MI approach is followed to gain a better understanding of the application of MI into a school curriculum. The researcher also had the opportunity to visit Harvard University where Professor Howard Gardner was employed. An unstructured interview with one of the members of his staff who was involved in the application of MI in different schools around the country gave valuable preliminary information.

After a discussion of the initial observations and unstructured interviews conducted during the visit to the USA, a description of what the brain profile assessments of learners and teachers entailed and the results obtained from these assessments are given. The main part of this chapter is used to report on the research results obtained from the implementation of an MI approach in the selected South African school.

## **Preliminary observations and informal interviews at an MI school in the USA**

### **4.2.1 The New City School**

The researcher had the privilege to visit The New City School in St Louis, Missouri, America. This account of the visit was compiled as a result of observations, informal interviews with teachers and Dr. Hoerr, the second Principal in America to have started an MI school, to broaden the perspectives of the researcher in terms of what a real MI school, as it is known in America and applauded by Howard Gardner, should operate like and what challenges the implementation of MI hold for teachers, parents and learners. It was in no way a formal assessment of anything as the researcher needed to go out there to learn from the experts with a completely open mind, being receptive to everything they do. Field notes were kept.

#### **4.2.1.1 Background**

The New City School, established in the early 1900's was converted to an MI school in 1995, serving the different neighbourhoods in St Louis. Different neighbourhoods also mean different social standing, different financial income, different nationality and different intellectual ability. The school is an Independent school, providing individualised education in a highly diverse and challenging environment to primary school learners, thus charging quite extravagant fees. The school is, however, in no way exclusive of anybody. They enroll 28% learners who get financial aid to be able to attend the school. They have learners from different cultural backgrounds like Spanish, Mexican, Chinese, Japanese, Afro-American, African, Irish, and American. There are even learners with South-African parents.





*Figure 4.1: The single building of the New City School (own photographs)*

Dr. Thomas Hoerr who graduated as a scholar of Dr. Howard Gardner, is the principal of the school. He decided together with his staff of the time, to change the approach of the school to that of MI.

#### **4.2.1.2 Observations at New City School**

For a period of three days most classes from kindergarten to grade 6 were observed. An MI Committee meeting was attended, teachers' preparation observed as well as pupil participation during formal and informal lesson time. Field notes were kept during the observations and were structured under the headings indicated below.

- The role of the teachers

The staff members appointed at this school are fully aware of the multi-dimensional teaching, planning and preparation which is expected of them and is appointed based on their knowledge and commitment to the teaching profession. As can be seen from the application form (Annexure A) which is used to select and appoint teachers they are expected to have an active imagination, think on their feet and be prepared to take a risk. Teachers at this school receive class visits literally everyday. They are confident and do not mind having people in their classes who video tape their lessons, speak to the learners when formal teaching is over and question the teachers about almost anything.

The teaching environment is a very casual environment where even the learners call the teachers by their first names. This practice did not seem to influence at all the professionalism of the teacher. It did, however, break down barriers usually present in a learning situation where teachers and learners are from different generations because of age or position. No fraternisation, disrespect or insubordination was present in any of the classes observed. The teachers had perfect control over every person and activity observed.

Most teachers have computers in their classrooms and take no or very little work home. They have developed very skillful assessment practices which are the reason for not having so much marking to do at home. Teachers write extensive reports on all learners and do not make use of a computerised report programme. Teachers are also allowed to decorate their classes how they want them to be (within budget and possibility in terms of space available).

All teachers have to be part of at least one academic committee, e.g. MI committee, diversity committee, assessment committee or the reporting committee. Each committee is responsible to do a presentation to the whole faculty once every term.

The teachers were constantly found in groups where they discussed performance of learners or other facets of teaching. They used their free periods to get together and discuss issues of interest or importance, they would go to a more experienced teacher to bounce off a new idea, or to ask for help where stuck. No negativity, hopelessness or overburdened attitudes were prevalent at any stage. Not once was a class found without a teacher actively involved. Remarkable was the way in which the teachers were prepared and ready for a class before they entered the room.

- The role of the learners

The more or less 20-25 learners per class clearly seemed to have accepted each other, respected each other and cared for each other. Nobody would laugh if somebody else couldn't get the answer right, they would on the

contrary rather try to help that person than to put him down. No disciplinary problems were observed in any of the classrooms. Teachers had a very soft and almost unobtrusive approach to deal with the over active ones in the class. The learners were allowed to sit or lie down or stand whenever the situation allowed that. It is clear that their unique personalities and intelligences were accommodated in every situation. There was a lot of movement in the classes.

When undivided attention was asked it was given. When silence was asked, the learners responded positively. Learners would ask if they may talk. The teacher also employed different ways of getting their attention as well as allowing them to talk e.g. "You may now whisper the answer to your friend." The learners seemed extremely confident and participated in all different activities appropriate to the teaching of all the intelligences.

The learners who were approached with questions all answered that school is fun and that they never find it boring. They appreciate the fact that they may always choose to work in groups or individually – they are not forced to work in a manner which they are not comfortable with.

- The role of the school environment

The school is characterised by a super enriched environment with an average of 20 learners per class. Everything a child would need to do an assignment, from a pencil to a computer is available in each classroom. There is not more than one desk of a kind. One desk will seat 5-6 learners, another 2, another 4 or 1. The shapes vary from a bean shaped desk to an ordinary kitchen table while chairs also differ from typist chairs, plastic chairs of different shapes and colour, cane chairs, to chairs covered with leather or other material.

Interesting is the fact that there are no cleaners to clean the classes. Each and every learner has a duty in each class which they have to do. This is so natural that they almost automatically do their chores.

- The role of the parents

When you enter the school building at one of two doors you are welcomed by a kaleidoscope of colour and shapes and posters. Dr. Hoerr says that he does not only use the walls for decoration with the latest work of the pupils, but also to educate the parents and everybody else who comes to the school. In an MI environment one needs the attention and co-operation of the parents. They play a very central role in the identification of the child's intelligences and need to help strengthen the intelligences where crucial. Many parents will enter the building in the morning and have a cup of coffee at a spot where parents are invited to linger any time of the day. Coffee is available there as well as the latest letters sent to parents. Parents will meet there and discuss whatever they want. They are not allowed to interrupt classes but may observe any class like any other visitor, by walking into the class and observe.

- Conclusion

From the observations made at the New City School it could be concluded that the aspects mentioned below should be kept in mind when implementing an MI approach in South Africa. Each of these aspects could pose a real challenge when implementing an MI approach in a South African school, especially because of problems such as unqualified (or under-qualified), uncommitted teachers, a lack of resources (refer to section 1.6 and 3.3) and uninvolved parents.

The way in which teachers are selected for appointment plays a very important role in a school where an MI teaching approach is followed. Creative teachers with very strong intra- and interpersonal qualities are needed. Qualified MI teachers are instrumental to the success of an MI school. In addition, it seems that the commitment and work ethics of teachers teaching in an MI school should be above average. Cooperative work, where teachers freely consult each other and work together as a team, contribute to the successful implementation of an MI approach.

The classroom set-up is extremely important when an MI approach is being followed. A colourful environment and relaxed atmosphere is essential.

An informal relationship between teachers and learners is conducive for an MI approach to teaching. A feeling of trust and acceptance in the classroom, amongst learners and between learners and teacher is a prerequisite for the effective implementation of an MI approach. Learners in an MI school accept each other's dominant or under-developed intelligences. They do not consider one intelligence to be superior to another.

Parents are actively involved and interested in the education of their children. They visit the school on a regular basis and are allowed to observe while teaching of their children takes place.

### **Findings from a preliminary interview held at the Harvard Graduate School of Education**

The researcher made contact with the Education Department where Professor Howard Gardner is the Dean of the Faculty with the hope that he could be available for an interview. In stead the researcher could speak to one of his assistant lecturers, Julie Viens.

The informal interview with Ms Viens included the following questions:

1. What methods do you use to test or determine the different intelligences of learners? Do you have a specific set of tests or is it not done at all?
- 2 What is your response to a standardised assessment and determination of the strongest intelligences through a computer assisted application like *Neurolink*? (The researcher explained the test and how it is administered.)
- 3 You are involved in many projects at many schools all over America. How do you motivate teachers to change their approach to that of MI teaching?

- 4 Do you experience a problem with learners who are troublesome, who feel hopeless and who do not achieve at school?
- 5 We are bound by a prescribed curriculum with specific content which have to be completed by the end of Grade 12. Would it be useful to still implement MI notwithstanding the fact that one cannot assess only through certain methods of observation?
- 6 How do you think can one encourage and motivate teachers to participate in an MI programme? Should one allow them to discover the benefits of MI and then to engage in this way at their own pace?
- 7 What do you do if teachers do not want to read extensively about the topic because of too little time available?

An analysis of the data obtained from the interview (refer to Annexure B) revealed a number of aspects which should be considered when implementing an MI approach in a school:

- The need for a top-down approach

A top-down approach is needed to implement a new teaching approach, such as MI, at any school.

- Teachers need to do research

The top-down approach include the necessity to see to it that teachers do research which means they have to do some reading about the new teaching approach. They need to be trained to implement the new approach.

- Constant monitoring and support

Constant monitoring of the implementation process is needed to ensure success. Teachers need the necessary support and encouragement. If teachers are made aware of their progress and success achieved with the new teaching approach, they will stay motivated.

- Teachers' attitude and commitment

Teachers' attitude and commitment to an MI teaching approach are key factors in ensuring successful implementation thereof.

- The use of computerised brain tests

Although computerised brain tests make it easier to determine learners' and teachers' dominant intelligences and learning style preferences at a specific point in time, they are a luxury, flexible and not a necessity. There are many other ways, for example by means of observation, to find out what the dominant intelligences are. By merely observing learners carefully their dominant intelligences can be established without any additional costs involved.

## **4.4 Results of the case study**

### **4.4.1 Background to the case study undertaken in this project**

Commitment to any research project is crucial to be able to gain from the results. As explained by Macmillan and Schumacher (2006:5) teachers, as research participants in a case study need to realise that their participation could have short and long term effects on their professional decisions. The staff involved in this research needed to find out if a new different look at teaching approaches with the necessary commitment is worthy of their effort and if it will change their own negative experiences as well as that of the learners into a positive experience and improved academic and behavioural results. Non-committed teachers would have caused the study to have been impossible or worthless in terms of validity.

According to a Report by the World Bank (s.d.:84-85), teachers in Sub-Saharan countries' motivation to implement new teaching strategies and curricula is often low and because they tend not to prepare for lessons, "... instructional processes are reduced to common, un-demanding outdated methodologies." Putting pressure on teachers and providing sufficient support

is, according to World Bank Report (s.d.:84-85) often necessary to ensure effective implementation of new teaching approaches: “Particularly for implementation efforts, guidance, direction, and support with pressure are crucial when adaptations are being made. Regardless of how much advanced planning or preparations take place in an effort to establish readiness, it is when professionals actually implement the new ideas or practices that they have the most specific problems and doubts. At this time, support coupled with pressure is vital for continuation. Support allows those engaged in the difficult process of implementation to tolerate the anxiety of occasional failures. Pressure is often necessary to initiate change among those whose self-impetus for change is not great.”

The staff at the Cramlington High School in Northumberland, England who also introduced an accelerated leaning approach at their school realised that they had to get the teachers to “buy in” to a new approach. Staff in general had deeply held personal beliefs which had to change before a new approach could successfully be implemented. The Sigmoid curve (which basically points out that one has to innovate before there is a downwards spiral of performance of any organisation or company to stay relevant) was used to explain the need for change and had a profound effect on the staff of that school (Wise & Lovatt 2001:25).

The researcher realised the importance of getting teachers to commit themselves to a new approach and therefore initiated the research process by requesting the teachers to conduct a survey in their own classes to determine how learners experienced the teaching and learning environment in their different classes with their different teachers to determine if change in any form is necessary for the continued survival of the school. This survey was only conducted to set the tone for the research project with the following goals in mind:

- Previous experience of resistance to new approaches caused the researcher to act pro-actively in order to convince the teachers that a new



approach was essential to improve the general teaching and learning environment which the learners described as “boring and outdated”.

- The teachers who would participate in the research project had to understand that the application of a new approach would form part of a study and would not just be left to the discretion of teachers to implement or not. Glatthorn (1997:85) refers to research which indicates that if teachers are left to their own devices they will emphasise what they know best without any concern for new approaches.

The use of student feedback in teacher evaluation is a widely investigated topic and many believe that a “focus on pupils reveals far more about the effectiveness of teachers than does direct study of teachers themselves” (Stronge 1997:145). The survey amongst learners by the teachers themselves convinced the teachers that they should do something about their teaching as it was generally described as “boring and outdated” and “using the same methods over and over” by many learners.

The researcher used action research methods, for example by allowing the learners to indicate on a questionnaire how they experienced the teaching methods used by their teachers. According to the knowledge and experience of the researcher the teachers would not have wanted to be part of the study if they did not experience the real attitude and perception of the learners they teach. The surveys that were done before the research project was introduced to the teachers revealed that a considerable number of learners found most of the teachers’ lessons boring, outdated, stressful and uninspiring.

Photos and videos of classes of the New City School in the USA where an MI approach was followed (New City School in America) were shown to teachers. These were compared with the classrooms used by the teachers who were part of the study. The physical appearance of a class, the creation of a learning environment where learners would be challenged and motivated to participate, as well as the visual displays in class were all important points of concern which had to be part of the process of implementation of MI. The

differences visible in the photos and videos were pointed out and discussed, which brought new challenges to the application of MI in all classes.

The reality of the survey in which learners indicated that they did not find teacher's lessons interesting as well as the pictures and videos of MI schools, made teachers more receptive to the researcher's suggestions of implementing an MI approach. They clearly realised the need to change.

The learners who formed part of the experimental group were in grade 8 at Prestige College at the beginning of the research project. They were from one class which was identified as the most suitable class for the project because all the teachers from the different departments who participated in this project had one thing in common and that was to have taught this class. Specific care was taken to ensure that these same learners were placed in the same class for the following academic year, to be able to have continuity with learners and teachers and also to be able to compare results with as little distortions as possible.

#### **4.4.2 Background to and results of the brain profile assessments**

The researcher attended a presentation that was commercially advertised by *Neurolink*. *Neurolink* makes use of a computer programme to evaluate and assess the multiple intelligences profile of a person.

The researcher then attended a course at *Neurolink* to qualify as a brain profile assessment consultant to be able to do "Brain profile" assessments as prescribed by the mentioned company.

The researcher consequently used the *Neurolink* programme to determine the multiple intelligences brain profiles of the learners who were part of the research. It was a very lengthy process where each learner had to be assessed outside school time and it took about 90 minutes for each assessment. The assessment was conducted by a computer based programme which would generate a profile at the end of the period which

could be printed for each learner and teacher. (An example of a brain profile assessment is attached in Annexure C.) The learners had already been prepared for the research project and were all willing and even pleased to undergo this type of assessment. They were very excited to get the results of the brain profile assessments.

The purpose of this exercise was to make the brain profile assessment results available to the teachers who would teach this group. To know the learners' learning preferences and their strong intelligences as well as possible, could contribute to a better understanding and more conducive teacher-learner relationship. Another purpose was to compare the teachers' and learners' profiles.

