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## The effect of classical music on painting quality, attitude and behaviour for students with severe intellectual disabilities

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**THE EFFECT OF CLASSICAL MUSIC ON PAINTING  
QUALITY, ATTITUDE AND BEHAVIOUR FOR STUDENTS  
WITH SEVERE INTELLECTUAL DISABILITIES**

**By**

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**B.A., Dip. Ed., M.Ed.**

A Thesis Submitted in Fulfillment of the Requirements for the Award of

Doctor of Philosophy

In the Faculty of Community Services, Education and Social Sciences at

Edith Cowan University.

Date of Submission: March 2006

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## ACKNOWLEDGMENTS

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## ABSTRACT

The main purpose of this study was to investigate the effectiveness of a new Pictorial and Musical Visual Arts Program for students with severe intellectual disabilities. In particular, to learn whether the addition of classical music as background helped students improve the quality of their abstract paintings, attitudes and behaviour in class.

Two measures of painting quality were created: (1) a linear measure based on Rasch measurement (seven items involving creativity, composition, colour application and colour use) and (2) a Guttman scale based on four items creativity (easiest), composition, colour application and colour use (hardest). One Guttman scale to measure attitude and behaviour was created based on four observation aspects: non-disruption to peers (easiest), not out-of-seat, not vocalising and on task, and inattention to task (hardest).

Twenty-four primary aged students with severe intellectual disabilities were taught a weekly art lesson for six consecutive weeks using the new Pictorial and Musical method, with and without a classical music background. Twenty-four regular year one and two students were separately taught art under the same conditions. Their abstract paintings were scored independently using a uniform marking system, anonymously, and the scores were used to create linear Rasch measures and non-linear Guttman scales of painting. Scores in attitude and behaviour were collected over the six weeks of the experiment for the students with severe intellectual

disabilities and used to create a Guttman scale of attitude and behaviour. The weekly measures for the six weeks were compared using a mixed between – within subjects ANOVA (General Linear Model, repeated measures). The main results for students with severe intellectual disabilities are listed.

1. Painting quality improved significantly from the Pictorial only method to the Pictorial plus Music method, due to the addition of the background classical music.
2. Painting quality improved significantly from week 1 to week 6 for both teaching methods, due to a practice effect.
3. Attitude and behaviour improved significantly from the Pictorial only to the Pictorial plus Music teaching method, due to the addition of background classical music.
4. Attitude and behaviour did not improve from week 1 to week 6 for either the Pictorial only or the Pictorial plus Music teaching method, due to a practice effect.

The main results for regular students were in agreement with findings 1 and 2 above.



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# CHAPTER ONE

## INTRODUCTION

*"Createdness is expressly created into the created being"*

*(Heidegger, 1935, p. p. 189-190.)*

### **Background to the Study**

This chapter provides an historical background on the early lack of education for students with disabilities, in Australia. It shows how government policies can affect the educational outcomes for students with special needs. It involves a summary of the effects of current programming in special education, with the emphasis on the influence of a group perspective in the Education Support School's classroom. The chapter explains the advantages of the instructional method when the emphasis is on the mastery of basic skills, and reveals that the education support teacher plays an integral part as a role model in the guidance, care and teaching of students with special needs. It was found that there was little published research on the topic of this research study, *'The Effect of Classical Music on Painting Quality, Attitude and Behaviour for Students with Severe Intellectual Disabilities'*, in Australia.

## Early Education in Australia

In 1862, a Common Schools system was established by an act of Parliament, which formed a Board of Education. Previously to 1862 there were only two types of schools. The first being the national school that was operated by the state and the second was run by the church, either Catholic or the Church of England (Grundy, 1972).

In every district in which a Government School is permanently established, a Local Committee is nominated by His Excellency the Governor. This is for the purpose of superintending the affairs of the school in accordance with instructions from the General Board.

(Board of Education Rules, 1862, cited in Grundy, 1972, p. 4)

In 1872, the Victorian Parliament passed an Education Act that had an effect on schools throughout Australia. The Act made a division in the Australian Education system that created three distinct types of schools for Catholic, Protestant and the State. Through the passing of the Act, power was given to the state over education for all, but also left parents the right to choose private education for their children and to reject state education. The Act did more than just require children to receive compulsory education; it restored to the government of the day the authority that had been traditionally left to the authority of the church. Although many disputes followed the Education Act, these were mainly based on the lack of provision for funding for the church schools (Grundy, 1972).

Table 1.1

Average School Attendance

---

<u>Students enrolled</u>	<u>Average attendance</u>
N.S.W.      1 in 6	1 in 12
Vic.          1 in 4	1 in 11
U.S.A.        1 in 4	1 in 7
Gt. Britain   1 in 12	1 in 16

---

Survey of average school attendance, 1873. Turney, 1969, p. 173.

### **Early Visual Arts Education in Australia**

According to Ryan and Malone (1996), the beginning of visual arts education began in Australia as early as 1872 in New South Wales. It provided an addition to the common school pedagogy and was based on the origins of English drawing, together with reading, writing and arithmetic, which formed the basis of the curriculum at this time.

The fast development of the new colony and the need for schools (see Table 1.1) which was partly due to the effects of the industrial era, made it necessary to read and write, specifically to read instructions and keep records. The reason for the early emphasis on drawing was two-fold.

Officials considered that drawing skills were an important extra addition to the school curriculum, to enable the future development of plans and building designs. Children could also observe and depict the country in which they lived, note the seasonal changes, rural lifestyle, and the landscape peculiar to their country.

In Australia, during the early part of the twentieth century, visual arts education programs were based on the British model and, as well as drawing and painting, the visual arts curriculum in the regular school started to include craft subjects. A more expansive outlook was developing towards visual arts study, where it was becoming a form of expressive art for its own sake. This followed the trend in England where child art became an important feature of art study, and schools were encouraged to incorporate painting as well as drawing into their art programs (Efland, 1990). For the first time, child art was essentially regarded as visual art. Children's visual art was executed by true artists and not regarded as just a child's primitive artwork of no intrinsic value. According to Efland, (1990) it was largely due to the strenuous efforts of Frans Cizek (1865 - 1946), (born in Austria) that this rather sudden discovery of the arrival of "child art" was considered as a valuable addition to art study in Europe and the United Kingdom.

There were three factors that contributed to the recognition of children's art, current studies in psychology, the growing interest in primitive art, and a general appreciation in modern art. These three developments gave advocates of early child art education a basis for arguing their cause. Cizek put great emphasis on the use of colour in children's art, as he believed that the colours should be used separately, relying on red, yellow and blue as a preferred palette. Cizek's importance to "child art" education is due to the fact that he was the first art educator to recognise the decorative rhythmic art, which comes naturally to children (Efland, 1990).

Victor Lowenfeld (1903 – 1960) was also an important influence on early child art. Lowenfeld, a student of Cizek, and, although critical of Cizek's aesthetic ideals about child art, believed in free expression as necessary to the healthy growth and development of the child. He also saw art as an important part of the education of the child. Lowenfeld believed that teachers with a minimal understanding of art could teach it to students if they learnt to motivate children and had realistic expectations of what the child was able to accomplish (Michael, 1982).

A UNESCO Art Seminar was held in Melbourne in 1954 and set some important guidelines for art education in Australia (Smith, 1958). The discussions were divided into four separate sections: Art Education and the Child, Art and Secondary Schooling, Art in Adult Education, and Art and the Training of Teachers. A number of resolutions pertaining to these fields were decided at the Art Seminar and the following edict was unanimous from all who attended the Seminar:

Art education should be based on creativeness; skills should develop in relation to the needs of expression. It is agreed that art education should develop taste. The purpose of art education is to assist the learner to grow intellectually, emotionally and socially.

(Smith, B. 1958, P.86).

Apart from taking a strong stand on the positive future for visual art education in Australia, the Art Seminar recommended that all primary schools should have an art syllabus that emphasized the creative aspect of art education and should present a challenge to a student's inventiveness. The art syllabus should be able to develop the student's appreciation of art and the materials used in its formation. The Seminar also expressed the opinion that indigenous art should be discouraged from being influenced by western



culture and indigenous artists should be encouraged to preserve their own culture.

Although visual arts education had been taught in colony schools in various Australian states since before Federation (1901), the early Government schools made no provisions for students with intellectual disabilities. According to Ryan and Malone (1996), it was unfortunate that, at the time, governments and society adopted this attitude in general. Although, at this time, some form of visual arts education, such as drawing was included in the curriculum by a few special schools. These schools were being established for the private education of students with intellectual disabilities by charitable institutions and religious establishments. Because the schools were largely reliant on charity, funding was an important issue for them. The amount of resources that could be provided in the visual arts area, and the type of visual art programs that could be provided for these children, depended directly on the amount of funding available year-by-year (Ashman & Elkins, 1994).

### **Early Australian Attitudes to Special Education**

After the landing of the First Fleet in 1788 at Botany Bay in Australia, the new colony was largely used as a jail for convicts being transported from England. The first schools provided by the Catholic Church around 1804-5 received no support from the military government and eventually had to be closed. Successive Governors showed some interest in starting charity schools. By 1820 the Church of England, under the auspice of Earl Henry Bathurst, who was in charge of the London Colonial Office, suggested that the establishment of Church schools would facilitate the students in their adoption of principles of the established Church of England. The British

government believed that the churches should be responsible for the education of any children whose parents were willing to send them to school (Ryan & Malone, 1996).

By 1870, a large number of elementary schools (Years one to eight) had been established by the Catholic Church and the Church of England, together with schools set up by the colonial governments. In 1872 in Victoria, the government passed the first free and compulsory Secular Education Act in an Australian colony, whereby all Victorian children had to attend school. In the schools drawing was also becoming an important part of the curriculum content that also included reading, writing and arithmetic. Unfortunately, these early government schools did not make adequate provision for students with special needs (Ryan & Malone, 1996).

Early Australian attitudes to education for students with special needs were similar to those in America and England. Children who were unable to be cared for in the home were relegated to the care of hospitals for the insane, or similar institutions where any education that was available to them was in the form of 'training'. In 1895, a private school for students with special needs was set up in Melbourne, and was formally recognised by the Victorian State Educational Authority. This school was able to provide a revised curriculum for students with special needs (Judge, 1987).

In 1910, a special class for *defective* children began in Perth, Western Australia with just 9 students. This small number quickly advanced to 19 students. Clay modeling, drawing and painting and an amount of guided physical activity, which included breathing and speech exercises, formed the curriculum. A boarding school was also started in order to give these children constant and expert supervision (Rankin, 1926).

In the first part of the twentieth century, the churches did provide some support within their schools and orphanages for children with special needs. The Salvation Army also provided an institution for *backward* boys and orphaned infants. Also the Catholic Church took those in need of care and attention, although it was not until the end of World War II (1945) that economic and social changes forced the Federal Government in Australia to extend educational funding to independent schools. This educational funding advantage allowed for the allocation of some old school buildings, from 1950 to 1965, for the education of students with intellectual disabilities (Casey, 1995). Also, a few new schools were being built according to the label of 'disability', such as schools for the 'deaf', and the 'blind'. In Australia today there are a number of schools and units for deaf and blind children, situated in capital cities, although where possible, these students are now included in mainstream education. There is still a need for specialised teaching of those students who require small group tuition and one-on-one instruction in order for them to gain basic communication skills and to reach their educational potential (Casey, 1995).

### **Special Education in Western Australia**

In 1973, a movement towards the inclusion of students with intellectual disabilities into the mainstream was promulgated by the Whitlam Labor government (Karmel Report, 1973). This report stressed equality of opportunity for all Australian children. Some of the advantages envisaged for students with intellectual disabilities were that they would benefit from social relationships with non-disabled children and that students with disabilities would also be able to take part in role play, shaping, rehearsing and group tuition. It was stated that these strategies were successful for

developing and improving the social skills of the students with disabilities (Carter & Sugai, 1988).

In Western Australia, the Beasley Report (1984) supported many of the earlier changes put forward in the Karmel Report (1973) covering children with disabilities. The inclusion of students with intellectual disabilities into the mainstream was recommended in the later report. The Beasley Report (1984) included the proviso that mainstream school resources be adapted to the needs of students with learning difficulties. This report also recommended that students with severe handicaps be schooled in special units, either on the regular school site, or in a special unit within the school building.

In today's mainstream classrooms it is important for all children to be able to gain as much information as possible, while minimising any disruptions. When this environment is disrupted by students with severe behavioural disabilities, special classes are provided to cater for their specific needs. In these classes the main goal is the personal welfare of the students and the administration of the most effective treatment procedures available.

(Alberto & Troutman 1995, p. 48)

The Western Australian Government (2005) has now provided some Education Support schools within the Perth metropolitan area for students with severe intellectual disabilities. There are a number of special units that are built on regular school sites and within school buildings for students with mild intellectual disabilities (The Education Department of Western Australia, 1993, 1999, 2001). These educational facilities helped to fulfill the premise that students with intellectual disabilities should have recourse to as normal an education as is possible. (De Lemos, 1994; Harvey, 1992; Schultz, 1992; The Department of Employment, Education and Training, 1990; The Education Department of Western Australia, 1993, 1999, 2001).

Visual art education is an important outlet for self-expression, as it can give the student with special needs some means of experiencing success. Even if the child's painting lacks a sense of formal balance, the composition deemed poor, or the use of colour is monotonous, just by the act of manipulating the brush to take up the paint and move it across the paper the child has achieved a successful outcome in self-development. The main purpose in seeking to provide stimulating visual art programs for these special children is not in trying to produce masterpieces of art, but in endeavoring to motivate the children to want to paint, and to receive some enjoyment from a learning experience at the same time. Painting can also help develop children's motor development. It can also be an outlet for self-expression, through just learning how to use the materials that are available to them, and it can be a valuable tool for these children in learning how to coordinate their hand and eye movement (Alkema, 1971).

### **Arts Outcomes of the Western Australian Curriculum Council (1998)**

The Curriculum Council of Western Australia certifies educational achievement for primary and secondary school students attending both government and independent schools. The Council approved a Curriculum Framework document in 1998 that gives direction to the teaching programs. The Arts involves Media, Music, Drama, Dance and Visual Arts and some relevant aspects are set out below.

## The Arts Learning Outcomes

### 1. Arts Ideas

Students are encouraged to advance their art experiences. Although their knowledge of life may be relatively small, their art works can be full of innovation and energy. Students should be encouraged to improvise and take on a number of different art processes.

### 2. Arts Skills and Processes

Students should be encouraged to explore new technologies like multi-media. They also need to explore the use of a wide range of art forms and styles. In this way they can decide on what forms their original art ideas can be used to their highest potential.

### 3. Arts Responses

Students must be given broader frames of reference in order to make considered opinions about their own and others art works. In this way, they will be able to advance a clear, concise and accurate knowledge and evaluation of the arts.

### 4. Arts in Society

Through their participation in arts programs in their schools, the students will come to a greater understanding of the arts. Students will learn how the arts can be seen through many different cultures. Aboriginal art and the art of other countries give students a wider knowledge upon which they can begin to formulate their own artwork.

## **Students with Disabilities**

The definition of *student disability* in the Western Australian Government school system was originally based on “autism, intellectual, physical and sensory disabilities”. The Education Department of Western Australia (2001, p.43) added to these definitions to include “cognitive, neurological and psychiatric disorders”. In their 2001 review of educational services for students with disabilities in government schools, the Western Australian Department of Education (2001, p. 16) set out seven principles in order to expedite services to students with these intellectual disabilities.

The first principle concerns access and participation for all students: “Students with disabilities have the right to enroll and participate on the same basis as other students.”

The second principle is supportive of inclusive schools: “Inclusive schools will be supported by the development of educational leadership and teaching that recognises diversity and ensures full acceptance and participation of all students.”

The third principle ensures local decisions and adjustments being made for the students: “A range of effective and appropriate adjustments is provided to ensure access, participation and achievement”.

The fourth principle is concerned with implementing a new framework for resource allocation: “Adjustments are provided on a needs basis and are equitably resourced”.

The fifth principle advocates matching pedagogy with the student needs: “The system supports the development of pedagogy to meet individual student needs”.

The sixth principle concerns the delivering of responsive services: “The range of coordinated services provided is flexible and delivered according to student needs”

The seventh, and final principle in the report is about collaborating for better outcomes for students with disabilities: “Services are provided and supported by collaborative models and partnerships.”

Western Australian department of Education 2001, p.16.

### Programming for Special Education Students

In consideration of the educational changes beginning to take place in Western Australia by the mid-1900s, programs for all students were being re-evaluated. This evaluation included visual arts programs for special education students that, until this time, were largely left to the discretion of the teacher, and more often than not, were based on the student’s disability. It was now believed that it may even be possible for educators to develop suitable programs that could be taught to regular students and students with disabilities, and include similar content (Cannon, Idol, & West, 1992).

The Curriculum Council of Western Australia (1998, p.64) states that all students need programs that challenges them to improve. They have indicated that teachers need to “identify students’ current understanding”, and endeavor to build programs that will “cater for students’ needs and styles of learning”. There is a slightly more flexible attitude towards ‘The Arts’ learning area in the outcomes for students with severe intellectual disabilities. This attitude puts the full responsibility on the special education art teacher for each student; the teachers then have an obligation to provide their students with a stimulating activity at each lesson. Within special education, the role of music in ‘The Arts’ learning area is sometimes



provided as a form of therapy for students with intellectual disabilities. Programs are often planned around the idea of producing a mood calming effect in an attempt to reduce inappropriate behaviour in the classroom. However, the goals of the music program can also seek to increase self-esteem in the student and encourage self-expression through improvised music, singing, listening to music and through combined music and movement.

The Curriculum Council (1998, p.64) in their curriculum framework outcomes for the arts, stated:

Inclusivity and difference:

Learning experiences should respect and accommodate differences between learners.

Teachers planning arts programs need to ensure that the range of activities takes into account the diversity of Australia's population and students' pre-dispositions about the arts: for example, some bring with them a pre-disposition, which is part of their culture to using stories or symbols to metaphorically represent their experiences.

Students with disabilities should be provided with appropriate alternative ways of demonstrating the outcomes of arts programs: for example, they may need computers with appropriate software, raised-line drawing kits or communication aids.

Some students have preferred learning styles and ways of constructing knowledge, such as using visual language, emotional dimensions or physical enactment, rather than narrative or logical methods. Learning and teaching programs need to identify students'

current understandings, personal strengths, interests and preferred learning styles (The Curriculum Council 1998, p. 64).

The Australian Government (DEET, 1994), The Education Department of Western Australia (1991,1993, 1994, 1999, 2001), and The Curriculum Council of Western Australia (1998) support the policy of a “fair go for all students”, including those with disabilities, in order to give all students the best chance to achieve their full potential. The Western Australian Education Department (2001), in their review of educational services for children with disabilities, has reinforced the objectives of the School Education Act (1999). This act stressed the importance of the right of every child to receive an educational program that is appropriate to their needs (Riddoch & Waugh, 2003).

There appears to be very little scientific research in Australia on experiments to test the worth of combined visual arts and music programs for students with severe intellectual disabilities. Although there has been some research conducted on music therapy for students with intellectual disabilities by Daveson and Edwards (1998) and Duffy & Fuller (2000), who point out that some students with severe intellectual disabilities can benefit by the use of music in their educational programs. This benefit to the students can be in their on task behaviour, the development of auditory skills, in the ability to follow directions, and also in enhancing attention. Daveson and Edwards (1998) also believed that through the use of well thought out musical programs, special education students could gain participation skills that may help them to improve their relationships with their peers.

Barry and King (1999) have noted, in a subjective opinion, that educational programs for students with intellectual disabilities can be

enhanced by the use of calming background music. In this way, it is possible for the teacher to create a sense of tone in the classroom by introducing classical music together with visual arts to the students at an early age. They believe that this development of 'tone' in the classroom should be high on the teachers' list of importance. This sense of 'tone' is very important when the teachers are endeavoring to establish a positive classroom environment, where the students can learn at optimum level and students are able to reach their highest potential in a safe and secure environment.

Although it is not in dispute that students with intellectual disabilities require stimulating and innovating arts education programs to reach their full potential in their expressive artwork, there is an obvious need to develop more combined visual arts and music programs for primary students with severe intellectual disabilities. There is also a need to research the outcomes of these programs for the benefit of other students and teachers involved in special education. Research has been carried out in America on integrated arts programs for students with disabilities, by such researchers as Kaskell and Lauer (1990). They developed music and visual arts programs for students with severe intellectual disabilities, by adding *mood-calming* music to the students' traditional arts program. Kaskell and Lauer (1990) carried out research on an integrated arts program that was considered to be suitable for students in the regular primary and special education school. This program used visual components and also gave students an historical analysis of works of art. It also included listening to music, whereby the students could combine listening and looking in the arts learning process.

## **Learning from a Group Perspective**

In a group of students with severe intellectual disabilities at an earlier trial of the Pictorial and Musical Program (Riddoch, 2001) showed that students with severe intellectual disabilities reacted similarly to those in the Kaskell & Lauer (1990) study, while calming and soothing classical music was being played as a background to their visual arts program. Although, in previous visual art lessons the students were subject to bursts of inappropriate behaviour, such as inattention to task, out-of-seat and peer aggression, it was evidenced, that when the classical music started, they acted in a much calmer manner than had previously been observed. The addition of background music had created awareness among the group of students that something different was happening in their environment and caused them to have the same reaction. This group reaction was supportive of the 'group effect' as explained by Durkheim (1956).

Many educators have referred to group learning as an integral part of the learning experience for students. The importance of the 'group effect' within the special and the regular classroom is of equal relevance because it affects the quality of the students' learning. The following quote from sociologist (Durkheim, 1956) reflects on the importance of the group perspective for the teacher.

A class, indeed, is a small society, and it must not be considered as if it were only a simple agglomeration of subjects independent of one another. Children in class think, feel and behave otherwise than when they are alone. There are produced, in class, phenomena of contagion, collective demoralisation, mutual over excitement, wholesome effervescence, that one must know how to discern in order to prevent or to combat some and to utilise others.

(Durkheim, 1956, p. 112).

It is an important feature of education that within each classroom setting, teachers have the task of establishing a good-group climate for their students, whatever the size of the pupil ratio may be. The establishment of this good-group climate is essential to the security of the students. Within the special education system, the establishment of a good-group climate is a first prerogative for the teacher, as is the use of small group tuition for students with severe intellectual disabilities. Small group tuition is necessary for the benefit of the teacher as well as the students, because of the number of diverse behavioural problems that the teacher may meet with during class (Kamps, Dugan, Leonard, & Daoust, 1994).

For special education teachers to overcome many of the inappropriate behavioural problems that may occur during some lessons, it is essential for teachers to generate a positive attitude, so that they can act as a role model for the students whilst providing them with innovative and stimulating educational programs. By using the small group perspective with from five to ten students, the teacher is able to give each student a fuller attention than otherwise, and with the use of some direct instruction, the teacher can lead the student step-by-step to accomplish each task. An important part of the learning experience for the students requires their teacher to have first gained each individual student's attention, because without this strategy, nothing worthwhile is accomplished. For instance, if a pictorial stimulus is being used in the lesson, each student in the group must be able to gain eye contact in order for the teacher to continue with the desired learning experience for the student, (Cole & Chan, 1990; De Ruiter & Wansart, 1982; Riddoch & Waugh, 2003).

## **Instructional Design**

The shift towards the inclusion of children with special needs into the mainstream class, has led educators in search of a more effective form of instruction for those students. Students who experience learning problems often find it difficult to function within the regular class curriculum outcomes. Educators have sought instructional programs that may be more acceptable for all students, and more empirically viable for teachers to implement when planning their instruction (Kameenui & Simmons (1990).

Carnine (1991) has advanced the idea that a number of students with intellectual disabilities are capable of higher order thinking skills. This researcher believes that because much of the curriculum includes child centered and discovery learning, all students must be able to organise and relate to new knowledge efficiently so that they can retrieve it later in their course. Carnine believes that his theory of 'sameness' will aid learning for students with disabilities in their attempt to attain both low, and higher order knowledge. In this theory, curriculum content is organised in a hierarchical way so that students can note the 'sameness' between different concepts and the material content made explicit and clear for them to understand. Carnine's theory of sameness is also supported by a number of other researchers, such as (Simmons, Baker, Fuchs, Fuchs, & Zymond, 1995).

An instructional design by Gagné, Briggs and Wager (1992) has outlined a program for the cognitive domain that is also based on a hierarchical structure. In this program students are required to learn basic discriminations, then actual concepts, rules, and defined concepts which will then lead them to higher order rules and problem solving. In this sequence, the assumption is, that for students to be able to perform higher order knowledge skills, lower order knowledge must be acquired first. This

analysis of knowledge performance underlines the instructional design strategy advanced by Kameenui and Simmons (1990), and especially concerns those who are responsible for the educational needs of students with intellectual disabilities.

The principles expressed by Kameenui and Simmons (1990) cover a wide range of instructional design problems and answers, so that teachers may be able to implement them in their special needs classroom. These principles of instruction are the foundation of their theory that, for teachers to teach effectively, they must first understand the interaction among three variables. That is, the learner, the teacher, and the content/skill, which must all eventually interact with each other during the instructional process. These three variables involve further assumptions. For the teacher, these are that teaching involves allowing the student to try a skill that the student has not attempted before, and that any problems evolving are placed in a context that the student has some control over. It also requires teaching more to students with learning disabilities in less time, and always treating the student with respect and compassion. The assumptions for the learner are that the teacher can control failure on their part, their behaviour can be altered by environment, and that wrong responses may be their best effort of intelligence. The content and skill variable is based on the assumption that all information can be taught. These principles were used in the design of the current Pictorial and Musical Visual Arts Program being advanced in this research study.

As a section of this study may concern students with a milder intellectual disability, as well as those with very severe disabilities, there are some comprehensive and curricular-based strategies that must be noted. These strategies seek the objective of enhancing cognitive development and improving behaviour in students with a mild disability. Such as teaching

projects that include a test-teach-test format, where the child is first tested on known knowledge, helped by the teacher to rectify any errors made, and then re-tested to evaluate the extent of knowledge learned. Small group tuition and as near to a one-on-one method of instruction, where the child can feel a sense of intimacy with the teacher is the most appropriate setting for this learning experience to take place. A special curriculum for children with special needs that decides for major domains detailed teaching sequences, which include cognition, communication, social skills, fine motor skills and gross motor skills. Each domain to have detailed instructions for teachers, with special emphasis on generalisation of skills that may also apply to other environmental settings outside the classroom. These skills are aimed at leading the child with special needs towards a more positive outlook, and hopefully, towards a more appropriate form of behaviour. The effectiveness of presenting stimulating cognitive learning programs to children at an early age is an important consideration. Special educators should be competent to design effective programs for their students, and students encouraged to complete their tasks with competence (Hickson, Blackman, & Reis, 1995).

When making the comparison between a process-based approach to instruction and the type of instructional design strategy advocated by Kameenui and Simmons (1990) it is essential to note that, historically, the attitude towards academic achievements for children with disabilities has gradually shifted from the medically orientated model. In this model the underlying deficiencies of the children were assessed as a first preference, before any form of treatment or education could be considered. There has been a move to the more enlightened approach of the educationally orientated model where the main assumption is that all children are capable of learning, whatever their handicap may be.



## **Purpose of the Study**

The main purpose of this study is to evaluate a new integrated Pictorial and Musical Visual Arts Program for students with severe intellectual disabilities, and to generate new knowledge in line with the research questions below. A main interest in the study is whether a classical music background improves abstract painting quality, and attitude and behaviour for students with severe intellectual disabilities. Although music therapy is widely used (Daveson & Edwards 1998), there is a lack of strong empirical evidence to support the view that a musical background actually helps improve painting quality, and attitude and behaviour in students with severe intellectual disabilities (see background and the literature review).

## **Research Questions**

1. Can a linear scale of abstract painting quality, based on colour and composition, be created using a Rasch computer program?
2. Can a Guttman scale of attitude and behaviour, based on aggression/docility, vocalising/quietness, and out-of-seat/sitting quietly, be created for students with severe intellectual disabilities?
3. Does a Pictorial and Musical Visual Arts Program improve the quality of artwork for students with severe intellectual disabilities, when compared with the Pictorial Program without music?
4. Does a Pictorial and Musical Visual Arts Program improve the quality of artwork of students with severe intellectual disabilities when compared with regular year one and two students?

5. Does a Pictorial and Musical Visual Arts Program improve the behaviour of students with severe intellectual disabilities when compared with a Pictorial Program without music?
6. Do the special education teachers involved in the experiment consider that the Pictorial and Musical Visual Arts Program improves the quality of artwork and the behaviour of students with severe intellectual disabilities?
7. Does the primary teacher of regular students involved in the experiment consider that the Pictorial and Musical Visual Arts Program improves the artwork of the regular students?

### **Significance of the Study**

There are three potentially important discoveries to be made in this study. One is to evaluate the worth of a new Pictorial and Musical Visual Arts Program for visual art to determine if it improves abstract painting quality for students with severe intellectual disabilities. In particular, the study could provide an answer as to whether the addition of classical music (Mozart) as background, helps students with severe intellectual disabilities improve the quality of their abstract paintings compared to not having classical music. Two, is to create a linear scale of abstract painting quality, and three is to create a linear scale of their behaviour for the students with severe intellectual disabilities when they are involved in their artwork.

The author of the current research study has recently trialed a similar Pictorial and Musical Program in both an Education Support School and a regular school, using a pictorial addition (a print of a great artist) and two musical interventions. The trial of the program had a successful outcome,

especially with the addition of calming and soothing classical music in the background (see Riddoch & Waugh, 2003).

A similar and improved visual arts program has now been trialed over a longer period (six weeks), with the introduction of different abstract prints and various classical music tapes, to the participating students. The study will test the effects of the program for students with severe intellectual disabilities. In particular, it will test for the student's ability to gain focus, understand the use of colour in creating an abstract painting, and improve the quality of their artwork. The program will help in gaining further understanding of the effect of a calming and soothing classical musical background on the behavioural outcomes for students with intellectual disabilities.

An important advance in this study is the creation of a linear scale of painting quality using a Rasch computer program. There are no studies where linear scales of abstract painting quality are created. It is important to have linear scales in painting, just as there are linear scales of weights and measures. Also, a linear scale of the attitudes and behaviour for students with severe disabilities based on aggression and docility, vocalising and quietness, out-of-seat and sitting quietly, will be created. Again it is important to have linear scales where none previously existed. With linear scales, it will be possible to increase the sensitivity in finding a positive result from the experiment. These linear scales may also help future researchers by providing good measures for them to use in their own work. Previous scales use judge's scores, or the sum of item scores, as the measure of painting quality or the measure of a student's attitude and behaviour. These scales are, at the best, just a ranking measure.

## **The New Pictorial and Musical Program**

This visual arts program, originally designed by the researcher for students with severe intellectual disabilities (but can be equally effective with regular students), is in two sections. In the first section, a pictorial stimulus is introduced to the students, who are asked to focus on a reproduction of a great artist such as Kandinsky's, 'The Park, Impression V, 1911 (see Appendix II). The teacher gives the students a very short biography of the artist, which includes the name of the artist and the painting. The teacher also explains some important points about the work to the students, such as the abstract composition, simple spatial concepts, the use of wide brushstrokes and the bright colours that the artist uses in the painting. The teacher also indicates some of these colours that the students will be using in their own painting. For the students with severe intellectual disabilities, the main aim at this stage is to hold the print close to the student's eyes so that the student can gain focus and concentrate on the print and its characteristics. The teacher then asks the students to create a painting, allowing them 15 minutes to finish the task. All the students will not work at the same pace, some will require the entire time to complete one painting, whilst others will do more than one painting in the required time. Only the first painting from each student will be set aside for the experiment. This procedure applies to both students with severe intellectual disabilities and those in the regular class.

In the second section of the program, the teacher introduces the sound of softly played classical music into the classroom. The students will then have another chance to view the artist's print up close, and be able to focus again on the main characteristics in the painting. The students will then produce another painting for their teacher, allowing a further 15 minutes for completion. The same rules apply as for the first section of the program, and

only the first painting from each student is taken for the experiment. Each student is required to produce two paintings per lesson for the experiment, even if the students wish to continue painting for the rest of the lesson. During this section of the program, the students receive both the pictorial and musical stimulus. The limit on painting time is because the Education Support School lessons are usually only 45 minutes in duration. To allow enough time for students with severe intellectual disabilities to gain full focus on the prints, teachers must be aware that the program has to be structured to fit the lesson time.

All the prints used in the program are to aid in the students' ability to gain a sense of colour coordination in their painting. As soon as the teacher is convinced that the students have gained focus on the prints, they are removed from sight. This strategy prevents any pre-disposure for the students to copy, and leaves each student to create his or her own colourful abstract painting.

### Wassily Kandinsky

The main artist's prints used in this experiment are those of Wassily Kandinsky. The reasons for using the paintings of this artist are his vibrant use of colour, especially red, blue and yellow, and his strong brushwork in the formation of abstract markings in the works. These works make it easier for students with intellectual disabilities to note the colours and to relate them to the colours that they have in their own palette. They can also follow the form that the painting takes, when the teacher points to the brush marks made in the print.

Kandinsky, who was born in Moscow in 1886, graduated from Moscow University in 1892, with a degree in law. After writing his doctoral thesis on "The Legality of Labourers' Wages", he became disinterested in

following a career in law and in 1897 began his studies at a private art school. At the beginning of his career Kandinsky was influenced by the *Fauves* who were a group of artists in the late nineteenth century whose works were characterised by their vibrant use of colour and strong brush - work. From 1904 Kandinsky traveled extensively and exhibited his works in Holland, Berlin, Onslow and Paris. He eventually left Moscow to settle in Paris, returning in 1918 when he was appointed director of the Museum of Political Culture. This venture lasted only four years, when he decided to settle in Berlin, and gained German citizenship (Becks-Malorny, 2003).

During his lifetime (1886 - 1944), Kandinsky taught art and was a prolific painter. He became a prominent member of the *Bauhaus* group of artists, and although there were other abstract artists in the early twentieth century, Kandinsky was truly the founder of abstract painting. He experimented with the dissolution of the object and the promotion of colour and form, and he was the most successful and persistent artist in this sphere (Becks-Malorny, 2003).

Form in the narrow sense is the boundary between one surface and another. Painting stands, in fact, at the first stage of the road by which it will, according to its own possibilities, grow in the abstract sense and arrive finally at painterly composition. For this ideal of composition, painting has two means at its disposal.

1.Colour. 2. Form

Form can stand alone as a representation of an object (real or not), or as an abstract limit to a space or surface.

(Kandinsky, 1912, p.46)

Apart from colour and form, music as an adjunct to art lifted Kandinsky to observe the “sounds” of music in colour. He attempted in his painting to establish a “theory of harmony of painting”. Kandinsky preferred to paint whilst listening to classical music because he believed that the source

of his art came from a “spiritual” inner voice created by music (Kandinsky, 1912).

### Visual Art programming for special education

Within the Education Support School, visual art is an important part of the curriculum. Students take part in various art activities, including abstract painting. It is the latter activity that concerns this study, and also to make the students’ activity more interesting and stimulating for them than just putting some paint on paper, (much of which is often done by the teacher). The Pictorial and Musical Visual Arts Program will help the students to gain focus and become more independent. The calming classical music introduced into the classroom will aid in the students’ ability to concentrate. Although the music chosen for the program has been carefully selected by the researcher to ensure its suitability, it is not necessarily linked to the painter of the print being viewed by the students.