- Learners

The following results were obtained as far as the learners are concerned:

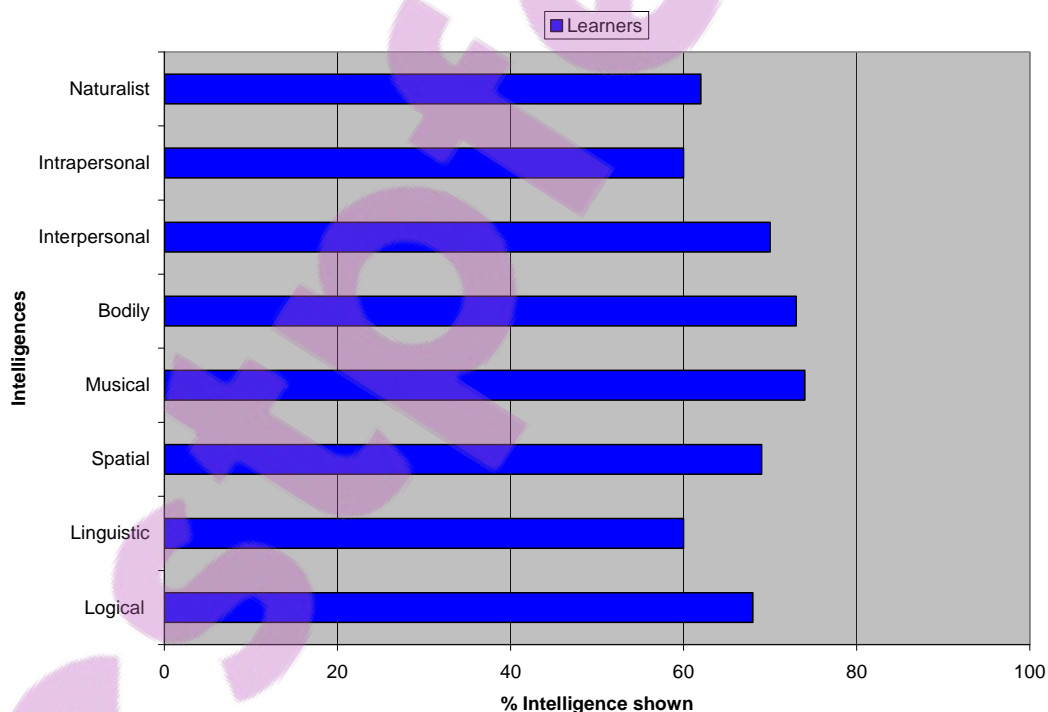


Figure 4.2: The brain profile assessment results presented as an average for the whole class

The following points were to be taken note of as a result of the above mentioned brain profile assessments as these could have an impact on the teaching and learning which had to take place in the class:

- The music intelligence was mostly displayed by all learners, closely followed by the bodily-kinesthetic intelligence.
- The linguistic intelligence was the least represented by the learners, notwithstanding the fact that the usual way of teaching relies very strongly on this intelligence. The linguistic intelligence is also the intelligence used most often to prove learning.
- The intelligences most represented by the learners are the bodily-kinesthetic, musical, spatial and also interpersonal intelligences.

- Brain profile of the teachers

The teachers did the “Adult test” which was unfortunately not exactly the same as the learner test and made comparison therefore a challenge. The questions were more focused on a professional work environment and different type of relationships whereas the learner test focused on a school environment where one is still subject to parent and teacher authority.

The manifestation of multiple intelligences of the teachers was quite different from those of the learners, as illustrated in Figure 4.3. All the teachers showed a strong interpersonal and linguistic intelligence. These two intelligences are mostly used in a classroom situation where one has to be a good communicator to be able to teach, and are therefore mostly the best developed in teachers.

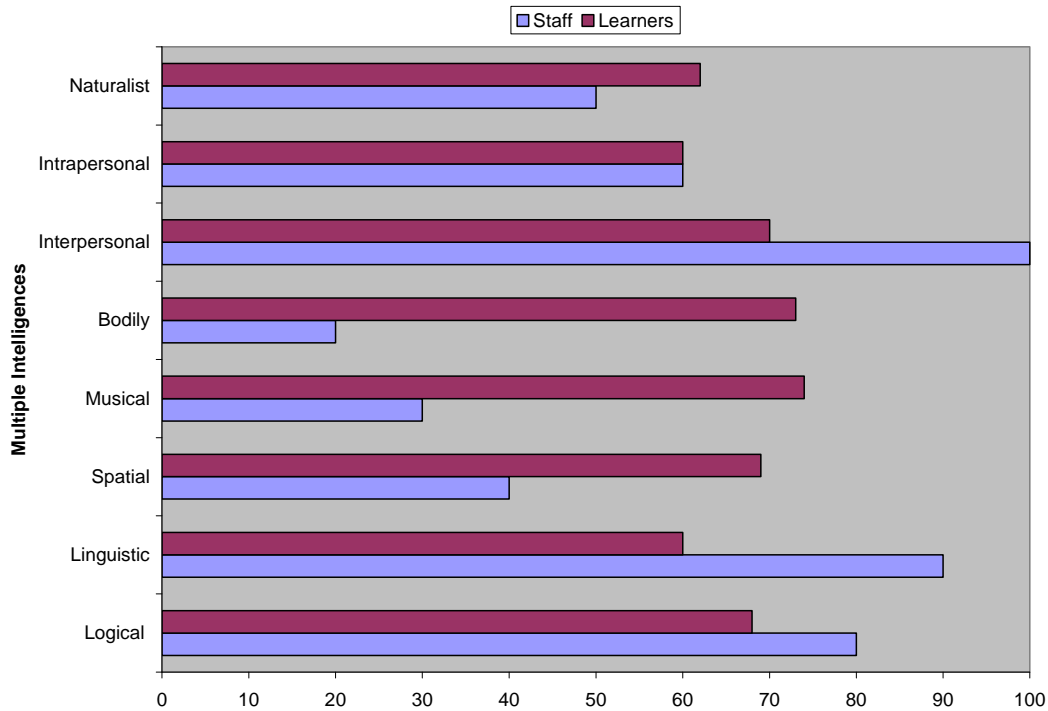


Figure 4.3: A comparison between the brain profile assessment results of learners and teachers

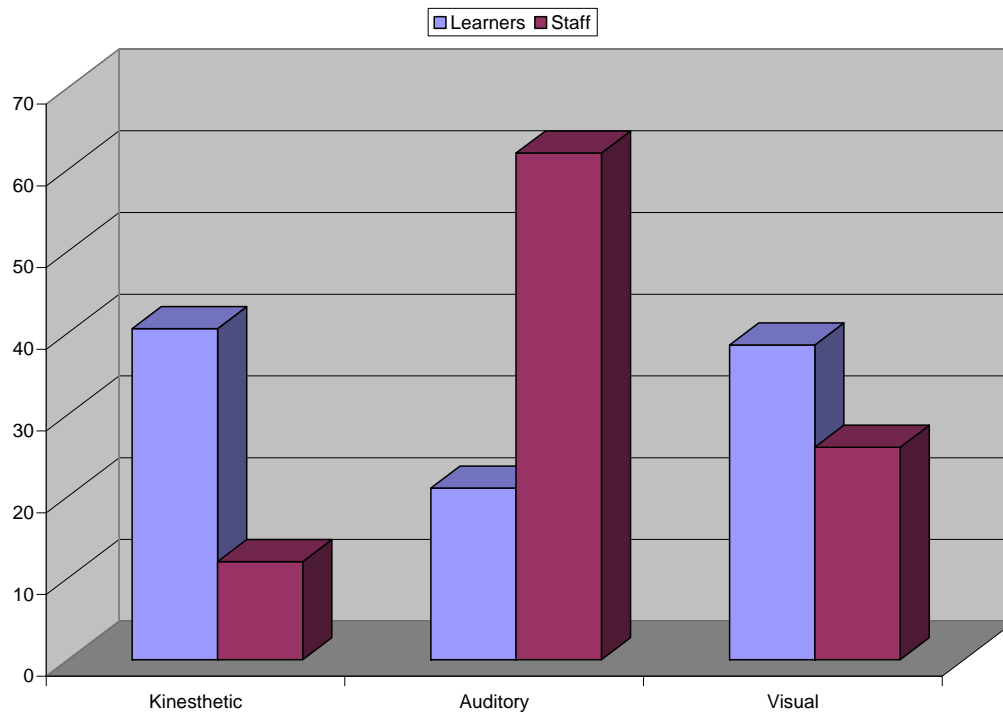
The **learning style preferences** of the teachers and learners were also identified by the *Neurolink* program. As can be seen from Figure 4.4 the learning style preference of the teachers showed a direct opposite to those of the learners. Whereas the teachers were dominantly auditory learners and interestingly also auditory teachers (by their own admittance and the researcher’s observation), the learners were much less auditory inclined. The teachers did not show any significant preference for bodily-kinesthetic learning. However, most of the learners had a kinesthetic learning style. Three teachers showed an average preference for visual learning and two almost no preference at all (10%) for visual learning. As can be seen from Figure 4.4, the learners had a stronger preference for visual learning.

The MI training was mostly done taking the teachers’ multiple intelligences into consideration and in most of the sessions a “hands-on” approach was used. (It is important to note that the researcher has not included all power point presentations which were used to train the teachers but only an example

in Annexure H). The researcher felt quite adamant to teach the teachers as she would have wanted the teachers to teach the learners. An example would be the dissection of sheep brains during such a training session where teachers had to cut open and identify the different parts of the sheep brain which is very similar to the brain of a human. Although this exercise was not to the liking of everybody they agreed to do it and had fun doing it. The researcher wanted them to experience how learners must feel when a teacher is constantly teaching to his own intelligences and ignoring those of the learners. The main aim was all the time for teachers to be aware of and willing to sacrifice their own preferences to enhance learning for the learners by giving them opportunities to excel when they could dwell in their most preferred intelligences.

During the training sessions the researcher took the role of facilitator and participants had to present topics at hand. Coloured pens, posters, clay, music and musical instruments were always available for them to use in their explanation or presentation of topics. They improved on the available materials by making their own puppets, summarizing their understanding of an intelligence in mind maps and made it available to their colleagues.

The researcher, after discussion with the teachers concerned, came to a collaborative conclusion that the teachers in this research, taught according to their own preferences in terms of learning, which happened to be in line with the results of the brain profile assessment, but also according to their knowledge of themselves.



*Figure 4.4: Comparison between learners' and teachers' preferred learning styles*

- Conclusion

When following an MI approach to teaching, the challenge that teachers have to face is to utilise each learner's strong intelligences on the one hand, but to also develop and improve the learner's less developed intelligences. This implies that teachers should be aware of the different dominant intelligences of each of the learners in his class. Teachers should also realise that their own learning style would influence their teaching style. They should therefore try to adapt their teaching style to ensure that they accommodate all learner preferences: the more variation in the ways they teach, the more learners they will reach.

The learners and teachers who participated in the research not only had different dominant intelligences, their learning styles also differed considerably. Teachers' teaching styles were mostly influenced by their learning style.

#### **4.4.3 Content analysis of teachers' written preparation documents**

It was clear to the researcher that preparation is particularly important to the inexperienced teacher but certainly also to the experienced teacher. The importance of preparation for both inexperienced and experienced teachers is pointed out by Tucker and Stronge (2005:104) who found that the benefits of experience seems to level off after eight years experience.

The researcher is of the opinion from previous experience with educator staff, that teachers will not change their "old ways" of teaching if the change is not controlled and assessed in some way. The fact that teachers need to be monitored on a regular basis when implementing an MI approach, was also indicated in section 4.3.

There are various reasons for people to be resistant to change and Moorhead and Griffen (1992:666) refer to "habit, fear of the unknown and other social factors" as the most common reasons why people resist change. It was therefore vital to establish a common ground that all teachers agreed to and that all teachers committed themselves to. This common ground was decided on by the teachers themselves. It entailed a common preparation form where all preparation would be specifically focused on MI and which would be handed in on a weekly basis. The common preparation form was also seen as a good measure to prove the active involvement of the teachers in thinking differently about their teaching. This form was changed several times, because discussions with teachers revealed shortcomings and as the teachers became more au fait with the MI approach to teaching, they came up with several suggestions for improving the form. (Refer to Annexure D for examples of how the preparation forms changed over a period of time.)

The researcher devised rubrics to assess the teachers in their attempt to plan for the application of an MI teaching and learning approach in the classroom. The rubric as presented in Table 4.1 was used to assess the extent to which teachers planned for the integration of all intelligences.

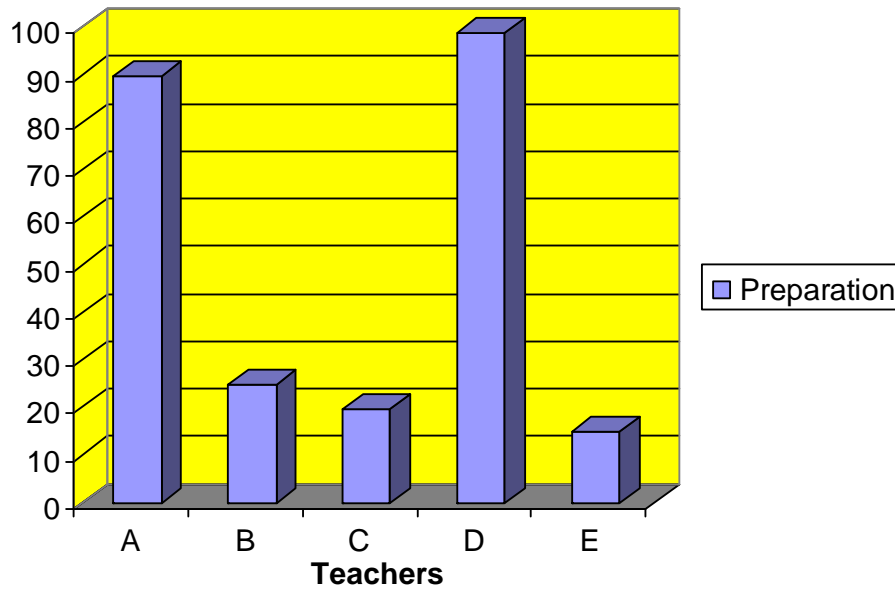


*Table 4.1: Rubric used to assess teachers' performance in terms of preparation*

Not achieved 0%-20%	Partly achieved 21%-40%	Basically achieved 41%-60%	Achieved beyond 61%-80%	Outstanding achievement 81%-100%
Did not hand in preparation most of the time	Handed in preparation some times with elements of MI present	Handed in preparation on time but with little extra effort and reference to MI visible. Preparations are very generic	Handed preparation in on time with visible effort to innovate and integrate all intelligences	Always handed preparation in on time. Effort visible. All intelligences covered

The teachers who formed part of the research displayed a variety of approaches to preparation. Some would not miss one preparation while others excused themselves for not having done any preparation and sometimes did not even offer an excuse. Some simply did not hand in any preparation and felt that it didn't mean that they didn't teach well. The researcher did not put undue pressure on the teachers and wanted to experience their personal commitment under this very close type of relationship-circumstances where they had to hand in their work to the researcher personally on a weekly basis which was never done before.

The preparation done by the teachers was one of the most important factors for the researcher to see how deeply they engaged in what could affect better learning. Observation of lesson presentations (refer to section 4.4.4.) revealed that ignorance towards the quality of the preparation brought about unstructured presentation of the lesson which usually resulted in not having enough time to finish the lesson according to the accelerated learning cycle. It is, however, also true that the researcher saw excellent planning on paper which did not bring about deep learning in the evaluation of outcomes achieved in the lesson.



*Figure 4.5: Teachers' compliance with expectations concerning their preparation*

In Figure 4.5 it can clearly be seen how the teachers differed in terms of their planning and preparation. The rubric (Table 4.1) used by the researcher to assess the planning was used to determine their overall performance expressed in percentages as indicated here. Teachers' planning and preparation were discussed with them during an individual meeting between the teacher and the researcher and during the weekly meetings (refer to section 4.4.6). Preparation documents needed to be handed in on Fridays and the individual meetings were held on Mondays. Field notes were kept of the individual meetings between the teacher and the researcher. Times were set aside for the teachers (during their free periods) to meet with the researcher to discuss their planning. When planning was not handed in on a Friday, they would often not arrive for the meeting on the Monday. Others would come to the meeting and bring their preparation with. That was a difficult situation for the researcher as it left her with no time to properly assess the planning before the discussion on Monday or the subsequent observation of the lesson(s).

**Teacher A** was the teacher who was very eager from the beginning to join the MI group because he wanted to improve his own teaching and learning

outcomes in his classes. He also made it clear that he wanted to develop his own skills as a professional person. He was extremely conscientious in handing in his preparation every Friday as agreed. He even once brought the preparation to the home of the researcher not to miss those due dates which showed his commitment to the approach. If the researcher could not see him on the Monday to discuss the preparation he would make an appointment to make sure that the preparation was discussed so that he could teach according to plan. Teacher A visibly applied his mind to his preparation as could be seen in the trouble taken to include examples of how the different intelligences would be accommodated in a lesson whereas other teachers would mainly focus on only one other intelligence than the linguistic intelligence which is usually promoted. Although it was not always possible for the teacher to reach the outcome of the lesson within the stipulated time, more learners indicated their understanding of the subject matter. The researcher also enjoyed discussing the planning with this teacher as he was always open-minded and really wanted to know where he could improve or do differently.

**Teacher B** did not contribute much to the discussions when the preparation form was designed. He did, however, redesign his own preparation form which was similar to the one discussed in the meeting. Teacher B initially seldom handed in his preparation (but started to do so at a very late stage in the project). This resulted in very few discussions taking place between the researcher and Teacher B. Teacher B had a problem to distinguish between the outcome to be achieved in a lesson and the activities the learners would be engaged in. This problem was prevalent in the few preparation forms which were handed in. This was pointed out to the teacher at every opportunity (e.g. classroom observations and meetings). The last few preparation forms which were handed in showed a remarkable improvement of the understanding of the outcome. Teacher B complained that he was not very creative and could therefore not come up with new ideas.

**Teacher C**, like Teacher B, was not eager to hand in preparation. There was notwithstanding this fact, a huge difference in the preparation handed in at the

beginning of the period and the last preparation handed in. Teacher C followed his own lesson plan and did not use the form the group discussed and agreed on. After two months, he started to use the agreed form as he received it on a computer disk. He made a few copies and handed in his preparation in writing.

**Teacher C** also struggled to incorporate other intelligences into the planning of his lesson as he is so used to “chalk and talk”. The times when the researcher could discuss the planning with the teacher and could suggest other novel ideas, the teacher was eager to incorporate other intelligences like music, visual literacy and even bodily-kinesthetic activities. He indicated his willingness to change his approach but complained that he lack the creative thinking skills to do so. He also admitted that he constantly needed to engage in discussions with other teachers to learn new ideas from them. He was very much in favour of collaborative lesson planning.

**Teacher D** taught Mathematics to Grade eight to twelve learners. Teacher D did not miss one preparation which had to be handed in. He tried to include all different intelligences from the linguistic to the naturalist in different lessons but made it clear that he did not want to be involved with things that would waste his time. His preparation was complete with assessment methods and rubrics worked out and included in the preparation. The completeness of the preparation made it possible to determine the worth of such comprehensive preparation by the whole group. Everybody agreed that his preparation was the way to go, but it took its toll in terms of time to do the planning. Everybody also agreed that time during school hours to do collaborative planning would make it much easier and much more possible to complete as requested. Teacher D initially complained that the preparation took up too much of his time. He sat for hours before he could come up with a new idea to incorporate learner activity other than logical-mathematical activities. During the course of this research he showed the greatest improvement of incorporating all other intelligences in his planning and actual presentation. The researcher could see that a lot of extra time was spent on planning. Teacher D also presented a very specific personality where one could very seldom determine if the he

was excited, bored or completely irritated by this approach. At least he did his preparation exceptionally well.

**Teacher E** was the one who handed in the least of his preparations. He had more than 20 years teaching experience and regarded himself as a “natural” teacher. He had a lot of confidence. He often apologised for not handing in preparation forms but reasoned that he was very busy and not having preparation did not mean that he did not teach to accommodate MI. Teacher E was also the one who often spoke about the enormous value of MI to other staff and promoted the idea on all levels. The classroom walls of Teacher E were nicely decorated and showed great initiative in creating a real MI environment.

From the above it is clear that constant monitoring of the planning and preparation of the teachers helped teachers to come up with creative ideas for accommodating all intelligences in their teaching. It also allowed for clearing up misunderstandings and correcting mistakes. It also allowed the researcher the opportunity to provide much needed support to the teachers.

Time management seemed to be a challenge when implementing a new teaching approach such as MI. Collaborative planning and preparation was regarded as a means to help ease time pressures and to expand creative and innovative ideas for incorporating the different intelligences when teaching. An analysis of the meetings with teachers also revealed that they often claim that they are not creative and that they struggled to come up with innovative ideas for incorporating all the intelligences when planning their lessons.

The use of a common preparation form, which provide for the inclusion of MI activities helped teachers with their preparation. Some of them, however, preferred to adapt such a form to suit their particular learning area. Changing planning and preparation forms as teachers learned more and understood the MI teaching approach better was inevitable (Refer to Annexure D).

#### **4.4.4 Observation of lesson presentations**

Kossan, as referred to by Schmocker (2006:43), is convinced after his extensive research in a wide variety of American schools, that underperforming schools and therefore underperforming learners had all one thing in common; they operated in a culture where teachers did their “own thing”. Schmocker (2006:43) came to the conclusion that improvement in teaching and learning can only come from a strategy focused on improving instruction. The researcher carries the same view that change in learning should start with instruction and knowledge transfer where inspiration and motivation to achieve well should be present although it is difficult to measure.

Tucker and Stronge (2005:11) cite that objective feedback offers an invaluable tool for development and professional growth. The presentation of the prepared lesson and subsequent learning that takes place is part of the key teaching and management skills necessary for effective learning. Each teacher was visited on a regular basis by the researcher as well as by the other teachers who formed part of the project to observe said skills. The primary purpose of teacher evaluation is professional growth and accountability and “monitoring of instruction is the heart of successful instruction” (Tucker & Stronge 2005:10-12). It is not possible to determine what learners have learnt without a quality assessment plan executed to the finest detail. In the same way teachers need to be assessed to be able to know where they stand in terms of successful teaching.

The researcher has also experienced a much more positive attitude from teachers where their performance was discussed with them in detail and where they had time to reflect and comment on feedback received from the researcher. They were more aware of possible pitfalls and tried to avoid that.

Teachers in the study later realised the value of self-reflection in dealing with the intra-personal intelligence while teaching and later included a “self-reflection” section on their preparation forms. They were also given self

reflection sheets during a few meetings to write down where they think they failed and where they feel they were successful.

A willingness to self-assess as objectively as possible also improved the attitude to be assessed by others. Teachers in the study were given examples of assessment strategies to be used by learners and by themselves to assess the presentation of the teacher. Some teachers enjoyed this type of feedback and others never used any of the proposed assessment tools. It was difficult for the researcher to use any of the information as it was very inconsistent. (These assessment tools were taken from Airasian & Gullickson 1997: 21; 31; 38 and 39). The researcher realised that this is such an important part of professional development that learner assessment of teachers should be required irrespective of teachers' approval although Airasian & Gullickson (1997:56) pointed out that self-reflection is self-administered, self-analysed and the teacher is the sole provider of feedback. The advantages of student feedback according to Airasian & Gullickson (1997:61) could be summarised as follows:

- Research demonstrates that students can provide valid feedback about the quality of instruction they have received.
- Research shows that teachers do change their teaching as a result of student feedback that is perceived as valid.
- Research also shows that student ratings that are significantly lower than self-ratings will more likely lead to improvement.
- Because students are most directly affected by instruction, the process empowers the students to influence their own instruction and makes them feel respected as valued participants in the teaching-learning process.

The disadvantages observed by the researcher include amongst others that teachers feared the feedback from learners and felt threatened by it. They felt that learners' moods and previous experiences might influence their objectivity and that they might therefore only report on a single most recent (negative) experience. That might be the reason why most teachers did not

use the proposed tools in their self- evaluation and did not want learners to assess them.

The observation of their colleagues by the participants was a real challenge in the research because the teachers were not used to formally record the observations they made in others' classes while observing their colleagues. They initially felt it was not their duty to observe others but later realised the value of sharing their observations with each other. Some teachers had grown to accept and even improve their observation skills where others were reluctant and not at ease doing observations. The researcher, nevertheless, used their observation feedback where available as a valuable resource in deciding which direction the process should take.

The following rubric was devised by the researcher to assess the teachers in terms of their lesson presentation:

*Table 4.2: Rubric used for assessing teachers on lesson presentations while being observed by the researcher and fellow teachers*

Not achieved 0%-20%	Partly achieved 21%-40%	Basically achieved 41%-60%	Achieved beyond 61%-80%	Outstanding achievement 81%-100%
Very little difference in presentation of lesson in comparison with the "old" chalk and talk method	Here and there a change in approach on paper but not sufficiently in class. Teacher is still the main spokesperson in the class. Variety of intelligences only sporadically employed	Visible change in approach on paper and fairly good attempt to change practical teaching approach. Teacher not only person to speak or do in the class. Brain gym and other intelligences employed to	Teacher starts to act as facilitator in the class and lessons become learner centered in most cases. New ideas and different methods used to stimulate active participation in class. Attempts are made to	Teachers accommodate all/most intelligences in most lessons and facilitate active learning. Learners enjoy the variety of teaching strategies in classes and deep learning takes place. Teacher usually completes



		affect learning. Teacher usually can not finish the lesson due to time constraints. New approach causes discipline problems	address some intelligence	accelerated learning cycle. Brain gym is always part of the lesson as well as thinking skills applied
--	--	---	---------------------------	---

The researcher observed each teacher a minimum of ten times. Teachers were not informed beforehand when observations were going to take place. Each teacher was also observed several times by other teachers in the research group. An observation sheet was completed during the observation (Annexure E) and the rubric (Table 4.2) was used to assess the teachers' lesson presentation. An average was calculated for each of the teachers based on the percentages they achieved. The researcher discussed the lessons with the teachers after they have been observed but when teachers observed other colleagues, they seldom discussed their observations with each other. They tended to make general remarks during the general meetings and the researcher encouraged them there to express an honest opinion about their observation as all could learn from each other through these remarks. It seemed as if it was easier for them to do that in a group situation than to be in a face to face situation with a colleague, criticising their teaching.

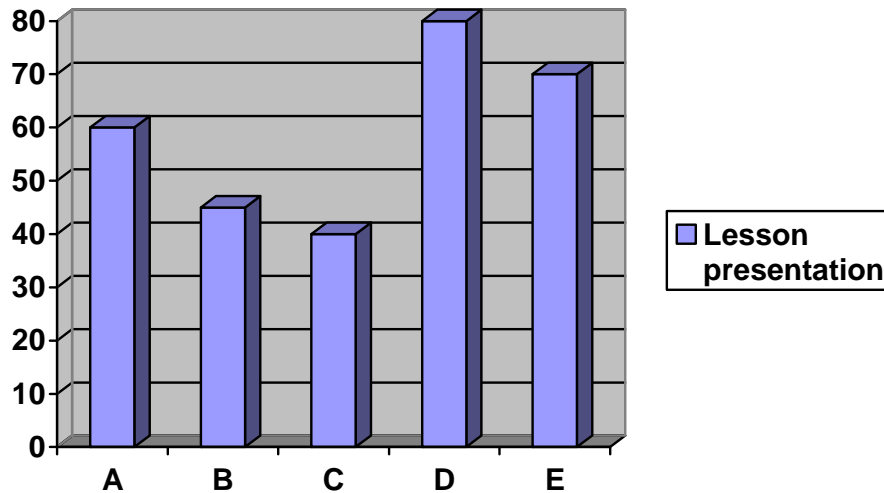


Figure 4.6: Teachers' performance in lesson presentation measured according to the rubric in Table 4.2.

Although there usually is a strong link between preparation and presentation, it is also true that “natural” teachers can get away with little preparation and yet present a good lesson. A good example is Teacher E who did not spend too much time on preparation (as can be seen from Figure 4.4 he obtained an average of 14% for his preparation) but received good observation reports from the researcher and other teachers. A question that stays unanswered to the researcher is the fact that the two teachers, who were rated quite high in terms of their instruction, received the least impressive improvement in learner performance results in comparison with the other subjects. As can be seen from Figure 4.10 (section 4.4.6) there was a decline in the learners' performance in Mathematics and English. There appears to be only a very weak link between lesson presentation and performance of the learners as far as those results are concerned.

Teachers were initially very reluctant to observe colleagues and to being observed by other teachers. One of them (ironically a very experienced and well-prepared teacher) was very nervous in the presence of the observers. Teachers felt threatened and under the spotlight and some of the teachers did not hesitate to tell the researcher how they felt about the observations. The

teachers, however, gradually got used to being observed and later on even promoted the practice under the other staff members who were not part of the project. They indicated that they had learned a lot about themselves and their teaching habits in the process and also agreed that lesson observation was a very relevant tool in improving one's own teaching and especially in becoming aware of the little habits and irritations of other teachers which might also be relevant in their own teaching style.

The more the teachers who formed part of the research spent time together, the more they trusted each other and the more they worked together and came up with creative ideas. The teachers worked collaboratively on learning outcomes and assessment standards where a single topic could form the common denominator. The researcher, for example, observed a series of lessons where "water" was used as a general theme. Water was used as the common denominator and every learning area found a way to assess knowledge and skills from a multiple intelligence perspective. The Mathematics teacher designed lessons where the problem of water consumption at school had to be worked out. The learners had to investigate (interpersonal and intrapersonal intelligences), design questionnaires (linguistic intelligence), calculate information (logical-mathematical intelligence) and visually (spatial intelligence) present a solution to the consumption problem at school. In the Art class learners wrote a song/chant (musical intelligence) to remind learners to conserve water and in the Human and Social Science as well as Economic and Management Sciences they investigated the impact of water disasters like a tsunami on a country and its people. In Natural Science the learners had to collect water and do some tests (bodily-kinesthetic and naturalistic intelligence) at the water sewerage plant to test the usability of the recycled water. The learners had to present all their activities in a single project. Every teacher assessed another part of the project and the learners could benefit in understanding the big picture. Teachers who were not part of the research project could also observe during this project how the workload of teachers could be reduced if they can work together.

The initial observations of lessons revealed that teachers taught to their own dominant intelligences and not to accommodate those of the learners, even though they were very aware that learners were different from them as indicated in the brain profile assessments as well as their learning style assessment. When made aware of the fact that their teaching style did not suit all learners during the weekly meetings (refer to section 4.4.6), they were prepared to adapt their teaching style. Subsequent observations revealed an improvement in this. The researcher also insisted that the teachers had to focus on a different intelligence in different weeks. Their planning for that particular week had to prove their commitment to the “other” intelligences than those (especially the linguistic intelligence) habitually used.

Discipline in class became a non-issue with the implementation of a multiple intelligences approach, because learners were occupied in a way they enjoyed and all time in class was taken up by activities. Learners were actively involved and there was simply not time to engage in unwanted activities.

One of the aspects that hampered the implementation of an MI approach to teaching, was the number of learners in the classes. Teachers often could not pay individual attention to learners and could not differentiate properly. A lack of space in the classroom was a real problem. Although the atmosphere in most classes was very relaxed, the relationship between teachers and learners was still very formal. Teachers indicated that this was because of the tradition in South African schools (where learners do not address teachers by their first names) and because it was easier to keep discipline in a more formal relationship.