In the Education Support School, the usual visual art class in painting for students with severe intellectual disabilities includes art paper, primary poster colours brushes and water. The students in their traditional art painting class begin their painting immediately. They can paint one painting or ten paintings during the lesson time. The teacher is mainly concerned with the student’s ability to manage the brush and keep the colours from mixing too much. This strategy requires the teacher getting involved in the student’s painting, and consequently, the painting can often be more the work of the teacher than the student.

Therefore, there are four main differences between the Pictorial and Musical Visual Arts Program and the students’ usual art lesson. One difference is that students with severe intellectual disabilities will be able to gain focus on a print of a great artist before beginning their painting, and that

this strategy will improve their concentration on the painting. Two, the painting time is restricted to 15 minutes for each painting. Three, the students will have the addition of calming and soothing classical music played in the background before beginning their second painting. Four, the artwork produced by the students will be their original work.

### **Teacher Interviews**

The teachers of the severely intellectually disabled students from the Education Support schools taking part in this research study will be required to complete a questionnaire at the beginning of the study. This questionnaire is concerned with their attitudes to the program and their expectations for their students. Later, the teachers' opinions on the success, or otherwise, of the Pictorial and Musical Visual Arts Program and the effects that it has had on the quality of the students' artwork, will be noted. The special education teachers will also note any effects that the program may have on their students' attitudes and behaviour. The results from this section are presented and discussed in chapter eleven and Appendix I.

No interviews with the regular teachers, who are involved in the benchmark paintings, will be required by the researcher, except for the initial discussion of the lesson plan before commencement of the program.

### **Definition of Terms**

**Abstract Painting Quality:** It is acknowledged and understood that, among artists, there are strong divergent views about what painting quality means. In the present study a narrow view of quality was taken for abstract



paintings in order to obtain a 'clean' measure of painting quality that gives a reliable scale, according to good measurement principles, so that valid inferences can be made. Thus, for the present study, abstract painting quality was based on four judging aspects (items). Composition (easiest), creativity, colour application and colour use (hardest). Judges scores on these four items were arranged in order of difficulty, so that the item judging scores by total scores form a Guttman pattern. This gave a clear, unique relationship between total scores and item difficulties, as required for good measurement (explained in later chapters in more detail).

**Attitude and Behaviour:** Similarly, there are strong and divergent views about the appropriate attitude and behaviour that constitutes the outcomes from a visual art class for students with severe intellectual disabilities. A narrow view was taken to obtain a 'clean' measure of attitude and behaviour in the visual art classroom. Four judging aspects (items) were used. No disruption to peers (easiest), not out-of-seat, not vocalising softly and on task and not inattentive to task (hardest). Judges scores on these four items were arranged in order of difficulty so that item scores by total scores formed a Guttman pattern. This gave a clear unique relationship between total scores and item difficulties for attitude and behaviour, as required for good measurement (explained in later chapters in more detail).

**Autism:** Autistic Spectrum Disorder is an intellectual disorder characterized by a severe inability to relate to other people. Students diagnosed with Autism often find it difficult to imitate peer models (Matson, Smioldo, & Hastings 1998).

**Asperger Syndrome:** A form of high functioning autism (Jones, 2002).

**Fauvism:** A late nineteenth century art movement in painting characterised by vibrant colour and bold brush work (Gardner, 1980).

**Guttman Scale:** An ordered scale of items in which the total scores represent a unique pattern of responses. If one knows the total score, one knows the ordered pattern of responses (Guttman, 1944, 1950).

**Mental Retardation/Mentally Handicapped:** Many researchers and educators in America and England describe students who have sub-normal intelligence in these terms. For the benefit of this thesis the researcher will use the term students with severe intellectual disabilities.

**Music of Mozart and Debussy:** The music of Debussy (“Claire de Lune”) was used as the second stimulus for the first two weeks of the Pictorial and Musical Visual Arts Program in order to get the students with severe intellectual disabilities accustomed to having classical music played in the classroom. The more strident and attention – gaining music of Mozart’s “Concerto for Violins” and “Sonata for Two Pianos” were used as the second stimulus during the next four lessons of the program.

**Prints of Kandinsky:** The three reproductions of Kandinsky’s works used in the present study are “The Park”, Impression V. 1911. “Murnau with Church”1910. “Mountain” 1908. In technical modern art terms, these are reproductions of Kandinsky’s original work, but they are called prints in common usage when purchased at art shops. Consequently, the term print is used throughout this study, in preference to reproduction.

**Rasch Computer Program:** This program is used to create a linear scale of painting quality by calibrating quality measures and item difficulties on the same linear scale in units called logits (Andrich, Sheridan, & Luo, 2003, Rasch, 1960/1992).

**Severely and Mildly Disabled:** Severely disabled describes students with a much lower IQ than students with a mild disability i.e., mild disability IQs are from 50 – 70, severe intellectual disability IQs are from 24 – 34.

**Students with Special Needs:** Applies to students with physical disabilities and those students who are intellectually and physically disabled, both mildly and severely.

**Students with Severe Intellectual Disabilities:** This term applies directly to the majority of students participating in the current research study. They are enrolled at Education Support schools in Perth and have IQs, on average, from 24-34.

**The Arts:** This term is used by the Curriculum Council of Western Australia, it refers to the collective use of five arts areas, namely, dance, drama, media, music and the visual arts. The present study is in the area of visual arts, non-objective visual art paintings by students with severe intellectual disabilities.

**The Bauhaus:** A group of artists in Germany in the early twentieth century. The artist Wassily Kandinsky was a prominent member of the group.

## **Structure of the Thesis**

Chapter two is a literature review. This chapter includes general literature on the historical implications of the early treatment of children with intellectual disabilities in Europe, England and America. The implications of government policy for students with intellectual disabilities in Australia are recorded. An account of general arts education pertaining to the instruction of students with intellectual disabilities, with the emphasis on programming and behavioural management relevant to the current research study is included in this chapter, which concludes with a short summary of the chapter.

Chapter three explains the theoretical framework. It describes the theoretical model upon which, the Pictorial and Musical Visual Arts Program is structured, and contains a plan of the proposed program, and the expectations for its implementation in the classroom.

Chapter four explains the measurements pertaining to the study. It contains an explanation of the use of the Rasch Uni-dimensional Measurement Model (RUMM) computer program and the creation of a linear measure. It also explains the creation of Guttman scales for use in measuring painting quality, and attitude and behaviour.

In chapter five, the study design and the administrative procedures that were implemented in the six weeks experiment for the collection of the data are explained. The researcher collected approximately 576 paintings from the participants in the study, and the procedures used in marking these paintings are explained, as well as the controls to ensure uniformity. The data analysis procedures are explained here.

Chapter six presents the data analysis (part one) pertaining to the linear benchmark measures. That is, the chapter explains the computation of linear measures of painting quality for the 200 regular students taught by the Pictorial and Musical Visual Arts Program, and used as the scale for the measures of painting quality for students with severe intellectual disabilities in chapter seven.

Chapter seven continues with the data analysis (part two) and is concerned with the analysis of the abstract painting scores of the students with severe intellectual disabilities ( $N = 24$ ) when instructed by the Pictorial and Musical Visual Arts Program. The chapter provides an explanation of the use of linear measures and a t-test analysis of the painting measures over the six-week experiment to test for significant differences.

Chapter eight gives an account of the data analysis (part three) of the abstract painting scores for students with severe intellectual disabilities ( $N = 24$ ) when using the non-linear Guttman scale of measurement. A mixed between – within subjects ANOVA (General Linear Model with repeated measures) using SPSS was used to investigate the effect of the Pictorial and Musical Visual Arts Program on painting quality over six weeks.

Chapter nine continues with the data analysis (part four). The attitude and behaviour of the students with severe intellectual disabilities were analysed over the six weeks experiment. A mixed between – within subjects ANOVA (General Linear Model with repeated measures) using SPSS was used to investigate the effect of the Pictorial and Musical Visual Arts Program on attitude and behaviour.

Chapter ten was concerned with the data analysis (part five) of painting quality for 24 regular primary students taught under the same controls and methods as for the students with severe intellectual disabilities.

Non- linear Guttman scales of measurement were created for both groups, and tested for significant differences using ANOVA.

Chapter eleven concludes the account of the research study by answering the research questions, discussing the findings of the study in relation to the literature (chapter two) and the theory behind the study (chapter three). The implications for Education Support schools, school units, administrators, the special education teachers and for students with severe intellectual disabilities and the regular students, are discussed.

## CHAPTER TWO

### LITERATURE REVIEW

*"I do not want art for a few, any more than education for a few, or freedom for a few."*

(William Morris, (1834-1896), p. 35)

#### Introduction

The literature review begins with an account of the historical implications involving the treatment and education of individuals with intellectual disabilities. It includes relevant information on visual arts and music education and the importance of innovative programming for students with intellectual disabilities in America, England, Europe and Australia, as it applies in special education from 1975 - 2005.

#### Historical Background

The historical implications for children with intellectual disabilities were relevant to the current study, because they showed the gradual change in societies attitudes towards the care and education of these children. It gave an understanding of the reasons behind the search for some form of

educational reform, and the desire of educators to give children with intellectual disabilities a chance for a higher learning potential.

Throughout the ages, the education of children with severe intellectual disabilities had not been considered of prime importance to administrative and governing bodies or to the general populace (Kearns, 1983). It was a dismal fact that the treatment of these children had been and, to some extent still is; something of which humanity may well feel ashamed. This shame for the treatment of individuals with severe intellectual disabilities had been expressed by a number of historians and educators. They included Hickson, Blackman and Reis, (1995), Judge (1987, Scheerenberger (1983), and Trent (1994) who found that the treatment of children considered to be intellectually disabled was governed largely by the customs, policies and social attitudes of the times.

According to Scheerenberger (1983), as far back as pre-scientific times, few infants who exhibited some form of disability would have survived in an era where the survival of the fittest was an essential prerequisite for survival. In the past, civilisations such as ancient Greece and Rome showed little consideration for people who were intellectually or physically disabled. They were often subjected to ridicule, figures of amusement, or treated with extreme cruelty (Judge, 1987), and often left to fend for themselves without food or shelter.



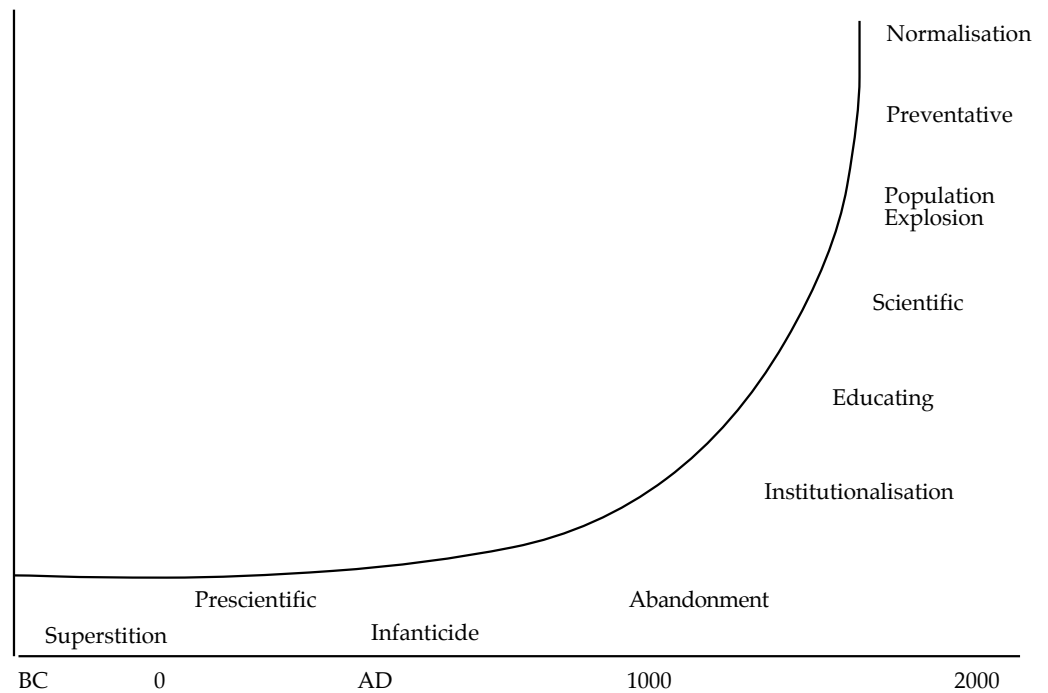


Figure 2.1 The Evolution of Attitudes and Services for *Retarded* People.  
Adapted from (Judge 1987, p. 1).

Judge (1987) categorised the historical evolution of human behaviour towards those people deemed to be intellectually disabled, and noted several relevant eras of historical significance, as shown in figure 2.1. The first era of historical importance, according to Judge (1987), before science was to have a dramatic effect on civilisation, lasting from BC 300 to approximately AD 1000, when infanticide was prevalent on sub-normal infants, and superstition was very common in communities. Then, according to Judge, another era arose when the voluntary relinquishing of children was rife, when they were thought to be sub-normal, and even normal children were left to the care of orphanages and poor houses (Judge, 1987).

Judge (1987) stated that throughout the Middle Ages till the beginning of the Renaissance, and through to the eighteenth century in Europe, there

was a time when adults and children in need of care, either mentally or physically, were incarcerated in institutions. They were subjected to restraint and solitary confinement. Although educational theories were being advanced by the late eighteenth and nineteenth century by people like Dr. Eduoard Seguin, J. L. Down and Maria Montessori and some effort was being extended to educate a few children with intellectual disabilities, not a great deal of achievement was reached.

According to Judge (1987), scientific experimentation and new medical treatments for various forms of disability were being discovered during the eighteenth and nineteenth centuries. The world's population was increasing rapidly, so by the beginning of the twentieth century owing to more favourable conditions for survival, institutions for the intellectually disabled became over-crowded and the conditions within them deteriorated (Judge, 1987). These institutions also became over-crowded because of the increasingly moralistic social attitudes of the times. There was an *out of sight out of mind* attitude in dealing with the problem of what to do with intellectually disabled people (Hickson, Blackman, & Reis, 1995).

In his study of the intellectually disabled, Judge, (1987) found that, by the end of the twentieth century, when scientific and medical technology had advanced further, the number of people with intellectual disabilities that needed to be institutionalised dropped substantially. There was slightly less antagonism towards those in the community who were considered to be intellectually disabled. Government reforms led to some acceptance in mainstream schools and special education units became available for students diagnosed as severely intellectually disabled (Judge, 1987).

Scheerenberger (1983) also pointed out that the treatment of children with intellectual disabilities in Europe varied during the Middle Ages. This

time span lasted from approximately 476 AD when Rome was conquered by invading forces, until the Renaissance period that began near the beginning of the fourteenth century. Although certain individuals extended some kindness, there was also great cruelty. According to Scheerenberger (1983), from the Middle Ages to the Renaissance, when the Church held a pivotal role in society, children who were categorised as sub-normal in intelligence were often deemed *innocents of God* by a superstitious populace. Unfortunately this accolade was rare and, although the monasteries of the day were prepared to take in many of these unfortunate children, many more were left to wither and die in destitution, or to perish by being persecuted and hunted down, and often executed for practicing witchcraft (Scheerenberger, 1983).

### **The Early Treatment of Children with Intellectual Disabilities**

According to Judge (1987), during a large part of the seventeenth century, St. Vincent de Paul (1581 - 1660) rescued many abandoned children from the streets of Paris. Although there was vigorous opposition to his cause, he was credited with the opening of the first home for abandoned children, and set a precedent by including accommodation for lepers and those suffering from insanity, including children considered to be intellectually disabled. This *institutionalisation era* began with good intentions, not only in France, but also in other parts of Europe in the seventeenth and eighteenth century, with the main idea of taking abandoned children off the streets (Scheerenberger, 1983).

In America, from the seventeenth to the eighteenth century, the treatment of children with intellectual disabilities was poor and the gradual

realisation that the children were capable of being educated was a slow process. Initially, those given the care and education of students with intellectual disabilities had difficulty with the realisation that educational programs were needed to allow the children to develop their maximum potential (Judge, 1987). The early attempts by some educationalists, such as Dr. Eduoard Seguin (1812-1880), who immigrated to America, and Italian educationalist Maria Montessori (1870 - 1952), to provide cognitive development for students' with intellectual disabilities, were not met with the enthusiasm they may have warranted. It was largely through the excellence of their educational programs that they were able to eventually gain historical importance (Trent, 1994). The early realisation that worthwhile educational programs were necessary for the cognitive development of students with intellectual disabilities was of direct historical concern to this thesis, because the need for innovative educational programs for students with intellectual disabilities was still apparent today.

In the USA, before the Civil War (1850 - 1861), people with intellectual disabilities were treated and tolerated by society as simple-minded members of the community. They were more to be pitied, and sometimes to be teased, but they were not to be feared. Although nothing was done to improve their quality of life, this rather generous, albeit superficial attitude, where the problem of intellectual disability was one that was largely left on the shoulders of the concerned family and the local authorities to find a solution, required a change of policy (Trent, 1995). An important change came during the 1840s, when the American states began to take a more active interest in the general situation of people with intellectual disabilities and institutions for the care of the intellectually disabled were becoming more of an option. This led to the eventual growth, at the beginning of the twentieth century, of a more specialised form of care for people with disabilities, such as a more

humane attitude in their treatment and care and a realisation that education was also a possibility for them (Hickson, Blackman, & Reis, 1995).

### The effect of industrialisation

Although the eighteenth century in America saw little thought given to the education of children with severe intellectual disabilities, by the beginning of the nineteenth century the plight of these children was becoming more noticeable than it had been. It was more difficult to hide people with severe intellectual disabilities in fast growing cities, where the needs for employment were becoming increasingly more complicated, owing to the event of industrialisation. It was obvious that an intelligent work force was necessary if society was going to cope with these changes, and people with *sub-normal* intelligence would be hard pressed to find work in this more advanced society (Hickson, Blackman, & Reis, 1995).

It was not until the nineteenth century, when scientific developments into different types of intellectual disabilities, such as that of J.L. Down (1828 -1896), were discovered. His discovery of what is now known as 'Down's Syndrome', brought some dramatic changes to the treatment of children with intellectual disabilities in America (Hickson, Blackman, & Reis, 1995).

### Reform Movements

Reformers began to call for a more humane treatment for those in society who were considered to be severely intellectually disabled. Economic, scientific and social changes helped to create an atmosphere that was conducive to change and, by the end of the nineteenth century, some educational facilities had been provided for children with intellectual disabilities in Europe and the USA (Hickson, Blackman, & Reis, 1995).

Reform movements began to appear in both Europe and the United States. In Switzerland, Guggenbuhl (1816-1863) established a model residential facility for "cretins." In the United States, Samuel Gridley Howe (1801-1876), Charles Sumner (1811-1874), Horace Mann (1796-1859), and Dorothea Dix (1802-1887) called attention to the intolerable conditions endured by most individuals with mental retardation and mental illness.

(Hickson, Blackman, & Reis, 1995, p. 12)

In the United Kingdom, according to Woods (1983), the Mental Deficiency Act (1913) gave the local authorities the right to provide accommodation for mentally handicapped people. But to be accepted by these institutions, all internees had to be legally certified. Children and adults who were found to be "... mentally handicapped were divided into four grades, they were considered to be idiot, imbecile, dull and backward and morally defective" (Woods, 1983 p. 1). Before the middle of the nineteenth century, in Great Britain, parents were expected to put their intellectually disabled children into care. This was mainly due to the social pressures of the time, when it was considered by society that children who were intellectually disabled would be preferably kept *out sight and out of mind*. Although the hospitals involved in the care of these children were concerned with the well being of the children, and were run by medically qualified staff, the only other option for the concerned parents was to keep their child at home, often under lock and key (Woods, 1983).

According to Silver (1990), in Great Britain during the 1920s and 1930s, the educational position for disadvantaged children became confused with poverty and class, favouring the radical political ideas of the times that pointed towards changing educational policy directions. Student disadvantage often pointed to school failure due to poverty and the child's general environment. The Hadow Committee in 1933 reported on childcare and nursery schools, which brought to light the effects of deprivation and the

growing numbers of children with *mental deficiency* and *backwardness* in the community.

Woods (1983) pointed out that it was not until the mid to late twentieth century in the United Kingdom, that parents of intellectually disabled children ceased feeling guilty, if they preferred not having their child institutionalised. Since then, an improvement in the general health care for these children, with an advanced "Child Assessment Team" had been effective in helping parents come to terms with their child's disability and also provided for the child's care and treatment (Woods, 1983).

### Early Special Education

According to Trent (1995), by 1970 in the USA, the need for special schools was becoming obvious. This change in consideration for the needs of students with intellectual disabilities was not entirely due to humanitarian grounds. Because the upkeep of large institutions was not financially viable, Federal law required change, and the people in society were also looking towards a more advanced educational outcome for children with disabilities. This outcome eventually resulted in less institutionalism, more home care, and the instigation of special schools for children with intellectual disabilities (Trent, 1995).

Trent (1995) had pointed out that historical records showed that Dr Eduoard Seguin (1812-1880) (certainly in his own opinion and most probably in the opinion of many other educators) was the first person credited with a realistic attempt to bring some form of education to children with severe intellectual disabilities in the USA. At the same time in Europe, some research was being carried out on the successful training of the deaf and blind, to encourage them to rely on their other senses. It was Seguin who was

advancing his theories on training children with intellectual difficulties by establishing schools for the severely intellectually disabled (Trent, 1995).

According to Trent (1995) Seguin's theories were based on physiological education, these included muscular education, education of the senses and also moral education. Seguin's teaching relied on some form of gymnastic training to strengthen the body, and the education of the senses of touch, sight, taste and smell. He taught his students to feel different textures and to feel the experience of being on a swing whilst listening to music. These theories were quite contemporary and still used, in some form, in special schools today, over 150 years since they were first visualised by Eduoard Seguin (Trent, 1995).

Away then, with books! Give us the Assyrian and Jewish mode of instruction. The representative signs of thought were painted, engraved, sculptured in deepness or relief, sensible to the eye and to the touch; the tables of the mosaic laws appear in the midst of thunder and of the lightning's flash; in the same way, the symbols, under which is concealed the modern mind, should appear to the idiot, under these histories powerful forms, so that seeing and feeling all at once, he will understand.

(Seguin, 1856, cited in Trent, 1995, p. 150 - 51)

Kode (2002) discussed the work of Elizabeth Farrell (1870 - 1932) of the USA who campaigned strongly for the education of children with disabilities. Farrell spent her lifetime involved in special education. She established special schools, writing programs for intellectually disabled students, and training special education teachers in the implementation of them. She also proclaimed advanced ideas on the possibility of inclusive classes for those disabled students who were considered able to receive their education in the regular class, using the same curriculum as their peers (Kode, 2002).



In Europe, and then in the USA, Italian psychiatrist Maria Montessori (1870 -1952) was influenced by the work of Eduoard Seguin, in advancing education for students with intellectual disabilities. She believed that Seguin's specialised teaching methods could be applied to intellectually disabled and normal children, with equal effect (Montessori, 1949). These methods were based on spontaneous learning in a controlled environment and the use of didactic materials. Verbal positive reinforcement was used by constant rewarding of the student's appropriate behaviour, with the teacher being an important role model for the students. Montessori applied Seguin's methods of physical training for muscular coordination and the heightening of the children's sense of touch, taste and smell. These educational methods are carried out in Montessori schools today, and often applied to children in special schools with some success, an outcome of which, no doubt Eduoard Seguin would have fully approved (Hickson, Blackman, & Reis, 1995).

## **Further Advances in Special Education**

### Piaget's influence

According to Woolfolk (1987), Jean Piaget (1886 - 1980) created some new and innovative ideas pertaining to the study of human behaviour. During the twentieth century, his research included the categorisation of the growth of intelligence of the child into four different stages. These stages ranged from birth to 15 years. The first steps (0 - 2 years) is a sensor motor stage where the child begins to use memory, imitation and thought. The second stage (2 - 7 years) is the pre-operational stage, and is the child's gradual language development stage. The third stage, concrete operational (7 - 11 years) is where the child begins to solve problems in a logical way. The

fourth stage, formal operational (11 - 15 years) is where the child becomes more adept at solving more complex problems and also shows some concerns about social issues and its own identity. Piaget's study of the child's intellectual concepts influenced the future behavioural structure of the behavioural assessment of students with intellectual disabilities. In the idea of the measurement of their intelligence and in their ability to imitate and model others in their play, as well as the influence of their moral and social development on the students' cognitive development (Scheerenberger, 1983).

According to Casey (1994), Piaget stressed the concept that teachers must spend more time with students with intellectual disabilities, because of their slower rate of learning. Piaget believed that the problems in the cognitive learning area for these students were a direct result of incomplete development in underlying motor and perceptual areas, and that teachers should build their programs for students with intellectual disabilities around these areas. Piaget also believed that early motor activities are the basis for a child's cognitive growth, although children with severe disabilities who may have had very little early motor activity could still show normal cognitive ability (Maltby, Gage, & Berliner, 1995). A Piaget orientated teacher's assessment at foundation level of a student with intellectual disabilities, in motor development, included learning to work a zip, lace a shoe, button, buckle, hop, skip, balance, walk backwards, jump rope and catch a ball (Tindal & Marsdon, 1990).

The student with intellectual disabilities perceptual development might be assessed by activities that included pointing to, and naming simple coloured shapes, such as a circle, a square, and a triangle, and naming the colours. Students could also be assessed when they are required to stay on

task, and on their ability to complete the task successfully. Teacher assessment for students with intellectual disabilities also included student cooperation, with a show of willingness to take turns and join in activities with their peers without disruption. The student's ability to handle materials in creative activities might also be a part of their perceptual activity assessment (Casey, 1994).

Although Piaget's ideas influenced the teaching, learning and assessment of children with intellectual disabilities world wide, these ideas were not generally accepted for special education in the USA until the 1960's. This was because there were many complex social, economic and political factors involved in special education. Disagreement about who should be eligible to receive it, what type of education they should receive, and where they should receive it. At this stage, the special education curriculum was largely designed on European standards which relied solely on physical, intellectual, and moral training for students with intellectual disabilities (Ysseldyke, Algozzine, & Thurlow, 1992).

### Advances in America

In the USA, there was a definite swing towards new educational outcomes for students with intellectual disabilities during the 1970's (Scheerenberger, 1983). By 1978, the *Association for Retarded Citizens* called for more research into disability education. Such as who could be accepted or rejected into mainstream schools and, if accepted, would it be for the full term, or on a trial basis only. What would be the level of the disability required for acceptance into the regular school, and what curriculum changes, if any, would be needed. In the early eighties, the "Education for all Handicapped Children Act" was endorsed in the United States of America, but not without a number of political challenges, and, although some of these

outcomes for students with intellectual disabilities were resolved, not all were met with immediate success (Scheerenberger, 1983).

Kennedy (1999) pointed out that today, the United States provided for the curriculum for all students with disabilities, and their Visual Arts curriculum had a similar structure to that which applied in Australia. For example, The New York State Learning Standards for the Visual Arts, included outcomes in multi-media, painting, ceramics, tile mosaics, watercolour, jewellery design and murals. The outcomes were modified for students with disabilities, when necessary, in much the same way as they were for students with disabilities in Western Australia (The Curriculum Council, 1998). All students with disabilities, in the USA and Australia, might now have the opportunity to enjoy a wide range of art experience and creative expression from their visual arts curriculum, and the innovative programs provided by their art teachers (Kennedy, 1999).

In 2003 a recent survey was carried out at the University of Minnesota in the USA. The purpose of the survey was to provide a summary of the new trends and issues for the academic achievement of students with disabilities. The survey collected information from all of the 50 states of the USA directors and other officials representing special education. The report showed that more students with disabilities were achieving increased academic standards than had previously been experienced (Thompson & Thurlow, 2003).

Four of the main findings relevant to this section are set out below:

1. The American states identified more positive than negative consequences of the participation of students with disabilities in standards, assessments, and accountability.

2. More states were now studying trends in the achievement of students with disabilities.
3. Three-quarters of the states have one alternate assessment option that addressed the needs of students with significant cognitive disabilities.
4. Over 80% of special education directors were involved in the states development of the definition of Adequate Yearly Progress (AYP).

Educators in the field of special education still faced many challenges, such as the paucity of funding, which has led to too few schools for students with special needs. The survey found that their efforts to increase the level of achievement for students with disabilities, in the USA, have shown a valid documentation of their success (Thompson & Thurlow, 2003).

#### Advances in the United Kingdom

Woods (1983) stated that the Mental Health Act (1959) of the UK promoted an advance in the educational outcomes for students with intellectual disabilities. A Royal Commission for England and Wales, recommended that the majority of mentally handicapped children should no longer be legally certified, directly followed the act. According to Woods (1983) further advances in the care of all children with intellectual disabilities by government intervention gave some direct indication of the nations intent to further the educational opportunities of students with intellectual disabilities.

By the end of the 1970s, these reports had helped to set in motion a more in-depth study of those involved in the care of children with intellectual disabilities, and for the children concerned, culminating in *Special Care Units* being provided within the regular schools for their educational

needs. These units provided the students with intellectual disabilities with a number of activities, which were largely based on the concept of Piaget's methods for students with intellectual disabilities (Woods, 1983).

Casey (1994) agreed that The Education Act (1981), in Great Britain, profoundly changed the face of education with its focus on integration, where there were changing educational attitudes towards a more humanitarian outlook for students with intellectual disabilities. This change in attitude provided students with special needs with a greater opportunity to experience an interaction with their non-disabled peers. It also gave them a chance to be educated in a local setting with their siblings (Casey, 1994).

### **Some important Government Decisions for Students with Disabilities in Australia**

"The 1872 Education Act in Victoria laid the foundation of universal, state-controlled, secular elementary schooling. It was the first legislation of its kind in the Australian colonies"(Grundy, 1972 p. 2). The act was given impetus largely due to the reaction against sectarianism. It had become very hard for the government to manage the refusal of the clergy to overcome their differences and to give some cooperation in providing a unified educational system. The 1872 Education Act achieved more than overcoming the stressed relations between the State and the Church. It required all students to attend school and set the curriculum that they were to follow. The schooling that was provided was not for the rich, but rather designed for the middle class and poorer children whose parents were not able to afford private schooling (Grundy,1972).

### The Federation period 1901-1945

During this period there was an evolving role between the State and Federal Governments. In 1918 the control of the Blind, Deaf and Dumb Institution was transferred from a Board of Management to the Department of Health. In 1924 the Federal Government passed a "Bill of Blind, Deaf and Dumb Children's Institution" making education compulsory for these children. By the nineteen twenties the problem of the *sub-normal* in the community began to receive more careful attention. Public health and public morality demanded the segregation of those afflicted, and special schools were needed for the *feeble-minded* (Rankin, 1926).

According to Andrews, Elkins, Berry and Burge (1979, p.29), the following account is an important summary of events before World War II, that led to government acknowledgement of the educational rights of students with disabilities.

- 1903 - 4      Royal Commission Reports in N.S.W. led to recommendations for the establishment of special schools for children with disabilities.
- 1906              Medical inspection of school children was introduced in W.A.
- 1910              In Victoria, parents required to provide education for physically and mentally disabled children.
- 1913              The first government special school in Victoria.
- 1916              Conference of the Directors of Education to discuss education for the *mentally handicapped*.
- 1923              The first classes for *backward* children in Queensland.

- 1927            A residential school for *backward* and *mildly* disabled children established in N.S.W.
- 1939            The Australian Association for Teachers of the Deaf founded in 1935 and all teachers of deaf children were required to be properly qualified by 1939.
- 1945            A Ministry of Education pamphlet No. 6 on Art Education set out ideas on art education for all students which involved student choice and selection and the curriculum and forms of instruction (Forrest, 1983).

#### The Period 1946-1972

After the end of World War II in 1946 and during the next two decades, there was some growth in special schools in Australia. This culminated in a recommendation by the Senate Standard Committee on Health and Welfare in 1971, "... those states which have not taken full responsibility for the provision of free, and compulsory education for all *handicapped* children should take immediate steps to do so". (Senate Standing Committee on Health and Welfare, 1971, p 30. Cited in Andrews, Elkins, Berry, & Burge, 1979).

#### The Period 1973-1993

A movement in Australia in 1973, led towards the inclusion of some students with intellectual disabilities into the mainstream, and was promulgated by the Whitlam Labor government in the Karmel Report (1973). This report also allowed for "...the right of parents to educate their children outside government schools" (Ryan & Malone 1996, p.39). The Karmel Report stressed equality of opportunity for all Australian children. Some of



the advantages envisaged for students with intellectual disabilities, by the report, were that they would benefit from the development of social relationships with non-disabled children in mainstream education. It was considered that they would have the opportunity of modeling their behaviour on that of their peers. Students with disabilities would be able to take part in role-play, shaping, rehearsing and group tuition. It was stated that these strategies were successful for developing and improving the social skills of the students with disabilities although the report failed to explain the extent of a child's disability to make it ineligible for inclusion (Carter & Sugai, 1988).

In Western Australia, the Beasley Report (1984) supported many of the earlier changes put forward in the Karmel Report (1973) on children with disabilities. The inclusion of these students into the mainstream was also recommended in the later report, including the proviso that mainstream school resources be adapted to the needs of students with learning difficulties. The Beasley Report (1984) also recommended that students with severe *handicaps* be schooled in special units, either on the regular school site, or in a special unit within the school building. The Report of the Review Committee on the "Quality of Education in Australia" (1973) (chairman Peter Karmel), addressed the special needs of students with disabilities.

The Review Committee (1973), known as the Karmel report, suggested that there appeared to be a lack of continuity between the States in what constituted children who were in need of *special attention*. The Committee believed that there was much work to be done to prevent educational disadvantage for children with disabilities. One of their main concerns was for additional funding. A further concern expressed by the Review Committee was for the needs of *handicapped* children in country areas, where

there was a paucity of resources. The general conclusion of the Committee was that a more effective coordination was required between the States and the Commonwealth, in order to ensure a more positive educational outcome for children with disabilities in Australia.

### The Period 1993-2001

The School Education Act (1999, p. 15.) provided the following objectives for all students:

Every child has the right to receive an appropriate educational program;

Parents have the right to choose the form of education that best suits their child's needs;

Parents have a responsibility to work together in partnership with schools for children's schooling to be successful; and

A government schooling system must be provided to meet the educational needs of all children.

The 1999 Western Australian School Education Act, in section 73, gave specific reference to the educational program for students with a disability.

1. Where a child with a disability is enrolled at a government school, the principal is to -
  - (a) consult with the child's parents, any of the child's teachers or perspective teachers and, if appropriate, the child; and
  - (b) take into account the wishes of the child's parents and, if appropriate, the child, for the purpose of addressing or reviewing the particular child's requirements in relation to the content and implementation of the educational program for the child.

2. The content and implementation of the educational program for a child with a disability is to be decided by the principal subject to the direction and control of the chief executive officer.