It was also very difficult for the teachers to design a “different” learning environment as the sizes of the classrooms were set and also the number of learners in all classes. They could however manage to move the tables to form groups in stead of rows and one teacher even moved the desks to the one side of the room with all the chairs only in a half circle where a drama could be performed by the different groups of learners who had to practice

together to present their learning. They called it the “cinema”. During the water project some teachers took the learners out to different parts of the school where the knowledge transfer took place under a tree. The positive side to this is that more teachers realised they did not have to be limited by a classroom to teach successfully.

During the observations it became clear that the lack of resources was a stumbling block, but that one could compensate by means of innovative teaching methods and using what is available. The “court case” used to teach different forms of ownership (refer to section 4.4.6) is an example of this as well as the water project.

Teachers admitted that they found it very pleasing to become the facilitator of the lesson instead of the transmitter of knowledge and that they enjoyed the complete involvement of the learners. They found the brain gym activities very useful in class and at times like after 13h00, essential to stimulate brain activity. The learners became used to such bodily-kinesthetic activities and would ask to do brain gym when teachers forgot or when they didn’t include it in their lesson plan, which showed again the need for learners to use their bodies during learning. Learners were constantly reminded that one can be intelligent in different ways and that different activities could stimulate different intelligences. Learners seemed to be very enthusiastic about this idea. Brain gym activities included “midline movements” (Dennison & Dennison 1989:3) where bilateral movement skills were developed which is a prerequisite for the co-ordination of the whole body. Such midline movements would include for example touching your left knee with your right elbow and vice versa on the beat of rhythmic music. There are literally hundreds of different activities which promote different learning skills that were used to stimulate the children and help them not to get bored with the activities or lesson.

In spite of the many successful MI lessons that were observed, there were also many lessons where the teachers resorted to a traditional, teacher-centered, transmission mode of teaching. This made the researcher realise

that comfort zones of teachers where they fall back on “talk and chalk” is a very real problem and a difficult habit to change.

Examples of a number of completed observation forms appear in Annexure F.

#### **4.4.5 Observation of teachers’ attitudes**

The attitude of learners plays an important role in effective teaching. The attitude of teachers can in an equal manner either destroy or develop a learner. It was difficult for the researcher to determine the attitude of the teacher in an ordinary classroom situation. The researcher was aware that another atmosphere was present in class while the observation took place. This fact is also pointed out by Denscombe (2003:39) who explains the “observer effect” as follows: “Those being researched might behave differently from normal owing to the knowledge that they are ‘under the microscope’ and being observed in some way.”

Armstrong has pointed out after lengthy research that attitude and behaviour of staff improve with interpersonal skills training programmes where the training is directly relevant to the responsibilities and aims of the staff as a team (Armstrong 1992:279). The researcher therefore mainly focused on the attitude of the teacher towards change in approach to teaching.

The researcher kept field notes of her conversations with each teacher who took part in the research project. Teachers were also informally observed (e.g. during weekly planning and preparation meetings, staff meetings, in the staff room during break and during social events). The following rubric was developed to assess the teachers’ attitude based on the experience and observation of each teacher.

Table 4.3: Rubric used to measure teacher attitude in attempts to change teaching style/approach

0%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Always too much work, not available for meetings, outspoken not positive about changes	Sometimes interested, willing to listen, seemingly not enthusiastic, or very motivated. Focus mostly on the negative side and difficulties in the implementation process	Very neutral about its value, not visibly for or against the approach, but willing to try new ideas	Speaks out about the value of MI, mostly positive about applicability of MI in the classroom	A real MI promoter. Speaks out about the value of MI, helps other staff to get involved, always available to help, innovative ideas

The percentages obtained by each of the teachers are illustrated in Figure 4.6.

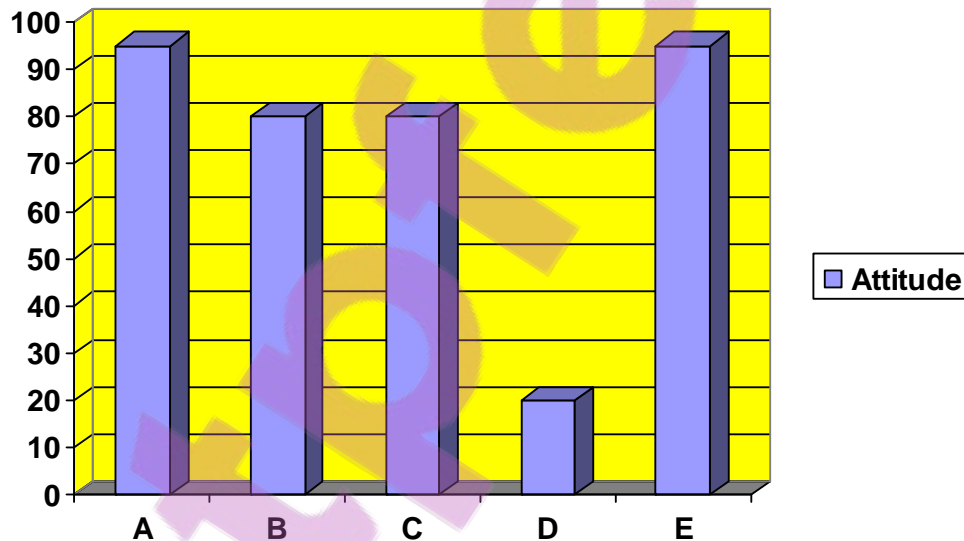


Figure 4.7: Teachers' rating on attitude towards change in teaching style/approach

As can be seen from Figure 4.7 the teachers mostly had a very positive attitude towards the new teaching approach. The exception is Teacher D who showed a pertinent negative attitude. In spite of this he performed very well in his preparations (Figure 4.4) and lesson presentations (Figure 4.5). Teacher D would say exactly how he felt with every discussion and was not always

positive about this new approach because he felt he had put a lot more effort into planning and did not get the expected better results. He did, however, feel that the teaching time was much more pleasant because of the involvement of the learners and the fact that he enjoyed not having to speak all the time and yet knew where he was going with the lesson because of the thorough planning.

Although the overall picture of the teachers' attitude shows a positive attitude, this was not the case right from the beginning. Teachers were initially very negative and skeptical about the new approach, but they gradually changed their attitude and became more motivated (refer to section 4.4.6). Once they have seen the positive effect this new teaching approach had on learner performance (refer to section 4.7) their attitude also became more positive.

The researcher further wanted to establish if the teachers' comments of others during or after observation would have an impact on each other's approach in the classroom. This was not possible to establish as the teachers were not eager to use all the opportunities to observe. This is a general problem where teachers easily feel threatened when visited by other members of staff.

The researcher also found that the completed observation form was handed to the teacher observed by the observer, but the lesson was seldom discussed by the two parties.

The following rubric was developed to assess the teachers' willingness to observe each other and to be observed by others.



Table 4.4: Rubric used to assess teachers' willingness to observe others and be observed by others

0%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Almost never observed others or by others. Can not see the value of other's involvement in own development. Does not approve of other in own classroom	Sometimes observed others only because expected too. Found very little value in observation of others or by others. Not comfortable with others in class	Observed others because expected to and completed observation form as agreed. Took advice from the researcher but seemingly not from others	Observed others regularly, commented freely and received critique with open mind from others	Observed often, made comments and gladly received critique. Contributed to others and own development through observations

The results obtained by means of the rubrics were used to depict the teachers' willingness to observe others and to be observed by others in the following graph.

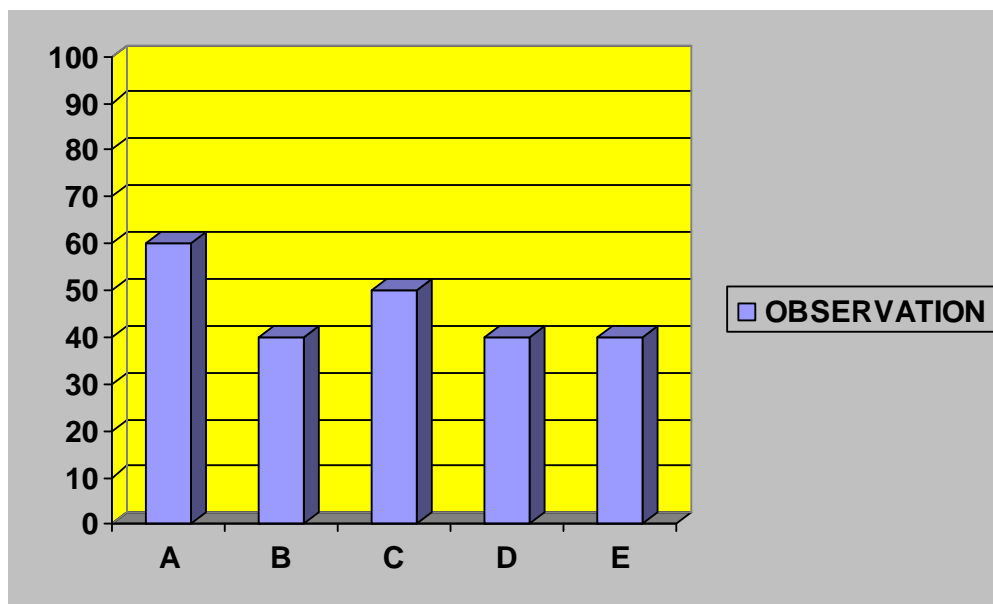


Figure 4.8: Teachers' rating of their observation of others and by others

It seems that teachers initially did not really feel comfortable to observe colleagues or to being observed by others. The researcher experienced this as a serious challenge, because visits to schools in the USA where an MI teaching approach is followed revealed that one of the prerequisites for the successful implementation of an MI teaching approach is close collaboration between teachers.

Figure 4.9 serves as a summary of the five teachers' rating in terms of planning according to a multiple intelligences approach, lesson presentation in the classroom, attitude towards a change in approach, and willingness to observe and learn from other through observation.

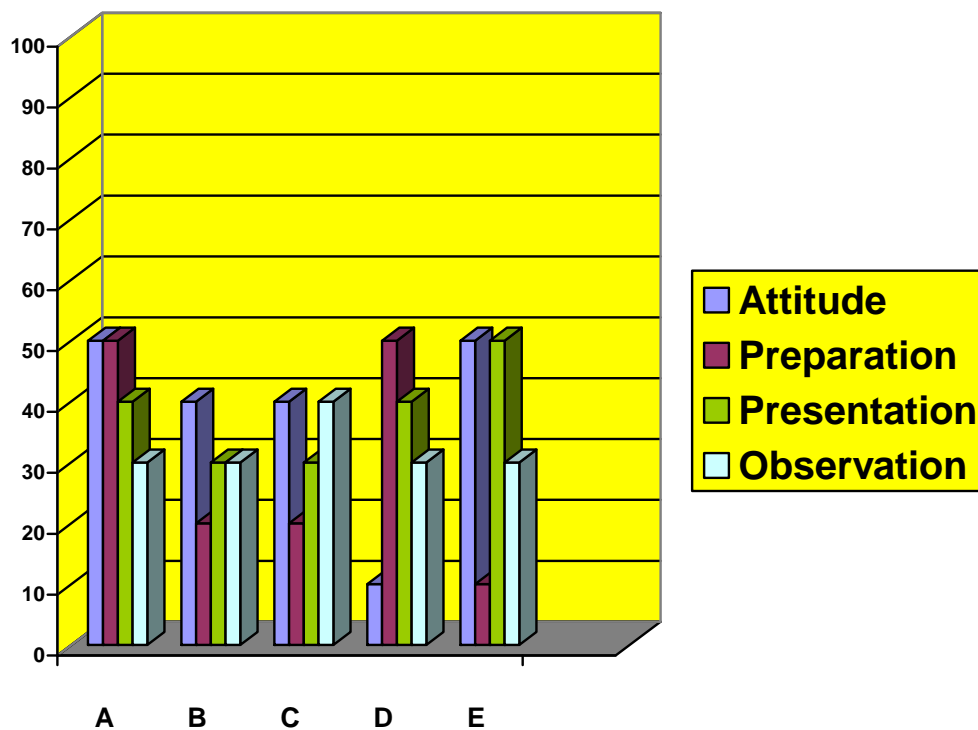


Figure 4.9: General overview of the performance of all staff in terms of the assessed points of performance

#### **4.4.6 Regular meetings held with teachers**

Regular meetings were held with the teachers to train them, to discuss their planning and preparation and lesson presentations and to guide and support them. Very few of the teachers were familiar with MI (some weren't even aware of the existence of such a theory) and the weekly meetings were the only time available for teacher training and had to be utilised as such. That posed quite a challenge for the researcher as every minute had to be utilised fully. During the meetings teachers could voice their concerns. The meetings were also used as platform to share success stories, point out mistakes and misunderstandings, to revise and adapt the planning and preparation form and to suggest innovative ideas for accommodating all intelligences. The meeting time was also utilised to sometimes fill in individual self-reflection sheets which helped the researcher identify the attitude of individuals towards the approach (refer to Annexure G for examples of reflection sheets completed during meetings). The meetings took place on a weekly basis over a period of 18 months. An agenda was compiled (which was often generic) for each meeting and the researcher kept field notes of the meetings (An example of the agendas for a number of meetings could be found in Annexure G).

The meetings posed several challenges. One of the teachers could, for example, not stay a minute after four and when the discussion was in full swing he would excuse himself because he had to leave. All the extra-mural activities and teachers' involvement in these activities often caused some of the teachers not to attend the meetings/training as regularly as others. The researcher continuously had to remind the teachers that training was essential to make a success of this approach.

It was made clear to the researcher from the very beginning that the teachers do not have the time to read comprehensively about the topic. With the first attempt of the researcher to get the teachers to read "Frames of mind: the theory of multiple intelligences" (Gardner 1983) as it contains the essence of the Multiple Intelligences theory, teachers made it clear that it was too time

consuming and that the book surely was “not a story book” that could be read for relaxation. Reading the book demanded a high level of concentration. They requested short pieces of information given to them in writing (summarised) about the theory.

The researcher prepared snippets for the first few weeks’ meetings and presented a power point presentation on MI to the teachers (Annexure H). The researcher was, however, not satisfied with the teachers’ commitment to studying the material and subsequent class visits revealed that they were not applying the MI theory satisfactorily in their teaching. Summarised material (compiled by the researcher from different MI books) which they had to study was then given to them. Each teacher then received a chance to present a lesson during the weekly meetings using the particular intelligence which was to be discussed that week. Although teachers were initially reluctant to present the lessons during the meetings, they later on enjoyed it and indicated that they have learned a lot from each other. One teacher who took great trouble to present a very special MI lesson, surely inspired other teachers to also present a “special” learning experience.

The researcher also contacted Beryl Lourens and Associates who is considered an expert on the topic and arranged with her to present a lecture to the teachers in an organised fashion as part of teacher development. Beryl Lourens spoke previously at a Principals’ conference attended by the researcher. It was the first time somebody referred to MI and other AL concepts at such a conference in South Africa attended by the researcher. The researcher therefore regarded it as a good idea for the whole staff to be present at this training session where another person, considered an expert, would present the course. It was unfortunately a wrong thing to do as the research group was ahead of the rest of the staff in terms of their knowledge and they were not impressed at all with the “training session”. Some of the teachers, however, admitted that they became aware of the fact that they did not consider the emotional intelligence enough in their teaching approach. They felt it was otherwise not worth the time they had spent in training.

A few of the teachers who participated in the research project attended the first few MI meetings very reluctantly. They were suspicious about the new approach and generally regarded it as extra work. The teachers' initial resistance, however, disappeared as they became more familiar with the material and with their colleagues. It was also interesting that Thomas Hoerr, the principal of New City School, visited by the researcher, reported the same tendency amongst his teaching staff. It is also clear from his book (Hoerr 2000:8-12) that the process his school has taken shows quite a few similarities with the experiences in this research project. The researcher could learn from and also implement some of his suggested ideas. Unfortunately not all ideas were taken by the research group. Their unwillingness to commit themselves to do research and extensive reading on the MI approach to teaching is an example of this.

The subsequent meetings where the problems experienced with the implementation of the different intelligences and success stories were shared with each other showed a more positive attitude and acknowledgement of the possible advantages MI held for teaching. The teachers' suspicious attitude and resistance to the new approach gradually changed over time and they actually became enthusiastic about the approach. The researcher put in a lot of effort to stay enthusiastic during the meetings and constantly acknowledged the extra effort that teachers put into their lesson presentations and made a point of praising those teachers where good lessons had been observed. Other members of staff (not part of the research project) were even invited to attend some classes where the research group teachers felt there were specific advantages evident. Teachers indicated that the researcher's enthusiasm and the acknowledgment they received for "a job well done" served as a motivating factor to continue with the approach. The researcher is also of the opinion that these invitations to other members of staff to observe their classes coupled with the research group's enthusiasm are the elements that appealed to other staff which also eventually convinced them to try out a few new ideas. The senior Science teacher (who was not part of the research group) for example attended an MI lesson where the learners chanted certain information which they had to know off by heart. He took the example to teach

his senior learners the periodic table through a rap song designed by the learners themselves.

It is true that one can make many plans to be able to implement MI in an under resourced school, but it must also be considered that teachers have limited time available to do so over and above their normal duties and responsibilities. Teachers complained that the one room that was available with electronic equipment, posters, music and other helping aids could not be used by all. It surely was a limiting factor. They were encouraged to decorate their classrooms with colourful pictures and posters and to use examples of learners' work to decorate walls. Not all of them adhered to this. Based on their complaints the researcher made sure that each teacher obtained a tape recorder which could be used in class.

Another concern that was often expressed was the noise that was created, especially when the musical intelligence was involved. The noise that can be produced by large classes who used songs and music was a negative experience for neighbouring teachers who chose to teach in perfect silence. The resulting noise levels sometimes forced the MI teachers to rather stick to the comfort zones of the chalk and talk approach not to cause any conflict with neighbours.

Time management became a real issue when following an MI approach to teaching. Teachers explained that they planned the lesson in detail, but often lost track of time. The researcher found that very few teachers could round off a lesson to the last detail of the accelerated learning cycle. This was also the most common remark in teachers own reports or self reflection which they shared during the meetings (refer to Annexure G where some of the reports and self reflection sheets were included during some of the meetings). That was a constant concern in the beginning of the process but gradually improved over time. It was evident however, that time was one of the biggest concerns for new prospective teachers who joined the group. They seldom reached the outcome as stipulated in their planning and then felt that the class was left behind with work not done in comparison with other classes. The use

of timers to control the learner activity, group work or other elements of lesson presentation started to play an important role. The teachers even set the timers to control their own “talking” time to be able to allow for enough learner activity and assessing the outcome.

One of the aspects that was repeatedly raised during the weekly meetings, was the fact that certain learning areas like Languages, Arts and Social and Human Sciences were easier to teach in a MI way because of the availability of resources like art materials, visual reading programmes, drama activities, music and computers. Mathematics was the most challenging and the researcher had to give the Mathematics teacher a lot of support. The researcher really focused on this learning area and put in a lot of effort to assist with the incorporation of all the intelligences (and not just the logical mathematical intelligence) when teaching this learning area.

Apart from the Mathematics teacher, the Economics and Management Sciences teacher also struggled to incorporate other intelligences with the teaching of the subject. That urged the researcher to think of lesson plans where all intelligences could be used to bring about an understanding of certain topics. An example that can be mentioned was a lesson where the teacher had to explain the different forms of ownership and the implications of that like a company, partnership, single owner, etc. The researcher came up with the idea of a court case where all the elements of the different companies would be a factor. A case was put together, the class divided into groups, a judge selected, attorneys, prosecutor, etc. and the learners argued the case as part of a drama but also as a competition. There had to be a winner. The teacher was there only to remind the learners of certain technical points pertaining to the different forms of ownership. The learners enjoyed the lesson tremendously and indicated that they didn't have to study the elements afterwards as they knew it by the time they left the class.

Although the researcher realised the need for support and guidance, she was very concerned about the fact that teachers tended to consider it the duty of the researcher to find innovative ways of application and that they often

claimed that they are not creative enough to think of ideas of how to accommodate and develop the different intelligences in their learning areas. They used this claimed “lack of creativity” as an excuse for lessons where an MI approach to teaching and learning was not followed. It was also clear that the teachers who had not spent enough time on planning and finding the appropriate ways fell back on their old way and comfort zone of “chalk and talk”.

The researcher was surprised when teachers who were not initially part of the research project started to attend the weekly meetings. The announcements in the staffroom and the mutual discussions amongst staff triggered the imagination of other teachers who then volunteered their presence at the meetings. These teachers were not part of the research project but also took part in subsequent discussions. The researcher is of the opinion that the interest of other staff contributed to the change in attitude and increased levels of motivation in the research group of teachers. The meetings even carried on during the time the researcher was not at school for a few weeks.

- Conclusion

If something is not planned properly the chances are good that it will not be implemented and therefore the implementation process should be monitored closely right from the planning phase of instruction. This constant monitoring of preparation is, however, one of the biggest challenges that will have to be faced if an MI approach to teaching is implemented in a school. This could become very problematic as teachers often do not adhere to requests to submit their planning to be scrutinised, adapted or changed. Teachers also easily feel threatened when their planning and preparation are criticised.

Preparation handed in does not necessarily make a difference if not thoroughly checked and discussed with the teacher. This needs to be done to indicate to teachers where they are misunderstanding concepts, but also to suggest innovative ideas regarding the use of activities to stimulate all eight intelligences when teaching. Teachers need constant support. Discussing their planning and preparation with them and offering help with this important



aspect of their teaching is an important form of support. This is, however, a time-consuming activity and teachers, who already feel that they are overworked, do not always see their way open to participate in an activity which they regard as “a waste of valuable time”. Teachers also perceive the constant monitoring of their activities as a threat and do not like to be criticised. Although support is important teachers sometimes misuse this support by believing that the onus to come up with innovative ideas for incorporating all the intelligences in their teaching rests with somebody else. Teachers tend to use a lack of creativity as an excuse for not following an MI approach to teaching.

If done collaboratively, preparation could be much more creative. It can also help with time management. The challenge is to plan creative MI lessons but to do time management as well, in other words not to spend too much time on the planning and preparation and become demotivated and overworked in the process. Teachers had to be taken through a process where they had to determine if two day’s planning of a specific topic was worth the time.

Thorough lesson planning lead to better lesson presentation and improved learner activities which in turn lead to better utilisation of class time and deep learning.

Large classes do hamper the proper implementation of an MI approach as was evident from the fact that teachers often struggled to pay individual attention to learners and did not have enough space available for bodily-kinesthetic activities especially when used with music. Noise levels that can be produced when music is involved can also become a problem.

Teachers have to be constantly reminded that they have to adapt their teaching style to accommodate all learners. Teachers and learners agree that the involvement of all intelligences in the teaching situation, will be more fun and surely more enjoyable for both teachers and learners.

Teachers do not want to take part in any activities that they perceive as a waste of time. They are, however, willing to participate if these activities add value to their teaching and if they feel that they can learn from these. Teachers are unwilling to do research and to read comprehensively about the new teaching approach. They prefer summaries of the new approach.

Teachers are not always willing to collaborate with each other and if they are not used to being observed while teaching, they feel threatened. The researcher regarded this as one of the first obstacles that should be overcome if an MI approach is implemented, because teachers need to learn from each other and should be willing to let all stakeholders (parents included) observe what they are doing. It seems, however, that as teachers become more knowledgeable about the new approach and more comfortable with the idea of working together, their initial resistance to collaboration can be overcome.

The attitude, motivation and commitment of teachers are important factors to keep into consideration when implementing a new approach. They are very suspicious and skeptical about any new endeavor that could mean extra work, but as they become more familiar with the new approach, their attitude becomes more positive. The success achieved with the implementation of a new approach could influence teachers' motivation and willingness to change.

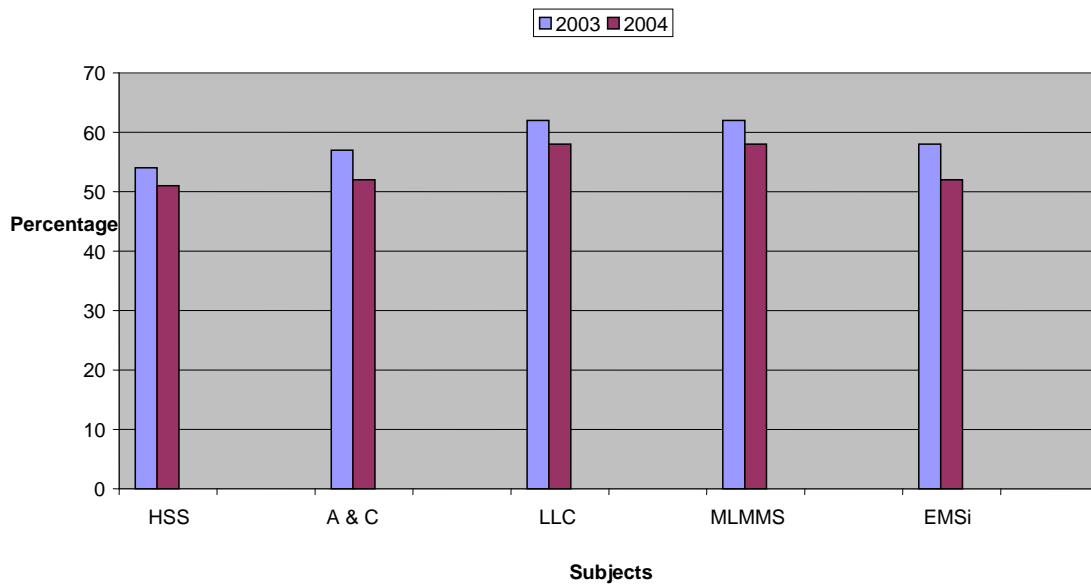
Lack of resources could be a limiting factor in the implementation of an MI approach to teaching. If the lack of resources is recognised and accepted, the use of innovative and interesting activities should be regarded as second best.

#### **4.4.7 Analysis of the scholastic achievement of the learners**

The next phase in the research project was to establish to which extent the changed approach to teaching had influenced learner achievement and attitude.

- Scholastic achievement of learners who progressed from grade 8 to grade 9 at the end of 2003

The researcher knows from experience that there has always been a trend where the marks seem to decrease from grade 8 to grade 9 in different degrees. The tendency had been discussed in the researcher’s school in previous years to find possible reasons and solutions. (There are, however, always exceptions depending on change of teacher, change in content and size of classes.)



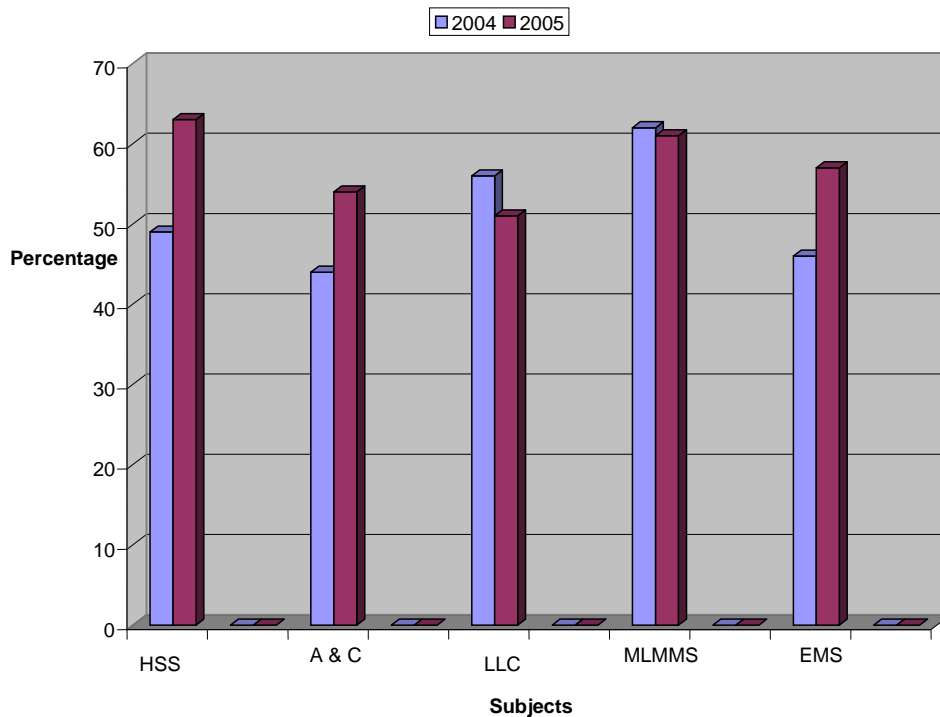
*Figure 4.10: Comparison of academic performance of a previous group of learners’ mid year results*

The graph above displays the results of a group of learners which represents most previous groups in the researcher’s school in terms of their general performance in the mentioned subjects. The decline in performance was visible in all the learning areas.

- Scholastic achievement of learners who took part in the research programme

The researcher studied the scholastic achievement profiles of the grade 8 learners who formed part of the research programme. The mid-term results of 2004 were used as a point of reference. Up to this point the learners had not received any instruction through the application of accelerated learning techniques. The results available were a 50-50 combination of continuous assessment and formal examination results. The teachers had been prepared during the first half of the year to start with the MI approach in July 2004.

The mid term results for 2005 were the next group of results and these were accumulated during the first part of 2005 to be able to compare similar accumulated results with those of 2004. The same teachers again taught the same group in 2005. It is important to report that only 25 out of 35 learners from the previous year remained in the school in 2005. Only the results of the remaining 25 learners were taken into consideration.



*Figure 4.11: Academic results of the grade 8 learner participants compared after one year of MI instruction.*

When interpreting figure 4.10 it should be kept in mind that the teachers of the following subjects attended the multiple intelligences training and meetings and also taught accordingly: Human and Social Science (HSS), Arts and Culture (A&C), Economic and Management Sciences (EMS), Mathematical Literacy, Mathematics and Mathematical Science (MLMMS), and Language Literacy and Communication (LLC 1).

Whereas the decline in performance was visible in all the learning areas of the group who progressed from grade 8 to grade 9 at the end of 2003 (refer to figure 4.9) a decline in performance of those learners who were taught according to an MI approach manifested in only two learning areas (LLC and MLMMS).

The results obtained from the analysis of learner performance were shown to and discussed with the teachers. They were extremely pleased with the results and experienced it as a motivating factor.

#### 4.4.8 Presentation and analysis of the questionnaire data of the grade 8 participants

Learners were constantly made aware of the fact that one can be intelligent in different ways and that one intelligence is not more important than any of the other intelligences.

By the middle of 2005, after the learners had been exposed to an MI approach for one year, they had to complete a questionnaire. Only 25 of the 35 learners who were in grade 8 in 2004 remained in the school, therefore only their responses are accommodated here.

**Question1:** Do you know your weaknesses and strengths in your learning at school? Explain.

Yes	23	No	2
-----	----	----	---

The two learners who answered “no” explained that they only knew their weaknesses. They also by accident wrote their names on their questionnaires and happened to be of the group who had severe learning difficulties and behavioural problems in class which also explains why they focused on their weaknesses - everybody else probably also focused on that.