The School Education Act (1999) gave further considerations relating to students with a disability in sections 82 and 83 of the Act. That is, before any decision was made about the availability of an appropriate educational program for a child with a disability, the child's parent must be consulted and then informed in writing by the chief executive officer dealing with the case. A parent was also given the right of appeal if this decision was considered inappropriate by the parent. The chief executive was required to advise the *Disabilities Advisory Panel* with any decisions relating to the educational program for the child with a disability.

In their review of "Educational Services for Students with Disabilities in Government Schools", The Western Australian Department of Education (2001) has outlined some principles for the special education of students with intellectual disabilities. The main principle being that students with intellectual disabilities will have the right to enroll and participate on the same basis as other students. This principle was qualified by the fact that each student must be judged individually, and that the particular educational needs of the student must be taken into account, together with the needs and desires of the student's parents, before enrolment could take place. Another principle was concerned with inclusion into the mainstream school. It required educators to have an awareness and confidence to support students with special needs and required schools to adopt inclusive pedagogical and cultural practices. The main terms of reference for this review were to look at the current state of educational supports for students with disabilities and to expedite learning outcomes for these students.

Historically, definitions of disabilities in the Western Australian government school system have included autism spectrum disorders and intellectual, physical and sensory disabilities. This relatively small group, which encompasses approximately 3% of the school age population (School Census 2001), has high support needs and is provided with a targeted resource allocation. The School Education Act (1999) widens the historic definition of disability to include neurological, cognitive and psychiatric conditions.

(Review of Educational Services for Students with Disabilities in Government Schools, 2001, p. 3)

## **The Role of the Teacher in Special Education in Western Australia**

According to Cole and Chan (1990, pp. 12 - 13), there are ten main methods of instruction, which may be used by educators in special education:

1. **Behaviour Analysis** - The method concerned with the analysis of target behaviour.
2. **Contingency Management** - Strategies that emphasise the contingent use of consequent events to change behaviours.
3. **Stimulus Control** - Strategies that focus on the manipulation of antecedent events to bring about changes in behaviour
4. **Mastery Learning and Direct Instruction** - Methods that focus on the systematic organisation of instruction, explicit teaching of concepts and skills and use of teacher-directed activities.

5. **Modeling and Social Skill Training** - Methods that emphasise the acquisition of learning through observation and in social interaction with others.
6. **Process Training** - Strategies to train underlying abilities and psychological processes assumed to be critical for learning academic skills.
7. **Cognitive and Metacognitive Instruction** - Methods designed to improve the learners' awareness and control of their own thinking processes.
8. **Peer Tutoring** - Strategies that involve a tutor teaching a learner in a one-to-one situation.
9. **Cooperative Learning** - A procedure that involves students working in cooperative groups.
10. **Computer Applications** - Ways of applying computer technology to facilitate learning by students with special needs.

#### Small group tuition

It is up to the discretion of the individual special education teacher to choose the methods of instruction most suitable to the students' learning abilities (Cole & Chan, 1990). It is also important to note that, within each classroom setting, the teacher has the task of establishing a good group climate to create a sense of security for the students (Barry & King, 1999). In the special education system, small group tuition is considered necessary for the benefit of the students, and for the teacher, who may meet with the behavioural problems of students during class (Kamps, et al., 1994). To overcome these difficulties, a good group climate can be established by the

positive attitude generated by the class teacher as a role model and with the use of visual and physical prompts in well thought out educational programs for students with severe intellectual disabilities (Cole & Chan, 1990; Westling & Fox, 2004). These programs can also be enhanced by a 'calming' background music. In this way, it is possible for the teacher to create a sense of tone in the classroom in introducing classical music and visual art to students at an early age. This development of *tone* in the classroom should be high on the teachers' list of importance when establishing a good classroom environment (Barry & King, 1999).

The benefits of small group tuition, the importance of a good group climate in the classroom, and the effectiveness of the special education teacher as a role model for students with special needs are basic requirements on which to build a learning experience for students with severe intellectual disabilities. Although nothing worthwhile can be gained for these students without first gaining the student's attention (De Reiter & Wansart, 1982). If a stimulus is being used as part of the educational program, each student's attention process must be brought into focus. That is, if a pictorial stimulus is being used, it is important for the teacher to see that each student in the group is able to gain eye contact with it in order for the teacher to continue with the desired learning experience for the student (De Reiter & Wansart, 1982). This strategy formed part of the base of the *Pictorial and Musical Visual Arts Program* of the present research study.

#### Language-learning impairment

The special education teacher's role in providing a worthwhile learning experience for students with disabilities is important, as is the importance of the student's ability to understand what is being relayed. In their endeavour to provide a worthwhile learning experience for students

with disabilities, and to improve the ability of some students who have evidenced a lack of this ability by their language-learning impairment, Tallal, Miller; Bedi; Byrne; Wang; Nagarajan; Schreiner; Jenkins, & Merzonich, (1996) researched the relevant rapidly changing elements in the acoustic waves of normal speech that children who have a language-learning impairment have been unable to process. The researchers noted that Tallal's earlier experiments in this field during the 1980s, showed that the children who were experiencing language difficulties may have been due, in some cases, to the child's inability to process rapidly changing sensory input. That is, that the child could not identify fast elements embedded in ongoing speech, because they have difficulty in discriminating between many speech syllables, but children with language-learning impairment can identify these syllables when rates of change to the main format are synthetically extended in time. To test these theories further, the researchers carried out two studies.

In their first study Tallal et al. (1996) chose seven primary school children with language-learning impairment in the USA. The children were required to be tested for three hours per week over a period of six weeks. The study was aimed at noting the effect that exposure to acoustically modified speech had on the children's speech discrimination and language comprehension. Benchmark scores were obtained with natural unprocessed speech. In weeks 2 - 5, the children were rotated through a series of ten different listening exercises that were in the form of specially designed computer games that gave the children maximum exposure to acoustically modified speech. The findings from the first study showed that after one month of training with the acoustically modified speech, each of the seven participants in the study approached, or exceeded, the normal limits for their age in speech discrimination and language comprehension. The second study in the research examined the extent of the improvement of a larger

group of language-learning impaired primary students, when they were subjected to a similar treatment. Because of the size, the students were divided into two groups. Group (a) received computer games that had been acoustically modified, group (b) used games with natural speech. The research findings showed that the children who had received acoustically modified speech training gained rapidly in their speech. They also improved in their speech reception. The few limitations that were noted by the researchers in the study were mainly due to the ages of the participants (5 to 10 years). The researchers believed that the benefits to the participants might have been greater if the intervention had been earlier.

It is interesting to note that Nash (1996) issued a note of caution on the findings of Tallal et al. (1996), Nash questioned that playing computer games for a fairly short time could have a lasting effect on students with language related disabilities, such as dyslexia. He believed that this research study had only helped a few students mildly affected by a language-learning impairment, and was not truly indicative of the wider population of language-learning disabilities. Nash quoted neuroscientist Patricia Kuhl, of the University of Washington, who stated that the first year of a child's life is vital in language development. In this regard, Nash appears to agree with the stated limitations of Tallal et al.

### **Music Therapy for Special Education**

In France, during the middle of the twentieth century, Dr. Alfred Tomatis (born in France), presented his own unique method of applying music as a form of stimulation of the human nervous system through its connection to hearing, and the effect on human behaviour. Tomatis is also



credited with the invention of the electronic ear and has continued to expand his techniques over a number of years (Thompson & Andrews, 2000). The use of music therapy was an integral part of the Tomatis Method of treatment for children with disabilities, especially his stress on the benefits of listening to Mozart over time, using a specialised form of listening training (Bancroft, 1982).

Tomatis published a number of books from 1963 until his autobiography in 1979, the most popular of these being "Pourquoi Mozart?" in 1952 (Campbell, 1997). Although most of his works were written in French, and are not easily attainable, they gave a detailed account of his life and research on the intercommunication between the human ear and the nervous system. His experimental work and methods have caused much controversy in academic circles, but his insight into the effects of sound, and more especially high frequency sound on the human brain has led to further research in many areas of educational and developmental growth and disability (Thompson & Andrews, 2000).

Tomatis emphasised the vital role played by the teacher when acting as a role model for the students in the classroom. He also stressed the importance of creating the proper classroom environment and presentation conducive to learning. Tomatis favoured the use of certain classical music, such as Mozart's "Concerto for Violins" as a background to student learning, relying on the frequent listening and repetition of the sound to produce a feeling of well being and a calming atmosphere for the student (Bancroft, 1982). This calming atmosphere of the Tomatis method, was born out at the Tomatis Centre in Paris, where children who were diagnosed to be severely intellectually disabled were placed in a comfortable position with headphones over their ears. The children who appeared to be paying

attention, were listening to the sounds of Mozart. This method, which has also been integrated with art therapy at the centre, has been successful in gaining a lengthened attention span and greater self-esteem for children with severe disabilities (Campbell, 1997).

What has commonly come to be known as the “*Mozart Effect*” may have had its origins in the work done by Tomatis during the middle of the last century, and only a small amount of research has been produced on this topic since that time. Brewer and Campbell (1991) believed that learning begins as hearing evolves into listening. In 1990 their innovative research was carried out at the *University of California’s Center for the Neurobiology of Learning and Memory*. This research documented the effect of listening to Mozart had on students and young children. The research study included 36 undergraduates from the universities’ psychology department. The students scored eight to nine points higher on a spatial test after listening for ten minutes to Mozart’s “*Sonata for Two Pianos in D Major*”. The research team concluded that, even though the amount of listening time was fairly short, listening to this particular music had made a difference (Campbell, 1997).

In a follow-up study, the researchers tested spatial intelligence by projecting 16 different folded abstract figures on to a screen for one minute each. This experiment required 79 students to view the paper abstracts over a period of five days. The students were placed into one of three groups. The first group listened to the original Mozart Sonata, group two viewed the abstracts in silence and the third group listened to dance music. The groups were required to assess how the folded abstract patterns would look when they were unfolded. All the groups improved their scores from day one to day two, but the Mozart groups pattern recognition scored 62 per cent overall to 14 and 11 per cent scored by the other groups. The Mozart group

continued to score much higher than the other two groups on subsequent days (Campbell, 1997).

It may be asked, why Mozart? According to Campbell (1997), in 1952, Tomatis asked the same question. He found that Mozart's compositions often managed to have a calming effect improving spatial perception and communication. Tomatis also found that the rhythms, melodies, and the high frequencies of the music stimulated the creative impulses and motivational regions of the brain. Unlike the heavily emotional music of Bach, or the rather desolate traditional simplicity of a Gregorian chant, Mozart's music has a special quality to stir the human spirit. Tomatis believed that Mozart had an effect, an impact, which the others did not have, and that he was a true exception among human beings, with his "*healing*" power (Campbell, 1997).

Mozart was a child prodigy. He was born on Jan. 27th 1756 into a very musical family, and was a gifted performer at the age of four. He began composing music by the age of six years, and during his lifetime, which ended at the age of 35, he composed 17 operas and 41 symphonies, as well as many other compositions for clarinet, violin and other musical instruments. His musical genius is renown in the world, as would be the general knowledge of his chaotic personal life, but his art is serene and his compositions of healing power transcend both his era and ours. "Clearly, the rhythms, melodies, and high frequencies of Mozart's music stimulate and charge the creative and motivational regions of the brain" (Campbell, 1997, p. 27).

It was not the direct intention of the present research study to prove the effectiveness, or otherwise of the 'Mozart effect', but to produce a calming mood in the art classroom through classical music. The music of

Debussy was also used in the musical intervention, as well as a later suggestion by the researcher of the possible future trial of music such as the Nut-Cracker Suite and the ballet music from Swan Lake.

Steele, Bass & Crook, (1999) attempted to prove a Mozart effect, but found that using this music failed to produce either a statistically significant difference or gave little evidence of its worth when it was trialed over a short period of time during their study.

Within the Education Support School, the role of music in the arts learning area is often provided as therapy for students with disabilities. The use of web sites, such as those of the National Arts and Disability Centre, Music Education and Music Therapy for Children and Youth with Disabilities, are an example of some additions to the students' art curriculum. The many benefits of art therapy for people with various learning difficulties was discussed by Mair Rees (1998), who brought together a number of professionals with their knowledge of the issues faced, and the challenges presented to them, in producing art therapy for people with disabilities. They produced case studies of people with differing needs, their differences and similarities, and provided an overall picture of the general desire among professionals for the application of stimulating and simplified programs in all areas of art therapy, including both music and drama therapy.

Hutinger (1996) is a researcher in the field of music therapy who has also produced a CD-Rom, Art Space that provided an educational program to help young children with disabilities to make art with accompanying images, voice music and graphics. The software was designed and based on three themes, Adult Gallery, Children's Gallery, and Studio. A reported finding during field-testing, among others, was that some children with

severe intellectual disabilities showed increased time-on-task and attention when using this program. The children seemed to be more alert and less likely to be out-of-seat. A major limitation of this field of music therapy is that it is restricted in the number of children with severe intellectual disabilities who are able to take advantage of it.

In the USA, Hallam & Price, (1998) have advocated the use of background music to be used as a calming influence in the classroom for students with emotional and behavioural difficulties. They found that a class of 10 students who were attending a special school and were exhibiting a high frequency of disturbing behaviour such as tantrums, crying and aggression reacted positively to a musical background in the classroom. The researchers cited Giles (1991) who pointed out that most students function better with the right choice of background music as this can help to make the pupils less stressed.

In Australia, Daveson & Edwards, (1998) pointed out that programs for students with disabilities may be formed around the idea of creating a beneficial effect with music in an attempt to alleviate inappropriate behaviour in the classroom. The music program can also seek to increase self-esteem and to encourage self-expression in students through singing and listening to music. These researchers had also found that students gained in their development of auditory skills and in their ability to follow directions and to stay on task through the use of background music. The role of music therapy is seen as having a special place in the educational life of students within the regular school and the Education Support unit (Daveson & Edwards, 1998).

In the USA, Lacina (1991) presented an interesting study that showed the extent of the use of music and movement in Education Support and

regular schools in Louisiana, Kentucky. Questionnaires were sent out to 114 primary teachers, including 27 special education teachers and 87 regular teachers. The teachers were asked how often they provided their students with learning opportunities through visual and auditory means, as well as through movement and gestures, including the use of music. The main limitation of the study was that the researcher noted that both groups of teachers failed to use music as much as was expected, although the researcher contended that music and movement are known to improve the student's attention, retention, and retrieval span. Both groups agreed that pictorial additions to their programs were of benefit to their students throughout different domains of learning. As a result of the experiment, Lacina (1991) concluded that all teachers, regardless of their students' potential, would do well to incorporate additional methods of teaching, such as combining art with music into their future programming.

In England, according to Gee (1997), some special schools were provided with an innovative musical experience by the "Sonic Arts Association". This group was comprised of a body of concerned music teachers, composers and performers. This association provided these schools with a regular visit from professional music teachers and professionals, and also gave the school access to special technology. In this way, children with disabilities were able to enjoy, and become involved with a musical performance of good quality, which took place within their usual classroom environment. In this way, the students with intellectual disabilities enjoyed a musical experience that might otherwise have been denied them.

This literature review has not found a large amount of scientifically valid research on the benefit of musical therapy for students with severe intellectual disabilities. A recent article in the Macquarie University News

(December, 2005) has quoted Special Education Senior Lecturer Jennifer Stephenson as being frustrated by the lack of scientific evidence being available to researchers on the benefits, or otherwise, of music therapy for students with severe disabilities. She suggested that the employment of music therapists by special schools could be a waste of their resources. This is a valid argument at a time when funding for Education Support schools is at a low ebb (see also Stephenson, in press) and indicates that further research is needed.

### **Visual Art Education for Children with Severe Intellectual Disabilities**

Frans Cizek believed that childrens' visual artwork should be regarded as a true form of art. But his ideas were largely grounded on purely aesthetic aspects, that is, the laws and principles that determine the beautiful in art. One of his greatest critics in the USA was Victor Lowenfield (1903-1960). Lowenfield, who was a student of Cizek, moved from Austria at the beginning of World War II. He was more concerned with the psycho-analytic concepts of child art. Lowenfield believed that children should develop their creativity without interference. His early work in the USA concentrated on the artistic activity of the blind, *mentally retarded* and the emotionally disturbed and provided a solid basis for future visual art programs for these students (Michael, 1982).

In America, over 30 years ago, Dirr and Anderson (1974) provided a project for the implementation of visual art programs to be given to children with severe disabilities at primary school level. They interviewed 17 special education teachers and 38 third grade students, and also tested thirty

students, in order to evaluate their ideas on program improvement. These researchers believed that their report on a project design for improved instructional programs for *handicapped* children had accomplished a new learning style to initiate, evaluate and document a crisis-intervention program, and in developing and using three computer programs for 38 third grade students. They encouraged the teachers, in both special and regular education, to give their students in the visual art class wider options of choice, and to produce programs that were more interesting for them. The researchers reported that all sections of this project had a positive outcome from the professionals who were involved in the study.

Their study motivated Gair (1975), in the following year, to carry out an evaluation study on visual art-based programs for students with disabilities. This researcher analysed the work of 20 children with learning difficulties to ascertain the effectiveness of the visual arts program on the psycholinguistic abilities of these children, with a positive result in both aptitude and attitude in the participating students. The researcher studied the regular art program for students with disabilities and included an intervention that provided for the naming of the colours by each student as they used them in their artwork.

At an early age, the majority of young children enjoy filling in colouring books with coloured pencils and crayons. Unfortunately, for children who are born with, or acquire through accident or illness severe intellectual disabilities, this enjoyable activity is one that may not be experienced (Morreau & Anderson, 1984). Therefore, in the Education Support School, the very basic elements of visual art education must be taught to children with severe intellectual disabilities before they can manage



to grasp the rudiments of creativity for themselves (Morreau & Anderson, 1984).

In Western Australia, visual arts education for students who were professionally diagnosed as severely intellectually disabled is given in special Education Support schools (The Education Department of Western Australia, 2001). These schools are situated within the Perth metropolitan area. The schools are staffed with qualified, dedicated teachers and their assistants, who are willing to try innovative and stimulating educational programs, such as the Pictorial and Musical Visual Arts Program being presented in this research study.

Permission was received from two of the Education Support schools that took part in the study for their information to be included in this section. In Western Australia, one of the largest Education Support schools to cater for students with severe intellectual disabilities, and extremely proud of its record, was Burbridge Education Support School. The purpose of this school was to provide the students with an environment conducive to developing their skills to function and participate in society. The Multi Sensory Environment room at the school provided for an exciting, safe and comfortable setting in which each student's senses were stimulated by a unique variety of lighting effects, music, tactile experiences and aroma. These sensations could be combined to create an environment, which would assist the student to focus and to achieve specific educational therapy goals (Burbridge Education Support School Brochure, 2003). The Education Support school curriculum covered the Foundation Outcome Statements, and where appropriate, Student Outcome Statements, which formed the basis of the school curriculum in Western Australia. Students aged 5 to 15 years were offered programs across seven learning areas – The Arts, English,

Health and Physical Education, Mathematics, Science, Society and Environment and Technology and Enterprise. Arts programs, such as Visual Arts, Music and Dance were conducted on a weekly basis with teachers and teacher assistants. These programs provided a means to express the student's creativity. Works of art were on display throughout the school and, on occasions, in the community.

Another Education Support school in Perth, for students with severe intellectual and multiple disabilities is the Gladys Newton School, which has an average enrolment of 72 students aged from 4 -18 years. The school boasts an award winning Multi-Sensory playground, which is a feature of the school, and is staffed by a multi-disciplinary team who are committed to student learning. The schools learning programs are organised to comply with the Curriculum Framework and incorporate special education pedagogy (Gladys Newton Annual School Report, 2003).

It is realised that the students who are multi-disabled and have special needs will require the individual care and attention of a special school, but for many students with disabilities in the community it is expedient and preferable to integrate them into mainstream education (Cole & Chan, 1990). In this way these students will be able to foster peer models and receive the right of play, and the right to experience problem-solving within the regular school environment (Carter & Sugai, 1988; Morsink & Lenk, 1992).

Morreau and Anderson (1984) believed that arts teachers should endeavour to create individualised programs for their students, especially for those who are severely disabled, so that they could develop in these students the basic outcomes skills of arts expression and arts appreciation. They also advocated the use of small group tuition, and the modeling of the task by the teacher. Their theory was that reduced disabled class numbers

enabled children to work at their own pace so they could learn the basic skills and processes that would allow them to complete the required tasks. This theory was strengthened by more recent research carried out by Kamps et al. (1994). These researchers found that students with autism and developmental disabilities reacted well to small group tuition, choral responding and strategic changes to programming. Their results showed better responding, higher gains on weekly tests and a decrease in the passive and inappropriate behaviour of the students.

In the USA, Ferguson and Owen (1993) brought together a program of visual art history and hands-on creative expression for fifteen, year three students with learning disabilities. The experiment lasted over a period of a few weeks. They gave the students a chance to look at and experience prints of well known visual art works for themselves. As all the students participating in the experiment were categorised as mildly disabled and were in a special class, the words that were used to describe the art works to them were fairly simple, such as descriptions of colour and shape. Then the children used pieces of paper to make the colours and shapes that they were seeing in the prints. Prints, which showed non-objective works of art, were used in the experiment, such as works by Kandinsky, Alexander Calder and Chagall, and then the colours and shapes were pointed out to the children. These were bright and dull, heavy and light in red, blue, yellow and green. Cut fabrics were then found in these colours so that each child could make their own "*picture*". At the completion of the study, the students were willing and able to continue the visual arts experience with their usual visual arts teacher, who believed that the students had taken their activity to a higher level of understanding. By hearing, looking and talking about visual art works, the students had developed their perception and insight as well as their expressive language abilities. The researchers believed that this

innovative program appeared to be advantageous for the students, and could to be used by their visual arts teacher after the experiment.

Arts education is one form of education for students with severe intellectual disabilities, whereby the disabled student's ability to communicate can be enhanced through listening to the sound of music (Daveson & Edwards, 1998). Students with learning disabilities can also learn to paste brightly coloured pieces of paper to form an interesting collage, or to make brush marks on paper to form a colourful painting. These activities can be performed without the need for verbal expression. In this non-verbal interaction between student and teacher, the role of the art teacher is an essential factor in order to guide the student through a stimulating structured activity and to gently lead the student to ultimate success (Smith, 1988).

Hutinger et al. (1997) stressed the importance of arts education for students with disabilities, and outlined the role that the arts can play in these children's lives in helping them to gain self-esteem, especially when it is begun at an early stage in their education. These researchers believed that arts education could be of benefit to the student's learning experience when it is applied over a number of educational domains, such as in the use of a pictorial addition in a program for teaching students to read. This theory has also been noted in programs advocated by Kennedy (1999).

### **Pictorial Arts Programs for Students with Disabilities**

Some similarities to the present research study can be found in the use of a pictorial addition to the design of an arts program by Pierce and Schreibman, (1994). The main purpose of their research was to assess the

effectiveness of picture prompts and the elements of self-monitoring and self-management on students with autism. As participants in the experiment, the researchers chose three boys aged 6, 8 and 9 who had been medically diagnosed autistic. The experiment was carried out in a quiet classroom environment with the boys seated at a large table in the middle of the room. The picture prompts were in the form of a picture book, each child having his own book. The child was then required to place coloured pictures into the book in their correct place, such as plates on a table. The pictures used in the experiment were all of familiar objects to the children. Positive reinforcement was given to each child when he succeeded in placing the picture in the right place and instruction from the teacher was gradually decreased over consecutive trials. All data were graphed, and the results showed that, whereas all behaviour at baseline had been inappropriate for all children, such as out-of seat and flaying arms and aggression (with one exception), all behaviours were 100% appropriate after the trials had been completed. The researchers found that, once the tasks had become routine, all the children had acquired more independence.

Brieger, Kendall-Dudley and Sarmiento (1997) expanded on the Morreau and Anderson (1984) theory of providing individualised arts programs for students with disabilities by teaching a fine arts-based program for second and third grade students with disabilities. They presented this arts program to 30 second and third grade students from a bilingual learning disabled school in the USA. This program included the use of visual components, including pictorial and historical references, and a cooperative painting experience that was performed by all of the targeted students. The results were based on student self-assessment and teacher observations of the program, and the student's reaction to the program. The researchers' conclusion was that the students used more terminology and principles of

construction in each of the visual arts areas, from knowledge gained through the use of pictorial and historical references. The researchers also found that all the participating students showed a rise in self-confidence and self-esteem, and showed increased levels of appropriate behaviour when engaged in the arts activities.

According to Yanow-Schwartz (1994), in Washington DC, at the Laboratory School of Washington, innovative programs have been devised for students with learning disabilities based on the work of Smith (1988). Smith believed that students who had difficulties connecting with others, could express themselves through at least one art form. These programs involved visual arts students learning to paint ceilings and frescoes and to receive a history lesson on Leonardo Da Vinci's use of perspective. They also were able to participate in a number of other visual arts activities, because the school used the arts as the core of its curriculum, and the teachers believed that visual and performing arts skills could relate to those used in everyday activities. For example, collage in relation to planning, and architecture in reference to history and to visual detail used in the school. Puppetry for language, social skills and hand-eye coordination, and print making and painting for the development of reading readiness through the use of left-right orientation, were also used. During a seminar for arts teachers at the Laboratory School in Washington USA, the artist Robert Rauschenberg (diagnosed with dyslexia) stated that taking part in these innovative activities advantaged the students with learning disabilities. Because it could help them in their coordination and be effective in their gaining self-esteem (Yanow-Schwartz, 1994).

Mirenda,(1990) and Winner,(1993) found that a pictorial addition to educational programs, including those in the field of visual arts, was an

effective educational tool to use for those with severe and profound disabilities. The researchers also pointed out the advantage to teachers, not only in the arts, but also throughout various domains of learning. Winner also stressed the importance of teacher and student communication before their instruction began and found this strategy of prime importance when using a pictorial intervention in a program for autistic students. The researcher found that by first gaining the student's focus, the student could then be aided in achieving greater communication skills during the program. This researcher also tested various strategies, such as the use of pictures of familiar objects, a house, a dog or a cat and a tree, and also used symbols, such as a coloured circle to stimulate the students to focus, especially combining these objects with the use of bright colours. Winner found that the students with autism became more attentive and appeared more responsive to the lesson. Less positive results were found when students were not able to focus on the pictorial intervention and thus communication between the teacher and the student had not been appropriately obtained at the beginning of the lesson.

Livermore (1996) described the advantages of providing students with learning disabilities with pictorial enhanced arts lessons. Because some students with learning disabilities often have attention-problems, short-term memory difficulties, auditory-processing difficulties, eye-hand coordination problems, and can also have sensory integration or central nervous system dysfunction, pictorial enhanced lessons can be a useful aid for the teacher to get her message across to the student. Livermore (1996), in answer to critics who asked if this strategy encouraged the students to copy, stated that students with disabilities do not copy, "*they create*". Livermore believed that the use of pictorial additions to the visual art lesson can also enliven the students use of colour and composition, and can act as a stimulant to their

own powers of comprehension. In viewing the reproductions of famous artists, the students get a chance to discover how and why the artists created their work. In this visual arts program, the teacher also models her own painting for the students, and then asks them to go ahead and create their own painting. It is understood from the teacher's remarks about the program, that all the students who were involved in it completed their task quite successfully.

In the USA, Kennedy (1999) gave an account of some innovative visual arts programs that have been specially designed for students with significant developmental delays. The programs for these students reflect the standards set down for the Visual Arts by the New York State Learning for all Schools. They are similar to our Western Australian visual arts area of the Curriculum Council (1998), where programs in the visual arts area are created to include mixed media painting, ceramics, tile mosaics, water-colour, jewellery design, and murals. In the visual arts program that requires the students to paint murals, the students are shown prints of artists work that tends to focus on those who are, or were, physically disabled, such as Chuck Close and Henri Matisse, who became disabled later in their lives. The visual arts teacher believed that the surrounding classroom environment is also very important for the student to be able to create and produce their best paintings.

### **A Combination of Music and Visual Arts Programs for Special Education**

An innovative arts program for children in the regular primary school, which could also equally be used for students with disabilities in the



inclusive classroom or special unit, was investigated by Kaskell and Lauer (1990) in the USA. The researchers explored the possibilities of combining painting with listening to music. The program was constructed into two separate parts. The first part used visual components and a short historical description of visual works to encourage the students to create their own landscape painting. The second part of the program was listening to selected music, whereby the students could combine “*looking*” and “*listening*”. The students were then required to paint their own landscape picture. If a visual arts teacher was using this program in the primary visual arts class, the teacher was not given specific instructions whether the student’s work was to be the original work of the child, or could be a copy of a viewed landscape. The researchers believed that the format of the arts program would develop the students’ arts appreciation and, at the same time produce an atmosphere in the arts classroom that would be conducive to creative endeavour by the addition of a musical intervention combined with the students’ usual painting class.

The effectiveness of a Pictorial and Musical Arts Program for students with severe intellectual disabilities was shown during a recent study, and has been presented by Riddoch and Waugh (2003), in Western Australia. The Pictorial and Musical Program was used to teach non-representational visual art to 12 primary students with severe intellectual disabilities, in Western Australia. The students’ visual artwork was compared with a control group of regular primary students visual artwork, using the same Pictorial and Musical Program for both groups. A 2 (2 levels) x 2 (3 levels) ANOVA was used to test three hypotheses. The dependent variable was the quality of non-representational visual art, measured in narrow terms of three aspects (use of colour, composition and creativity). The independent variables were type of student (special or regular) and type of teaching program. There were

no significant interactions. The findings showed that there was a significant main instructional effect favouring the pictorial and musical sequence of the program over the use of a pictorial only sequence.

Fairall (1989), in a study of students abstract painting, in Western Australia, used some aspects in the evaluation that could be comparable to those used in the current study. The subjects for the Fairall study were senior students of design, craft, art education and fine art. Judgement comparisons of the art quality were also made with music and accounting students who represented aesthetic, but not visual, and non-visual disciplines respectively. Fairall (1989) used a Rasch measurement model (N = 220) to create a scale that was only partially successful as the Person Separation Index was 0.69 (which is not high). Slides of eight paintings were judged, arranged in four subject matched pairs, with one member of each pair being more saliently abstract than the other. The measures involved four aspects (1) Knowledge of art; (2) Knowledge of naturalistic and abstract art; (3) boldness of judgement (based on non-evaluative constructs; and (4) boldness of judgement based on the evaluative constructs followed by discrimination and based on non-evaluative constructs. Fairhall (1989, p.219) used an art judgement inventory using bipolar adjective pairs (semantic differential), and these are set out in Table 2.1.

Table 2.1

Semantic Differentials for Scoring a Visual Arts Aesthetic Value

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1	abstract	<u>6 5 4 3 2 1</u>	naturalistic
2	merging forms		definitive forms
3	worthwhile		worthless
4	shallow space		deep space
5	movement		no movement
6	structural		unstructured
7	vibrant colour		quiet colour
8	simple		complex
9	angular forms		rounded forms
10	'live with this work'		'not live with this work'
11	mystical		material
12	tells a story		no story
13	peaceful		turbulent
14	sensitive		harsh
15	somber		joyful
16	objective		subjective
17	emotive		unemotive
18	conventional	<u>6 5 4 3 2 1</u>	unconventional

(Source: Fairhall, 1989, p. 219)

The majority of the adjective pairs are not suitable for judging the worth (quality) of Kandinsky type abstracts. Fairhall (1989) was

endeavouring to measure aesthetic value. In the current research study, the evaluation of the students' abstract painting is on their use of colour, colour application, composition and creativity. The similarities can be found in colour use (see no 7), composition (see nos. 2, 4, 6) and creativity (see nos. 9, 11, 14, 16, 17, 18). In combining some of these aspects it was considered that a better scale could be provided for the judges evaluation in the current study. This is explained in the Measurement and later chapters.

## **Behavioural Management**

Everything the teacher does moulds student behaviour. If a student starts hitting one of her/his peers in class, is constantly out-of-seat or becomes disruptive to the lesson, intervention alone is often not enough to ensure maintenance of a more appropriate form of behaviour. Therefore, it is the responsibility of the teacher when this disruption occurs during a lesson, to develop a plan to initiate a more appropriate behaviour for each student and to monitor its effects regularly (Alberto & Troutman, 1995).

In today's mainstream classroom, it is important for students to gain as much information as possible, while minimising any disruptions. When students with severe intellectual disabilities disrupt this environment, special classes are provided to cater for their specific needs. "In these classes, the main goal is the personal welfare of the students, and the administration of the most effective procedures available to the students in a least restrictive environment." (Alberto & Troutman, 1995, p. 49).

Deprived of a stimulating environment, a child's brain suffers (Johnston, 1997). According to Johnson, research at Baylor College of

Medicine, for example, has found that children who don't play much, or are rarely touched, develop brains 20 per cent to 30 per cent smaller than normal for their age. Laboratory animals provided another interesting parallel. Young rats in toy-strewn cages exhibited more complex behaviour than rats confined to sterile uninteresting boxes. Researchers at the University of Illinois have found that rats in toy-strewn cages contain as many as 25 per cent more synapse per neuron than rats in cages without any toys (Johnston, 1997).

In an educational article, in *Time Magazine, 1997*, Johnston (1997, p.51) pointed out that scientists have found that the brain during the first year of a child's life is extremely malleable. "Very young children who suffer strokes or injuries that wipe out an entire hemisphere in the brain can still become highly functional adults. Moreover, it is becoming increasingly clear that well-designed early school programs can help many children overcome deficiencies in their home environment." Johnston stated that, with appropriate therapy, even severe disorders like dyslexia might be treatable. While inherited problems may place certain children at greater risk than others, Dr. Harry Chugani, a paediatric neurologist at Wayne State University in Detroit USA, believed that this is no excuse for ignoring the role of the environments' power to help remodel the child's brain (Johnston, 1997). It is true that some behavioural problems in the classroom reflect the stresses and difficulties that students experience outside the school environment (Westwood, 1990). It is also true that some problem behaviours have an environmental base and can also serve as a function of escape (Repp & Karsh, 1994).

Repp and Karsh (1994) were specially concerned with research into the behavioural problems of two students within the special education

classroom who exhibited severe tantrum behaviour. The main purpose of their research was to extend studies that had been done previously. Earlier studies had concentrated on the association of problem behaviours with negative reinforcement theory. The researchers wished to determine why greater rates of tantrum behaviour were evidenced in demand situations. They also proposed to present a study of the escape function and positive reinforcement of tantrum behaviour. The research required the collection of data on the behaviour of the students during normal instruction time to assess the cause of their behaviour. The two students in the study were girls aged seven and nine years and both students were considered to be severely intellectually disabled. Repp and Karsh (1994) began their study at a special education school in Illinois, USA, where all phases of the study were conducted.

Data were collected on the students' inappropriate and appropriate behaviour. The escape function as well as the environmental function of the tantrums was assessed. Hypotheses were then based on these assessments and later interventions were based on these hypotheses. The interventions for both students were similar and included eliminating attention for tantrums and praising appropriate behaviour. Time was structured to allow the students to receive social interaction with the teacher and the assistant, with the use of specific pictures to communicate the students' request for attention. Results showed that there were more tantrums in demand situations than in no-demand conditions, and the function of the behaviour was used more to gain attention (positive reinforcement) than to avoid demands.

Limitations of the study were the length of time required to conduct the assessment and collect the baseline data, the researchers believed that fewer sessions might have produced a better outcome. Although Kazdin (1994)

believed that because behaviour is rarely performed at a consistent rate, to obtain a representative sample assessment of a student's behaviour, it must cover an extended period of time.

Cowick and Storey (2000) pointed out that improving the environment for students with disabilities may help to create changes by decreasing the students' inappropriate behaviour in the classroom. The researchers have set out an assessment of the various intervention processes for the development of appropriate classroom strategies for teachers who have the responsibility of setting behavioural standards for students with serious emotional and behavioural disorders. Their research favoured regular student assessment, the importance of a calm environment, positive reinforcement, and educational programming that was geared to the needs of the student.

When implementing an intervention program (such as the one put forward in the current research study) there are two main steps to be considered. One is to ensure that all procedures are implemented correctly, and two is to see that the implementations are assessed continuously. The latter may be through direct observation, where a percentage agreement of the student's behaviour over time may be established. When the accumulation of relevant information is achieved, judgements can be made on the basis of data rather than on subjective impressions (Wolery, Bailey, & Sugai, 1988).

### Music Therapy in Behavioural Management

The use of music therapy for students with severe intellectual disabilities is fairly well documented in behavioural psychology, with the emphasis on arousal and reinforcement for these students, but little has been

done in the area of educational programs. The main aim of the therapy being to improve the quality of life for the students by the playing and listening to music. Although some successful developments in fostering appropriate behaviour have occurred, especially in one-on-one and clinical situations (Daveson & Edwards, 1998).

In recent years there has been an increase in strategies applied to challenging behaviour and the improvement of learning for students with disabilities (Cowick & Storey, 2000; Krakouer, 1998; Neef & Iwata, 1994; and O'Neill et al. 1997). Some of these studies produced significant evidence that some behaviours were used to convey social intentions and that, when different environments and different strategies, such as combining music and visual arts were used, traditional negative behaviours decreased. One particular different environment for students with severe intellectual disabilities is the combination of visual arts with music in an Education Support school visual art classroom in Western Australia.

Riddoch and Waugh (2003) researched the effectiveness of teaching students with severe intellectual disabilities non-representational visual art using a Pictorial and Musical Art Program. Their study included the participation of 12 primary school students with severe intellectual disabilities at an Education Support School in Western Australia. The quality of the students' visual artwork was compared with the visual artwork of 12 regular primary school students, when each group was subjected to the same art program. It was expected that the Pictorial Art Program when it was combined with a musical background, would produce a mood altering effect on the students with intellectual disabilities as well as the regular students. In the study it was also important to decide if the quality of the paintings, produced when the musical addition was made to the pictorial program,



were the result of the experimental procedures or the result of the novelty of the situation.

The study found that the addition of classical music as background, together with the observation and instruction of the Kandinsky print used in the teaching program, seemed to be the main stimuli for improving the quality of the students' painting. The students responded to the addition of the classical music in a positive way. This good group atmosphere generated a calming effect and gave a sense of security to the students. This alteration in mood was noted as a group effect. The results supported the group effect as explained by Durkheim (1956). The results also extended the work of Kaskell and Lauer (1990) in using visual art and (Hallam and Price) music to teach students with severe intellectual disabilities.

### **Some Effects of Cognitive Psychology on Behaviour for Students with Severe Intellectual Disabilities**

Woolfolk (1987) gave a description of information processing as the mind's activity in taking in information, storing it, and acting upon it. Cognitive development can then be an on-going advancement of a child's ability in the act of processing information. According to Woolfolk, Piaget (1963) suggested that the act of information processing is an activity that rests with the child alone, outside of any other influence, such as the teacher, the parent or the environment. An example of this, for a child with intellectual disabilities, would be the child's spontaneous decision to paint a picture. Vygotsky (1978), on the other hand, has expressed the belief that cognitive development relies on the interaction of the child with others, giving the child information and support throughout its formative years.

Vygotsky sees a zone of proximal development as an area where the child must have help to solve a problem. He saw this zone as the area where educational instruction is possible. An example of this belief, for the child with intellectual disabilities, may be the constant effort required by helpers to encourage the child to attempt to tie its shoe laces.

American psychologist Howard Gardner (1973) gave a description of the artistic process as a communication between one person and another by the means of a symbolic object. Whereby the first person has created and the second person can appreciate, understand, or at least react to. Based on his study of child development from the artistic viewpoint and his studies in neuro-psychology where he had been studying profiles of artistic abilities, Gardner set about redefining intelligence and as part of that study, he proposed his theory of *Multiple Intelligence*.

Gardner (1983) developed the theory of *multiple intelligence* further, and stated that he believed it to be a counter to the use of IQ tests, such as the Stanford- Binet test to measure a child's intelligence. According to Gardner's theory, the nine main areas of human intelligence are linguistic ability, logical, musical, spatial, bodily, interpersonal and intrapersonal ability, naturalistic and existential intelligences. Gardner believed that children could be regarded as being *at risk* or *at promise*. He also stated that Piaget may have underestimated the capabilities of young children. He found that the artistic development in young children may follow a "U" curve with well developed behavioural patterns, which declined gradually. When he was assessing childrens' drawings on the degree of "imaginativeness", "flavourfulness" and "originality", he established that five year olds may score better than ten year olds. Unless the child is in a coma, Gardner (1999) believed that every child could have some degree of intelligence. He is an

advocate of individual tuition, small group tuition, and peer tutoring for students with learning disabilities in special education schools, as well as in the mainstream school for students who are considered to be of normal intelligence.

In the end, we will in all probability find that the way in which we think about human behaviour and thought looks past – or through – such traditional divisions as artist and scientist, normal and brain-damaged, skilled or unskilled individuals. Yet in focusing on the arts, we may bring to light capacities and properties which have been hitherto neglected, and may discover as well that such aspects play a significant role outside the arts.

(Gardner, 1976, p. 31)

There are many causes of disability that can affect the cognitive development of the child, brain damage being an obvious example. Although according to Casey (1994), the specific disability of the child does not always determine the outcome of the effectiveness of an intervention. Westwood (1993) suggested that the effectiveness of an intervention on a child's learning ability may first require adjustments to the external learning environment, such as the quality and type of instruction, the teacher expectations for, and rapport with the student, and the classroom environment.

Cole and Chan (1990) pointed out that within the educational learning environment for students with severe intellectual disabilities cognitive strategies for student advancement depend on two essential aspects. The first one is for the student to gain attention, and the second is to become motivated to achieve. Although a varied number of teaching methods have found that no one method has proved completely efficient in surmounting all the problems in this area for all students with intellectual disabilities. The subject of gaining attention and motivation for these students will be advanced in the following chapter.

## Summary

The literature review of this research study began with a short summary of the historical implications that have had an impact on present day attitudes for special education both overseas and in Australia. The educational perspective for children with disabilities, especially in Western Australia, has been documented. The behavioural management of these children, which is an important aspect of this research project, has also received some consideration. An explanation of its practical application to students with severe disabilities has been included in the literature review, together with some effects of cognitive psychology on the attention, motivation and achievement of these students.

The use of music therapy, especially in clinical type situations of one-on-one or one-on-one with child and parents, has a long history with people with intellectual and development disability. Much of this work is in behavioural psychology using aspects of the Behaviourist Model, with an emphasis on producing arousal and reinforcement. The playing of music and listening to music has often been helpful for the development of some people with disabilities. For some fairly recent work on music therapy in clinical situations' one could consult Cowick and Storey (2000), who provided an assessment of the various systems available to students with serious emotional and behavioural difficulties. They found that the addition of music to the students' learning experience helped to facilitate a more positive behavioural attitude in the students who were experiencing emotional and behavioural difficulties.

There is some evidence from the USA, that arts programs combining music and visual arts can improve painting quality, the student's time on task and the attitudes and behaviour of students with disabilities. Some art

programs have proved to be effective in gaining focus and communication for students with autism. Also, in England there have been some innovative strategies devised for students with intellectual disabilities to challenge their creative skills, by giving students a chance to experience and take part in innovative musical programs.

Although a small amount of research has been conducted on the use of music and visual arts therapy for people with disabilities, very little research has been carried out on using music and visual arts in an educational setting, for students with severe intellectual disabilities, in Australia. In a short trial study, Riddoch and Waugh (2003) found that the added stimuli of classical music and visual arts improved abstract painting quality and attitudes and behaviour in students with severe disabilities in Western Australia. Therefore, it was realised that a more intensive study was required to investigate the use of classical music and art in an educational setting for students with severe intellectual disabilities in Western Australia, and to further investigate the effect of these interventions on the students' attitudes and behaviour in the classroom.

The next chapter describes the theoretical framework, and model of the present study involving the classical music and art in an educational setting. It describes the structure of the framework behind the visual arts program that will allow the participants to reach out and put into practice their own special form of art expertise.

## CHAPTER THREE

### THEORETICAL FRAMEWORK

*“In a behavioural analysis, probability is substituted for accessibility, the contingencies which affect an organism are not stored by it, they are never inside it; They simply change it.”*

*(Skinner, 1974, p. 121)*

#### **Introduction**

This chapter gives a description of The Pictorial and Musical Visual Arts Program that is based on the theoretical Behaviourist Model. The program includes the observation of student behaviour when the students are being subjected to certain stimuli. It works on the premise that the use of stimulus control can cause appropriate changes to the student's inappropriate behaviour that can, in essence, affect the quality of the student's artwork. A discussion of the Behaviourist Model, with the application of its main principles in the visual arts program, together with other theoretical ideas relevant to the study, is explained in this chapter.

## **Developing a Theoretical Framework for Special Education Art and Music**

In creating a format for an effective and informative visual arts program, whereby students with severe intellectual disabilities can benefit through enhanced creativity, improved behaviour outcomes and a heightened sense of self-esteem, it is important to first develop an effective teaching theoretical framework. By giving students a solid framework on which to produce their work, the teacher and the students are given the opportunity to operate for optimum learning potential from the lesson.

### The Role of the Teacher in the Pictorial and Musical Visual Arts Program

In the Pictorial and Musical Visual Arts Program, the teacher plays an important role in firstly being able to gain the students' focus and, secondly, by imparting knowledge in a simple and interesting way, that is easy for the students with severe intellectual disabilities to understand. This initial theory is based on the strategies of Vygotsky (1978), who emphasised the importance of the outside influences, such as type of instruction and learning environment on the child's cognitive ability, in contrast to Piaget (1962) who stated that the ability to perform must come from within the child. The opportunity for the students to perform or achieve is accomplished in the next stage of the Pictorial and Musical Visual Arts Program when the student is encouraged to pick up a paint brush, choose a colour from the palette and begin an original painting. Therefore, in developing an effective teaching framework for the art program in the current study, the influences of both Vygotsky and Piaget were taken into consideration. The Pictorial and Musical Visual Arts Program was also formed in line with the requirements

of the visual arts guidelines provided by The Curriculum Council of Western Australia.

The Curriculum Council of Western Australia (1998) pointed out that when teachers are planning their visual arts programs, they must be aware of the diversity in the Australian population. Therefore, the teachers need to construct visual art programs around the diverse interests and abilities of their students. The Council explains that all students need opportunities to work individually and in groups to express their own ideas and to develop focus and organisational skills in the creation of their visual artwork. It is important that visual arts programs, such as the Pictorial and Musical Visual Arts Program, are structured to give students with intellectual disabilities the encouragement they need to express themselves within a safe learning environment. In this safe learning environment, it is the teacher who provides them with positive reinforcement, and gives them the information and simple tools to effectively complete their task within a calm and supportive classroom environment. This premise applies equally to students with disabilities in the Education Support School as it does to their peers in the regular school (Casey, 1994; The Curriculum Council of Western Australia, 1998).

#### The Role of the Student in the Pictorial and Musical Visual Arts Program

Providing a well-structured framework for students with severe intellectual disabilities who are participating in the current study, allows them to select and name the colours they will use in their painting. This gives them the opportunity to use their ability to treat the painting exercise in a more personalised way. The cognitive action needed to make their own colour selection and the way in which they want to use the colours, also gives them a sense of independence and helps to foster their self-esteem



when they are able to view the outcome of their creative efforts. In this way, the students are integrating their visual artwork with cognitive processing strategies, which will help them to emphasize and use their creative abilities (Courtney, 1995; The Curriculum Council of Western Australia, 1998).

### **The Pictorial and Musical Visual Arts Program**

This new visual arts program consists of two main parts, a pictorial aspect and a musical aspect. Both parts are expected to influence students' concentration and creativity. The pictorial aspect gives students with severe intellectual disabilities the chance to focus and concentrate on the stimulus print of a great artist (Kandinsky) and to view its characteristics. The second stimulus is the addition of the classical music of Debussy and Mozart to the art lessons.

The effect that the Pictorial and Musical Visual Arts Program may have on the quality of the student's artwork, and on changing the inappropriate behaviour of students with severe intellectual disabilities, relies on gaining the attention of the students. Gaining attention is an essential part of the program and the teacher has an important role in its application. According to Maltby, Gage and Berliner (1995), in their section on children with special needs, no learning can take place without first gaining the attention of the student. In special education, teachers will often gain the attention of the students by first clapping their hands and then call the students to look at the clapping, sometimes the students may also start clapping. In this way, at the beginning of the Pictorial and Musical Visual Arts Program, the students are alerted to face the teacher and the stimulus print can be held close to the student's face for at least a couple of minutes, while the characteristics of the painting are explained. The class is small and

all the students in the class have their own copy of the print. There is a class teacher, and an assistant teacher in attendance on the students. The students are given time to focus, concentrate, and think about the stimulus painting, before they begin to paint.

When students with severe intellectual disabilities focus and concentrate for a time on the stimulus print, they have the chance to think about the painting and its characteristics, and about how they can use similar colours, composition and brush marks to create their own painting. This circumstance comes about because the teacher will be constantly pointing to the different colours in the print and to the similar colours in the student's palette and stressing this similarity. It is this sense of colour that the teacher endeavors to impart to the student at this stage that is most important for the student to grasp. After a few minutes, the print is removed from sight and the students are given a paint brush so that they can get on with their painting without further distraction. There is little chance that the students will try to copy the stimulus print because it has been removed from their sight. According to Smith (1988), students with intellectual disabilities do not copy, because they would find this activity almost impossible to achieve.

During the second part of the art lesson, it is expected that the musical aspect of the Pictorial and Musical Visual Arts Program will produce a mood-calming effect on the students. The classical music of Debussy and especially that of Mozart is soothing and, at the same time, attention-producing. The students should become more alert, to concentrate, and to create. The calming effect on the students' thoughts and behaviour is expected to give the class teacher a greater chance of communicating with each student, even though there may be little or no verbal response. The musical stimulus begins before the second viewing of the artist's print is produced. When the teacher does verbalise and explain the characteristics of

the stimulus print again, the students are more alert and able to concentrate, and think about the colours and composition of the stimulus painting in front of their eyes before it is removed and they begin their second painting.

It is expected that the combined pictorial and musical aspects will produce an effect of concentration, thinking and creativity that is greater than the effects of each, individually. During the second part of the lesson, when mood-altering classical music provides a soothing and attention-producing atmosphere The stimulus print is held in front of their faces, the students will concentrate on the characteristics of the print to the exclusion of other thoughts, such as the lines in the painting (simple spatial concepts) and the colours. These students then become more like clever intellectuals, or elite sports people, who can concentrate on one aspect in spite of what is going on around them. When the students concentrate and absorb the colours and style of the stimulus painting, they are then more likely to use these characteristics, and their own creativity, to produce a painting of good quality. Over a period of six lessons with a combined pictorial and musical intervention, students are likely to improve their concentration and creativity through increased concentration and practice.

Before each print is shown to the participants in the study, the teacher will give a short explanation of the artist. This will include the artist's name, some important dates, and the major colours that the artist used in his painting, such as red, blue and yellow that can be found in their own palette. The reason for drawing the student's attention to the colours is to form a link with the artist's print and their own painting that they are about to produce. It is an important colour learning experience for the students. The majority of the students with intellectual disabilities who are participating in this research study do not know the names of the colours they are about to use in

their painting. With repetition, they will begin to know the names of the colours and to choose their own colour preference in their painting.

Table 3.1

The Proposed Student Reaction to the Stimuli

<i>Stimulus</i>	<i>Expected Student Reaction</i>
1. Kandinsky Print of 'The Park' Impression V, 1911	Teacher gains attention by giving the student a print and pointing to colours.  Student notes colours in palette and paints first picture.
2. Kandinsky print, plus softly played classical music	Student senses calming atmosphere of music in classroom. Student views print closely for the second time and paints another picture.
3. Theoretical outcome	Due to the calming atmosphere of the music any inappropriate student behaviour should decrease and the quality of their painting improve.

The students with severe intellectual disabilities who participated in this research study, were not given the name of the classical music or its composer, being used in the visual arts program. The reason is that the music is introduced into the background at the same time the students are viewing the print for the second time. The teacher is showing them the characteristics of the print again and they are directly concerned with the colours used in the print. They are required to paint, but not to play music. Therefore, the music is used only to create an atmosphere in the classroom conducive to their creativity. The researcher chose the music of Debussy for the first two

weeks of the program because it is very quiet. Some of the students were not used to music during their lessons, so it was considered wise to introduce the more attention gaining music of Mozart when the students had become acclimatized to the background music during lessons.

## **Theoretical Models**

According to Cole and Chan (1990), there are six basic theoretical models used in the education of students with intellectual disabilities. The following models can be used to apply various strategies in the teaching of these students.

1. **Medical Mode** - This model requires the medical diagnosis of the student's disability. Assessment of the various learning problems of the student can then take place. It is based on the assumption that all the student's learning problems, and any inappropriate problems that the student may have are due to biological and neurological dysfunction.
2. **Developmental Model** - This model is rather similar to the medical model. It is based on the view that all children and adults have defined developmental stages, and their biological growth governs their cognitive and social growth. This rate in children with special needs is thought to be similar, but only proceeds at a slower rate than those of normal intelligence.
3. **Behaviourist Model** - An analysis of the student's behaviour is an empirical factor in this method. Observable behaviours can be manipulated to achieve desired outcomes through environmental changes. The use of changes to antecedent events that precede

inappropriate behaviour and the consequent events that may help to cause desired outcomes are applied and the behaviours are observed and charted. The behaviourist model may include the use of stimulus control and contingency management, together with precision teaching, mastery learning and direct instruction.

4. **Cognitive Model** - The model is concerned with the inner processes of the student's mind, as opposed to the outer process of external responses. Cognitive theories rely on training the thinking skills of the student to cause effective changes in the child's ability to process information.
5. **Humanistic Model** - This model relies on teaching the child to become more self-reliant. The gaining of academic qualifications is considered less important than the learning of social skills and the gaining of self-esteem. These strategies apply directly to cooperative learning methods.
6. **Ecological Model** - The ecological model is widely based on the environmental aspect of the child's learning that surround the child. It is concerned with the school, the child's family and the community. Problems in the child's learning ability are viewed from the aspect that there must be a lack of balance surrounding the child and that these anomalies must be discovered and irradiated before any worthwhile learning can take place. This model has received some criticism because of its sociological view of the educational process.

## **The Behaviourist Model and its Theoretical Relationship to the Pictorial and Musical Visual Arts Program**

The theoretical framework used for the visual arts program in this study favours the Behaviourist Model, and is based primarily on the Behaviourist Model, although it also combines some aspects of the other theoretical models. For example, it assumes that part of the Developmental Model that relies on diagnosis of the child's disability and the belief that students with special needs are capable of learning, albeit at a slower rate than students in the regular school. It also includes that part of the Humanistic Model that relies on helping the student to become more self-reliant. The students are encouraged to produce their own original artworks and to choose their own colours for this task. It also assumes that part of the Ecological Model concerned with environmental effects on the behaviour of students with severe intellectual disabilities, such as the positive attitude of the teacher to the students, the calm atmosphere of the classroom and the importance of a well structured program. Each student in the study is judged as an individual, so that the program is structured to chart each child's behaviour throughout the lesson.

The Behaviourist Model advocates the use of stimulus control by using continuous prompts and positive reinforcement to initiate positive responses from the students (Cole & Chan, 1990). The Behaviourist Model also inspires the use of direct instruction by the teacher, where programs must be well structured and presented in a one-to-one format to stimulate the student's acquisition of skills that emphasize the mastery of basic skills (Woolfolk, 1987). The mastery of materials and a strong sense of student involvement in a pleasant environment is also emphasized in the Pictorial and Musical Visual Arts Program advocated in the current study. The program strongly supports the use of continuous prompts and positive

reinforcement of the participating students. It also relies on direct instruction in a one-to-one format to stimulate the student's creativity. This theoretical base to the program relies on giving the students the teacher's attention, but still allows the students to act in the completion of their own task in a positive manner, in a secure and pleasant environment.

Behavioural corrective procedures for students with intellectual disabilities can be made by regular and systematic changes to the student's environment (Jenkinson, 1997). Behaviourist theories employ the observation and measurement of the student's behaviour when they are confronted with a series of different changes. These changes are constructed in such a way as to cause favourable and more appropriate behaviour in the student. Stimulus Control, Contingency Management and Precision-Teaching are some of the teaching methods used by the Behaviourist Model to cause appropriate behaviour in students with intellectual disabilities. Student behaviour is observable and an analysis of the student's behaviour nearly always requires four separate steps. One, define the behaviour. Two, measure the behaviour. Three, make an accurate record of the measurements and, four, analyse the data (Cole & Chan, 1990).

In a behavioural analysis, probability is substituted for accessibility, the contingencies which affect an organism are not stored by it, they are never inside it; they simply change it. As a result, the organism behaves in special ways under special kinds of stimulus control. Future stimuli are effected if they resemble the stimuli, which have been part of earlier contingencies.

(Skinner, 1974, p. 121)

The Behaviourist method of *Stimulus Control* stresses antecedent stimuli, such as the stimuli used to induce the student to respond (Porter, 1996). In this current study, the first stimuli used in the Pictorial and Musical



Visual Arts Program encourages the student to look at the artist's painting and to note the same bright colours of blue, red and yellow in their own palette. Although this contingency is considered outside the student, it has an affect on the student. When the teacher encourages the student to try and name these colours, this small exercise, especially if it is repeated over time, becomes routine. It also gains momentum from the second stimulus in the art program, that is the addition of mood-calming music into the student's classroom, which is helping to create an environment that is conducive to the creation of the student's further artwork.

Contingency-management is the method used by the teacher during the lesson. The constant use of positive reinforcement throughout the Pictorial and Musical Visual Arts Program helps to cause the desired responses from the student. With the addition of precision teaching, which requires this constant monitoring of the student's behaviour throughout the intervention process, the researcher, as observer of the lesson is charting this by constant monitoring. The effect of the antecedent stimuli on the student's behaviour is noted, measured and analysed, to give a reliable and accurate assessment of any changes that may occur in the student's behaviour due to the intervention process. It also gives an accurate progress report of the student's reaction to the stimulus, when their quality of work is taken into account. That is, better application of brush strokes, cleaner and calmer appearance of composition of the artwork, over time (see Appendices V – VIII).

#### Some Criticisms of the Behaviourist Model

According to Woolfolk (1987), the main criticism of the Behavioural Method of contingency management is in the use of token programs. Woolfolk points out that this may not always be effective, when students

who are already sufficiently interested in the subject matter they are learning, may lose interest altogether when the token program ends. Contingency management where the use of tokens, such as biscuits, sweets or stickers are often used in the Education Support school by teachers to activate and encourage students to begin, or stay on task, is considered to be the most effective (Westwood, 1987). The use of tokens was given due consideration before compiling the teaching framework for the Pictorial and Musical Visual Arts Program, but it was decided that biscuits, sweets or stickers would be inappropriate. In the case of biscuits or sweets which may be given to the students during the art program, their hands would require to be washed before eating and this would cause disruption to the timing of the lesson. Stickers added to the students' paintings might tend to confuse the markers of the paintings at a later date, because not all of the paintings would have a sticker. Therefore, the use of reinforces other than that of constant positive verbal reinforcement for the students taking part in the Pictorial and Musical Visual Arts Program were not considered necessary, or appropriate.

The second main criticism of the behavioural method of token reward, according to Woolfolk (1987) is the effect of a reward system on the other students. This system can appear to reward one student over another, and may affect other students in the class adversely. Although, it is suggested by Woolfolk that students who are not participating in the reward program can be taught to understand the reasons why the teacher is using the system for some students and not for others, by the expert explanation of the teacher. This type of instruction may be too difficult for students with severe intellectual disabilities to understand and was not considered appropriate in the current study.

## Relationship between the Behaviourist Model and Socio-cognitive Theory

Woolfolk (1987) suggests that social cognitive theory that stresses student learning through observation may be a connection between the behaviourist theory and some cognitive strategies. Thus, by combining the basic theories of Piaget (1962) and Vygotsky (1978). By the use of the direct instruction of the teacher and also allowing the student to work unaided to complete the required task to produce the desired object, it was believed that a worthwhile outcome may be obtained from the Pictorial and Musical Visual Arts Program.

Cognitive behavioural interventions may also be in the form of self-instruction, which is achieved when the teacher acts as a model for the student by slowly describing certain learning tasks step-by-step. Then the student follows the same task under direction from the teacher. Lastly, the student is required to repeat the task alone. The child receives positive reinforcement on completion of the task. Another form of cognitive behavioural intervention is self-recording. This is similar to self-instruction, except that the teacher mentions a behaviour, such as "I am happy, so I clap my hands." The teacher mentions the behaviour and the child decides what is happening and copies this behaviour.

Some research has been effective in the socio-cognitive area in helping to show that appropriate student behaviour may be increased, or undesirable behaviour decreased, by these methods (Cole & Chan, 1990). Teachers may also use a combined behavioural procedure by including the traditional behavioural intervention (tokens, verbal reinforcement) as well as cognitive behavioural techniques in their intervention strategy, to change the student's inappropriate behaviour. One of these techniques essential to the successful

start of the Pictorial and Musical Visual Arts Program is in first gaining the student's attention.

### The Role of Attention in the Pictorial and Musical Visual Arts Program

In education, one of the main cognitive abilities for a student to obtain is that of attention ( De Reiter & Wansart 1982). Flavell, Miller and Miller (1993) noted four categories of gaining attention for the student. The first two are learning to control their attention and attempting to gain focus on an object. Then, they must pay attention to the task in hand and be able to plan their attention. If the teacher goes to the front of the class and claps her hands loudly at the beginning of a lesson, the child will learn that this act will mean "pay attention to me". When the first three acts of information processing, that is, paying attention to the teacher, listening to what is being said and following the instructions being given, have been accomplished, the students may learn to change their attention from the wrong to the right strategy. The students might have been playing with a pencil when suddenly they will realise that they should have been listening to instruction and paying attention to the teacher.

Casey (1994) explains that to gain and hold the student's attention, teachers must provide educational activities that are both interesting and appropriate to the students' level of achievement. Students with severe intellectual disabilities often have great difficulty in applying themselves to the task in hand. It is also possible that the teacher requiring them to complete work that is over their level of competence might increase this problem. In the Pictorial and Musical Visual Arts Program, after the teacher has successfully gained the student's attention, each student is taken gradually step-by-step through the lesson. With the use of constant positive

reinforcement, the lesson stimulates the students through the use of colour and music to accomplish their task.

Attention is usually a pre-requisite of learning, and as every teacher knows, the lack of attention to task is often the most inhibiting factor in a child's learning. The teacher must utilise the various characteristics of stimuli that arouse attention - *novelty, contrast and anticipation of reinforcement* to make the child's tasks interesting and attention-getting.

(Casey, 1994, p. 80.)

### The Role of Motivation in the Pictorial and Musical Visual Arts Program

Students with intellectual disabilities learn at a much slower rate than their peers in the regular school, though they may progress through the same development stages according to Piaget's theories (Woolfolk, 1987). To motivate the student to understand basic concepts at a slower rate, teachers must spend more time working through ideas and activities with the students. Students with disabilities are more likely to be motivated by teachers who understand what it is to provide them with a good classroom environment (Barry & King, 1999). In the Pictorial and Musical Visual Arts Program, the teacher provides for optimal motivation of the students in a number of ways. First, the teacher must have a positive attitude in the classroom. The delivery of the structural program must be simple, concise but interesting for the students. The students come into the classroom, receive their painting aprons and sit at the table with a palette of bright colours before them. The teacher describes what is expected of them, they are going to paint a picture with the colours of red, blue and yellow, with the help of a stimulus print and the addition of paper and a paint-brush, the students focus on the print, note the colours and begin to paint. At this stage, the motivation for the students is externally controlled.

Students will learn best when they understand what is required of them, and when their active involvement and achievement is fostered by both the content and the process of the delivery of the instructional program. The teacher can modify the classroom environment to be conducive to optimal learning, and can negotiate rules and procedures that promote the smooth functioning of the group. Student motivation can be enhanced by ensuring the learning tasks meet their academic needs.

(Porter, 1996, p. 250)

Motivation can be defined as either self-determined or externally controlled. Intrinsically motivated behaviour is self-determined, because it is done for ones' satisfaction in the enjoyment of an activity. Extrinsically motivated behaviour is apart from the satisfaction of the activity, such as the obtaining of a desired outcome or by avoiding a chastisement. There are a number of strategies that may help to motivate students and can be presented to the students by their teacher. They include creating an atmosphere for the students before beginning the lesson. The teacher can add to the motivational atmosphere in the classroom by the addition of *visual sensitisers*, such as interesting pictures or colourful banners on the walls. Praise of the student's work as it progresses and the setting of a time limit for the completion of a task can also be a successful motivation strategy (Knight-Murdie, 1990). These strategies for motivation apply to the Pictorial and Musical Visual Arts Program of the current research study.

The addition of music to the lesson at an appropriate time can also add to the student's interest and motivation (Duffy & Fuller, 2000). Teachers have a number of different strategies for obtaining student motivation apart from the obvious one of praise of the student's work. In the Pictorial and Musical Visual Arts Program, student motivation is obtained and sustained by the use of a pictorial stimulus as well as constant verbal reinforcement and the addition of a musical stimulus during the lesson.

In the educational learning environment for students with severe intellectual disabilities, cognitive strategies for student achievement depend on the student first gaining attention. Then the student must become motivated to achieve. Although the application of a varied number of teaching methods has found that no one method has proved completely efficient in surmounting all the problems in this area, for all students with intellectual disabilities (Cole & Chan, 1990).

At the beginning of the Pictorial and Musical Visual Arts Program, the students come together as an art group in their usual visual arts classroom with their usual visual arts teacher. The students are familiar with their surroundings, which is an important consideration when introducing new material to students with severe intellectual disabilities. In this way they are not liable to be disturbed by a change of routine. At the beginning of the lesson the students are treated as a group and they all receive the same stimulus of a print of an artist's painting. They will begin to paint at the same time and receive the same instruction in a calm and familiar environment, with the addition of a further stimulus of softly played background music. The teacher instructs but does not interfere with the students' creativity, because the students must be allowed to go ahead and produce work that is entirely of their own making. The type of behavioural management that allows the student with severe intellectual disabilities to achieve more of his or her potential and which is largely based on the strategies of the Behaviourist Model, applies to the theoretical application of the Pictorial and Musical Visual Arts Program.

## Meta-Patterning - Music and the Mind

What is meant intuitively by a “pattern” is essentially a representation of something simpler. When one represents  $x$  in terms of something simpler than  $x$ , one has obtained a pattern in  $x$ . Therefore, a representation is a kind of relation between the representer and the thing represented. So, as one would expect, the Meta pattern reduces self-organisation to certain relations between entities. It contends that everything is made up of a relationship.

(Goertzel, 1993, p.2)

Stige (2002) refers to the earliest form of meta-patterning of music for an infant from its earliest stage. The researcher relates it in the beginning to the tones in the voice of its mother or other care giver. According to Cross (1999), proto-musical behaviours may be an important link in cognitive development by distributing and reinforcing information across many domains. Cross (1999) proposes that the effect of the sound of music can be shown quite early in an infants’ development and quotes Papousck (1996, p. 46) as referring to the “significance of elements of music in the ocilitating development in the child’s expressing and learning capacity.” The second stimulus provided for the students with intellectual disabilities, who are participating in the Pictorial and Musical Visual Arts Program, is calming background music. This introduction aids the student by forming a meta-pattern, or a relationship with the student that is something other than self (Stige, 2002).

Janata and Grafton (2003), although accepting that the cognitive neuroscience of music is still in its infancy, believe that the importance of the patterned sequences of music on a child’s ability to perceive and to influence the child’s behaviour is very relevant in today’s learning environment. Jensen (2000) gives an account of the effects of the patterned sequences of



music on learning. The ability of music to lower stress levels through specific ways when it works as a *carrier* by a melody or rhythm to engage the brain, as an *arousal*, to be a calming influence, to excite, and to act as a *primer* through its effect as an 'energy source' for the brain. Jensen (2000) also alludes to visual arts as especially important for education as it can provide students with an outlet for creative expression when using music and visual arts to enhance the learning experience for the students.

### The Importance of the Tomatis Method

Dr Alfred Tomatis affected a technique to use classical music as a stimulus connection between the human ear and the nervous system. He developed this technique in order to blend together certain features of human development and behaviour. Tomatis believed that *bone conduction* was the main channel to the inner ear (Thompson & Andrews, 2000).

The rhythms, melodies and high frequencies of Mozart's music stimulate and charge the creative and motivational regions of the brain and bring success for the student with intellectual disability by lengthening the attention span and giving the student a greater sense of self-esteem (Campbell, 1997).

Figure 3.1 shows the neuro-psychology of the Tomatis Method. This refers directly to the relationship between the student's brain and their behaviour. Because the human nervous system responds to the senses of taste, sight, smell and sound, the Tomatis Method is based on the assumption that the senses react to sound, more especially high frequency sound, which can affect the stimulation of the brain. Concerning the evaluation of the Tomatis Method, Thompson and Andrews, (2000) state that:

In some meta-analytic studies involving students with learning and communication disorders, positive effect sizes were found for each of the five behavioural domains analyzed: linguistic, psychomotor, personal and social adjustment, cognitive and auditory. The results suggest additional research is warranted, and they are consistent with clinicians' reports of beneficial effects.

(Thompson & Andrews, 2000, p. 11)

The Pictorial and Musical Visual Arts Program is theoretically reliant on the *Tomatis Method* during the introduction of the second stimulus to the lesson, that is the playing of classical music, with the emphasis on the music of Mozart ("Concerto for Violins" and Sonata for Two Pianos in D major"). It is believed that the effect of the carefully selected classical music will affect the students with severe intellectual disabilities, by creating an environment where the brain will be stimulated by the use of the classical music. Mozart's high frequency sections of music improve the students' cognitive awareness and thinking, and painting strokes (psychomotor abilities) (Campbell, 1997).