Other explanations amongst the group members who answered “yes” were:

- They know their weaknesses and strengths because of their brain profiles that pointed it out.
- Eight learners explained that they easily lose concentration in class when teachers speak all the time.
- Ten learners explained that they knew they are lazy to do their work.

- Other explained that they knew their specific strengths and weaknesses like cannot speak in public, cannot write fast, can listen very well, etc.

It can be concluded that learners were aware of their strengths and weaknesses. Awareness of strengths and weaknesses is very important as it assists learners in addressing weaknesses on the one hand and on the other hand utilising their strengths. The fact that learners were all subjected to a brain profile analysis certainly helped them to be more aware of their strengths and weaknesses.

The researcher wanted to establish if the learners could identify their specific weaknesses and had hope for themselves to change the weaknesses by realising that all possibilities lay within themselves. Therefore the following question was included:

**Question 2:** Can you do something to improve your weakness to become a strength? What can you do?

Only one learner indicated that teachers generally need to explain better for her to improve her concentration and other weak points. All other (24) learners indicated that they tried to work on their weaknesses by inter alia getting extra help, working smarter, keeping to a time table for studying and believing in themselves.

What is important in this answer is that the learners had grown in their intrapersonal intelligence to such an extent that they sought for an answer to their problems within themselves and did not look for a source outside that could be implemented to solve their problems.

**Question 3:** What are your strengths as a learner? How do you know that?

All respondents could identify a strength with some realistic explanation of why they considered that to be a strength except for one of the two learners

who initially indicated “no” to the first question – he said he had no strengths. It is interesting that the other one of the two who said “no” to question one could indeed identify a strength as she mentioned that she was a fast reader.

The fact that so many learners could identify realistic strong points clearly shows that the impact of the reinforcement of positive thoughts about themselves had an impact on the learners.

**Question 4:** Are you born with a set intelligence which you can not do anything about?

Yes	12	No	13
-----	----	----	----

The researcher is of the opinion that not all learners understood the question in the same way because their explanations did not correspond with their answer of yes or no. Many answered that they were still busy to develop their intelligence although they answered “yes” indicating that they had a set intelligence. Some also indicated that their teachers could do something about their intelligence.

The researcher wanted to establish if the learners realised that they could develop their intelligence further and that they did not have to accept any longer that they were just intelligent or not (as possibly already labeled by teachers), i.e. that intelligence is not a static concept. This issue also raised the question if the teachers had pursued the main point of hope contained in MI, namely the possibility that one’s brain can develop throughout life and that “intelligence” was not a fixed predisposition.

**Question 5:** Do you think it is important to know the details of how your brain works? Why do you think so?

Yes	25	No	0
-----	----	----	---



All learners indicated that they regarded it as important to know how one's brain works. Reasons given were:

- So that you can control your brain better.
- So that you can realise the potential of your brain towards learning.
- To be able to know what is good and what is bad for your brain.
- So that you can feed your brain with the right food.
- Because you need to know what to do to get the best out of your brain.
- So that you will know how to take care of your brain.
- So that you can improve the weak parts to become better.

**Question 6:** Do you have a positive or a negative attitude to school and learning?

Positive attitude	23	Negative attitude	2
-------------------	----	-------------------	---

The majority of the learners had a positive attitude towards school and learning.

**Question 7:** Is there any difference in the way the teachers are teaching in comparison with your previous (primary) school teachers? Explain.

Yes	20	No	5
-----	----	----	---

The majority of the learners noted a difference in the teaching approach followed by their teachers in primary school and secondary school. Although it is to be expected, the explanations provided by the learners clearly indicate that the changes that were perceived relate to the implementation of an MI approach to teaching.

Explanations given were mostly:

- We have never done brain gym before.

- The teachers are serious about their work and give lots of homework.
- We have never learnt about our brains and what its needs before.
- Here they play music in the classes to activate your brain
- They use new and different methods.
- Here we have fun while learning.
- They are only satisfied with your best.
- The teachers here are more respectful to the learners and really care about us.
- If you don't understand the teachers give you individual attention.

- Conclusion

After analysing the results of the questionnaire, the researcher came to the conclusion that the learners were very aware and receptive of the new methods used in some classes and that they responded well to it. It is also clear that the knowledge about the brain which was shared with the learners had a positive impact on their general approach towards learning. Learners were more aware of their own weaknesses and strengths and as a result had more hope for their future.

Learners responded positively to the MI approach and their behaviour improved significantly where they were actively engaged in the lesson. Learners enjoyed the classes a lot more and were very outspoken about the change in attitude of educators. They enjoyed coming to school much more than in the past.

It is important to note that 80% of the learners indicated that the teachers in this school taught differently from what they were used to in previous schools. There was a clear change in the minds of learners in the sense that they realised that they could actually do something about their intelligence. The researcher believes that if they grow up in an environment where this

information is shared all the time, they will gain a life-long inclination towards self-improvement.

It is clear from the questionnaire that there is in fact no problem in exposing learners to new approaches - they were much more positive towards the teachers in general than before. They live in a world where they experience change on a daily basis and they have not only developed the skill to adapt to a changing environment but also the need to learn in challenging ways.

#### **4.5 Challenges experienced in the implementation of an MI approach**

Although most of the initial challenges experienced in this research project were overcome with time, it is important to summarise these challenges as they were experienced by the researcher. This summary could provide a clear indication of the areas that will need attention to others who would like to implement an MI approach to teaching.

- **Thorough training**

An MI approach to teaching needs specialised skills and teachers need to be thoroughly trained to implement this approach. Very few teachers are taught MI teaching skills during their initial training. This calls for in-service training by means of workshops or weekly training sessions. The time constraints and general teacher resistance also call for innovative ways to utilise teachers' time optimally by presenting innovative training sessions.

- **Teacher resistance**

Teachers are very suspicious of any new approach that could possibly mean extra work for them. Some experienced teachers also have a deeply imbedded belief of what should be taught and how it should be taught. Experienced teachers often feel that they need not learn new things – the younger generation should be exposed to the new developments. This is a very real and a very challenging scenario to face and to overcome.

- Time constraints

Teachers are very busy and do not have time to do extra reading in order to become familiar with the new approach. The new curriculum recently introduced by the Department of Education in South Africa demands quite extravagant administrative commitment from teachers and new approaches are generally seen as more time consuming and time is one thing that teachers feel they do not have.

- Teacher commitment

Teachers who are committed and willing to make a success of the new approach is a prerequisite for the successful implementation of an MI approach in a school. This is, however, one of the biggest challenges anyone who would like to implement an MI approach would have to face. Teachers tend to claim that they are not very creative and use that as an excuse for not implementing the new teaching approach. There are wonderful resources available in books (mentioned under consulted resources) and on the internet which were in many cases already copied to make it less time consuming for the teachers, but the researcher found that they did not bother to even read or use the examples they received. There has to be a way where teachers' commitment could be assessed and their commitment required as standard practice.

- Teacher support

Teachers need constant support to implement the new approach. They, however, tend to abuse this support and in the process rely too much on the project leader to come up with innovative ideas. Meetings where all get a turn to present a lesson, create new ideas to use in certain situations, where they are empowered to develop rather than be developed by the trainer, should be organised. The researcher found that personal attention, personal class visits and real involvement in their lesson planning did make a difference in terms of their willingness to change. Teacher support is a very demanding task and it

cannot be expected from the school principal to be the sole support system. The challenge is to come up with innovative ideas for other forms of support.

- Resources

The availability of a number of resources is necessary to ensure the effective implementation of an MI approach to teaching. Acquiring the resources needed could be a real challenge in the South African context where schools are mostly under-resourced and lack the necessary funds to improve the situation. The implementation of MI or any other teaching strategy should, however, not be seen as dependent on fancy expensive equipment which is hard or impossible to obtain. That may become an excuse not to innovate or implement any other approach in teaching.

- Collaboration

Close collaboration between teachers when planning and presenting lessons is necessary. Teachers, however, are reluctant to collaborate if they are unfamiliar with the process, when they are new and do not trust the people they work with as well as if the person they work with has a judgmental attitude and not a supportive attitude.

- Constant monitoring of the process

Although constant monitoring of the implementation thereof is essential for the success of any new teaching approach, it is very challenging to do so because teachers easily feel threatened and under the spot light when being observed or criticised about their planning and preparation and teaching activities. Some well experienced teachers see a monitoring process as invasive and threatening. Monitoring should, however, initially be the rule and not the exception. Once teachers seem to be on track and know what to do, the monitoring process can be scaled down.

- Informed learners

Learners need to be aware of how they can use their different intelligences to improve learning. Assessing learners' brain profiles is a very useful method to

do this and to indicate to learners what their learning style preferences and their dominant intelligences are, but it is time-consuming to do the assessments. It is also expensive, as these assessments need to be done by a qualified person. The challenge is to find alternative ways of determining learning style preferences and strong and weak intelligences that are reliable and valid.

- Development opportunities

The researcher was quite inspired by the opportunity to experience a fully fledged MI school and holds the opinion that teachers should be given similar opportunities to incite their enthusiasm and passion for learning.

- Professional training

Training of teachers should be carefully planned and trainers well selected to get the desired results. Poor presenters who do not know their subject well or who do not have exceptional skills to present a new approach in an innovative manner rather alienate staff than encourage them.

- Planning and process

It is imperative that the teachers are involved in the whole process of implementing a new approach from where planning is done quite in advance and executed as described in the plan. Changing of dates and venues and other demands cause an uncertainty and the idea that everything goes. It should be a collaborative process but controlled from the top to get maximum commitment.

## **4.6 Summary**

In this chapter the results obtained from the case study, which entailed observations, content analysis, informal, unstructured interviews and open-ended questionnaires, were discussed.

Before the actual beginning of the research, the New City School in the USA - where an MI approach had been implemented very successfully - was visited. Lesson presentations were observed and informal interviews were held with teachers. Thereafter the Harvard Graduate School of Education was visited and an interview was held with one of the assistant lecturers who was an expert in the implementation of an MI approach in schools. These visits revealed that the teachers play a very important role in the implementation of an MI approach and that proper planning and constant monitoring of the teachers' progress are necessary.

Teachers who formed part of the research project had to submit their weekly planning and preparation documents to the researcher. These documents were discussed with the teachers and rubrics were used to assess the extent to which the planning and preparation documents made provision for the development of all eight intelligences in the learning situation.

Teachers were also observed in the classroom by both the researcher and other teachers who formed part of the project. These lessons were assessed by means of a rubric. The focus was once again on the extent to which teachers incorporated an MI approach in the classroom. Rubrics were also used to assess teachers' attitude and commitment to a changed teaching approach as well as their willingness to observe colleagues and to be observed by others.

An analysis of learner performance showed an improvement in all learning areas, except Mathematics (MLMMS) and English (LLC). Reasons for the non-improvement in these learning areas appeared to be closely related with teacher resistance towards changes in teaching style. Learners had to answer a questionnaire which aimed to determine their experience of a changed teaching approach and better knowledge of their own strengths and weaknesses. An analysis of the data obtained by means of the questionnaire revealed that they have benefited in many ways from the implementation of an MI approach. The researcher came to the conclusion that the challenges associated with the implementation of an MI teaching approach are inter alia

the constant monitoring of the implementation process, the commitment and training of the teachers, the teachers' willingness to collaborate, not only with regard to planning and preparation, but also with regard to lesson presentation, the changing of teachers' attitude and ways of keeping them motivated.

In the next chapter an overview of the research will be provided. The researcher will also come to conclusions and suggest a number of recommendations.



## **CHAPTER 5**

### **OVERVIEW, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter provides a general overview of the investigation. The researcher summarises the study and outlines the limitations of the study. Major conclusions from the study are highlighted and recommendations, including areas for further research, are highlighted.

#### **5.2 Overview of the investigation**

The researcher set to investigate the challenges and measures for best practice in implementing an accelerated learning programme with the focus on MI. The main body of the study was divided into four chapters.

In Chapter 1 the background to the study was discussed. This discussion entailed a short explanation of the brain, its functioning and new knowledge about the brain that became available during the last few years. It was indicated that there is a dire need for change in the teaching approach followed in South African schools, but that teachers tend to resist change. It was explained that accelerated learning (AL) developed as a result of new information on the brain. AL provides a procedure for helping pupils learn more effectively because it recognises that each learner has a preferred style of learning that fits his or her intelligence profile best. Therefore there is a close connection between accelerated learning and the multiple intelligences (MI) theory. There is also a close relationship between an MI approach to teaching and OBE as introduced in the South African classroom. Both are learner-centred and recognise the individuality of each learner.

The first chapter also presented the research problem, research aims and research design. These basically revolved around the challenges and best practices associated with the implementation of accelerated learning with particular reference to MI in a South African school. The study took the form

of a case study and it was explained that a case study entails an in-depth analysis of a phenomenon in a particular setting. The variety of methods that were used were also mentioned and briefly discussed. The chapter was concluded with an indication of the chapter division.

Chapter two constituted the literature study. In this chapter it was explained that intelligence was initially regarded very narrowly. It was believed that one is born with set abilities that could not be changed. IQ tests were used to measure this intelligence. Various concerns about the use of tests to measure intelligence led to the development of the MI theory by Howard Gardner. The intelligences which he defined are: linguistic, logical-mathematical, musical, bodily-kinesthetic, interpersonal, intrapersonal, spatial and naturalist.

The linguistic intelligence refers to the ability to articulate ideas in language format. The mathematical/logical intelligence relates to the ability to work with numbers, structures, sequence and the ability to reason. The visual/spatial intelligence is the ability to think visually and three-dimensionally. Bodily-kinesthetic (physical) intelligence is the ability to use one's physical abilities and to manipulate physical objects. Musical intelligence refers to the ability to articulate ideas through music. Naturalist intelligence is the ability to distinguish among and classify aspects in the natural world. Interpersonal intelligence refers to the ability to recognise and make connections with regard to others' feelings and emotions and to draw on these in solving problems. Intrapersonal intelligence enables learners to understand their own feelings, to build accurate mental models of themselves and to assign meaning to their inner emotions.

The discussion in this chapter also covered the concept of accelerated learning (AL). According to AL every person has a preferred learning style. AL makes use of the theory of MI to accelerate learning in the classroom. Various ways in which each of the intelligences could be facilitated in the classroom, were also discussed in this chapter. The mathematical intelligence is for example facilitated by means of activities which expect learners to calculate, reason, estimate, prioritise, generate lists, justify a case, add, subtract,

multiply or divide. The linguistic intelligence is switched on every time learners are expected to articulate their ideas (or some else's) in words. These type of activities include inter alia writing, rewriting, describing, acting and rhyming. Musical intelligence is developed every time learners have to make an association between music and a learning concept or when music is used to enhance the learning experience. The visual/spatial intelligence is used when spatial connections are made between objects and concepts and include activities such as drawing, sketching, colouring, mind mapping, flowcharting, visualising and imagining. Bodily-kinesthetic intelligence is developed every time movement is used to learn something and include any "hands-on" activity. Naturalist intelligence is facilitated when learners are expected to categorise different kinds of plants or animals or to use natural objects in the learning process. Intrapersonal intelligence is involved whenever learners are requested to mediate, reflect, judge and evaluate or provide an own opinion. Interpersonal intelligence is developed when learners have to work together to complete a project or learning task. Discussing, arguing, debating, presenting and defending are all examples of classroom activities that would contribute to the facilitation of the interpersonal intelligence.

Chapter three dealt with the design and methodology of the case study as conducted at a school in the Hammanskraal area. The role players in the case study were identified and described. They consisted of five teachers, responsible for the teaching of five different learning areas. These learning areas were: Language, Literacy and Communication - English home language (LLC 1), Mathematical Literacy, Mathematics and Mathematical Sciences (MLMMS), Human and Social Sciences (HSS), Arts and Culture (A&C) and Economic and Management Sciences (EMS). One of the grade 8 classes that was taught by all the teachers who were purposively selected to participate in the research project, also formed part of the research project.