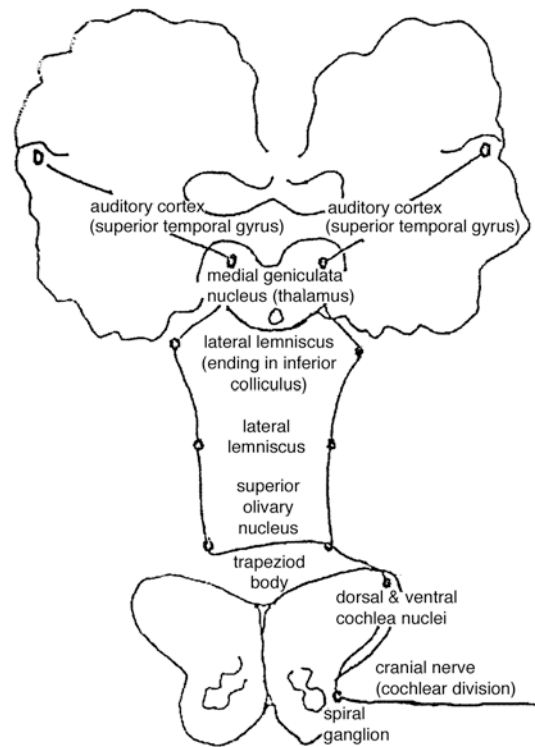


Figure 3 Diagrammatic Picture of the Brain. (Thompson & Andrews, 2000, p.10).

## Summary

This chapter has endeavoured to show the importance of the Behaviourist Model in the structural framework of the Pictorial and Musical Visual Arts Program. It stressed the reliance that the program has on the addition of music and especially the music of Mozart for these students. An attempt has been made to find a source of behavioural intervention that may produce a desired change within the child's general attitude to learning through an appreciation of the application of colour and the addition of sound to their visual arts lesson.

In the program the students with severe intellectual disabilities can develop new skills. They will have the opportunity to learn the names of the primary colours in their palette. They will also select the colours for themselves and apply the brush strokes in a number of different ways. The students will discover that they are capable of producing colourful paintings entirely on their own. This ability may not be evident in the first, or even the second lesson, but by the end of the program they will display their original work with pride and a new sense of self-esteem. The students will also gain by their gradual introduction to the high frequency music of Mozart, in a situation where they will experience a stimulating improvement on their cognitive and psychomotor abilities.

The next chapter explains the linear and non-linear measures used in the painting quality, and attitude and behaviour for the students.

## CHAPTER FOUR

### MEASUREMENT

*“Happily, we have in our grasp today technology that should allow a quantum leap in the delivery of individualized services for both students and teachers.”*

*(Gardner, 1999, p. 179)*

This chapter begins with a description of the requirements for linear, uni-dimensional measures and explains how a Rasch computer program can be used to create a linear scale of students’ abstract painting using technical judging aspects. A Rasch analysis requires  $N = 200 +$  with four items and this was not possible for students with severe intellectual disabilities where class sizes are usually around eight students or less. Thus, painting scores from 200 regular year 1 students were analysed with a Rasch computer program to create a benchmark linear scale that could also be used for students with severe intellectual disabilities.

For some data, it was not possible to create a linear Rasch scale and so non-linear Guttman scales were created for some aspects of this study. Hence, it is necessary to explain the characteristics of a Guttman pattern for a uni-dimensional variable and of a Guttman scale (Guttman, 1944, 1950).

## Creating Linear Measures

### Linear Measures

Linear uni-dimensional measures are needed in the present study because there are no studies where linear, uni-dimensional scales of abstract painting quality are created. With the use of linear scales, it will be possible to increase the sensitivity in finding a result (either positive or negative) for the experiment.

In a linear scale of quality of student painting, equal differences between the numbers along the scale represent equal amounts of quality of abstract painting. The only currently known way to achieve this is with a Rasch measurement model (Wright, 1999). Wright (1999) points out that merely summing scores on a test or questionnaire (and this applies to judges scores on aspects of painting) does not produce a linear scale. At best, summated scores can only produce a ranking score and Michell (1990,1999) has produced evidence to suggest that even a ranking cannot be guaranteed with summated scores produced with classical test theory, only with Guttman scales.

There are five main requirements for linear measures in education (see Wright, 1999, for commentary on this).

1. Measures must be linear, in the sense that equal differences between any two item difficulties on the scale must equal the two corresponding amounts of what is being measured, so that adding, subtracting, dividing and multiplying can be done with the measures. This means that a person's response to an item on the scale must only be related to the difference between the calibrated person measure

and the calibrated item difficulty, for each item on the scale, and for each person who answers the items.

2. Item difficulties must be calibrated 'sample-free' and be ordered from easy to hard.
3. Person measures must be calibrated 'test-free' and be ordered from low to high.
4. Persons must be able to be measured on parts of the scale targeted at their abilities so that other parts of the scale do not affect their measure; and
5. It is a benefit if the method is easy to apply.

### Rasch measurement

A Rasch measurement model requires that items must fit the measurement model and not the other way round (see Andrich, 1989). The measurement requires that item difficulties be ordered conceptually from easy to medium to hard. It requires that persons with high measures most probably answer the hard, medium and easy items positively, that persons with medium measures most probably answer the medium and easy items positively (but not the hard items), and that persons with low measures only answer the easy items positively. The Rasch method produces 'scale-free' person measures and 'sample-free' item difficulties (Andrich, 1988, Wright & Masters, 1982, 1981). This means that differences between pairs of person measures and the corresponding pairs of item difficulties are sample independent, a requirement of a linear measure (Wright, 1999).

### Tests-of-fit for Rasch measures

For a cumulative trait, the best computer program to use in creating a linear scale is Rasch Uni-dimensional Measurement Models (RUMM) (Andrich, Sheridan, & Luo, 2003). This computer program makes six tests of the data to fit the measurement model so that a linear scale can be created and these are now explained.

One, item thresholds are calculated in relation to the category responses. At a threshold, persons have odds of 1:1 of answering adjacent categories. Three response categories means that there are two thresholds, four response categories mean that there are three thresholds, and so on. If persons answer the category responses consistently, in line with their person measures and the item difficulty, then the thresholds for that item are ordered in correspondence with the ordering of the response categories. Otherwise, the item is deleted.

The second test is an item-trait test-of-fit, and is calculated as a chi-square, with a corresponding probability of fit (see Andrich & van Schoubroeck, 1989, pp. 479-480 for the equations). The item-trait test-of-fit examines the consistency of the item parameters (item difficulties) over the range of person measures by comparing the observed and expected values. If the observed and expected values are not significantly different, then there is no significant interaction between the responses to the items and the person measures along the trait, according to the measurement model. This test shows the collective agreement for all items across students of different measures along the scale and indicates whether a uni-dimensional trait (inferred by a single score for each person) can be used to describe each person's item response.



The third test is where an item-person interaction and a person-item interaction are calculated. The item-person test-of-fit examines the response patterns for items across persons and the person-item test-of-fit examines the response patterns for persons across items (see Styles & Andrich, 1993, p. 914 for the equations). The fit statistics approximate a distribution with a mean near zero and a standard deviation near one, when the data fit the measurement model. This is because the fit statistics are residuals (differences between observed and expected values), which are standardised. Negative fit statistics indicate a response pattern that fits the model too closely (probably because response dependencies are present, (see Andrich, 1985) and positive fit statistics indicate that other measures are present as 'noise'.

Test four is a Person Separation Index and is constructed as the ratio of estimated true variance among persons and estimated observed variance among persons, using the estimates of their locations (measures) and the standard errors of these locations (measures) (see Andrich & van Schoubroeck, 1989, p. 483 for the equations). For good Rasch measures, this index would always be expected to be greater than 0.90 and is interpreted in the same way as a Cronbach Alpha. Standard errors of measurement for the measures and the item difficulties are calculated (see Wright & Masters, 1982, for the equations) and set out in tables by the RUMM computer program.

In test five, the RUMM program tests individual item and person fits to the measurement model through the use of residuals. Residuals are the differences between the expected values predicted from the model and the observed values. For good measurement, residuals should be minimised, but this depends on collecting good data and on the persons answering the questionnaire properly and consistently in line with the truth, and on how well the data fit a Rasch measurement model.

The sixth test concerns construct validity of the data. In the present study, a linear measure of painting quality was created using scores of 1 – 5 for four aspects in the use of colour, colour application, composition and creativity. The four aspects (used as items in the Rasch analysis) were conceptually ordered from easy to hard. Examining the actual item difficulties can test this structure of conceptual item difficulties. In this way, the construct validity of the data supporting the model behind the conceptual structure of painting quality can be tested, as is usually done in questionnaire analysis with the RUMM computer program (see for example, Waugh, 2003, 2005).

An additional aspect that can be tested is targeting. For good targeting, the item thresholds should cover the person measures along the scale so that the items are neither too easy nor too hard for the persons. The RUMM program produces graphs to show this targeting.

### The Simple Logistic Model of Rasch

There are two parameters in the Simple Logistic Model of Rasch (Rasch, 1960, 1980, 1992). One, which represents a measure for each person on a variable, and the other, represents the difficulty for each item. Items are conceptually ordered by difficulty from easy to harder for the variable being measured. Person measures are conceptualised as being ordered from low to high. Data are collected from persons and scored dichotomously. From the measurement model, a parameter (item difficulty) is estimated for each item based on the data. This parameter does not differ for persons with different measures of the variables. Similarly, a parameter (person measure) is estimated for each person based on the data. If different persons do not agree with the item difficulties, this will reveal a poor fit to the measurement

model. These parameters are estimated together and calibrated on the same scale in logits — the log odds of answering positively.

The probability of a person answering an item positively is related to the difference between the person’s measure and the item’s difficulty. A positive difference indicates a good probability of answering positively, since the measure is higher than the item difficulty on the same scale, that is, the item is easy. A negative difference indicates the item is too hard and there is a low probability of answering positively.

Table 4.1

Equations for the Simple Logistic Model of Rasch

Probability of answering positively (score 1) for person n	=	$\frac{e^{(B_n - D_i)}}{1 + e^{(B_n - D_i)}}$
Probability of answering negatively (score 0) for person n	=	$\frac{1}{1 + e^{(B_n - D_i)}}$

Where

e = natural logarithm base (e+2.7318)

B<sub>n</sub> = parameter representing the measure (ability, attitude, performance) for person n

D<sub>i</sub> = parameter representing the difficulty for item I

The Partial Credit Model of Rasch

The Partial Credit Model of Rasch is an extension of the Simple Logistic Model taking it from just the two response categories to three or more categories or outcomes that are ordered (see Masters, 1982, 1997). The output from the RUMM computer program is similar to that from the Simple Logistic Model except that the order of the outcome categories are tested through threshold, ordering and category response curves. The Partial Credit Model differs from the Simple Logistic Model of Rasch, in that it has more

than one threshold. This form of Rasch measurement was used in this study (see Chapter 6).

The Partial Credit Model of Rasch applies to ordered levels of knowledge, such as school tests where items are marked in a set of ordered categories, such as 0, 1, 2, 3, 4, 5, or ordered levels of problem solving tasks that need to be completed in a required time. It could also be applied, as it was in the present study, to ordered scores (outcomes) for painting quality.

#### Linear Rasch Scale

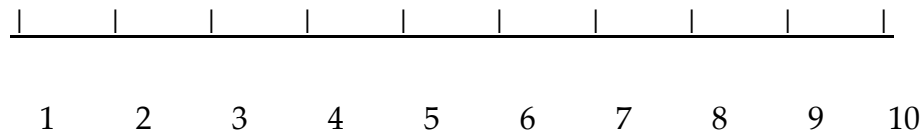


Figure 4.1 An Idealised Linear Rasch Scale

- Note:
1. The scale is in logits, the log odds of successfully answering the items
  2. Equal differences between the numbers represent the same amount of painting quality.

Table 4.2

Equations for the Partial Credit Model of Rasch.

$$\begin{aligned}
 &\text{Probability of person } n \text{ scoring} \\
 &\text{in outcome category } x \text{ of item } i \\
 &\text{(for } x = 1,2,3,4 \dots M_i)
 \end{aligned}
 =
 \frac{e^{\sum_{j=1}^x (B_n - \delta_{ij})}}{1 + \sum_{k=1}^{M_i} e^{B_n - \delta_{ik}}}$$
  

$$\begin{aligned}
 &\text{Probability of person } n \text{ scoring} \\
 &\text{In outcome category } x \text{ of item } i \\
 &\text{(for } x = 0)
 \end{aligned}
 =
 \frac{1}{1 + \sum_{k=1}^{M_i} e^{B_n - \delta_{ik}}}$$

Where

$e$  = natural logarithm base ( $e = 2.7318$ )

$\sum (B_n - \delta_{ij})$  is the sum of  $B_n - \delta_{ij}$

$B_n$  = a parameter representing the measure (ability, attitude, skill or performance) for person  $n$

$\delta_{i1}, \delta_{i2}, \dots, \delta_{iM_i}$  = are a set of parameters for item  $I$  which jointly locate the model probability

curves for an item with  $M_i + 1$  outcome categories.

## Scores on Painting Quality

### Painting Quality (paintings produced by all students)

Two or three qualified teachers marked all of the paintings required for the experiment. The Paintings were marked on four aspects, use of colour, colour application, on composition and creativity. These are defined below and each marker used the same criteria. A mark was given from 1 - 5 on a scale from low to medium to high for each of the four categories. A mark of 3 was awarded at the medium level. The scores were then analysed

with the RUMM (2020) computer program (Andrich, Sheridan, & Luo, 2003) using the Partial Credit Model to create a linear scale of painting quality. The idea here was to use judges to obtain scores more on technical quality (skills and processes outcomes) of the paintings than on aesthetic quality, in contrast to what was done with Western Australian data by Fairall (1989), although creativity was included.

### Marking Criteria

#### **Use of Colour**

One mark was awarded if the student used only one colour.

Two marks were awarded if the student used more than one colour.

Three marks were awarded if the student used all of the colours in their palette.

Four marks were awarded if the student used these colours cleanly.

Five marks were awarded if the colours were used to show some understanding of the spatial concepts taught in the lesson.

#### **Colour Application**

One mark was awarded for attempting a colourful brush mark.

Two marks were awarded when the student applied more than one colourful brush mark.

Three marks were given if the student showed some understanding of complimentary colours in the application.

Four marks were given if the student applied a combination of colours (not necessarily complimentary) in a balanced and clean application of the paint.

A fifth mark was awarded if the student had fulfilled all the above criteria.

## **Composition**

One mark was given if the student had made an attempt to cover some of the picture plane.

Two marks were awarded if the student had used these brush marks cleanly in an attempt to cover the picture plane. An extra mark could be given when the colours were used to show some understanding of the spatial concepts taught in the lesson.

Three marks were awarded if the brush marks were used cleanly to form a balanced composition.

Four marks were awarded if the student had covered the picture plane with a clean, clear and well balanced composition and one extra mark was given if the student showed an understanding of spatial concepts by the use of line in the composition (see Appendix V).

## **Creativity**

One mark was given if the student had made some attempt to paint.

Two marks were awarded for two colourful brush strokes.

Three marks were awarded for an overall clean and colourful attempt at painting.

Four marks were awarded if the student's painting depicted a good use of colour in a balanced composition covering the picture plane.

Five marks would have required the student to have shown a good use of colour, used brush strokes cleanly and clearly, shown some basic knowledge of spacial concepts and to have produced an interesting and well balanced composition (see Appendix VIII).

In a study of students' abstract painting, Fairall (1989), used a semantic differential in the measurement of mainly aesthetic painting quality and, although this measure differs somewhat from the current study, some aspects of the Fairall study are included in a combined form. It was hoped that, since Fairall (1989) only found a Person Separation Index of 0.69 with his semantic differential measure, the current study would be able to improve on this. It was also expected that improvements might be made through various tests-of-fit to the measurement model, as provided in the more advanced RUMM computer program.

### **Guttman Scales**

A Guttman Scale, sometimes known as cumulative scaling, endeavors to establish a uni-dimensional continuum for a concept requiring measurement with the outcome of producing perfect item response patterns when only the total scores are known (Guttman, 1944, 1950). Example is given in Table 4.3.

Table 4.3

An Example of a Guttman Scale using Three Items

Item 3	add	1153	+	1627	(hardest item) score 3
Item 2	add	135	+	116	(harder item) score 2
Item 1	add	12	+	15	(easiest item) score 1

A person who answers item 3 correctly will be able to answer items 2 and 1 correctly. A person who answers item 2 correctly but not item 3, will



answer item 1 correctly. A person who answers item 1 incorrectly will also answer items 2 and 3 incorrectly. Guttman scores for four items scored dichotomously are set out in Table 4.4, which also shows the total scores for each of the five possible response patterns and the corresponding total scores for the scale. Once we know a particular total score, we know the individual scores on each item. This guarantees that the scores represent a ranking of the measure, which the usual summing of scores on test items does not guarantee (see Guttman 1944, 1950; Michell, 1990, 1999).

Table 4.4  
Ideal Guttman Pattern for Dichotomously Scored Items

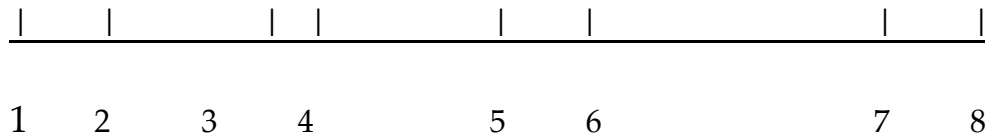
Item 1	Item 2	Item 3	Item 4	Guttman Score
Yes	Yes	Yes	Yes	4
Yes	Yes	Yes	No	3
Yes	Yes	No	No	2
Yes	No	No	No	1
No	No	No	No	0

Note: In an ideal Guttman scale, if we know the total score, we know the individual scores of each item.

An ideal Guttman pattern, for the present study in judging painting quality, is set out in Table 4.3. In this case, where scores of 1 to 4 (instead of 1 to 2) are given for each item, there is still a correspondence between total scores and scoring patterns, but it is possible for some total scores to have two or three different patterns. Where the patterns do not conform to Table 4.3, there is a non-perfect fit with the Guttman pattern. If the misfit is too large (Guttman suggests > 10%), then the scale is considered to be multi-dimensional and the items should be revised.

Guttman scales formed from summated scores on a set of ordered items are considered to be non-linear. This is because equal differences

between the numbers on the scale represent unequal amounts of the measure, in this case, painting quality (see Michell, 1990, 1999) (see figure 4.2).



**Figure 4.2** Representation of a Non-Linear Scale formed from Summated Scores for Painting Quality.

Note:

Equal differences between the numbers on the scale represent unequal amounts of the measure of painting quality.

In practice, it is difficult to obtain an ideal Guttman pattern for a uni-dimensional variable for two reasons. One reason is that it is difficult to write items, or judging criteria, in which there is an exact correspondence between the total scores and the scoring patterns. A second reason is that nearly all behaviours (like painting quality) involve more than a single factor. Painting quality involves, for example, cognitive skills, hand skills, colour coordination and attitude which is multi-dimensional, making it difficult to have an exact Guttman scoring pattern on a uni-dimensional scale, whether linear or non-linear. However, by using more technical outcomes (skills and processes) than aesthetic criteria for judging painting quality, it was thought that it might be possible to obtain a uni-dimensional scale, or at least a good approximation to a uni-dimensional scale.

Table 4.5

Ideal Guttman Pattern Showing Four Judging Scores (4,3,2,1), for Four Items

Item 1	Item 2	Item 3	Item 4	Guttman Score
4	4	4	4	16
4	4	4	3	15
4	4	3	3	14
4	3	3	3	13
3	3	3	3	12
3	3	3	2	11
3	3	2	2	10
3	3	2	1	9
2	2	2	2	8
2	2	2	1	7
2	2	1	1	6
2	1	1	1	5
1	1	1	1	4

Note: In this ideal Guttman pattern for judging painting quality, some total scores can be obtained by scoring patterns not represented here. For a uni-dimensional non-linear scale, the scoring pattern should be as close as possible to the ideal pattern.

An observation checklist was compiled by the researcher to note the on-going attitudes and behaviour of the students with severe intellectual disabilities, whilst taking part in the Pictorial and Musical Program.

Table 4.6

Observation Checklist of Students with Severe Intellectual Disabilities

- 
1. Student is aggressive and disruptive to peer/s
  2. Student is disruptive to a peer
  3. Student is inattentive to task
- 
4. Student vocalises loudly and disrupts class
  5. Student vocalises and annoys peers
  6. Student vocalises softly and is not on task
- 
7. Student is out-of-seat and disrupting class
  8. Student is out-of-seat
  9. Student flays arms and disrupts peers
- 

Note:

1. Because the items are written in a negative sense, the response categories are reversed to provide a high score as good behaviour and a low score as bad behaviour.
2. Response categories: never scored 4, sometimes was scored 3, often was scored 2, and most of the time was scored 1.
3. The hypothesised conceptual order is 2 (hardest occurs least often), 8, 9, 7, 6, 5, 4, 1, 3

The students were checked for their inappropriate behaviour on nine aspects, called items in the analysis in Chapter 9. For each of these inappropriate behaviours during the painting segment of the lesson, a symbol was placed beside the student's name on a chart. If there was no symbol beside the student's name at the end of the lesson, a score of 4 was given. A score of 3 was given if the inappropriate behaviour had taken place

for a little of the painting time (that is, sometimes). A score of 2 was given if the inappropriate behaviour took place for about half of the painting time, and a score of 1 if the inappropriate behaviour occurred for most of the painting time. These response categories are reversed scored because the items are written in a negative sense and a high score was required to represent good behaviour. The scoring was allocated to the students during the duration of the painting for stimulus 1 and also for stimulus 2 of the program. The results of the behaviour scores over the six weeks of the experiment are explained in Chapter 9.

The next chapter explains the study design, and also explains some characteristics of the students with severe intellectual disabilities who took part in the research study. It gives an account of the administrative procedures and methods used in this study.

## CHAPTER FIVE

### RESEARCH DESIGN AND ADMINISTRATIVE PROCEDURES

*“By imagination and reason, we turn experience into foresight.*

*We become the creators of our future, and cease to be slaves of our past.”*

*(Durant 1933, p.141)*

In this chapter the study design is explained, together with relevant data pertaining to teaching methods and administration for the research study. The order of treatments for the experiment is explained. The chapter also includes the case histories of the participating students with severe intellectual disabilities from the Education Support schools, ethics procedures and teaching procedures for the Pictorial and Musical method, and the various experimental and teaching controls.

#### **Study Design**

##### Benchmark Paintings (regular students)

Initially, 200 year 1 regular students (average age 6 years) were chosen to create abstract paintings whose quality would act as a benchmark measure. These students were required to complete one lesson of the Pictorial and Musical Visual Arts Program. This strategy was essential because the number of students with severe intellectual disabilities who were

available to participate in the experiment was too small to use for Rasch measurement analysis where  $N = 200$  for five items is usually required. Thus, the regular students' benchmark scores were used to create a linear scale of painting quality using Rasch analysis. These linear measures for the regular students' paintings had a corresponding total raw score from the seven items that fitted the Rasch measurement model. The total raw scores from the paintings for the students with disabilities could then be awarded a corresponding linear measure from the Rasch analysis for the regular students' paintings.

Year 1 regular students were chosen because, from the Researcher's earlier experience as an art teacher, their painting quality would cover the range of painting quality provided by the students with severe intellectual disabilities. This was a calculated assessment, which had to be checked later by measurements.

#### The Experiment (students with severe intellectual disabilities)

The study experiment required the students with severe intellectual disabilities to complete six weeks of visual art lessons, one per week. They were taught by the new Pictorial and Musical method. Their paintings were collected at the end of each lesson for anonymous judging (see Chapter 4 for the scoring criteria).

At the Special Education Support schools, students with severe intellectual disabilities are generally taught in class sizes of up to  $N = 8$ . The three schools willing to take part in this experiment were able to initially supply 28 students to take part in the experiment. As four students were absent during some of the lessons, their scores had to be deleted because they were not available for the full six weeks and only 24 students were

available to take part in the final assessment. The 24 students with severe intellectual disabilities who were available for the experiment were taught using the Pictorial only method followed immediately by the Pictorial and Musical method.

The researcher collected two paintings from each student in each of the six art lessons, one after the Pictorial only method and one after the Pictorial and Musical method. Thus, there were  $2 \times 24 \times 6 = 288$  paintings collected for anonymous judging.

Table 5.1

Experiment (Students with Severe Intellectual Disabilities)

<u>Teaching Method</u>	<u>Sample</u>
Pictorial method only	N = 24
Pictorial plus Musical method	N = 24

During this experiment over six weeks, the researcher completed an observation checklist for each of the 24 students with severe intellectual disabilities in all six visual art lessons (number of observation scores  $24 \times 6 = 144$ ). This included ongoing attitudes and behaviours. Guttman scale scores (non-linear) were created from these observations.

Type and Order of Experiment Treatment

The students taking part in the Pictorial and Musical Visual Arts Program over the six week period were given the opportunity to view a print of Kandinsky's work each week. Three prints were used, and were selected



with different pieces of music, in such a way that they were easily recognised, but not repetitive for the students. The semi-abstract prints were chosen for their strong colours and well defined brush strokes. The prints of Kandinsky were (1) "The Park", 1911, (2) "Marnau with Church", 1910 and (3) "Mountain", 1908.

The music of Debussy was chosen to partner the prints for the first two weeks of lessons because of its lyrical quality and as an introduction to classical music for the students. The addition to the program of Mozart's music was introduced when the students had become accustomed to the background music. In this way, it was hoped that the subtle nuances of the music would produce a more effective influence on the students' behaviour when they were painting. Three music pieces were used: (1) Debussy, "Claire de Lune", (2) Mozart, "Concerto for Violins" and (3) Mozart, "Sonata for Two Pianos in D major".

The three prints and the three music pieces were alternated to provide some variety over the six weeks and maintain some interest, without making any drastic differences in presentation. This order of presentation is summarised in tables 5.2 and 5.3.

Table 5.2

Order of Treatments by Week for Students with Severe Intellectual Disabilities

<u>Week 1</u>	<u>Week 2</u>	<u>Week 3</u>	<u>Week 4</u>	<u>Week5</u>	<u>Week 6</u>
Pictorial 1 only	Pictorial 2 only	Pictorial 1 only	Pictorial 3 only	Pictorial 2 only	Pictorial 1 only
Pictorial 1 and Music 1	Pictorial 2 and Music 1	Pictorial 1 and Music 2	Pictorial 3 and Music 2	Pictorial 2 and Music 3	Pictorial 1 and Music 3

The program of Mozart’s music was introduced when the students had become accustomed to the background music. In this way, it was hoped that the subtle nuances of the music would produce a more effective influence on the students’ behaviour when they were painting. This plan is shown in Table 5.3.

Table 5.3

Type of Painting and Music used in Treatments by Week

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Week 1

Print 1: Kandinsky, "The Park" 1911.

Music 1: Debussy, "Clair de Lune".

Week 2

Print 2: Kandinsky, "Murnau with Church" 1910.

Music 1: Debussy, "Clair de Lune".

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Week 3

Print 1: Kandinsky, "The Park" 1911.

Music 2: Mozart, "Concerto for Violins".

Week 4

Print 3: Kandinsky, "Mountain" 1908.

Music 2: Mozart, "Concerto for Violins".

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Week 5

Print 2: Kandinsky, "Murnau with Church" 1910.

Music 3: Mozart, "Sonata for Two Pianos in D major".

Week 6

Print 1: Kandinsky, "The Park" 1911.

Music 3: Mozart, "Sonata for Two Pianos in D major".

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## Characteristics of Students with Severe Intellectual Disabilities

### Students (names anonymous)

The students with severe intellectual disabilities participating in the current research study will remain anonymous in this short listing of their various case histories. They are listed alphabetically with a code name, and not placed according to their school or the class in which they participated in this study. Twenty-eight students began the program, but four were deleted from participation in the study due to failure to complete the full Pictorial and Musical Program.

#### *Adrian, aged 9 years*

Adrian is epileptic. He is autistic and needs help with dressing, and is on a toilet program. He is fully mobile and loves outdoor play.

#### *Andrew, aged 10 years*

Andrew has Aspergers Syndrome Disorder (ASD) and has severe developmental delay. He is non-verbal and does not appear to comprehend spoken language. He has some problem behaviours related to attention seeking and tends to be out-of-seat when he gets the opportunity to do so. He can stay on certain tasks independently for a short time, but is easily distracted. Andrew does not show any real aggression towards his peers and is usually easy to work with in class, but he needs constant attention to stay on task.

#### *Audrey, aged 13 years*

Audrey has Aspergers Syndrome (ASD). She came to the Education Support School 4 years ago with a very long record of behaviour problems at her previous school. These behaviour problems included kicking and spitting at people (mainly staff). She also has outbursts of shouting including swearing and using abusive language. Her language skills are poor but she can comprehend simple sentences. She has poor numeracy skills and little understanding of time concepts, and needs constant attention to stay on task.

During the course of the Pictorial and Musical Program, Audrey attacked the researcher with a blow to the throat, causing lack of breath and

some discomfort. Audrey was removed from the school and into a care situation for a few weeks until she was stabilized. She was unable to complete the program.

*Ben, aged 6 years*

Ben has been diagnosed as having Downs Syndrome. He has significant delays in his fine motor skills, bilateral skills and development grasp. He is non-verbal with delays in both his expressive and receptive language. Polish is the language spoken at home. His comprehension is limited to following predictable routines and commands. Although Ben is a fairly happy student he can be stubborn and needs an amount of physical assistance to finish a set task. He has poor eye contact and wears glasses to correct his eyesight. He does not have a behaviour problem as such, but is happy to sit and be waited on during all classroom activities. He loves music and this is often used as a reward for him to finish a task.

*Bill, aged 9 years*

Bill has been diagnosed as being autistic. He is quite ambulant and has a preference for using his left hand. Bill is fairly independent but needs an amount of prompting before beginning tasks. Bill is sometimes very stubborn when he does not want to cooperate, but he is not aggressive with his peers. He is fond of artwork.

*Bobby, aged 8 years*

Bobby has been diagnosed as being developmentally delayed with no known prenatal influence. He has slight epilepsy but has shown no seizures for a number of years.

*Brent, aged 8 years*

Brent has been diagnosed as having Pseudo Bulbar Palsy. Brent is quite ambulant and sometimes has difficulty staying in his seat in class. He has no trouble getting on with his peers, and shows no aggressive tendencies.

*Beryl, aged 8 years*

Beryl has osteopenia (very brittle bones) and is susceptible to fractures. She is in a wheelchair. Beryl is non-verbal and is often hard to get

on task. She is totally dependent and prefers to be in a group situation as she gets on well with her peers.

*Brian, aged 8 years*

Brian has been diagnosed with Down Syndrome. Brian is quite ambulant but he is slow to begin tasks, and requires one-on-one to get him started. He responds well to positive reinforcement but can become aggressive on occasions.

*Bridget, aged 10 years*

Bridget is epileptic and has been diagnosed as being intellectually handicapped. Bridget is fairly independent in her work tasks as long as she receives an amount of positive reinforcement and does not have a behavioural problem as such. She enjoys painting.

*Don, aged 12 years*

Don has been paralysed since birth. He is confined to a wheelchair and wears splints for both hands. He suffers from visual impairment. Don is non-verbal and communicates through visual prompts. Don requires one-on-one attention but displays good social behaviour, and considering his many disabilities, has no apparent problem behaviours.

*Gina, aged 7 years*

Gina has been diagnosed as being developmentally delayed, although there is no known cause. She is non-verbal and uses some Makaton signs to communicate and Boardmaker line cards. She understands simple commands and requests. Gina has some problems with walking and has treatment for this condition. She is able to grasp a paint brush and pencil correctly, but her fine motor skills are very uncoordinated. She is unable to recognise her name or any other letters of the alphabet. She has a right hand preference. Gina is also very stubborn and non-compliant in class, she needs both verbal and physical prompts to finish a task, but if she feels confident

that she can have success when given a task will happily have a go at it. She loves painting and music.

*Jack, aged 8 years*

Jack has Attention Deficit Hyperactivity Disorder (ADHD) and an intellectual disability. Jack is quite verbal and can explain what he wants. He has no extreme behavioural problems in class, but can be easily influenced by other children. Jack is very fond of music and art.

*Jason, aged 7 years*

Jason has developmental delay. He is fully mobile and verbal but can be very shy. He is independent and presents no obvious behavioural problems. He enjoys colouring in, swimming and playing soccer.

*John, aged 6 years*

John has been diagnosed as being global developmentally delayed and language delayed. He is just starting to join words to make a simple sentence that can be understood by others. His comprehension is developing with understanding of simple commands and requests. He is able to walk and run without any difficulties and can grasp a pencil or paint brush correctly and trace a simple outline. He is unable to write his name or produce any letters of the alphabet independently. He has a right hand preference. John is a happy student who is very compliant in class. He will sit quietly and finish an activity without being prompted, but still needs some physical assistance to complete some activities. He will ask the teacher for help with a task if he needs it, usually during an activity, which requires him to use his fine motor skills.

*Josh, aged 7 years*

Josh has Aspergers Syndrome Disorder (ASD) and severe developmental delay. He is non-verbal. Josh has received discrete trial training that has made an improvement on his problem behaviours of crying, screeching, spitting and pinching. He is not interested in staying on task and at times has to be physically restrained. Josh does not usually show aggressive behaviour towards his peers or staff but needs constant one-to-one attention.

*Kevin, aged 6 years.*

Kevin has been diagnosed as being global developmentally delayed. He wears glasses to correct his vision and he wears calipers to help correct a walking problem, but this does not stop him from running or being involved in physical activities. Kevin also has a slight hearing problem and requires a hearing aid. He has a left hand preference for all fine motor skills. Kevin has had an ongoing feeding problem since birth, and a lot of his consequent behavioural problems have been blamed on this, he will still only eat food that has been processed and is now only just beginning to spoon feed himself. Kevin can be very non-compliant during classroom activities, although he is not aggressive and will comply when a firm voice is used. He is also language delayed but he is just beginning to say words and to join them to form a simple sentence, his comprehension is quite good as long as the requests and instructions are kept simple. He enjoys any activity that involves music and loves to pretend play with other students and dress up in play clothes.

*Meredith, aged 6 years*

Meredith has Down's Syndrome. She presents as a sturdy healthy little girl who has significant expressive language delays and relies on Makaton signs and Boardmaker symbols to express her needs. She is beginning to say words but they are very limited. She has quite good comprehension skills (receptive language) understanding all that is asked of her. Her fine motor skills are poor but she can hold writing tools correctly, although she is unable to produce any letters of the alphabet independently without physical assistance and is unable to trace over a line. Meredith can feed herself independently and enjoys all food that is placed in front of her. She is able to assist when dressing or undressing herself and can turn pages of a book, and use switches to turn technical equipment on and off. Meredith is very stubborn and will only do a task when she wants to do it. She loves to listen to music and will request music as a reward for her good behaviour.

*Michael, aged 12 years*

Michael has been diagnosed as autistic. He is non-verbal and is likely to be often out-of seat during class. Michael is on a behaviour management plan in order to correct this inappropriate behaviour.



*Noel, aged 11 years*

Noel has Aspergers Syndrome Disorder (ASD) and developmental delay. He can speak a few words, but requires constant attention to stay on task. Noel has a few behaviour problems mainly stemming from turning computers off, and is similarly interested in any audio - visual equipment. Apart from attempts to disrupt the lesson in this way, Noel has few behavioural problems if he receives constant supervision.

*Sam, aged 10 years*

Sam has asthma and is developmentally delayed. He has some single words, such as yes and no. Sam can become aggressive and is inclined to push and hit his peers. Sam is fully mobile and fairly independent, but requires a great deal of positive reinforcement to stay on task.

*Sean, aged 8 years*

Sean is autistic and has developmental delay. He is non-verbal and relies on prompts and a great deal of positive reinforcement to get started and continue on task. He can become distressed and very stubborn at times and is given time out. He is not aggressive with his peers.

*Teresa, aged 8 years*

Teresa has been diagnosed with Down Syndrome. Her spoken language at home is Vietnamese. Teresa has few behavioural problems but she gets on well with her peers. She shows an interest in painting.

*Trevor, aged 6 years*

Trevor is autistic and intellectually disabled. He is non-verbal, but will react to his name. Trevor's main behavioural problem is biting, although this action is usually carried out on himself, and it will eventually cease if he is ignored. Trevor is very unmotivated and is extremely influenced by his peer group. He is very fond of food and if not watched carefully will eat the other children's' food.

*Warren, aged 7 years*

Warren is autistic and has slight epilepsy, for which medication is taken regularly, and appears to be effective. He is also developmentally

delayed. To aid in his communication, Warren is on a phase 2 of a special speech training program and can echo some words. He is highly mobile and inclined to run away if not watched closely. Warren is very fond of music.

## **Characteristics of the Regular Students**

### Benchmark Study (regular students)

The students chosen to take part in the benchmark (phase 1) of the current study came from two Catholic primary schools in the eastern suburbs of Perth, Western Australia. The schools were very willing to take part in the study as they considered it advantageous for their students to try something new in art programs. Each school was asked to provide 100 students for the experiment. School number one was able to provide all of the students at year one level (average age = 7 years), but school number two could only provide 75% of the required number. At the initial interview with the researcher, the teacher asked if a lower level of year two students (8 year olds) could be added to the other classes taking the Pictorial and Musical Visual Arts Program. The researcher granted this request because their standard was at a lower level.

Although gender was not a specific requirement for participation in the research study, the number of boys and girls in the benchmark experiment was approximately equal. The participating students provided the study with two paintings each using the Pictorial and Musical Visual Arts Program ( $200 \times 2 = 400$  paintings). The paintings were collected by the researcher, one after the Pictorial only method and the second after the Pictorial and Musical method, and marked by anonymous judges, using the scoring system explained in Chapter 4.

### Comparison Study (regular students)

The regular students chosen to take part in the comparison section (phase 3) of the current study came from a private school in the northern suburbs of Perth, Western Australia. During the initial interview with the teacher, it was requested that her full class of 34 students be allowed to take part in the Pictorial and Musical Visual Arts Program, although the researcher required only 28 students. All of the students were given the program for one lesson per week over a six weeks period. The teacher decided on the seven students to be randomly deleted from the experiment, and the researcher collected the paintings each week ( $28 \times 2 = 56$ ) to be marked by anonymous judges. Because of the failure of four students with severe intellectual disabilities to complete the six week experiment, only 24 regular students were required for marking as numbers had to be equal for a fair assessment.

## **Data Collection**

### Paintings

Twenty paintings were collected from the students with severe intellectual disabilities taught by their normal visual arts method at their Education Support school. The reason that only 20 paintings were collected is that only twenty students attended classes on the collection day.

Twenty-four paintings were collected from the students with severe intellectual disabilities taught by the Pictorial only method and a further 24 paintings collected from the same students when they were taught immediately afterwards by the Pictorial and Musical method. This process

was repeated for regular students who were treated the same as the students with disabilities. This is summarised in Table 5.4.

Table 5.4

Paintings Collected in the First Week.

Type of teaching	Students with disabilities	Regular students
Normal teaching method	20	24
Pictorial only method	24	24
Pictorial and Musical method	24	24

Note: Only 20 in the normal teaching group of students with disabilities due to illness.

The researcher acted as an observer at all of the art classes in the Education Support schools, and was also able to confirm that the artwork was the original work of the student, so that no copying of the stimulus print was allowed. All students were required to present their own original work at the end of each lesson.

In the Education Support schools, each visual arts lesson required two paintings (with stimulus) per student, (one painting after the Pictorial only method and a second painting after the Pictorial and Musical method); during each art lesson, each week for a six weeks period, providing 288 paintings, for the experiment. A further 288 paintings were provided by 24 regular students as a comparison study. This is summarised in Table 5.5.

Table 5.5  
Paintings Collected during the Six Week Experiment

Artwork Stimulus	Students with Disabilities (N=24)	Regular Students (N = 24)
1. Used Pictorial only (Kandinsky) no music in background 1 painting x 6 weeks	144	144
Artwork Stimulus	N = 24	(N =24)
2.Pictorial (Kandinsky) plus Classical music background 1 painting x 6 weeks	144	144

### Attitude and Behaviour

Attitude and behaviour scores were made for each of the students with severe intellectual disabilities, during each of the art lessons over the six weeks period of the experiment. The attitude and behaviour checklist has already been explained in Chapter 4. The collection of the data is summarised in table 5.6.

Table 5.6

Attitude and Behaviour Checklist Data Collected During the Six Weeks

Experiment

	Students with Disabilities (N = 24)
	<u>Checklist Data</u>
Pictorial only Method (1 x 6 weeks)	6 x 24 = 144
Pictorial and Musical Method (1 x 6 weeks)	6 x 24 = 144

Teacher Interviews

The teacher interviews were given at a taped discussion (with the permission of the teacher). Some teachers did not wish to be taped, and in this event, the researcher used a pen and paper to take down the necessary data. The special education teachers were required to read the lesson plan of the Pictorial and Musical Visual Arts Program (see Appendix XXXIV) and their comments were noted. There was also a short discussion about the students who would be taking part in the program. The requirement of the researcher's presence in the classroom, also the availability of sufficient table room to accommodate the observation charts, was discussed at this time. The teachers were given a questionnaire to be completed before the commencement of the first lesson. A follow-up discussion was required at the end of the experiment, and the teachers were then able to give their opinion of the effect of the Pictorial and Musical Visual Arts Program on their student's artwork and also on the student's behaviour.

No taped interviews were required with the regular teachers who were involved in the benchmark study, or with the teacher for the comparison study. There was only an initial discussion of the lesson plan before the commencement of the program. The teacher taking the six weekly lessons for the comparison study was only required to write her comments about the outcome of each lesson, for the researcher.

### Experimental Controls

As all paintings were the original work of the students, no painting assistance could be given by the teacher, only verbal positive re-enforcement. The regular students were informed that they were not to copy the stimulus print and the print was removed from view while painting was in progress. The program was structured so that all students participating in the study including regular students and students with severe intellectual disabilities received equal time for viewing and painting. The type of equipment needed was the same for all students, both regular and those with disabilities. Music time, time allowed for each painting, instructions and type of music to be used in the six lessons of the experiment were the same for all students in any particular week. The researcher acted as an observer of the attitudes and behaviour for the students with severe intellectual disabilities, and, although no lesson outcome for students with severe intellectual disabilities can be predictable because of the very nature of their disabilities, it was noted that, if the lesson is well structured and any inappropriate student behaviour is well documented, then the lesson can be conducted in a manner in which obstacles may be overcome, and worthwhile conclusions can be obtained. During the study in the Education Support schools, the varying condition of each student's disability sometimes made it difficult for the teacher to maintain

order. This was not a difficult problem to overcome because special education teachers are trained to deal with these situations and disruption to the lesson was dealt with quickly. Thus allowing the lesson to continue.

#### Rater Reliability for Paintings and Behaviour Judges

For the judging of the paintings, two teachers were required to score each student's painting for quality, and in accordance with the requirements of the research study. If there was a conflict between the scores another teacher was required to decide the final mark. Each teacher received a copy of the marking requirements before commencing the marking and they were aware of the importance of accuracy in this regard. Paintings were given out to the markers at random, that is they were not left in their original school folders. The paintings were given a special number before being given to the markers, so that they could be returned to their original schools at the conclusion of the study. The three judges chosen for the study were all experienced teachers, two with masters in education and the third had over thirty years experience of marking primary students artwork.

#### Equipment

The equipment required for the study included a tape recorder to take the class teachers' comments during the pre-lesson interview (this interview is mentioned in the procedure). These comments included the teachers' initial reaction to the lesson plan of the Pictorial and Musical Visual Arts Program. It provided the researcher with a general background of the students who participated in that particular class and the special education teacher's remarks about the attitude and behaviour check list that the researcher needed at each lesson. Teachers were asked to provide a short lesson evaluation for the researcher at the end of each lesson.



At least 100 colour prints of a semi-abstract Fauvist style artist were required for distribution among the participating classes, during the time of the experiment. Three classical music CDs were provided for the teachers at each participating school. The prints and CDs were numbered so that the teachers used the appropriate pictorial and musical stimulus with each lesson. Four large art folios to contain the students art works were also necessary, to ensure that they were kept in their original order and condition for marking.

## **Ethics**

### Procedure

All the required ethical procedures and the approvals required by Edith Cowan University for the schools and the participants were arranged satisfactorily prior to initiation of research (see Appendices XXXV - XXXVII). The university, the school principals, the teachers and the students' parents and guardians gave permission for the research study, and for the results of the study to be published using the teacher and student data anonymously. The Education Support school Principals also gave their permission for information concerning their schools to be published, although one school did not have the necessary information on hand when requested. Participation was voluntary for all those taking part in the study. The regular students participating in the study, whose paintings were chosen at random, were not informed that their paintings were to be compared with students with disabilities, because it was considered that this would add a

confounding variable. The markers of the paintings were told that they were marking primary school year 1 abstract artwork.

There were some ethics requirements for the students with severe intellectual disabilities including that specialist teachers be available at every class (N = 10 maximum class size). All students were given other first names to protect their identity and teachers were listed as teacher No, 1, 2, 3 or 4. The Principals gave their consent for their schools to be correctly named in the study.

### Teachers

The teachers taking part in the study were interviewed before commencement of the program, in order to ascertain their initial reaction to the practical implications of the Pictorial and Musical Visual Arts Program. They were given the opportunity of expressing their opinion on the six lessons to be provided by the researcher, the artist's prints (with a short biographical description on the back) and the classical tapes provided by the researcher, required for the program. The cooperation of teachers in the time allowance for student completion of paintings, and the regular marking of the attitude and behaviour data for each student which required the researcher to be present at every special education class for the time of the experiment, was discussed at this time.

The Principal of each school was consulted and, after permission to proceed with the research had been received, an interview with the class teacher was obtained. When the teacher and the researcher discussed the requirements of the lesson plan and the students' attitude and behaviour checklist, a date was decided for the researcher to observe the first lesson. Before this date, the researcher had obtained the consent of the parents or

guardians of all students participating in the study. All participants in the study were to remain anonymous, in order to protect their identity.

### **Procedures for Teaching Students**

Before the teaching procedures began, all students had easy access to pre-mixed watercolour paints in the three primary colours of red, blue and yellow, brushes and clean water. After settling the students, the teacher immediately gained the students attention by giving each one a colourful print of a well known abstract artist (see Appendix II - IV). The teacher named the artist, gave a very short biographical description (name and dates), and explained briefly, the style of painting and the colours used by the artist, at the same time pointing to these colours in the students' palette. Before proceeding further, the special education teacher made sure that all of the participants were able to gain focus on the print. The print was then removed from the students' sight and the students then received a piece of A3 art paper (their name and no. 1 on the reverse side). The teacher then asked them to start painting; the time allowed for the completion of this painting was 15 minutes.

At this stage in the program, the teacher introduced the classical music in the classroom. Students were given another chance to focus on the same artist's print, and the teacher briefly repeated the artist's name, style and use of colour. Another sheet of art paper was then given to each student (with name and no. 2 on the reverse side). They were then allowed another 15 minutes to complete the painting. This was the conclusion of the Pictorial and Musical Visual Arts Program. The reason for the time allowance for painting is the difference in class time between the Education Support school and the regular school. The Education Support school allows 50 minutes for the

visual art class, as extra time must also be given to cleaning the students after the lesson. The regular school usually allows 60 minutes for each usual art lesson. In the regular class the teacher can allow the students to continue with further painting after the 45 minutes allowed for the lesson.

## **Lesson Evaluation**

The teacher for the comparison study completed a lesson evaluation, after each of the six lessons. These data were analysed qualitatively, by the researcher, to investigate any changes in the teacher's attitude towards the practical use of the Pictorial and Musical Visual Arts Program and to answer research questions 5 and 6.

### Teacher Interviews

The three special education teachers were interviewed by the researcher prior to the commencement of the Pictorial and Musical Visual Arts Program and also at the conclusion of the program (at six weeks). The information from these interviews was used to answer research question 5. The regular teacher taking the comparison program was expected to fill in a lesson evaluation at the completion of each of the six lessons of the experiment. The information gained from the teacher's evaluation was used to answer research question 6 (see Chapter eleven).

The next five chapters explain the analysis of the data. Chapter 6 gives the results from the Rasch analysis and the other chapters give the results of a Guttman scale analysis.



## **CHAPTER SIX**

### **DATA ANALYSIS (PART ONE)**

#### **BENCHMARK RASCH MEASURES WITH REGULAR STUDENTS**

This chapter explains the analysis of painting quality data scores from 200 regular students using the RUMM computer program (Andrich, Sheridan, & Luo, 2003). The 200 regular students were taught using the Pictorial and Musical Visual Arts Program. A linear, uni-dimensional measure of painting quality was created and used as a benchmark for the students with severe intellectual disabilities. The benchmark comparison for these students is reported in the next chapter.

#### **Raw Scores for Paintings (regular students)**

The 200 students from the regular school were required to paint some non-representational art when taught by the Pictorial only method (1 painting), followed by the Pictorial plus Music method (1 painting). The quality of the two non-representational paintings were scored in terms of use of colour and colour application, and on composition and creativity. Independent teacher markers were used to score the benchmark paintings. If there was a discrepancy in the marks, a third marker was used to decide on the score given to the student's artwork. All of the markers were highly qualified and experienced visual art educators; two with Masters in

Education and the third with thirty years teaching experience and all were conversant with marking procedures.

Raw scores were thus obtained for eight items. That is, for use of colour, colour application, composition and creativity for paintings taught with the Pictorial only method, and for use of colour, colour application, composition and creativity taught with the Pictorial plus Music method. As the Pictorial plus Music method follows directly after the Pictorial only method, it is possible to think of the two aspects as one method and analyse the eight scores as though they were part of a single measure. This provides a sort of control, so that one can compare the measures over the six weeks, which means comparing the whole art program over the six weeks.

The raw scores for the eight items were analysed with the RUMM computer program (Andrich, Sheridan, & Luo, 2003). The item, creativity, with the Pictorial plus Music method did not fit the measurement model and was discarded. The remaining seven items fitted the measurement model reasonably well and are set out in order from easiest to hardest (see Figure 6.1) in logits --- the log odds of answering positively.

Scale of Painting Quality in Logits

- item 5 difficulty = - 2.27 Colour use with print and music (easiest)
- item 7 difficulty = - 2.25 Composition with print and music
- item 4 difficulty = - 1.34 Creativity with print only
- item 3 difficulty = - 0.72 Composition with print only
- item 1 difficulty = - 0.08 Colour use with print only
- item 2 difficulty = + 3.05 Colour application with print only
- item 6 difficulty = + 3.62 Colour application with print and music (hardest)

The RUMM computer program provides six tests-of-fit to the measurement model and these are now explained. The RUMM (2020)





Table 6.1

Global Person and Item-fit Statistics (N = 200, I = 7)

Items			Persons	
	Location	Fit Residual	Location	Fit Residual
Mean	0.00	- 0.32	1.25	- 0.7
S D	2.41	+1.37	3.26	+0.93

- Note: 1. The item mean (location or item difficulty) is constrained to 0.00 by the measurement model.  
 2. The fit residuals have a mean near zero and a standard deviation near one when the data fit the measurement model. The fit residuals have shown a good fit to the measurement model.

An item-trait test-of-fit is calculated as a chi-square, with a corresponding probability of fit (see Andrich & van Soubroek, 1989, pp. 479-480 for the equations). Observed mean scores for persons with a total score T on item 1 are compared with the expected values along the scale. If these observed and expected values are not significantly different, then there is no significant interaction between the responses to the items and the measures of the persons along the scale. This test shows the collective agreement for all item difficulties across different student measures and indicates whether a uni-dimensional trait can be used to describe each person's response to the items. In this case, the probability is  $p = 0.18$  (see Table 6.2), which is not significant and so we have a uni-dimensional measure of painting quality.

Table 6.2

Item-trait Interaction (N = 200, I = 7)

Total item chi – square	= 8.56
Degrees of freedom	= 14
Chi – square probability	= 0.18

- Note: There is no significant interaction between the responses to the items and the person measures along the trait. The evidence supports the view that a uni-dimensional trait is being measured.

The Person Separation Index equals 0.90 for the measure of painting

quality. This means that the portion of observed variance considered true is 90 percent and the power of tests-of-fit, based on this index, is considered to be excellent. The index is constructed as the ratio of estimated true variance among persons and estimated observed variance among persons, using estimates of their measures and their standard errors. This also means that the painting quality measures were well separated and that the errors were small in comparison to the separation of the measures.

### Individual Item Fit

All seven items fit the measurement model within a probability of 0.02. The fit residuals are all within + 2 standard deviations, except one (see Table 6.3).

Table 6.3  
Item Fit to Measurement Model (N = 200, I = 7)

Item	Location	S E	Fit Residual	Chi-square	Probability
1	- 0.08	0.17	- 1.43	2.73	0.25
2	+ 3.05	0.23	- 1.58	1.08	0.58
3	- 0.72	0.16	- 1.12	1.02	0.61
4	- 1.33	0.18	- 4.10	0.39	0.82
5	- 2.27	0.18	- 0.29	1.98	0.37
6	+ 3.62	0.22	- 0.84	3.07	0.21
7	- 2.25	0.17	+ 0.12	8.28	0.02

Note:

1. Location is the item difficulty and SE is its standard error. Location is given in logits.
2. The log odds of answering positively.
3. All items fit the measurement model with a probability of  $p = 0.02$  Data are given to 2 decimal places because the SE's are to 2 decimal places.

## Individual Person Fit

Data from 200 persons fit the measurement model. The fit residuals for all are within + or -2 standard deviations, except for seven persons (see table 6.4). Hence, there is a good person fit to the measurement model.

Table 6.4

### Part of Person-fit Statistics for Painting Quality

Person	Raw Score	Rasch Measure	S E	Fit Residual
8	14	+ 3.08	0.87	2.71
9	12	+ 0.95	1.10	- 1.79
10	19	+ 7.34	1.53	-1.02
11	11	- 0.26	0.96	- 0.36

Note:

1. Nearly all student measures fit the measurement model within 2.0 standard deviations.
2. Rasch measure is in logits --- the log odds of scoring positively.
3. SE is the standard error.

## Item Thresholds

Item thresholds are calculated in relation to the category responses. At a threshold, persons have odds of 1:1 of answering adjacent categories. Three response categories means that there are two thresholds, four response categories means that there are three thresholds, and so on. In this case, there were five ordered judging categories (1, 2, 3, 4, 5) and so there ought to be four thresholds, but the judges of painting quality gave insufficient awards for the fifth category and so the scores were only 1, 2, 3 or 4, meaning that

there were only three thresholds in the analysis. Table 6.5 shows that the three thresholds are ordered in line with the four judging categories and so the judges' scores can be considered to be consistent and logical in line with the creation of a good linear measure.

The RUMM computer program provides Category Response Curves to check that the judges have scored the paintings consistently and logically for each item (judging aspect). Two of the curves are shown as Figures 6.2 and 6.3. The curves show the probability of judges awarding a particular score for paintings of various measures from low to high. For example, in Figure 6.2, when the measures of painting quality are low (-7 logits or less), the probability of the judges awarding a low score of 0 is high, as expected. As the painting measure increases there is less chance of being awarded a score of 0 and a greater chance of being awarded a score of 1. As the painting measure increases (above -2 logits), there is less chance of being awarded a score of 1 and more of a chance of being awarded a score of 2, again as is expected. As the painting quality increases further (+4 logits), then there is less chance of being awarded a score of 2 and more chance of being awarded a score of 3. Thus, these Response Category Curves allow one to check on the logical consistency of the judging scores that are consistent in this case for items 4 and 6 (Figures 6.2 and 6.3). The Response Category Curves for all seven items were good, showing that the judges scored consistently and logically.

Table 6.5

Item Thresholds (N = 200)

Item	Mean Thresholds	Thresholds		
		1	2	3
1	-0.08	-4.61	-0.99	+5.34
2	-3.05	-4.65	+4.55	+9.25
3	-0.72	-4.90	-0.97	+3.71
4	-1.34	-6.27	-1.65	+3.92
5	-2.27	-10.57	-1.06	+4.81
6	+3.62	-5.38	+3.46	+12.77
7	-2.25	-6.50	-2.52	+2.26

Note: For each item, the thresholds should be ordered from easy to hard, in line with the ordering of the judging scores, for good measurement, as is the case here.

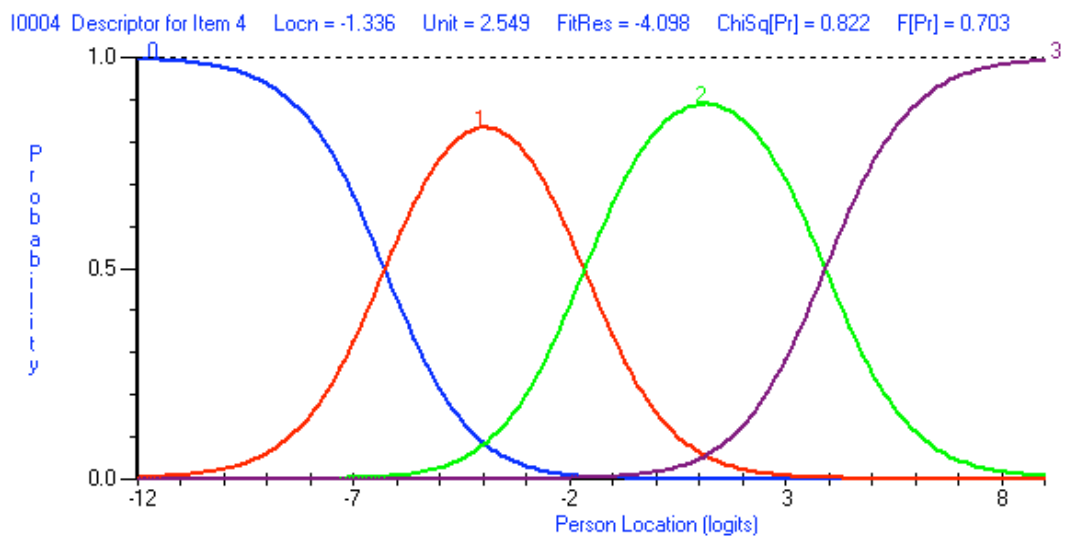
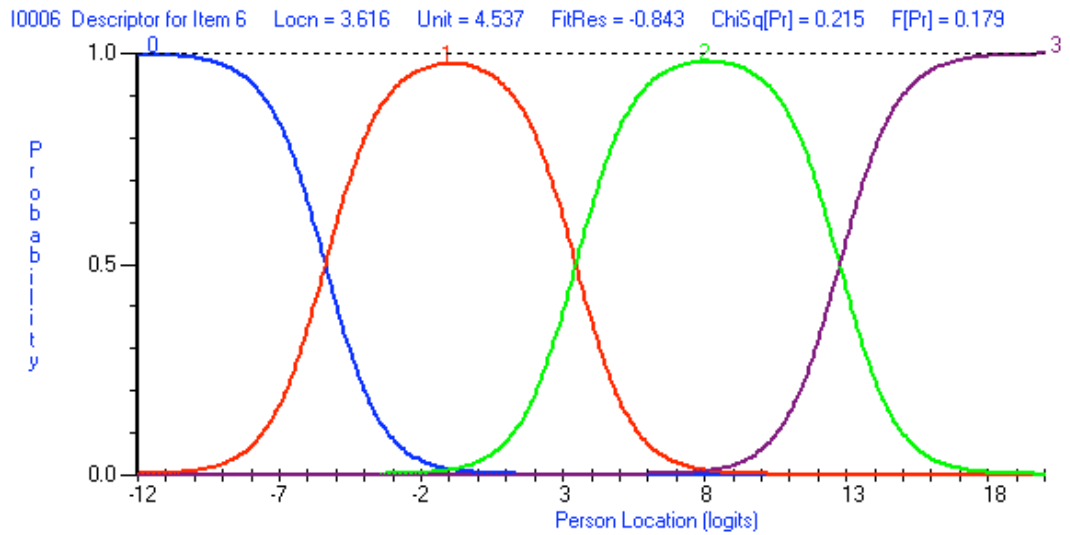


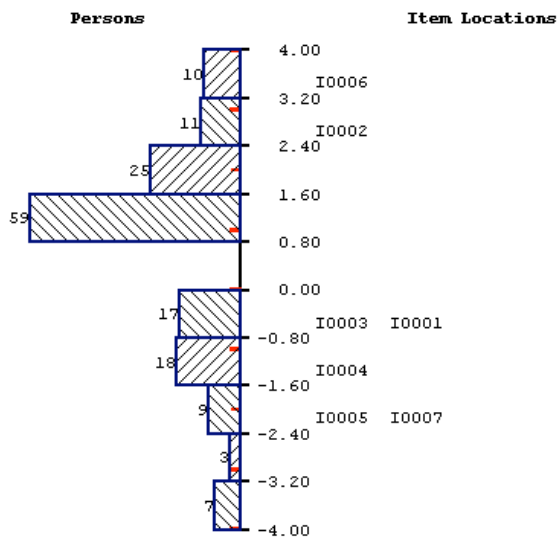
Figure 6.2 Response Category Curve for Item 4.

Note: 1. Response Category Curve for Item 4 ( good fitting item).  
 2. The RUMM (2020) program converts judges' scores of 1,2,3,4 to 0,1,2,3.



**Figure 6.3** Response Category Curve for Item 6.

Note: 1. The Response Category Curve for item 6 (a not-so-good-fitting item).  
 2. The RUMM (2020) program converts judges' scores of 1, 2, 3, 4 to 0, 1, 2 and 3.



**Figure 6.4** Item Person Map.

Note: 1. This graph shows the person measures of painting quality from low to high on the LHS.  
 2. The item difficulties are shown on the RHS (down to up) from easy to difficult.  
 3. Items are labeled I0001, I0002, and so on up to I0007.

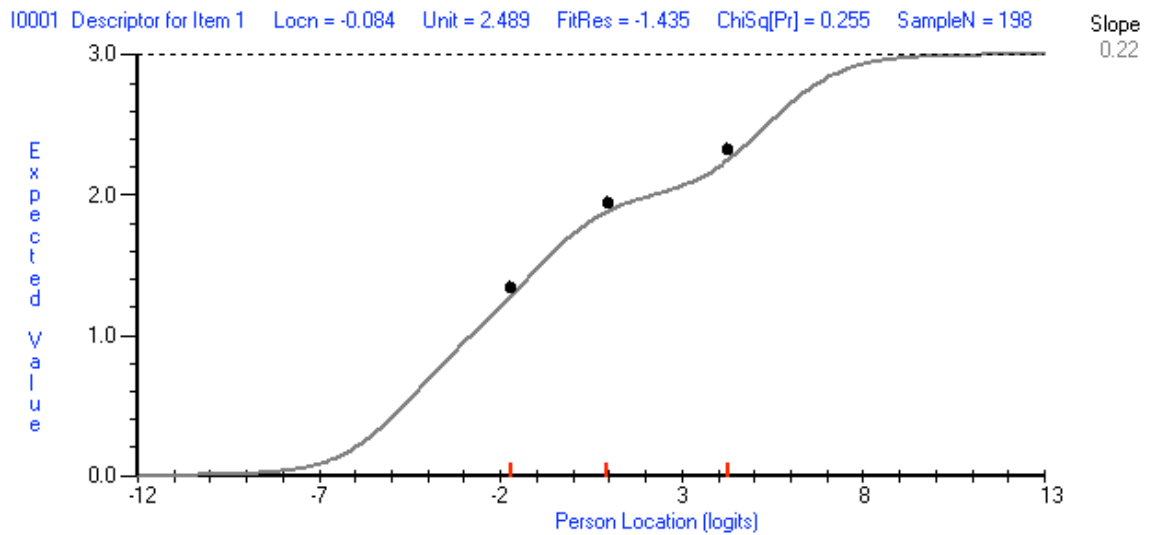
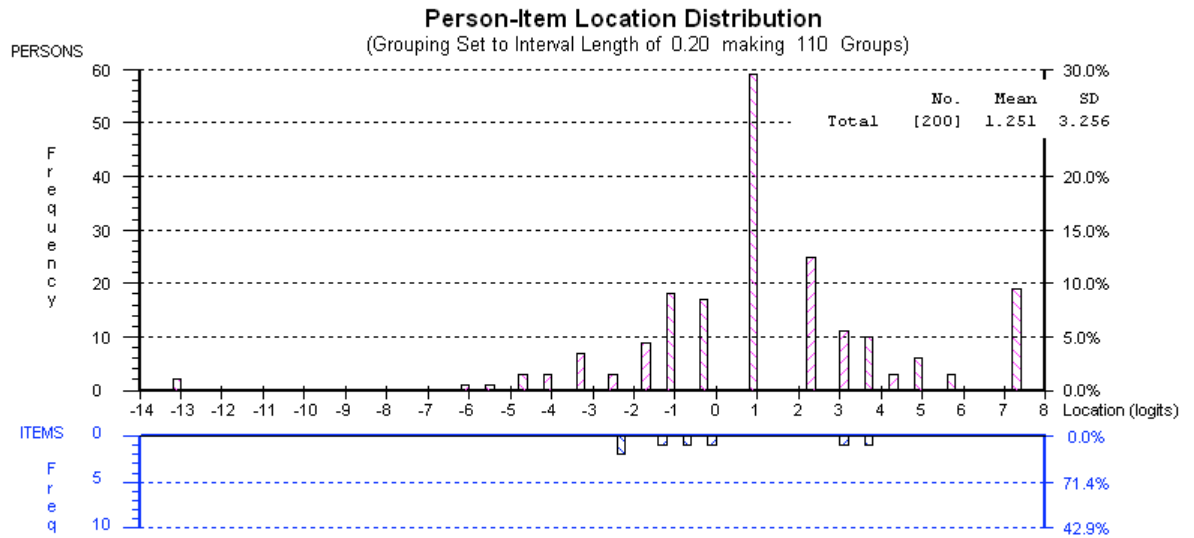


Figure 6.5    Characteristic Curve for Item 1 (Painting Quality).

The item characteristic curve for item 1 of the Painting Quality scale (see Figure 6.5) describes how well item 1 can differentiate between the moderately achieving students below the item location and those above the item location. Item 1 represents an item of medium difficulty because the expected value is lower when the person measure is below the item difficulty location and higher when the person measure is above the item difficulty location, as expected.

# Targeting

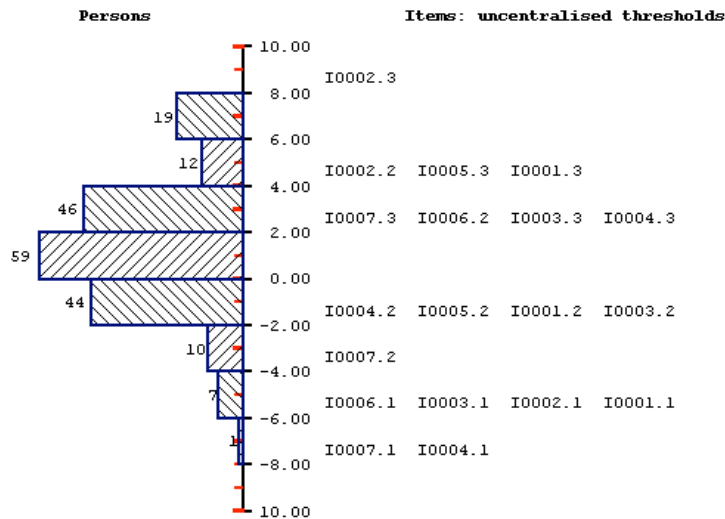


**Figure 6.6** Item/Person Targeting Graph.

- Notes: 1. The scale is in logits, the log odds of answering the response categories.  
 2. Painting Quality measures (low to high) are placed on the upper side of the scale and item location difficulties from easy to hard are placed on the lower side of the scale.

Painting quality measures are displayed on the same scale as the item difficulties in Figure 6.6. From  $-13$  to  $-2.27$  logits, there are 20 (10.2%) students and these can be regarded as having a low painting quality. From  $-2.27$  to  $+3.0$  logits, there are 128 (64%) students and these can be regarded as having a moderately high painting quality (they were scored on some items with a high response category). From  $+3.05$  to  $+3.62$  logits, there are 21 (11.5%) students and they can be regarded as having a high painting quality. From  $+3.62$  to  $+7.25$  logits, there are 31 (15.5%) students and they can be regarded as producing a high painting quality.





**Figure 6.7** Item Thresholds and Painting Quality Measures on the Same Scale.

Notes:

1. There are three thresholds per item, corresponding to the odds (1:1) of answering in the adjacent response categories from low to high. The thresholds are ordered in line with the ordering of the response categories from low to high.
2. Thresholds are ordered from easy to hard on the right hand side.
3. Student measures are ordered from low to high on the left-hand side.

The location (difficulties) of the items covers the middle range of painting quality measures, but not the lower and higher ranges (in Figure 6.6). However, the thresholds of the items range from about  $-6.5$  to  $+12.8$  logits and cover nearly the whole range of painting quality measures (about  $-13.0$  to  $+7.3$  logits, see Figure 6.7). This means that the targeting of the painting quality items is satisfactory, but harder and easier items could be added in a revision of the scale.

## Summary of the Findings

A Rasch measurement model was used to create a linear scale of painting quality for 200 regular students, for use in later data analysis with the paintings of students with severe intellectual disabilities. There was a good fit of the seven items to the Rasch measurement model and a uni-dimensional measure was created. The good fit and good linear measure was indicated by:

1. Good global item fit;
2. Good global person fit;
3. Good individual item fit (7 items);
4. Good individual person fit (200 regular students);
5. Good Person Separation Index (0.90); showing that the errors are small in comparison to the separation of the measures along the scale;
6. Good Category Response Curves showing consistent and logical judging scores;
7. Ordered item thresholds consistent with the conceptualised ordered judging criteria; and
8. A low item-trait test-of-fit indicating a uni-dimensional measure of painting quality.

This means that a reliable, linear scale of painting quality was created from which valid inferences could be made when using it in Chapter 7.

The next chapter uses the linear measures of abstract painting quality obtained in the present chapter, as a benchmark for painting quality for the students with severe intellectual disabilities, in order to make valid comparisons over the six week experiment.

## **CHAPTER SEVEN**

### **DATA ANALYSIS (PART TWO)**

#### **RASCH MEASURES FOR STUDENTS WITH SEVERE INTELLECTUAL DISABILITIES AND DIFFERENCES BY WEEK**

This chapter is concerned with the analysis of data pertaining to the abstract painting measures obtained from students with severe intellectual disabilities, when they were being instructed through the combined Pictorial only and the Pictorial plus Music Art Program over the six week experiment. This means that a measure of abstract painting quality was obtained that could be viewed as due to the teaching over the whole lesson each week. Raw scores from the seven items for the students with disabilities were given the corresponding linear Rasch measures calculated for the seven items for the 200 regular students, as analysed in the last chapter. The linear measures were then compared over the six weeks of the experiment.