The design of the data collecting devices and how these were administered in a specific class with a specific group of teachers were explained. A variety of research methods such as questionnaires, content analysis, observations, meetings and interviews were used to collect data. Each of these methods

and the way in which it was applied in the research project was discussed in this chapter.

A description of the brain profile testing component was given and the rationale for the initial questionnaires and surveys amongst the staff and learners was explained. The observations made and the interviews conducted with the staff of the New City school in America, as well as the staff at Harvard University were referred to as a valuable sources of information. The process of guiding the teachers towards applying the MI approach in the classroom was explained and the way in which academic performance results were used to compare possible progress was explained and data analysis was discussed.

Chapter four dealt with the presentation of the findings of the research. The researcher's visit to the New City School in the USA, where an MI approach had been implemented very successfully, as well as a visit to the Harvard Graduate School of Education was discussed. These visits revealed that the teachers play a very important role in the implementation of an MI approach and that proper planning and constant monitoring of the teachers' progress are necessary to ensure the successful implementation of an MI approach to teaching. Collaboration between teachers also contributes to the smooth running of such an approach.

Teachers who formed part of the research project were expected to submit their weekly planning and preparation documentation. These were then discussed with them and suggestions for improvement were made. Teachers were also observed in their classroom situation – by both the researcher and fellow teachers. Rubrics were used to assess the planning and preparation forms as well as the teachers' lesson presentations. A rubric was also used to assess teachers' attitude and commitment to a changed teaching approach, as well as their willingness to observe colleagues and to be observed by others. An analysis of the results obtained by means of these rubrics revealed inter alia that it is necessary to constantly monitor the implementation of a new approach, that teachers need to stay motivated and that a collaborative

approach to planning and preparation is a prerequisite for effective teaching based on an MI approach.

Weekly meetings were held with teachers to do training, discuss problems and success stories, handle queries and guide and support teachers. Minutes were kept of the meetings and field notes were made by the researcher. These meetings revealed the importance of a collaborative approach between teachers and the need for constant monitoring and support. The constant monitoring of preparation is very problematic as teachers often do not adhere to requests to submit their planning, do not have time for regular meetings and easily feel threatened when their planning and preparation and teaching practice are criticised.

Performance results of the learners were available to compare the difference between results derived after MI instruction and results available before MI instruction. Profiles of the learners' learning styles were compared with those of the teachers. The last questionnaire completed by the learners was discussed to indicate a possible growth in their own perceptions of learning experiences. Learners' performance also improved remarkably in all but two learning areas, namely Language Literacy and Communication (English home language) and Mathematical Literacy, Mathematics and Mathematical Sciences.

### **5.3 Limitations of the study**

While the contribution of this study to improve the knowledge on an MI teaching approach cannot be over-emphasised the applicability and generalisability of the findings are limited by the fact that the research took place in a private school where classes were small in comparison with government schools in South Africa. Other factors such as the availability of resources and quality and commitment of teachers at the school where the research was conducted, were also much better than in the average South African public school.

## **5.4 Conclusions of the study**

### **5.4.1 Conclusions drawn from the literature study**

- There are serious problems in the current teaching approach followed by many teachers in South African schools. This calls for a change to a teaching approach in which learner diversity is recognised and learning is optimally accelerated.
- New knowledge about the brain that becomes available on a daily basis should be communicated to teachers and learners to improve their understanding of themselves and learning in general. Present knowledge about the brain should not be seen as information important to the medical profession only but also of the utmost importance to the teaching fraternity.
- There is a close link between outcomes-based education and an MI approach to teaching. As such an MI approach to teaching is a valuable approach to follow when teaching in an outcomes-based way, because both approaches are learner-centered and take the individuality of each learner into consideration. Both these approaches also believe that all learners can achieve success if they are taught in innovative ways and according to their unique preferences and needs.
- When implementing an MI approach a variety of activities can be used in the classroom to not only develop the optimal use of learners' strong intelligences, but to also facilitate the development of the learners' weaker intelligences. In implementing an approach where all intelligences are developed, a very balanced individual will emerge.

### **5.4.2 Conclusions drawn from the case study**

The conclusions drawn from the case study are also the challenges that could be associated with the implementation of an MI approach to teaching in a South African school.

- Selection of teachers

The way in which teachers are selected for appointment plays a very important role in a school where an MI teaching approach is followed. Creative teachers with very strong intra- and interpersonal qualities are needed. (refer to the application form of the New City School as Annexure A)

- Teacher training

Teachers should be suitably trained and qualified to apply MI teaching principles. If teachers' initial training does not prepare them for accommodating an MI approach to teaching, in-service training should take place. Particular note should be taken of the fact that most teachers are unwilling to do research and extensive reading on a new teaching approach. Teacher training should contain modules where the role of the brain in teaching and learning is explored.

- The role of the teachers

Teachers are instrumental to the successful implementation of an MI approach in a school. Teachers need to be committed and focused. They need to be motivated to stay on track. Teachers should be made aware of the fact that their own attitude towards teaching and especially the planning and preparation phase of teaching has a far-reaching effect on the essential learning which should take place in the classroom.

- Constant support

It is a challenge for teachers to teach in such a way that they accommodate all the different intelligences. They need consistent support and new ideas to help them to be more creative in the presentation of learning material. This was the area where the researcher had most difficulty as the teachers claimed that they are not all equally creative and could therefore not easily accommodate learners with a dominant intelligence different from their own. It seems as though teachers tend to use this "claimed" lack of creativity as an excuse for not putting in enough effort to present lessons according to an MI approach

- The school environment and resources

An MI approach to teaching requires a colourful environment and relaxed atmosphere. Resources for a variety of activities such as field trips, presentations and bodily-kinesthetic movements are necessary. The lack of resources could, however, be overcome by improvising (e.g. using learners' own projects and drawings for class decorations) and by implementing creative teaching and learning activities.

- The relationship between teachers and learners

Learners should respect each other and should accept each other's dominant intelligences. Although the relationship between teachers and learners should be informal when following an MI approach, teachers and learners find it hard to adhere to this. This can be contributed to the traditional formal relationship between teachers and learners in South African schools.

- Awareness of multiple intelligences and individual learning styles

Although the use of brain profile tests is a useful way to establish learners' and teachers' dominant intelligences and learning styles, the application of these type of tests is not a prerequisite for the successful implementation of an MI approach to teaching. Learners who are aware of their strengths and weaknesses are also much more aware of what should be done to change their weaknesses into strengths.

- The need for a top-down approach

A top-down approach (i.e. from school management to teachers) is often needed to implement a new teaching approach, such as MI, at any school which is often regarded as negative. It might seem as though the teachers had no other choice than to start adapting to an MI approach to teaching. It should, however, be kept in mind that although the handing in of preparation was not always done as expected, the teachers' busy schedule was partly to be blamed. At the time when the researcher went to America to visit the MI schools, the teachers carried on meeting on a weekly basis and came up with



excellent ideas during the time when the researcher could not have had an impact on their participation. This behaviour is an indication that with implementation of a new approach initial top down management is needed but once teachers realise the benefit of the approach, they can and will make it work. The top-down approach then changes into a more participative approach.

- Proper planning

The implementation of an MI approach should not be left to chance or choice. Proper planning and preparation should be ensured by requiring teachers to not only submit their planning documents but to also discuss these with them.

- A collaborative approach

An MI approach to teaching demands that teachers employ creative methods. Teachers often prefer to collaborate with other teachers in order to come up with more creative ideas for facilitating a variety of intelligences when teaching.

- A positive experience for both teachers and learners

Both teachers and learners found the MI approach to teaching and learning very satisfying. Teachers enjoyed being the facilitator and learners enjoyed the many activities and active involvement associated with an MI approach.

- Improvement in learner performance

Although the implementation of an MI teaching approach does not guarantee an improvement in learner performance in all subjects, learners experience this teaching approach as enjoyable and prefer it to conventional approaches. The learners admitted that learning in the MI classes was fun and that those teachers understood them better. The decrease in disciplinary problems in the MI classes was also proof that there was much less disruption in those classes.

## **5.5 Recommendations**

### **5.5.1 Recommendations with regard to learners**

- Learners should be made to understand from the time they enter school that they have started with a phase of learning that will in fact never end, but that the next twelve years are the most exciting part where their brains are the most receptive to new and novel ideas and practices. Teachers and learners should be made aware of their dominant learning styles.
- Learners will have to realise that their success in life will be dependent on the extent to which they develop their own intelligences by getting involved in all possible opportunities to learn. They need to be made aware of the fact that there are different intelligences and that they do not need to feel caught up in a situation where one child is labeled “intelligent” and another “unintelligent”. It is a very encouraging thought to know that intelligences develop throughout life according to own input in increasing them.
- Learners love to know more about their brains. They are fascinated by new information about the brain and this aspect should be utilized fully to teach them how to care for and use their brains more effectively in all learning situations.

### **5.5.2 Recommendations with regard to the implementation of an MI approach in a school**

- Training of teachers

The Department of Education should be more assertive and prescriptive in terms of what teacher training should consist of. Teachers come from university today not much differently trained from almost thirty years ago when the researcher was trained as a teacher. With all the latest technology available and research findings about the brain that became available one should change the training of teachers accordingly. One can no longer ignore the developments in an area that directly influences learning. Without properly trained teachers the implementation of an MI approach is a real challenge.

If teachers are not suitably trained to follow an MI teaching approach this type of training should be provided by means of in-service training or informal training at the school. Teachers should be encouraged to do research and to be familiar with new developments in education. Teachers should be made aware of the importance of self-development and of doing research on new teaching approaches. It should, however, be kept in mind that teachers are very busy and have limited time to become familiar with the finer detail of a new approach. They need a lot of assistance in this regard.

- Providing support

Implementing a new teaching approach is challenging and demands a lot of (initial) extra work. Teachers therefore need constant support and guidance to be able to cope with the demands made by the new approach. They easily become demotivated if they do not see immediate results. Providing support and keeping teachers motivated are instrumental to the success of the implementation of an MI approach to teaching. Doing this is one of the challenges that could be met by constantly encouraging teachers and by sharing success stories with them and by acknowledging their efforts.

- Overcoming teacher resistance

Teachers initially resist change and resist it even more if they suspect that the change implies more work. The researcher has, however, also experienced a cycle of positive growth in terms of resistance. It seems that enough enthusiastic people who love to explore and tell about the successes they had in class on an ongoing basis, enthuse others to experiment with new approaches and eventually implement other ideas without realizing that they in fact have changed. The researcher also holds the opinion that the “talk” amongst learners where they tell of the fun they had in certain classes, have a definite impact on other teachers who do not want to be known as teaching “boring” lessons. A concrete way to overcome the resistance would surely be to expose all other teachers to the successful lessons either through video or physical presence during such a lesson.

- Learners' awareness of their different intelligences and the need to develop all their intelligences

Learners should be made aware of the fact that there are different intelligences and that one can be intelligent in different ways. They need to know that they can develop and improve their intelligences and that they have to on the one hand develop their strong intelligences and on the other hand improve their less dominant intelligences. Teachers have a huge task in that they have to teach learners in such a way that learners become self confident with who they are and develop a good self esteem as a result. There is a variety of ways which can be used to achieve that. Many books are available with very creative ideas from which legal photo copies can be made for this purpose. The researcher has mentioned many of these books under "Consulted resources".

- The school environment and resources

The school environment should be conducive to an MI approach. Teachers should ensure that their classroom environment is colourful and that a relaxed atmosphere is created. An informal relationship, characterised by respect for each other is a prerequisite for the successful implementation of MI teaching. Teachers' change of attitude to for example stand at the door and invite the learners into the class by greeting them, is already a change for most teachers. Only the attitude of wanting to improve the classroom will get the learners also involved to help with appropriate room and wall decorations.

- A top-down approach

Teachers should be thoroughly monitored to ensure maximum success. They need to be supported and encouraged and should be made aware of the progress they are making. A top-down approach should be followed to ensure the successful implementation of an MI teaching approach which means there should be a form of assessment for teachers. This implies that their planning and lesson presentation should be monitored and assessed. They should receive guidance on how they can improve their teaching as well as an indication of their progress.

- **Collaboration**

A collaborative approach, where teachers assist each other and learn from each other should be encouraged. The collaboration process can be included as part of the monitoring process where certain teachers who teach the same learning area could be granted free periods at the same time where they have to meet for collaborative planning. They could then hand in a collaborative plan as part of the process and as part of their assessment.

- **Keeping teachers motivated**

This is the most challenging task as the researcher believes that motivation is something that is generated from within. That means that teachers will over a longer period of time have to change their states of mind from one of resistance to one of enthusiasm and wanting to make a difference. The researcher believes that by being positive and enthusiastic about all the possible gains that could be achieved through a MI approach one could change the states of mind of most teachers which would in turn help them to stay motivated. The researcher presents one interesting aspect of MI during every morning meeting with staff together with a brain gym activity with music that accelerates learning which they can use in the class during the day with different groups.

## **5.6 Recommendations for further research**

The research was done in a private school, where classes are much smaller than in government schools. It is recommended that the same study be undertaken in a government school where the resources, class size and school environment are not as favourable as at the school at which the case study was conducted.

## **5.7 Conclusion**

It is clear from the experience of the researcher that traditionally schools in South Africa value certain kinds of skills and abilities more than others. It is an intense change for teachers to acknowledge and teach to intelligences other than the logical mathematical and linguistic intelligences.

The researcher found that it is possible, when armed with the latest knowledge on brain research and subsequent educational approaches as practiced in many countries in the world, to influence the behaviour and teaching approaches of educators to benefit more learners in the teaching and learning process. Chrisman (2005:17) has pointed out in her research amongst four schools that teacher leadership and willingness to change developed tremendously when teachers have had the time and opportunities to make decisions about teaching and learning, when they are involved in specific informal research and when they have formed their own informal leadership structures in school where they assist each other, share lesson plans and collaborate when deciding on lesson designs.

Teachers will have to acknowledge from their first year of teaching that children are diversely intelligent and that each child has a different set of unique qualities which give him or her a fair chance to succeed in life. Teachers will also have to be made aware through the knowledge of relevant research that they have a profound impact on the learning that takes place in the class, as well as on the performance of every individual child.

The MI approach strives to provide each learner with a joyful learning experience which should also be the goal of every teacher. In fact each and every front of educational reform will fall in place if the joy of learning is brought back into our schools. As the research findings indicate, accelerated learning through the MI approach can do exactly that, and should thus feature as a top priority on the task lists of policy makers and planners in education.

## Bibliography

Airasian, P.W. & Gullickson A.R. 1997. *Teacher self evaluation toolkit*. Thousand Oaks, Calif.: Corwin Press.

Armstrong, M. 1992. *Personnel management practice*. London: Kogan Page.

Armstrong, T. 1994. Multiple intelligences: seven ways to approach curriculum. *Educational Leadership*, 52(3): 26-28.

Armstrong, T. 2000a. *In their own way: Discovering and encouraging your child's personal learning style*. New York: Penguin Putnam Books.

Armstrong, T. 2000b. *Multiple intelligences in the classroom*. Alexandria, VA: ASCD.

Armstrong, T. 2003. *You're smarter than you think*. Minneapolis: Free Spirit Publishing.

Bogdan, R.C. & Biklen, S.K. 1998. *Qualitative research for education: An introduction to theory and methods*. 3<sup>rd</sup> edition. Boston: Allyn and Bacon.

Brearly, M. 2001. *Emotional intelligence in the classroom: Creative learning strategies for 11-18 year olds*. Bristol: Crown House Publishing.