## **Conversion of Raw Scores to Rasch Linear Measures**

It was not possible to make a linear Rasch measure directly using the abstract painting results from the students with severe intellectual disabilities because there were only 24 students, and  $N = 24$  is too few to make a Rasch analysis. With around 5 items  $N = 200 +$  students are required. It was decided to use another method. The painting judges had marked the abstract paintings for the regular benchmark students in the same way as they had marked the paintings for the students with severe intellectual disabilities. That is, for the judges, there was no distinguishing line between who had actually completed each painting. The linear measures gained from the regular students were created using Rasch analysis from the raw painting scores. The equivalent raw scores were used from the seven items that fitted the Rasch measurement model to equate with the raw scores from the students with severe intellectual disabilities. In this way, a linear measure of painting quality was obtained for the students with severe intellectual disabilities. Table 7.1 shows the raw scores for the seven items that fitted the Rasch measurement model and their linear Rasch measures equated from the benchmarking reported in chapter 6.

Results for Weeks 1 to 6 (see Table 7.2) shows the raw scores and their linear Rasch measure equivalents for week 1 results for the 24 students with severe intellectual disabilities. Results for weeks 2 – 5 were performed similarly but were not reported here to avoid repetition (see Appendices IX, X, XI, XII, XIII, XIV, XV, XVI). The mean Rasch measures for the six weeks

were calculated and are reported in table 7.3. These mean linear measures were used to make inferences in changes to painting quality from week 1 to week 6. The mean Rasch measures by week are in Figure 7.1.

Table 7.1

Total Raw Scores and Corresponding Linear Rasch Measures for Students with Severe Intellectual Disabilities (I = 7)

Total Raw Score	Linear Rasch Measures of Painting Quality
7	- 13.08
8	- 10.74
9	- 8.41
10	- 6.08
11	- 5.40
12	- 4.76
13	- 4.08
14	- 3.29
15	- 2.46
16	- 1.73
17	- 1.03
18	- 0.26
19	+ 0.95
20	+ 2.26
21	+ 3.08
22	+ 3.74
27	+ 4.35
24	+ 4.99
25	+ 5.77
26	+ 7.34
24	+ 9.30 estimated by proportion
25	+12.00 estimated by proportion
29	+15.00 estimated by proportion

Note: 1. Scores and measures include 4 items from stimulus 1 and 3 items from stimulus 2.  
 2. Item 8, from stimulus 2 did not fit the measurement model and was discarded. The raw scores for the 7 items for students with severe intellectual disabilities are given the corresponding linear Rasch measures, which are calculated from the raw scores for the same 7 items for the regular students.  
 3. The Rasch linear measures are in logits, which are standard Rasch measurement units.  
 4. According to the Journal of Applied measurement website, it is now standard practice to use the word measure when a linear scale is involved and score when a non-linear scale is involved and the measures are reported to 2 decimal places.

Table 7.2

Scores and Measures for Week 1 (Students with Severe Intellectual Disabilities, N = 24, I = 7)

Student	Raw Score		Rasch Linear Measures	
	Stimulus 1	Stimulus 2	Stimulus 1	Stimulus 2
101	8	6	14	- 3.29
102	10	9	19	+ 0.95
103	12	9	21	+ 3.08
104	10	7	17	- 1.03
105	6	6	12	- 4.76
106	7	7	14	- 3.29
107	10	6	16	- 1.73
108	4	3	7	- 13.08
109	4	5	9	- 8.41
110	8	9	17	- 1.03
112	10	7	17	- 1.03
113	9	6	15	- 2.46
114	4	3	7	- 13.08
115	12	9	21	+ 3.08
116	10	9	19	+ 0.95
117	4	6	10	- 6.08
119	7	6	13	- 4.08
120	7	7	14	- 3.29
121	10	7	17	- 1.03
122	10	8	18	- 0.26
123	8	6	14	- 3.29
124	10	7	17	- 1.03
125	10	7	19	0.95
126	12	9	21	+ 3.08

Note: 1. Stimulus 1 uses 4 items  
 2. Stimulus 2 uses 3 items  
 3. Rasch measures are in logits

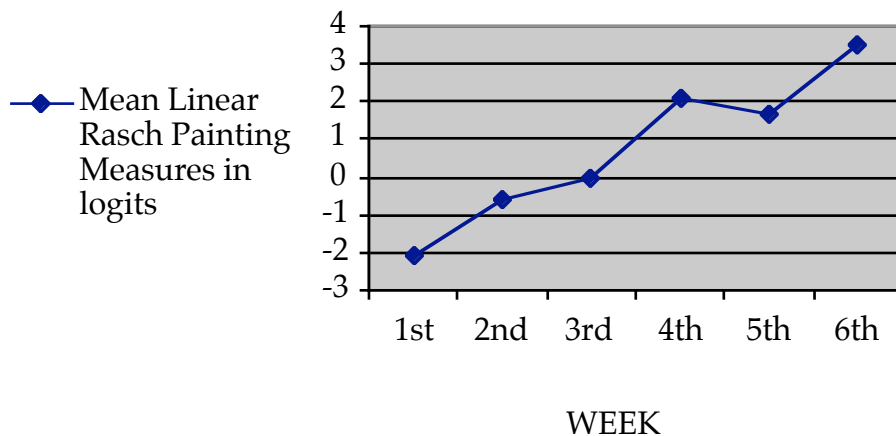
## Comparison of Measures by Week

Table 7.3

### Mean Linear Rasch Measures of Painting Quality by Week for Students with Severe Intellectual Disabilities (N = 24)

Week	Linear Rasch Measures of Painting Quality	
	Mean	Standard Deviation
1	- 2.45	4.27
2	- 0.57	2.77
3	- 0.07	3.14
4	+2.15	3.01
5	+1.61	3.18
6	+3.50	4.80

Note: 1.The measurements are in logits, the log odds of answering positively, which is standard Rasch measurement units.  
 2.The measures are reported to 2 decimal places because the errors are to 2 decimal Places.



**Figure 7.1:** Graph of Mean Linear Rasch Measures of Painting Quality by Week.

The results in Table 7.3 and Figure 7.1 show that the mean Rasch measures increased from week to week up to week 6, but that this increase is



not uniform. In order to test whether the differences in mean measures by week could be due to chance, t-tests of the mean differences by week are presented in Table 7.4.

Table 7.4

t – test (paired samples). Painting Quality for Students with Severe Intellectual Disabilities. Rasch Linear Measures (N = 24, I = 7)

Variable Pairs	Mean difference	SD	SEM	95% Confidence lower / upper	t score	df	p
S. 1 + S. 2 (week 1) and S.1 + S. 2 (week 2)	- 1.88	3.17	0.65	- 3.72 - 0.54	- 2.92	23	0.008*
S. 1 + S. 2 (week 1) and S.1 + S. 2 (week 3)	- 2.38	- 3.60	0.74	- 3.91 - 0.86	- 3.24	23	0.004*
S. 1 + S. 2 (week 1) and S. 1 + S. 2 (week 4)	- 4.60	3.77	0.77	- 6.19 - 3.01	- 5.99	23	0.000*
S, 1 + S. 2 (week 1) and S. 1 + S. 2 (Week 5)	- 4.06	4.67	0.95	- 6.03 - 2.09	- 4.27	23	0.000*
S, 1 + S. 2 (week 1 ) and S. 1 + S. 2 (week 6)	- 5.96	5.31	1.08	- 8.20 - 3.72	- 5.50	23	0.000*

- Note: 1. S 1 = Pictorial Only teaching method  
 2. S 2 = Stimulus 2. Pictorial plus Music method.  
 3. SD = Standard deviation.  
 4. SEM = Standard error of measurement.  
 5. df = degrees of freedom.  
 6. \* means significant at p = 0.01.

The t-tests that the mean measure differences of painting quality between week one and week two, week one and week three, week one and week four, week one and week five, and week one and week six, are significant at p = 0.01. This means that these differences cannot be considered as due to chance, but due to the effect of the whole teaching method together

with a practice effect. The effect is positive and occurred in each of the five weeks after week one, but not to the same extent.

Table 7.5

Correlations between Rasch Measures of Painting Quality for Students with Severe Intellectual Disabilities by week (N = 24, I = 7)

Variable Pairs	Correlation r	r squared
Week 1 / Week 2	0.67	0.45
Week 1 / Week 3	0.56	0.32
Week 1 / Week 4	0.51	0.26
Week 1 / Week 5	0.24	0.06
Week 1 / Week 6	0.32	0.10

Note: r squared represents the common variance between the two measures.

Table 7.5 shows the correlation between week 1 and week 2 measures, week 1 and week 3 measures, week 1 and week 4 measures, week 1 and week 5 measures, and between week 1 and week 6 measures. The correlation squared shows the proportion of common variance between the measures and this common variance decreases by week up to week 6. This shows that the positive effect on the quality of student paintings is not uniform over the weeks 2 to 6 for each student. That is, individual students improved by different amounts over the six weeks which supports the view that both the teaching method and practice are affecting the students' painting quality differently.

## Summary of Main Findings

There are three main findings from the analysis of the Rasch measures of painting quality when the students with severe intellectual disabilities were taught by the combined Pictorial only and the Pictorial and Musical method, each week for six weeks. The combined Pictorial only and the Pictorial plus Music method is treated as one method here.

1. Mean abstract painting quality improved from week one to week two, to week three, to week four, to week five, and to week six, significantly. This can be attributed to the new combined teaching method combined with a practice effect.
2. The amount of common variance in abstract painting quality between week one and week two, week one and week three, week one and week four, week one and week five, and between week one and week six, decreased.
3. The new combined teaching method combined with a practice effect improved abstract painting quality for the 24 students with severe intellectual disabilities by different amounts over the six weeks of the experiment.

The next chapter of the research study, data analysis (part three), will show the Guttman scale of measurement in the analysis of the painting quality for the students with severe intellectual disabilities.



## **CHAPTER EIGHT**

### **DATA ANALYSIS (PART THREE)**

#### **GUTTMAN SCALES FOR STUDENTS WITH SEVERE INTELLECTUAL DISABILITIES FOR PAINTING QUALITY AND DIFFERENCES BY TEACHING METHOD AND WEEK**

This chapter explains how the abstract painting scores for students with severe intellectual disabilities were created using Guttman type scales. These scales, which are non-linear, were then used to make comparisons of painting quality between the Pictorial only method (called stimulus 1) and the Pictorial plus Music method (called stimulus 2) over the six weeks of the experiment.

Initially, a Rasch analysis was performed with the four items used with the Pictorial only method and, separately, with the four items used with the Pictorial plus Music method for the regular students ( $N = 200$ ). This analysis was unsuccessful and it was not possible to create a linear scale with only four items. Global item and person fit to the measurement model were unacceptable and two of the four items did not fit the measurement model. Furthermore, the Person Separation Index was low, indicating that the errors were large compared to the separation of the measures along the scale.

Hence, it was not possible to create a uni-dimensional linear measure for the regular students and use the raw scores to determine a linear measure, in correspondence, for the 24 students with severe intellectual disabilities (as was done in the previous chapter using seven items).

The four items for the students with severe intellectual disabilities were then arranged in order of difficulty to investigate the possibility of obtaining a reasonable Guttman pattern of responses, and so create non-linear Guttman scales. Scales from total raw scores are considered to be non-linear (see Michell, 1990, 1999) unlike Rasch measures. The Guttman scales, although not perfect, were satisfactory and were used to compare painting quality between the Pictorial only method and the Pictorial plus Music method, over the six weeks of the experiment. This chapter reports on this analysis.

### **Guttman Scales of Painting Quality**

Twelve separate Guttman scales, six for stimulus 1 data and six for stimulus 2 data were set up with four items. The order of difficulty for the four items was conceptualised as, item 3, composition (easiest), Item 4, creativity (easier), Item 2, colour application (harder) and item 1, colour use (hardest). Two examples of Guttman scales from the data, one for stimulus 1 (week 1) and one for stimulus 2 (week 1) are set out in Tables 8.1 and 8.2, and two examples from the data for stimulus 1(week 6) and stimulus 2 (week 6) are set out in Tables 8.3 and 8.4. Similar Tables to Tables 8.1 and 8.2 (week 2 to week 5) were created for the intervening weeks, but not reported here to

avoid repetition. Some of these data are included in Appendices XVI to XXIII. In each case, there were only a few students whose response patterns were not in a perfect Guttman response pattern, and all patterns were acceptable.

Since the Guttman patterns were close to ideal (see Table 8.5), the total scores from the four judging items represent unique patterns (or very nearly so). Knowing only the total scores means that we know the response pattern and, when this occurs, Guttman (1950) has shown that a reliable, uni-dimensional scale has been created (even if it is non-linear), from which valid inferences can be made.

Table 8.1

Non-linear Painting Quality Scores (N = 24, I = 4) for Students with Severe Intellectual Disabilities (stimulus 1, week 1)

Student	Easiest		Hardest		Total raw score
	Item 3	Item 4	Item 2	Item 1	
	Composition	Creativity	Colour app.	Colour use	
116	3	3	3	3	12
112	3	3	3	3	12
103	3	3	3	3	12
102	3	3	2	2	10
104	3	3	2	2	10
107	3	3	2	2	10
113	3	3	2	2	10
117	3	3	2	2	10
122 *	3	2	2	3	10
123	3	3	2	2	10
125	3	3	2	2	10
126	3	3	2	2	10
114	3	2	2	2	9
101	2	2	2	2	8
110	2	2	2	2	8
124	2	2	2	2	8
106	2	2	2	1	7
119	2	2	2	1	7
120	2	2	2	1	7
121	2	2	2	1	7
105*	1	2	2	1	6
108	1	1	1	1	4
109	1	1	1	1	4
115	1	1	1	1	4

Note: 1. Colour app. means colour application

2. Only two students had non-perfect Guttman scales (numbers 105 and 122).

3. The Guttman pattern is close to ideal and acceptable for using the raw score total as a non-linear scale



Table 8.2  
Non-linear Guttman Painting Quality Scores (N = 24, I = 4) for Students with Severe Intellectual Disabilities (stimulus 2, week 1)

	Easiest		Hardest		
	Item 3	Item 4	Item 2	Item1	
Student	Composition	Creativity	Colour app.	Colour use	Total raw score
102	4	3	3	2	12
103	3	3	3	3	12
110	3	3	3	3	12
112	3	3	3	3	12
116	3	3	3	3	12
117	3	3	3	3	12
126	3	3	3	3	12
123	3	3	3	2	11
104	3	3	2	2	10
106	3	3	2	2	10
113	3	3	2	2	10
121	3	3	2	2	10
122	3	3	2	2	10
125	3	3	2	2	10
107*	3	2	2	2	9
114*	3	2	2	2	9
101	2	2	2	2	8
105	2	2	2	2	8
120	2	2	2	2	8
109*	1	2	2	2	7
119*	2	2	2	1	7
108	1	1	1	1	4
115	1	1	1	1	4

- Note:
1. Colour app. Means Colour application
  2. Four students had non-perfect Guttman response patterns (numbers 107, 114, 109, 119)
  3. The Guttman pattern is close to ideal and acceptable for using the raw total score as a non-linear scale

Table 8.3

Non-linear Guttman Painting Quality Scores (N = 24, I = 4) for Students with Severe Intellectual Disabilities (stimulus 1 week 6)

	Easiest		Hardest		Total raw score
	Item 3	Item 4	Item 2	Item 1	
Student	Composition	Creativity	Colour app.	Colour use	
106	4	4	4	4	16
102	4	4	4	3	15
125*	4	4	3	4	15
126*	4	4	3	4	15
103	4	4	3	3	14
112	4	4	3	3	14
105	3	3	3	3	12
100	3	3	3	3	12
111	3	3	3	3	12
113	3	3	3	3	12
115	3	3	3	3	12
116	3	3	3	3	12
117	3	3	3	3	12
120	3	3	3	3	12
121	3	3	3	3	12
122	3	3	3	3	12
110	3	3	3	2	11
101	3	3	2	2	10
103	3	3	2	2	10
114	3	3	2	2	10
123	3	3	2	2	10
124	3	3	2	2	10
119*	2	2	2	3	9
107	2	2	2	2	8

- Note:
1. Colour app. Means colour application.
  2. Only three students had non-perfect Guttman response patterns (Nos. 125,126, 119).
  3. The Guttman pattern is close to ideal and acceptable for using the raw total score as a non-linear scale.

Table 8.4

Non-linear Guttman Painting Quality Scores (N = 24, I = 4) for Students with Severe Intellectual Disabilities (stimulus 2, week 6)

Student	Easiest		Hardest		Total Raw score
	Item 3 Composition	Item 4 Creativity	Item 2 Colour App,	Item 1 Colour Use	
103	3	3	3	3	12
112	3	3	3	3	12
116	3	3	3	3	12
102	3	3	2	2	10
104	3	3	2	2	10
107	3	3	2	2	10
113	3	3	2	2	10
117	3	3	2	2	10
122	3	3	2	2	10
123	3	3	2	2	10
125	3	3	2	2	10
126	3	3	2	2	10
114	3	2	2	2	9
101	2	2	2	2	8
110	2	2	2	2	8
124	2	2	2	2	8
106	2	2	2	1	7
119	2	2	2	1	7
120	2	2	2	1	7
121	2	2	2	1	7
105 *	1	2	2	1	6
108	1	1	1	1	4
109	1	1	1	1	4
115	1	1	1	1	4

Note: 1. Colour app. Means Colour application.

2. Only one student had a non-perfect Guttman response pattern (number 105).

3. The Guttman pattern is close to ideal and acceptable for using the total raw score as a non-linear scale.

Table 8.5  
Summary of Painting Quality for Guttman Pattern Fit by Stimulus and Week

Stimulus/Week	Number of Scores	Guttman Scale
	Fitting Guttman Pattern	Fit
Stimulus 1 (Week1)	83/96	acceptable
Stimulus 2 (Week 1)	83/96	acceptable
Stimulus 1 (Week 2)	95/96	excellent
Stimulus 2 (Week 2)	91/96	good
Stimulus 1 (Week 3)	90/96	good
Stimulus 2 (Week 3)	89/96	acceptable
Stimulus 1 (Week 4)	92/96	excellent
Stimulus 2 (Week 4)	91/96	good
Stimulus 1 (Week 5)	81/96	acceptable
Stimulus 2 (Week5)	85/96	acceptable
Stimulus 1 (Week 6)	83/96	acceptable
Stimulus 2 (Week 6)	89/96	good

Comparison of Results between Stimuli over the Six Weeks

The mean non-linear scores for the two stimuli over the six weeks of the experiment were calculated and are set out in Table 8.6. They show that there was a general (non-uniform) increase in painting quality for stimulus 1 from week 1 to week 6 and a general non-uniform increase in painting quality from stimulus 2 in each of the six weeks.

## Comparison of Scores by Method and Week

Table 8.6

### Mean Painting Scores by Stimulus by Week

Week	Stimulus 1	Stimulus 2
1	M = 8.54 SD = 2.41	M = 9.46 SD = 2.38
2	M = 9.58 SD = 1.86	M = 10.37 SD = 1.91
3	M = 9.47 SD = 2.10	M = 10.79 SD = 2.28
4	M = 11.21 SD = 1.74	M = 12.21 SD = 2.34
5	M = 10.75 SD = 2.19	M = 12.12 SD = 2.01
6	M = 11.79 SD = 2.21	M = 12.58 SD = 2.30

- Note:
1. Stimulus 1 is the Pictorial only method.
  2. Stimulus 2 is the Pictorial plus Musical method.
  3. M = Mean Guttman score.
  4. SD = Standard deviation.

The individual student data for stimulus 1 (week one to week six) and for stimulus 2 (week one to week six) were then entered into the SPSS computer program and analysed with a mixed between – within subjects ANOVA (repeated measures, General Linear Model). The results are shown in Table 8.7 and in Figure 8.1.

Table 8.7

SPSS ANOVA Analysis with Repeated Measures (Method by Week)

	Effect	Value	F Hypothesis	df	Error df	Sig.
WEEK.	Pillai's Trace	.796	14.853*	5.000	19.000	.000*
	Wilks' Lambda	.204	14.853*	5.000	19.000	.000*
	Hotellings Trace	3.909	14.853*	5.000	19.000	.000*
	Roy's Largest Root	3.909	14.853*	5.000	19.000	.000*
METHOD	Pillai's Trace	.776	79.488*	1.000	23.000	.000*
	Wilks' Lambda	.224	79.488*	1.000	23.000	.000*
	Hotellings Trace	3.456	79.488*	1.000	23.000	.000*
	Roy's Largest Root	3.456	79.488*	1.000	23.000	.000*
WEEK*	Pillai's Trace	.136	.599*	5.000	19.000	.701
METHOD	Wilks' Lambda	.864	.599*	5.000	19.000	.701
	Hotellings Trace	.158	.599*	5.000	19.000	.701
	Roy's Largest Root	.158	.599*	5.000	19.000	.701

The results show that there is no statistically significant interaction effect between stimulus (method) and week (practice) for painting quality ( $F = 0.60$ ,  $df = 1,5$ ,  $p = 0.70$ ). There is, however, a statistically significant main effect for stimulus. The Pictorial and Musical method helps the students with severe intellectual disabilities produce significantly better quality abstract paintings than when they are taught using the Pictorial only method ( $F = 79.49$ ,  $df = 1, 5$   $p = 0.000$ ). The partial eta squared is 0.78 which is a very large effect (see Cohen, 1988).

### Guttman Scores for Painting Quality

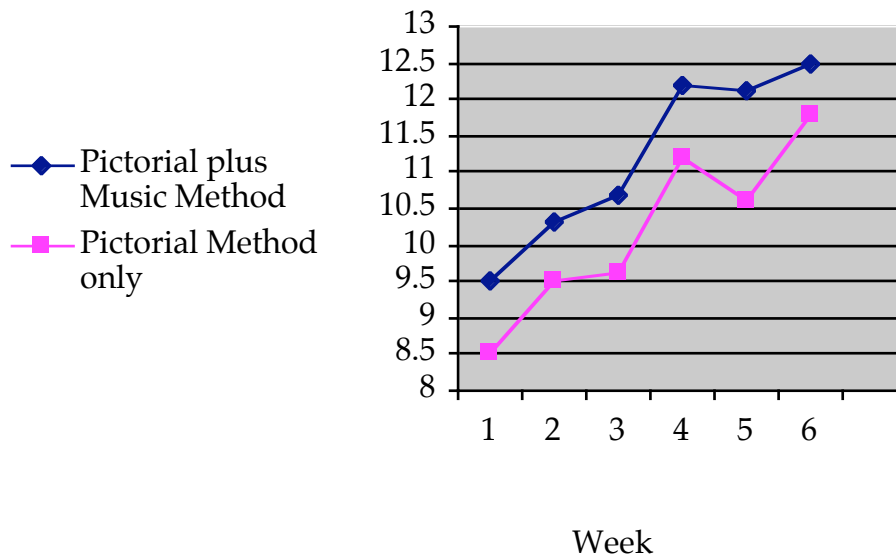


Figure 8.1 Painting Quality by Method and Week.

There is a statistically significant main effect for week (which is taken to mean practice). That is practice from week one through to week six helps students produce significantly better quality abstract paintings compared to just performing one painting ( $F = 14.85$ ,  $df = 1,5$   $p = 0.000$ ). The partial eta squared is 0.64, which is a very large effect (see Cohen, 1988).

In order to test whether the differences in mean painting quality scores given in table 8.6 are significantly different over various combinations of stimulus and week, paired t-tests of the near differences by stimulus and week are presented in Table 8.8. The paired t-tests show that the mean differences in painting quality scores for stimulus 1 and stimulus 2 in weeks one and six are significantly different. Stimulus 2 scores are a significant improvement on stimulus 1 scores. The paired t-tests show that the mean differences in painting quality scores for stimulus 1 (week one) and stimulus 1 (week six) and for stimulus 2 (week one) and for stimulus 2 (week six) are significantly different. Stimulus scores improve significantly from week one to week six. These results support the two effects due to practice and the

addition of classical music to improve painting quality found using the repeated measures, general linear model.

Table 8.8

t – test (paired samples) of Painting Quality (N = 24, I = 4) for Students with Severe Intellectual Disabilities

Variable Pairs	Mean difference	SD	SEM	95% Confidence lower/upper	t score	df	p (2 tailed test)
Stim. 1 Week 1 and Stim. 2 Week 1	0.92	1.35	0.27	- 1.49 - 0.35	- 3.33	23	0.003*
Stim. 1 Week 1 and Stim. 2 Week 6	4.04	3.04	0.62	- 5.33 - 2.76	- 6.51	23	0.000*
Stim. 2 Week 1 and Stim. 2 Week 6	3.12	2.59	0.53	- 4.22 - 2.03	- 5.90	23	0.000*
Stim. 1 Week 6 and Stim. 2 Week 6	0.79	1.06	0.22	- 1.24 - 0.34	- 3.65	23	0.001*
Stim. 1 Week 1 and Stim. 1 Week 6	3.25	2.97	0.61	- 4.50 - 2.00	- 5.37	23	0.000*

- Note:
1. SD = standard deviation
  2. SEM = Standard Error of Measurement
  3. df = degrees of freedom
  4. \* = significant at p = 0.01
  5. Stim. 1 = stimulus 1 and Stim. 2 = stimulus 2

## Summary of Main Findings

1. Near-ideal Guttman patterns were created from the four judging items, composition (easiest), creativity, colour application and colour use (hardest) for painting quality. The total scores from these four items formed a reliable, non-linear scale from which valid comparisons of painting quality between the two teaching methods (Pictorial only and Pictorial plus Music) could be made over the six week experiment.



2. There was no statistically significant interaction effect on painting quality due to method of teaching (Pictorial only and Pictorial plus Music) and time (practice) over the six weeks.
3. The students improved significantly in painting quality with stimulus 1 (Pictorial only teaching method) from week one to week six. This can be attributed directly to a practice effect.
4. The students improved significantly in painting quality with stimulus 2 (Pictorial plus Music teaching method) from week one to week six. This can be attributed directly to a practice effect.
5. Painting quality increased significantly from stimulus 1 to stimulus 2 by week. This can be attributed directly to the addition of the classical music as background, provided in the stimulus 2 teaching method.

Chapter nine, the next chapter, explains the data analysis for Guttman scales to show the attitude and behaviour of the students with severe intellectual disabilities throughout the six-week experiment.

## **CHAPTER NINE**

### **DATA ANALYSIS (PART FOUR)**

#### **GUTTMAN SCALES OF ATTITUDE AND BEHAVIOUR FOR STUDENTS WITH SEVERE INTELLECTUAL DISABILITIES AND DIFFERENCES OF TEACHING METHOD AND WEEK**

This chapter explains the analysis of the attitude and behaviour scores for students with severe intellectual disabilities, while they were involved in their visual art lessons in the Pictorial and Musical Visual Arts Program, over the six weeks of the experiment. Records of the attitudes and behaviour of the 24 special education students were collected whilst producing their paintings. Data were collected on nine items (see Table 9.1) as described in chapter 4. Using trial and error, a Guttman pattern was created with four items (2, 8, 6 and 3) where the items were arranged in order of difficulty from easy to hard, and the total raw score on these four items arranged from low to high. This chapter explains the results of the analysis.

## **Guttman Scales of Attitude and Behaviour**

The nine items in Table 9.1 were ordered from easy to hard and the observation patterns were examined. A good Guttman response pattern could not be ordered, so items were deleted until a good Guttman pattern was obtained with four items, (see pattern in Table 9.2). While it is not a perfect pattern, only three patterns are slightly disordered and their total scores are in sequence (persons 101, 120, and 124).

Since the Guttman patterns were close to ideal, the total scores from the four observations of attitude and behaviour represent unique patterns (or very nearly so). Knowing only the total scores means that we know the response pattern and, when this occurs, Guttman (1944, 1950) has shown that a reliable, uni-dimensional scale has been created from which valid inferences are made.

Table 9.1

Observation Items for Attitude and Behaviour

---

1. Student is aggressive and disruptive to peer/s

---

2. Student is disruptive to peer/s

---

3. Student is inattentive to task

---

4. Student vocalises loudly and disrupts class

---

5. Student vocalises and annoys peers

---

6. Student vocalises softly and is not on task

---

7. Student is out-of-seat and disrupting class

---

8. Student is out-of-seat

---

9. Student flays arms and disrupts peer/s

---

Note:

1. Observation responses are all the time (1), often (2), sometimes (3), and never (4).
2. Only four items fitted a Guttman pattern - 2 (easiest, 8, 6, 3 hardest).

Items fitting a Guttman Response Pattern are:

2. Student is not disruptive to peer/s (easiest), (shows good attitude and behaviour).
3. Student is inattentive to task (hardest), (shows good attitude and behaviour).
6. Student is not vocalising softly and is on task, (shows good attitude and behaviour).
8. Student is not out-of-seat, (shows good behaviour).

Table 9.2

Non-Linear Guttman Attitude and Behaviour Scores for Students with Severe Intellectual Disabilities. (N = 24, Stimulus 1, Week one)

Student	Easiest		Hardest		Total Score
	Item 2	Item 8	Item 6	Item 3	
103	4	4	4	4	16
106	4	4	4	4	16
112	4	4	4	4	16
123	4	4	4	4	16
126	4	4	4	4	16
105	4	4	4	3	15
107	4	4	4	3	15
108	4	4	4	3	15
110	4	4	4	3	15
114	4	4	4	3	15
119	4	4	4	3	15
102	4	4	3	3	14
109	4	4	3	3	14
115	4	4	3	3	14
116	4	4	3	3	14
122	4	4	3	3	14
125	4	4	3	3	14
101*	4	4	2	3	13
104	4	3	3	3	13
117	4	3	3	3	13
121	4	3	3	3	13
120*	4	2	4	2	12
113	3	3	3	2	11
124*	2	1	4	1	8

- Note:
1. Item 2. The student is not disruptive to peers (easiest)
  2. Item 8. The student is not out of seat (harder).
  3. Item 6. The student vocalises softly and not on task (harder still)
  4. Item 3 The student is inattentive to task (hardest).
  5. High score = good behaviour. Low score = bad behaviour.
  6. Students 101, 120 and 124 did not have a perfect Guttman pattern of responses.

The four items shown in Table 9.2 for Stimulus 1 week one, were found to produce a satisfactory Guttman observation pattern for Stimulus 2, week one (see Table 9.3). Only two persons had observation patterns not in a strict Guttman pattern (persons 120 and 113). Using the same four items (2,8,6 and 3), satisfactory Guttman patterns were produced for the two stimuli over the six weeks of the experiment. Two more of these are given in Tables 9.4 and 9.5 and the rest are included in the Appendices to avoid

repetition in the text.

Table 9.3

Non-Linear Guttman Attitude and Behaviour Scores for Students with Severe Intellectual Disabilities (N = 24, Stimulus 2, Week one).

Student	Easiest			Hardest		Total Score
	Item 2	Item 8	Item 6	Item 3		
103	4	4	4	4		16
105	4	4	4	4		16
106	4	4	4	4		16
107	4	4	4	4		16
110	4	4	4	4		16
114	4	4	4	4		16
116	4	4	4	4		16
117	4	4	4	4		16
119	4	4	4	4		16
122	4	4	4	4		16
123	4	4	4	4		16
125	4	4	4	4		16
112	4	4	4	4		16
108	4	4	4	3		15
115	4	4	4	3		15
102	4	4	4	3		15
104	4	4	3	3		14
101	4	4	3	3		14
109	4	4	3	3		14
121	4	4	3	3		14
120*	3	3	3	3		12
113*	3	3	3	3		12
124	3	3	3	3		12

Note: 1. Only two students, 120/113 Guttman pattern of responses were not idea  
 2. Items 2, 8, 6 and 3 are as in Table 9.1

Table 9.4  
Non-Linear Guttman Attitude and Behaviour Scores for Students with Severe Intellectual Disabilities (N = 24, Stimulus 1 week six)

Student	Easiest		Hardest		Total Score
	Item 2	Item 8	Item 6	Item 3	
123	4	4	4	4	16
111	4	4	4	4	16
118	4	4	4	4	16
122	4	4	4	4	16
106*	4	4	4	4	15
109	4	4	4	3	15
112	4	4	4	3	15
114	4	4	4	3	15
116	4	4	4	3	15
101	4	4	3	3	14
102	4	4	3	3	14
104	4	4	3	3	14
105*	4	3	4	3	14
110	4	4	4	2	14
113	4	4	4	2	14
115	4	4	3	3	14
117*	4	3	3	4	14
124	4	4	3	3	14
108	4	3	3	3	13
122*	4	3	4	2	13
119	4	4	2	2	12
120	4	4	2	2	12
121*	2	2	4	2	10
107*	2	1	3	2	8

Note: The observation patterns for six students (Numbers 106, 105, 117, 122, 121, and 107 were not in a perfect Guttman pattern, but were deemed acceptable.

Table 9.5

Non-Linear Guttman Attitude Behaviour Scores for Students with Severe Intellectual Disabilities

(N = 24, I = 4). Stimulus 2, Week six

Student	Easiest		Hardest		Total Score
	Item 2	Item 8	Item 6	Item 3	
101	4	4	4	4	16
102	4	4	4	4	16
103	4	4	4	4	16
104	4	4	4	4	16
105	4	4	4	4	16
106	4	4	4	4	16
107	4	4	4	4	16
114	4	4	4	4	16
115	4	4	4	4	16
116	4	4	4	4	16
117	4	4	4	4	16
123	4	4	4	4	16
126	4	4	4	4	16
108	4	4	4	3	15
109	4	4	4	3	15
112	4	4	4	3	15
113	4	4	4	3	15
122	4	4	4	3	15
110	4	4	4	2	14
119	4	4	3	3	14
120	4	4	3	3	14
121	3	3	4	4	14
124	4	4	4	3	14

Note: 1. Only one student (number 121) did not have a perfect Guttman pattern of observations.  
2. Items 2, 8, 6, and 3 are as in Table 9.1.



The observation response patterns for attitude and behaviour for students with severe intellectual disabilities were close to ideal Guttman patterns. These are summarised in Table 9.6. The total scores for the four items represent a reliable non-linear scale from which valid comparisons can be made.

Table 9.6

Summary of Attitude and Behaviour Scores to Guttman Pattern Fit by Stimulus and Week

Stimulus/Week	Number of Scores	Guttman Scale
	Fitting Guttman Pattern	Fit
Stimulus1 Week1	91/96	good
Stimulus 2 Week 1	92/96	excellent
Stimulus 1 Week 2	86/96	acceptable
Stimulus 2 Week 2	94/96	excellent
Stimulus 1 Week 3	88/96	acceptable
Stimulus 2 Week 3	96/96	excellent
Stimulus 1 Week 4	87/96	acceptable
Stimulus 2 Week 4	92/96	excellent
Stimulus 1 Week 5	91/96	good
Stimulus 2 Week 5	94/96	excellent
Stimulus 1 Week 6	94/96	excellent
Stimulus 2 Week 6	95/96	excellent

## Comparison of Attitude and Behaviour Scores over the Six Weeks

The mean non-linear scores for the two stimuli over the six weeks of the experiment are set out in Table 9.7. They show that there was no attitude and behaviour improvement for stimulus 1 from week one to week six but there was some improvement for stimulus 2 from week one to week six in attitude and behaviour. The latter increase needs to be tested for significance.