Brown, H.J. & Shavelson, J.R. 1996. *Assessing hands-on Science*. California: Corwin Press.

Campbell, B. 1997. The naturalist intelligence. *New Horizons for Learning: Teaching and Learning Strategies*.  
<http://www.newhorizons.org/strategies/mi/campbell.htm> (Accessed on 2005/05/31).

Caviglioli, O. & Harris, I. 2001. *Mapwise: Accelerated learning through visible thinking*. Stafford: Network Educational Press.

Chapman, C. 1993. *If the shoe fits....* Illinois: Skylight Professional Development.

Checkley, K. 2004. Meeting the needs of the adolescent learner. *ASCD Education Update*. 46(5): 1-8.

Chrisman, V. 2005. How schools sustain success. *ASCD Educational Leadership*, 62(5): 16-20.

- Christison, M.A. 1998. Applying multiple intelligences theory. *Forum* 36(2). <http://exchanges.state.gov/forum/vols/vols36/no2/p2.htm> (Accessed on 2003/06/21).
- Cienciolo, A.T. & Sternberg, R.J. 2004. *Intelligence: A brief history*. Oxford: Blackwell.
- Clark, B. 1986. *Optimizing learning: The integrative education model in the classroom*. Columbus, OH: Merrill.
- Cohan, L., Manion, L. & Morrison, K. 2000. *Research methods in education*. 5<sup>th</sup> edition. London: Routledge Falmer.
- Cohem, I & Goldsmith, M. 2000. *Hands on: how to use brain gym in the classroom*. Sea Point: Hands on Books.
- Conlan, R.(ed).1999. *States of mind: new discoveries about how our brains make us who we are*. New York: John Wiley & Sons.
- Convery, A. & Coyle, D. 1999. *Differentiation and individual learners. A guide for classroom practice*. London: CILT.
- Creswell, J.W. 2003. *Research design. Qualitative, quantitative and mixed method approaches*. Thousand Oaks: Sage.
- Curriculum Development Working Group. 1996. *Curriculum Framework for General and Further Education and Training*. Pretoria: National Department of Education.
- Dennison, P.E. & Dennison, G. 1989. *Brain gym*. Ventura: Edu-Kinesthetic.
- Denscombe, M. 2003. *The good research guide*. 2<sup>nd</sup> edition. Maidenhead, Philadelphia: Open University Press.
- De Porter, B. 2001. Accelerated learning. *New Horizons for Learning: Teaching and Learning Strategies*. <http://www.newhorizons.org/strategies/accelerated/deporter.htm/> (Accessed on 2006/07/21).
- De Vos, A.S. (ed.). 2002. *Research at grass roots*. Pretoria: Van Schaik.
- Dryden, G. & Vos, J. 2001. *The learning revolution*. New Zealand: Network Educational Press.
- Du Toit, G.F. & Du Toit, E.R. 2004. Understanding outcomes-based assessment. In: Maree, J.G. & Frazer, W.J. (eds). *Outcomes-based assessment*. Sandown: Heinemann. pp 1-27.



- Ellet, W.C. 2007. *The case study handbook: How to read, discuss and write persuasively about cases*. Boston: Harvard Business School Press.
- Entwistle, N. 1987. *Understanding classroom learning*. London: Hodder and Stoughton.
- Fouché, C.B. & Delport, C.L.S. 2002. The place of theory and the literature review in the qualitative approach to research. In: De Vos, A.S. (ed.). *Research at grass roots*. Pretoria: Van Schaik. pp 265-269.
- Gardner, H. 1993. *Frames of mind: The theory of multiple intelligences*. 2<sup>nd</sup> edition. New York: Basic Books.
- Gardner, H. 1993. *Multiple intelligences, the theory in practice*. New York: Basic Books.
- Gardner, H. 1999. *Intelligence reframed. Multiple intelligences for the 21<sup>st</sup> century*. New York: Basic Books.
- Gardner, H. 2000. *The disciplined mind: Beyond facts and standardized tests, K-12 education that every child deserves*. New York: Penguin Putnam.
- Gillham, B. 2000. *Case study research methods*. New York: Continuum.
- Glatthorn, A.A. 1997. *The principal as curriculum leader: Shaping what is taught and tested*. California: Corwin Press.
- Goleman, D. 1995. *Emotional intelligence*. New York: Bantam Books.
- Goleman, D. 1996. *Emotional intelligence: Why can it matter more than IQ*. London: Bloomsbury Publishing.
- Haggerty, B.A. 1995. *Nurturing intelligences*. Menlo Park, Calif.: Addison-Wesley.
- Hamel, J. Dufair, S. & Fortin, D. 1993. *Case study methods*. Newbury Park: Sage.
- Hoerr, T. 2000. *Becoming a multiple intelligences school*. Alexandria: ASCD.
- Hoerr, T. 2002. Applying MI in schools. *New Horizons for Learning: Multiple Intelligences*. <http://www.newhorizons.org/strategies/mi/hoerr2.htm>
- Immelman, I. 2000. *Assosiaat opleiding*. Pretoria: Neurolink.
- Jensen, E. 1995. *Brain based learning and teaching*. Del Mar: Turning Point.

- Jensen, E. 1998. *Super teaching. Over 1000 practical teaching strategies. 3<sup>rd</sup> edition*. San Diego: The Brain Store.
- Johnsen, B. & Christenson, L. 2004. *Educational research. Quantitative, qualitative and mixed method approach*. Boston: Pearson.
- Kagan, S. & Kagan, M. 1998. *Multiple intelligences: The complete MI book*. San Clemente: Kagan Publications.
- Kerfoot, C. & Winberg, C. 1997. *Learning about action research*. Cape Town: Juta.
- Kornhaber, M. & Fierros, E. & Veenema, S. 2004. *Multiple intelligences: Best ideas from research and practice*. Boston: Pearson.
- Kotze, G.S. 2004. Outcomes-based assessment strategies, In: Maree, J.G. & Frazer, W.J. (eds). *Outcomes-based assessment*. Sandown: Heinemann. pp 45-63.
- Leaf, C. 2005. *Skakel jou brein aan*. Cape Town: Tafelberg.
- Lechunga, V. 2006. *The changing landscape of the academic profession: The culture of faculty at for-profit colleges*. New York: Routledge.
- LeDoux, J. 1999. The power of emotions. In: Conlan, C. (ed.). *States of mind. New discoveries about how our brains make us who we are*. New York: John Wiley. pp 123-149.
- Leedy, P.D. & Ormrod, J.E. 2005. *Practical research*. Upper Saddle River: Pearson.
- Maree, J.G. & Frazer W.J. 2004. *Outcomes-based assessment*. Sandown: Heinemann.
- Macbeath J. 1999. *Schools must speak for themselves. The case for school self-evaluation*. London: Routledge.
- Maples, T. 1994. *Accelerated learning: Effective knowledge acquisition*. Nelson: Inova.
- McKee, L. 2004. *The accelerated trainer*. Aldershot: Gower.
- McMillan, J.H. & Schumacher, S. 2006. *Research in education: Evidence-based inquiry. 6<sup>th</sup> edition*. Boston: Pearson.
- Moorhead, G. & Griffen, R. 1992. *Organizational behaviour*. Boston: Houghton Mifflin Company.

- Mouton, J. 2005. *How to succeed in your Master's and Doctoral studies. A South African guide and resource book*. Pretoria: Van Schaik.
- Mwamwenda, T.S. 2004. *Educational psychology. An African perspective*. Sandton: Heinemann.
- Nadeau, B. & McNicoll, T. 2006. Europe's failing schools: the continent's education systems are crumbling. *Newsweek*. June 12: p. 30.
- Neethling, K. & Rutherford, R. 1996. *Is ek slim of is ek dom?* Pretoria: Benedic.
- Neethling, K. & Rutherford, R. 2005. *Creativity uncovered*. South Africa: Solutionsfinding.
- Ray, K.W. 2004. When kids make books. *ASCD Educational Leadership*, 62(2):14-18.
- Ridge, E. 1998. Multiple intelligences and outcomes-based education. *Per Linguam*, 14(2):31-43.
- Rios, R.J. 1998. Class size: Does it really matter? *New Horizons for Learning: Transforming Education*. <http://www.newhorizons.org/trans/rios.htm> (Accessed on 2005/05/31).
- Rose, C. & Nicholl, M.J. 1997. *Accelerated learning for the 21<sup>st</sup> century: The six step plan to unlock your master-mind*. New York: Dell Publishing.
- Silver, H.F., Strong, R.W. & Perini, M.J. 2000. *So each may learn; Integrating learning styles and multiple intelligences*. Alexandria: ASCD.
- Schmoker, M. 2006. *Results now: How can we achieve unprecedented improvements in teaching and learning*. Alexandria: ASCD.
- Smith, A. 1998. *Accelerated learning in the classroom, 2<sup>nd</sup> edition*. Stafford: Network Educational Press.
- Smith, A. 2003. *Accelerated learning in practice. Brain-based methods for accelerating motivation and achievement*. Stafford: Network Educational Press.
- Smith, M.K. 2002. Howard Gardner, multiple intelligences and education, *The Encyclopedia of Informal Education*, <http://www.infed.org/thinkers/gardner.htm> (accessed on 2005/08/27).
- Sousa, D.A. 2006. *How the brain learns*. Thousand Oaks: Corwin Press.
- Sternberg, R. 1988. *The triarchic mind: A new theory of human intelligence*. New York: Viking.

- Sternberg, R.J. 1997. *Thinking styles*. Cambridge: Cambridge University Press.
- Sternberg, R.J. & Grigorenko, E.L. (eds). 2002. *The general factor of intelligence: How general is it?* Mahwah: Lawrence Erlbaum Associates.
- Stronge, J.H. (ed.). 1997. *Evaluating teaching: A guide to current thinking and best practice*. Thousand Oaks: Corwin Press.
- Strydom, H. 2002. Information collection: participant observation. In: De Vos, A.S. (ed.). *Research at grass roots*. Pretoria: Van Schaik. pp 278-290.
- Taylor, N & Vinjevold, P. (eds). 1999. *Getting learning right: report of the President's Education Initiative Research Project*. Johannesburg: The Joint Education Trust.
- Taylor, N., Diphofa, M., Waghmarae, H., Vinjevold, P. & Sedibe, K. 1999. Systemic and institutional contexts of teaching and learning. In: N. Taylor & P. Vinjevold (eds). *Getting learning right: report of the President's Education Initiative Research Project*. Johannesburg: The Joint Education Trust.
- Tellis, W. 1997. Introduction to case study. *The Qualitative Report*, 3(2) <http://www.nova.edu/ssss/QR/QR3-2/tellis1.html> (Accessed on 2007/06/06).
- Tomlinson, C.A. & Doughty, K. 2005. Reach them to teach them. *ASCD Educational Leadership*. 62(7): 8-15.
- Tomlinson, C.A. & McTighe, J. 2006. *Integrating differentiated instruction and understanding by design*. Alexandria: ASCD.
- Trochim, W. & Donnelly, (3<sup>rd</sup> ed) J. 2007. *The research methods knowledge base*, 3<sup>rd</sup> edition. Cincinnati: Atomic Dog.
- Tucker, P.D. & Stronge, J.H. 2005. *Linking teacher evaluation and student learning*. Alexandria: ASCD.
- Tulloch, S. (Ed.). 1997. *The Oxford Dictionary and Thesaurus*. Oxford: Oxford University Press.
- Van den Berg, G. 2004. Die geleentede wat uitkomsgebaseerde taalhandboeke bied vir die ontwikkeling van leerders se meervoudige intelligensies. Unpublished DEd thesis. Pretoria: Unisa.
- Van der Horst, H. & McDonald, R. 1997. *Outcomes-based education: Theory and practice*. Pretoria: Kagiso.

Van der Horst, H. & McDonald, R. 2003. *Outcomes-based education: Theory and practice*. 4<sup>th</sup> revised edition. Pretoria: TeeVee Printers.

Wallis, C. 2004. Secrets of the teen brain. *Time Magazine*. 163(23): 46-53.

Wickham, S., Bailey, T. & Cooper, D. 2000. *The educator as researcher. Guidelines for district coordinators*. Cape Town: Research and Academic Development.

Wilson, L.O. 2002. What's the big attraction? Why teachers are drawn to using Multiple Intelligence theory in their classrooms. *New Horizons for Learning: Multiple Intelligences*. <http://www.newhorizons.org/strategies/mi/wilson1.htm> (Accessed on 2004/12/14).

Wise, D. & Lovatt, M. 2001. *Creating an accelerated learning school*. Alexandria: Network Educational Press.

World Bank. s.d. Curricula, examinations, and assessment in secondary education in Sub-Saharan Africa. World Bank Working Paper, No. 128. Africa Human Development Series. <http://siteresources.worldbank.org/INTAFRREGTOPSEIA/Resources/No.5Curricula.pdf> (Accessed on 2008/03/01).

#### **Sources consulted:**

Allen, R. 2004. Counsellors help students prepare for the future. *ASCD Education Update*, 46(8): 2-3.

Beaulieu, D. 2001. *Impact techniques in the classroom*. Bethel: Crown House.

Bragdon, A.D. & Fellows, L. 1978. *Exercises for the whole brain*. New York: Allen D. Bragdon Publishers.

Call, N. 2003. *The thinking child: brain-based learning for the foundation stage*. Cornwall: MPG Books.

Campbell, B. 1990. The research results of a multiple intelligences classroom. *New Horizons for Learning: Multiple Intelligences*. <http://www.newhorizons.org/strategies/mi/campbell.htm> (Accessed on 2005/04/10).

Campbell, L. & Campbell, B. 1999. *Multiple intelligences and student achievement: success stories from six schools*. Alexandria: VA: ASCD.

Danielson, C. 2002. *Enhancing student achievement: a framework for school improvement*. Alexandria: VA: ASCD.

- De Wet, W. 1989. *The optimization of intelligence actualisation by using Audiblox*. Master's Thesis: University of Pretoria.
- Faculty of the New City School. 1999. Multiple Intelligences: celebrating teaching for success. A Practical guide. 7<sup>th</sup> Edition. St Lois, Missouri: The New City School.
- GINNES, P. 2003. *The teacher's toolkit*. Glasgow: Crown House Publishing.
- MARLAND, M. 1993. *The craft of the classroom: A survival guide*. Oxford: Heinemann.
- MATHEWS, J. 2004. 21 Years later, multiple intelligences still debated. *Washington Post*, 7 September 2004: P A09.
- NAGEL, N.G. 1995. *Learning through real-world problem solving: The power of integrative teaching*. Thousand Oaks: Corwin Press Inc.
- POTTER D. & POWELL G. 1992. *Managing a better school*. Oxford: Heinemann Educational.
- POWELL, R. 1990. *Resources for flexible learning*. Stafford: Network Educational Press.
- ROGERS, B. 2006. *Classroom behaviour. A practical guide to effective teaching, behaviour management and colleague support*. London: Paul Chapman.
- SPRENGER, M. 1999. *Learning and memory: The brain in action*. Alexandria: VA: ASCD.
- STERNBERG, R.J. 1997. *Metaphors of mind: Conceptions of the nature of intelligence*. Cambridge: Cambridge University Press.
- STERNBERG, R.J. & GRIGORENKO, E.L. (eds). 1996. *Intelligence, heredity and environment*. New York: Cambridge University Press.
- WINBERG, C. 1997. *Learning how to research and evaluate*. Cape Town: Juta.
- WINBERG, C. 1999. *Learning how to mentor*. Cape Town: Juta.
- WOLFE, P. 2001. *Brain matters: translating research into classroom practice preventing early learning failure*. Alexandria, VA: ASCD.