Table 9.7

### Mean Attitude and Behaviour Scores for Students with Severe Intellectual Disabilities, Non-Linear Guttman Scores by Stimulus by Week

Week	Stimulus 1, N = 24, I = 4	Stimulus 2, N = 24, I = 4
1	M = 14.04 (SD = 1.85)	M = 15.08 (SD = 1.32)
2	M = 13.92 (SD = 2.22)	M = 14.79 (SD = 1.28)
3	M = 13.92 (SD = 1.69)	M = 15.17 (SD = 0,87)
4	M = 13.54 (SD = 1.96)	M = 14.67 (SD = 1.66)
5	M = 13.48 (SD = 1.53)	M = 15.12 (SD = 0.85)
6	M = 13.87 (SD = 1.90)	M = 15.38 (SD = 0.82)

Note:

1. Stimulus 1 is the Pictorial only method.
2. Stimulus 2 is the Pictorial plus Music method.
3. M = Mean Guttman score.
4. SD = Standard deviation.

The individual observation data, (attitude and behaviour) for stimulus 1 (week one to week six) and for stimulus 2 (week one to week six)

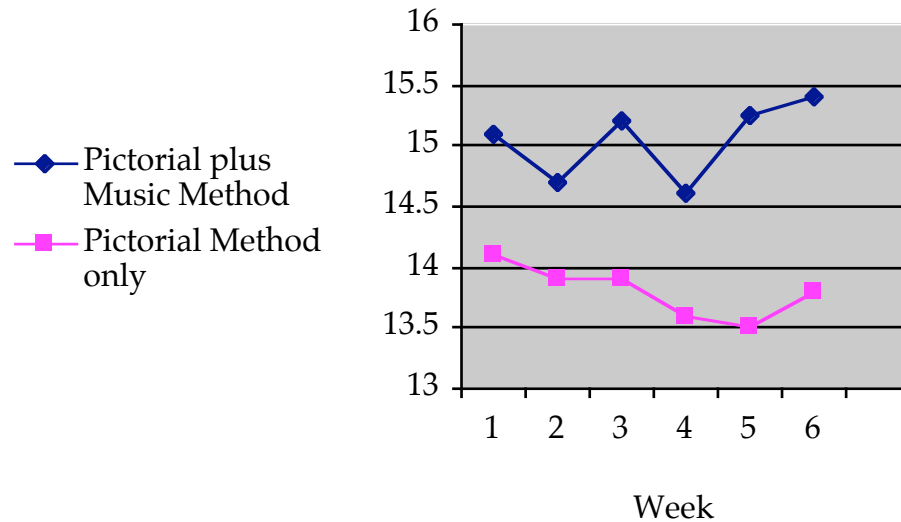
were then entered into SPSS computer program and analysed with a mixed between - within subjects ANOVA (repeated measures, General Linear Model). The results are shown in table 9.8 and Figure 9.1.

Table 9.8

SPSS ANOVA Analysis with Repeated Measures (Method by Week)

	Effect	Value	F Hypothesis	df	Error df	Sig.
WEEK.	Pillai's Trace	.253	1.287a	5.000	19.000	.310
	Wilks' Lambda	.747	1.287a	5.000	19.000	.310
	Hotellings Trace	.339	1.287a	5.000	19.000	.310
	Roy's Largest Root	.339	1.287a	5.000	19.000	.310
METHOD	Pillai's Trace	.768	76.013a	1.000	23.000	.000
	Wilks' Lambda	.232	76.013a	1.000	23.000	.000
	Hotellings Trace	3.305	76.013a	1.000	23.000	.000
	Roy's Largest Root	3.305	76.013a	1.000	23.000	.000
WEEK*	Pillai's Trace	.292	1.569a	5.000	19.000	.217
	Wilks' Lambda	.708	1.569a	5.000	19.000	.217
	Hotellings Trace	.413	1.569a	5.000	19.000	.217
	Roy's Largest Root	.413	1.569a	5.000	19.000	.217

Guttman Scores for  
Attitude and Behaviour



**Figure 9.1** Attitude and Behaviour by Method and Week.

The results show that there is no statistically significant interaction effect between stimulus (method) and week for attitude and behaviour ( $F = 1.57$ ,  $df = 1,5$ ,  $p = 0.22$ ). There is no main effect for week ( $F = 1.29$ ,  $df = 1,5$ ,  $p = 0.31$ ) meaning that there is no practice effect for attitude and behaviour. There is, however, a statistically significant main effect for method ( $F = 76.01$ ,  $df = 1, 5$ ,  $p = 0.000$ ). This means that the Pictorial and Music method produces significantly better attitudes and behaviour than the Pictorial only method.

In order to test whether the differences in mean attitude and behaviour given in Table 9.7 are significantly different over various combinations of stimulus and week, paired t-tests of the mean differences in attitude and behaviour are presented in Table 9.9.

There are significant differences in attitude and behaviour from stimulus 1 (week one) to stimulus 2 (week one), from stimulus 1 (week one) to stimulus 2 (week six) and from stimulus 1 (week six) to stimulus 2 (week six). It seems reasonable to infer that the significant improvement in attitude and behaviour in the students with severe disabilities is due to the musical addition with stimulus 2.

Table 9.9

t – test (paired samples) for Guttman Attitude and Behaviour Scores for Students with Severe Intellectual Disabilities (N = 24, I = 4)

Variable Pairs	Mean difference	SD	SEM	95% confidence Interval of difference Lower/Upper	t score	df	p (2 tailed test)
Stim. 1 Week 1 and Stim. 2 Week 1	1.04	1.0	0.20	-1.46 - 0.62	-5.11	23	0.000*
Stim. 1 Week 1 and Stim 2 Week 6	1.33	1.68	0.34	-2.04 -0.62	3.88	23	0.000*
Stim. 2 Week 1 and Stim. 2 Week 6	0.29	1.20	0.24	-0.80 +0.21	-1.19	23	0.245
Stim, 1 Week 6 and Stim. 2 Week 6	1.50	1.74	0.36	-2.24 -0.76	-4.2	23	0.000*

- Note:
1. SD = Standard deviation.
  2. SEM = Standard error of measurement.
  3. df = degrees of freedom.
  4. \* means  $p < 0.01$  and is significant..
  5. The computer program Statistical Package for the Social Sciences (SPSS) was used for these calculations.
  6. Stim. 1 = Stimulus 1. Stim. 2 = Stimulus 2.

## Summary of Main Findings

1. Near-ideal Guttman patterns were created from the four observations on no disruption to peers (easiest), not out-of-seat, not vocalising softly and on task, and not inattentive to task (hardest), for student attitude and behaviour during the lessons on painting. The total scores from these four items formed a reliable, non-linear scale from which valid comparisons of attitude and behaviour between the two teaching methods (Pictorial only and Pictorial plus Music) could be made over the six week experiment.
2. There was no statistically significant interaction effect on quality of painting due to the two methods of teaching (Pictorial only and Pictorial plus Music) and practice over the six weeks.  
  
The students improved significantly in attitude and behaviour in week one from the Pictorial only method to Pictorial plus Music method, because of the addition of the classical music.
3. The students improved significantly in their attitude and behaviour in week six from the Pictorial only method to Pictorial plus Music method, because of the addition of the classical music.
4. The students did not improve significantly in their attitude and behaviour from week one with stimulus 2 to week six with stimulus 2, due to a practice effect.

5. The students did not significantly improve their attitude and behaviour from week one to week six with stimulus 1 only (Pictorial only method), because of a practice effect.

The next chapter explains the comparison of the data for the lower primary regular students (N = 24) with the students from the Education Support schools that participated in the research study.

## CHAPTER TEN

### DATA ANALYSIS (PART FIVE)

#### GUTTMAN SCALES FOR REGULAR STUDENTS ON QUALITY OF PAINTING AND DIFFERENCES BY TEACHING METHOD AND WEEK

Although this study was primarily concerned with teaching students with severe intellectual disabilities non-representational painting using a newly devised Pictorial and Musical Visual Arts Program, it did involve 24 regular students who were taught in the same way for six weeks as the 24 students with severe intellectual disabilities. The data for the regular students were analysed in a similar way to that for the data of the students with disabilities (reported in Chapter 8). Chapter 10 now reports the analysis of the data with the 24 regular students.

This chapter will include an explanation of the similar teaching process that was created for the 24 regular students with the Pictorial and Musical program, and the problems that had to be overcome. It will show how a Guttman scale was created to analyse the painting quality of the regular students, and then explains the results of a between – within subjects ANOVA of the data to investigate the effects of the new teaching method with music over the six week experiment.



## **Teaching the Regular Students**

The experiment with 24 students from the regular primary school and those in the Education Support school was not intended as a competition to see who gained the highest scores for their painting when both groups participated in the Pictorial and Musical Visual Arts Program. Nevertheless, it is possible to ascertain whether the program improved the quality of the regular students' artwork as achieved by the students with disabilities. Therefore, it was important to establish as much of a similarity in the teaching instruction as possible, for both groups.

Each group was given the same visual arts lesson. The lesson plan was extended for a period of 50 minutes and was in the students usual visual arts classroom and given by their regular visual arts teacher. The program was held consecutively, each week, for a period of six weeks. The students in both groups had equal access to poster paints in colours of red, blue and yellow, a water jar, and the same size and texture of paper to complete their artwork.

The teachers in all participating schools were fully qualified and were interviewed on the requirements of the experiment before taking part. Each teacher agreed to the strict adherence of rules, such as the work must be the original work of the student and, although questions may be answered, the teacher was not to assist the student in the actual painting of the work. The researcher was present at all lessons in the Education Support schools and the first lesson at the regular school was viewed to ensure the correct procedure was carried out.

As previously noted, there were 28 regular students and 28 students with severe intellectual disabilities in the six week experiment, but four students with severe intellectual disabilities were absent during the required consecutive six weeks. This reduced the number of students to 24 in both groups.

### Differences between the Regular Students and the Special Education Students

The participating class of regular Year 1 primary students were from a private college in the Perth metropolitan area. The average age of the students was seven years. The average age of the special students was ten years, but their educational standard was at Year 1 level.

Because of the difference in class sizes between those in the regular school and the Education Support schools, the regular class had 28 students in the art lesson, while the special students were in three separate classes. The special classes were set at an optimal number of ten students, and required three separate Education Support schools to make up the number to 28 students for the experiment. The Education Support schools were specially set up to cater for students with disabilities and offered special facilities with small class sizes (N = ten). The visual art classrooms for the students with severe intellectual disabilities were more modern and better equipped than the classroom for the regular students.

## Guttman Scores for Painting Quality

Judges were used to score the paintings from the regular students in the same way as they did for the paintings of the students with severe intellectual disabilities. The judges were not told who produced the paintings or even that there were two types of students to ensure scoring was based only on painting quality for lower primary students. Non-linear Guttman patterns were created with the same four items for two groups of students, but the same items were not in the same order of difficulty for each group. For the students with severe intellectual disabilities, the order was composition (easiest), creativity, colour application and colour use (hardest). For the regular students, the order was creativity (easiest), composition, colour application and colour use (hardest).

Table 10.1

### Guttman Score Pattern for Regular Students (N = 24, I = 4, Stimulus1Week one)

Student	Easiest Item 4 Creativity	Item 3 Composition	Item 2 Colour application	Hardest Item 1 Colour use	Total score
121	4	4	4	3	15
103	3	3	3	3	12
104	3	3	3	3	12
107	3	3	3	3	12
108	3	3	3	3	12
115	3	3	3	3	12
124	3	3	3	3	12
125	3	3	3	3	12
120	3	3	2	3	11
106	2	2	3	3	10
111	2	2	3	3	10
112	2	2	3	3	10
110	2	2	2	3	9
126	2	2	2	3	9
101	2	1	2	3	8
109	2	2	2	2	8
113	2	2	2	2	8
114	2	2	2	2	8
117	2	2	2	2	8
119	2	2	2	2	8
127	2	2	2	2	8
128	2	2	2	2	8
107	2	2	2	1	7
122	1	2	2	2	6

Table 10.2

Guttman Score Pattern for Regular Students (N = 24, I = 4, Stimulus 1 Week 2)

Student	Easiest Item 4 Creativity	Item 3 Composition	Item 2 Colour app.	Hardest Item 1 Colour use	Total Score
103	3	3	3	3	12
107	3	3	3	3	12
112	3	3	3	3	12
115	3	3	3	3	12
124	3	3	3	3	12
125	3	3	3	3	12
121	3	3	3	2	11
102	3	3	2	2	10
113	2	2	2	3	9
102	2	2	2	2	8
101	2	2	2	2	8
104	2	2	2	2	8
106	2	2	2	2	8
109	2	2	2	2	8
110	2	2	2	2	8
111	2	2	2	2	8
112	2	2	2	2	8
114	2	2	2	2	8
117	2	2	2	2	8
119	2	2	2	2	8
120	2	2	2	2	8
122	2	2	2	2	8
126	2	2	2	2	8
127	2	2	2	2	8
128	2	2	2	2	8

- Note: 1. Excellent Guttman pattern.  
 2. Only 1/96 judge's responses did not fit an ideal Guttman pattern (student 113).

The judging response patterns for the paintings for the regular students were less than ideal Guttman patterns in some cases. A summary of the fit to an ideal Guttman pattern is given in Table 10.3.

Guttman (1950) showed that, when the patterns are ideal, the raw total score has a corresponding unique relationship with each pattern and the

raw total score represents a uni-dimensional variable (even if non-linear). Thus, we have an acceptably reliable scale from which valid comparisons of painting quality can be made.

Table 10.3

Summary of Judges' Responses to Guttman Pattern Fit by Stimulus by Week.

Stimulus/week	Number of Judges' responses in Guttman Scale	Ideal Guttman Pattern
Stim.1/W.1	83/96	acceptable
Stim.2/W.1	83/96	acceptable
Stim.1/W.2	95/96	excellent
Stim. 2/W.2	92/96	excellent
Stim.1/W.3	90/96	good
Stim.2/W.3	89/96	good
Stim.1/W.4	91/96	good
Stim.2/W.4	91/96	good
Stim.1/W.5	81/96	acceptable (just)
Stim.2/W.5	86/96	acceptable
Stim.1/W.6	83/96	acceptable
Stim. 2/W.6	89/96	good

- Note:
1. Stim. 1 = Pictorial only method.
  2. Stim. 2 = Pictorial plus Musical method.
  3. W.1 = Week one.
  4. W. 2 = Week two, and so on.

### Analysis with SPSS

The painting quality data for the 24 regular students were entered in the SPSS data-file by stimulus 1 (Pictorial only), from week one to week six and by stimulus 2 (Pictorial plus Music) from week one to week six. They were analysed using a mixed between – within subjects ANOVA (General Linear Model, repeated measures with SPSS) and the results are presented in

Table 10.4 and figure 10.1.

Table 10.4

Painting Quality by Method and Week for Regular Students (N = 24, I = 4)

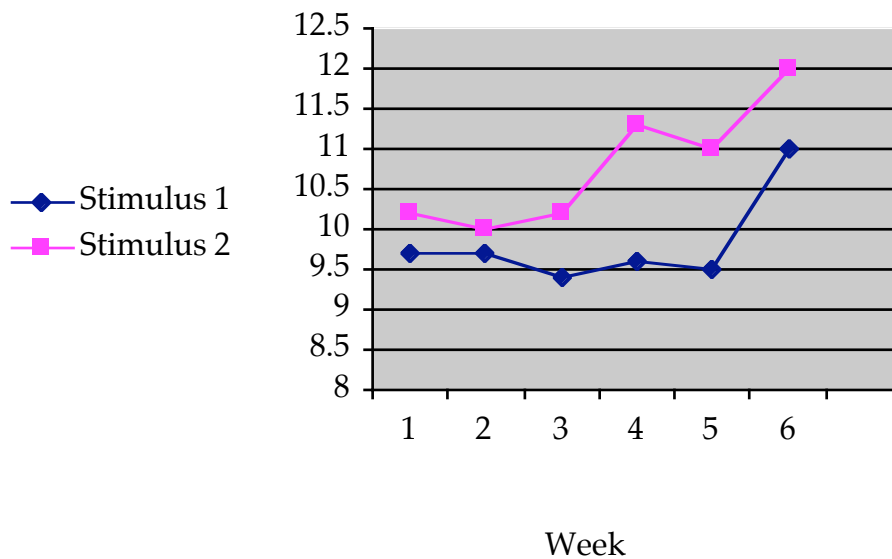
	Effect	Value	F Hypothesis	df	Error df	Sig.
WEEK.	Pillai's Trace	.352	6.996a	5.000	19.000	.001
	Wilks' Lambda	1.841	6.996a	5.000	19.000	.001
	Hotellings Trace	0.648	6.996a	5.000	19.000	.001
	Roy's Largest Root	1.841	6.996a	5.000	19.000	.001
METHOD	Pillai's Trace	.581	31.827a	1.000	23.000	.000
	Wilks' Lambda	.419	31.827a	1.000	23.000	.000
	Hotellings Trace	1.384	31.827a	1.000	23.000	.000
	Roy's Largest Root	1.384	31.827a	1.000	23.000	.000
WEEK*	Pillai's Trace	.315	1.749a	5.000	19.000	.172
METHOD	Wilks' Lambda	.685	1.749a	5.000	19.000	.172
	Hotellings Trace	.460	1.749a	5.000	19.000	.172
	Roy's Largest Root	.460	1.749a	5.000	19.000	.172

Note:  $p < 0.01$  is significant.

There are no statistically significant interactions by teaching method and week ( $F = 1.75$ ,  $df = 1, 5$ ,  $p = 0.17$ ) and the partial eta squared was 0.10, which is a moderate effect (Cohen, 1988). This means that there is no differential effect on painting quality by method by week. There is a statistically significant, main effect on painting quality by week (assumed to be due to practice) ( $F = 7.0$ ,  $df = 1, 5$ ,  $p = 0.001$ ). This means that the painting quality of the regular students improved significantly with practice over the six weeks. The partial eta squared is 0.19 which is a large effect (Cohen, 1988). There is also a statistically significant, positive main effect due to the Pictorial plus Music method ( $F = 31.83$ ,  $df = 1, 5$ ,  $p = 0.000$ ). The partial eta squared is 0.58 which is a very large effect (Cohen, 1988). This means that the

painting quality of the regular students improved significantly due to the addition of the classical music of Mozart during the lessons compared to teaching using only the Pictorial method.

### Painting Quality



**Figure 10.1** Graph of Painting Quality by Method and Week for Regular Students (N = 24).

- Note: 1. Stimulus 1 = Pictorial Only method  
 2. Stimulus 2 = Pictorial plus Music method

The mean Guttman scale for painting quality scores by stimulus (Pictorial only and Pictorial plus Music) and week (one to six) are given in table 10.5. They show that the general improvement in painting quality by week is statistically significant and that the superiority of the Pictorial plus Music method over the Pictorial only method is statistically significant.

Table 10.5

Means and SD's of Painting Quality for Regular Students (N = 24, I = 4).

Non –Linear Guttman Scores by Stimulus by Week

Week	Stimulus 1	Stimulus 2
1	M = 9.79 SD = 2.21	M = 10.17 SD = 1.95
2	M = 9.25 SD = 1.77	M = 9.96 SD = 1.79
3	M = 9.58 SD = 2.06	M = 10.17 SD = 2.35
4	M = 9.42 SD = 1.64	M = 11.37 SD = 1.58
5	M = 9.66 SD = 1.64	M = 11.04 SD = 1.47
6	M = 11.0 SD = 1.22	M = 12.08 SD = 1.10

- Note:
1. M = Mean score
  2. Stimulus 1 is the Pictorial only method.
  3. Stimulus 2 is the Pictorial plus Music method.
  4. SD is Standard deviation.

In order to test whether the differences in mean painting quality scores given in Table 10.5 could be due to chance, t-tests of the mean differences by stimulus and week were analysed using the computer program Statistical Package for the Social Sciences (SPSS). The t-tests show that the mean difference in painting quality from stimulus 1 to stimulus 2 for week one was not significant. The mean difference scores for stimulus 1 from week one to week six were significant. The mean difference scores for stimulus 1 (week one) to stimulus 2 (week six), and from stimulus 2 (week one) to stimulus 2 (week two) were significant. These data generally support the mixed between – within subjects ANOVA analysis presented in Table 10.4 and Figure 10.1. There is improvement in painting quality due to a practice effect and due to the addition of the classical music.



Table 10.6

Paired t – test Results for Regular Students Week one to Week six (N = 24, I = 4)

Variable Pairs	Mean Difference	SD	SEM	95% Confidence Interval of difference		t score	df	p (2 tailed test)
				Lower/	Upper			
Stimulus 1 Week 1 and Stimulus 2 Week 1	- 0.37	1.95	0.40	- 1.20	0.45	- 0.94	23	0.36
Stimulus 1 Week 1 and Stimulus 1 Week 6	- 1.21	2.2	0.45	- 2.15	- 0.27	- 2.66	23	0.01
Stimulus 1 Week 1 and Stimulus 2 Week 6	- 2.29	2.03	0.42	- 3.15	- 1.43	- 5.52	23	0.000 *
Stimulus 2 Week 1 and Stimulus 2 Week 2	- 1.92	1.93	0.40	- 2.75	- 1.08	- 4.75	23	0.000*

Note: 1. SD = Standard deviation.  
 2. SEM = Standard error of measurement.  
 3. \* means  $p < 0.01$  and is significant.

Table 10.7

Correlations by Stimulus and Week for Regular Students

Variable Pair	Correlation	r square
Stimulus 1 ( week 1) and Stimulus 2 (week 1)	0.56	0.32
Stimulus 1 (week 1) and Stimulus 1 (week 6)	0.26	0.07
Stimulus 1 (week 1) and Stimulus 2 (week 1)	0.40	0.16
Stimulus 2 (week 1) and Stimulus 2 week 6	0.26	0.07

Note: 1. r squared represents the common variance between the pairs of scores.

Table 10.7 shows the correlation between selected scores covering week one to week six for the two stimuli. The correlation squared shows the proportion of common variance between the two sets of scores. The proportion of common variance is only 0.07 at week six for both stimuli 1 and stimuli 2, compared to 0.32 at week one. This supports the view that the practice effect on painting quality is not uniform for each student and that, when this is coupled with the results from Table 10.4, it can be inferred that individual regular students improve by different amounts due to separate practice and musical effects.

### **Summary of Main Findings**

1. Acceptable to excellent Guttman patterns were obtained for painting quality from judges' scoring of four items, creativity (easiest), composition, colour application and colour use (hardest). The raw total scores were deemed to form a reliable, uni-dimensional scale from which valid comparisons could be made.
2. There was no statistically significant interaction effect between the two teaching methods (Pictorial only and Pictorial plus Music) over the six weeks on painting quality.
3. The regular students painting quality scores increased significantly from week one to week six, although individual students improved by different amounts.

4. The regular students improved significantly in their painting quality from week one to week six due to a practice effect.
5. The regular students also improved significantly in their painting quality due to the addition of the classical music background.

Chapter 10 (part five) brings to a close the data analysis section of this study. The next chapter will present an overview of the study, answer the research questions, discuss the findings in relation to the literature, and explain some of the implications of this study for teachers, students, administrators and for further research.

## CHAPTER ELEVEN

### SUMMARY, RESEARCH QUESTIONS, DISCUSSION AND IMPLICATIONS

*“Form can stand alone as a representation of an object (real or not), or  
as an abstract limit to a space or surface.”*

*(Kandinsky, 1912, p. 46)*

#### **Summary of the Study**

A new Pictorial and Musical Visual Arts Program, designed primarily for students with severe intellectual disabilities (N = 24), was evaluated in three Education Support schools within the Perth metropolitan area, and with a group of 24 regular students in a Perth metropolitan school. Twenty-four students with severe intellectual disabilities were taught painting each week for six weeks. Measures of painting quality and of their attitude and behaviour were compared, weekly, over the six weeks period.

The purpose of the study was to evaluate a new Pictorial and Musical Visual Arts Program for students with severe intellectual disabilities that

would provide them with a stimulating art experience, and at the same time, would, hopefully, give the students a sense of self-esteem. It was also believed that the methods used during the art lessons might help to mitigate the students' inappropriate behaviour.

### The Measures

There were two measures of painting quality. Firstly, a linear uni-dimensional measure was created with seven items using a Rasch computer program analysis of 200 students' regular abstract paintings. The total scores for the paintings of the students with severe intellectual disabilities were given the same linear Rasch measure as for the same total scores on the seven items as the 200 regular students' paintings. This was done because a Rasch analysis requires  $N = 200 +$  with about ten items and this was not possible for the students with severe intellectual disabilities where class sizes are restricted to around eight students. Secondly, a non-linear Guttman scale from four items was created for the experiment with students with severe intellectual disabilities over six weeks.

A non-linear Guttman scale of four observation items was used to measure student attitude and behaviour over the six week experiment. A Guttman scale was also used for the analysis of the regular students in a comparison study  $N = 24$ .

### Experimental controls

As all paintings were required to be the original work of the students, no painting assistance was given by the teachers. The students were informed before the lesson began that they were not to copy the print and the

print was removed from their sight before the painting time began. The program was structured so that all students participating in the experiment received equal time for viewing and painting. The type of equipment needed was the same for all students, both regular and those with disabilities. Music time, time allowed for each painting, instructions and type of music (Debussy and Mozart) to be used in the six lessons of the experiment were the same for all students in any particular week during the experiment.

### **Summary of the Findings**

A Rasch measurement model was used to create a linear scale of painting quality for 200 regular students, for use in later data analysis with the paintings of students with severe intellectual disabilities. There was a good fit of the seven items to the Rasch measurement model and a uni-dimensional measure was created. The good fit and good linear measure was indicated by:

1. Good global item fit;
2. Good global person fit;
3. Good individual item fit (7 items);
4. Good individual person fit (200 regular students);
5. Good Person Separation Index (0.90);
6. Good Category Response Curves showing consistent and logical judging scores;

7. Ordered item thresholds consistent with the conceptualised ordered judging criteria; and
8. A low item-trait test-of-fit indicating a uni-dimensional measure of painting quality.

This means that a reliable, linear scale of painting quality was created from which valid inferences could be made when using it. Analysis of the measures by week was performed with paired t-tests to investigate the effect on painting quality over the six weeks.

There are three main findings from the analysis of the Rasch measures of painting quality when the students with severe intellectual disabilities were taught by the combined Pictorial only and the Pictorial and Musical method (treated as one method), each week for six weeks.

1. Mean abstract painting quality improved from week one to week two, to week three, to week four, to week five, and to week six, significantly. This can be attributed to the new combined teaching method combined with a practice effect.
2. The amount of common variance in abstract painting quality between week one and week two, week one and week three, week one and week four, week one and week five, and between week one and week six, decreased.
3. The new combined teaching method combined with a practice effect improved abstract painting quality for the 24 students with severe intellectual disabilities by different amounts over the six weeks of the

experiment.

Near-ideal Guttman patterns were created from the four judging items of painting quality based on composition (easiest), creativity, colour application and colour use (hardest). The total scores from these four items formed a reliable, non-linear scale from which valid comparisons of painting quality between the two teaching methods (Pictorial only and Pictorial plus Music) could be made over the six week experiment

Although initially, a Rasch analysis was performed with the four items used with the Pictorial only method and, separately, with the four items used for the Pictorial plus Music method for the regular students (N = 200), this analysis was unsuccessful, and it was not possible to create a linear scale with only four items. Global item and person fit to the measurement model were unacceptable and two of the four items did not fit the measurement model. Furthermore, the Person Separation Index was low, indicating that the errors were large compared to the separation of the measures along the scale.

The four items for the students with severe intellectual disabilities were then arranged in order of difficulty to investigate the possibility of obtaining a reasonable Guttman pattern of responses and so create non-linear Guttman scales. Total raw scores in Guttman patterns are considered to be reliable, but non-linear (see Michell, 1990, 1999), unlike Rasch measures, which are reliable and linear. The Guttman scales, although not perfect, were satisfactory to excellent and were used to compare painting quality between the Pictorial only method and the Pictorial plus Music method, over the six weeks of the experiment.



A mixed between – within subjects ANOVA (General Linear Model repeated measures using SPSS) was used to investigate the effect of teaching method and practice on painting quality over the six weeks of the experiment. There are four main findings.

1. There was no statistically significant interaction effect on painting quality due to method of teaching (Pictorial only and Pictorial plus Music) and practice (time) over the six weeks.
2. The students improved significantly in painting quality with stimulus1 (Pictorial only teaching method) from week one to week six. This can be attributed directly to a practice effect.
3. The students significantly improved in painting quality with stimulus 2 (Pictorial plus Music teaching method) from week one to week six. This can be attributed directly to a practice effect.
4. Painting quality increased significantly from stimulus 1 to stimulus 2 by week. This can be attributed directly to the addition of the classical music in the background, provided in the stimulus 2 teaching method.

During the six weeks of the experiment, observations of the attitude and behaviour of the 24 students with severe intellectual disabilities were collected whilst they were producing their paintings. Data were collected on nine items and, using trial and error. Guttman patterns were created with four items arranged in order of difficulty from easy to hard, the total raw scores on these four items arranged from low to high were satisfactory to excellent in terms of their fit to an ideal Guttman pattern. A mixed between – within subjects ANOVA (General Linear Model, repeated measures using

SPSS) was used to investigate the effect of teaching method and practice on attitude and behaviour over the six weeks. There were six main findings.

1. Near-Guttman patterns were created from the four observations on non-disruption to peers (easiest), not out-of-seat, not vocalising softly and on task, and inattentive to task (hardest), for student attitude and behaviour during the lessons on painting. The total scores from these four items formed a reliable, non-linear scale from which valid comparisons of attitude and behaviour between the two teaching methods (Pictorial only and Pictorial plus Music) could be made over the six week experiment.
2. There was no statistically significant interaction effect on quality of painting due to the two methods of teaching (Pictorial only and Pictorial plus Music) and practice over the six weeks.
3. The students improved significantly in attitude and behaviour in week one from the Pictorial only method to Pictorial plus Music method, because of the addition of the classical music.
4. The students improved significantly in their attitude and behaviour in week six from the Pictorial only method to Pictorial plus Music method, because of the addition of the classical music.
5. The students did not improve significantly in attitude and behaviour from week one with stimulus 2 to week six with stimulus 2, that is; there is no practice effect for attitude and behaviour due to the addition of classical music.
6. The students did not improve significantly in attitude and behaviour

from week one to week six with stimulus 1 only (Pictorial only method), because of a practice effect.

Although this study was primarily concerned with teaching students with severe intellectual disabilities non-representational painting using a newly devised Pictorial and Musical Program, it did involve 24 regular students who were taught in the same way for six weeks as the 24 students with severe intellectual disabilities. This was done to see if there was any significant difference in reaction to the program between the two groups. The data for the regular students were analysed in a similar way to that for the data of the students with disabilities.

1. Acceptable to excellent Guttman patterns were obtained for painting quality from the judges' scoring of four items, creativity (easiest), composition, colour application and colour use (hardest). The raw total scores were deemed to form a reliable, uni-dimensional scale from which valid comparisons could be made.
2. There was no statistically significant interaction effect between the two teaching methods (Pictorial only and Pictorial plus Music) and time (practice) over the six weeks on painting quality.
3. The regular students painting quality scores increased significantly from week one to week six, although individual students improved by different amounts.
4. The regular students improved significantly in their painting quality from week one to week six due to a practice effect.

5. The regular students also improved in their painting quality due to the addition of the Pictorial and Musical method, as had the students with severe intellectual disabilities.

## **Research Questions**

It is now possible for the research questions to be answered:

### Research Question 1

Can a linear scale of abstract painting quality, based on colour, creativity and composition, be created using a Rasch computer program?

A linear 7-item scale of abstract painting quality, based on colour, creativity and composition was created for  $N = 200$  students using a Rasch computer program. The 7- item scale data was shown to be reliable – there was a good fit to the measurement model, the Student Separation Index was high and targeting was good. This scale data was used as a benchmark for the experiment to make valid inferences, and to give the order of difficulty of the items.

### Research Question 2

Can a Guttman scale of attitude and behaviour, based on aggression/ docility, vocalising/ quietness, and out-of-seat/ sitting quietly, be created for students with severe intellectual disabilities?

Near-ideal Guttman patterns were created from the four observations on non-disruption to peers (easiest), not out-of-seat, not vocalising softly and

on task, and inattentive to task (hardest), for student attitude and behaviour during the lessons on painting. The total scores from these four items formed a reliable, non-linear scale from which valid comparisons of attitude and behaviour between the two teaching methods (Pictorial only and Pictorial plus Music) could be made over the six week experiment.

### Research Question 3

Does a Pictorial and Musical Visual Arts Program improve the quality of artwork for students with severe intellectual disabilities, when compared with the Pictorial program without music?

The students improved their painting quality significantly with stimulus 2 (Pictorial plus Musical teaching method) from week one to week six. This can be attributed directly to the addition of the classical music of Mozart.

### Research Question 4

Does a Pictorial and Musical Visual Arts Program improve the quality of artwork of students with severe intellectual disabilities when compared with regular year one/two students?

From week one to week six, there was a significant improvement in the quality of the artwork of the students with severe intellectual disabilities. This improvement was considered to be due to the addition of the classical music background of the Pictorial and Musical Visual Arts Program and was an additional effect, over and above the practice effect, which also improved painting quality.

The regular students painting quality scores increased significantly from week one to week six too, due to the addition of the Pictorial and Musical Visual Arts Program, and, this was an additional effect, over and above the practice effect which also helped to improve painting quality

#### Research Question 5

Does a Pictorial and Musical Visual Arts Program improve the attitude and behaviour of students with severe intellectual disabilities when compared with a Pictorial program without music?

The students improved significantly in attitude and behaviour in week one from the Pictorial only method to the Pictorial plus Music method, because of the addition of the classical music. The students also improved significantly in their attitude and behaviour in week six from the Pictorial only method to the Pictorial plus Music method, because of the addition of the classical music. There was no practice effect here and all improvements can be attributed directly to the background classical music addition.

#### Research Question 6

Do the special education teachers involved in the experiment consider that the Pictorial and Musical Visual Arts Program improves the quality of visual artwork and the behaviour of the students with severe intellectual disabilities?

At the beginning of this study, two of the special education teachers voiced some apprehension about the ability of their students to be able to comprehend some of the instructions involved with the program, but they

were willing to give it a try. At the end of the six weeks experiment they all agreed that it had been a worthwhile experience for them and for their students (see Appendix I). It was also stated that the classical music, more especially during the last four weeks of the program with the music of Mozart, had been consistent in reducing some inappropriate behaviour by the students with severe intellectual disabilities.

### Research Question 7

Does the primary teacher of regular students involved in the experiment consider that the Pictorial and Musical Visual Arts Program improves the visual artwork of the regular students?

The primary teacher was impressed with the Pictorial and Musical Visual Art Program. In the beginning, she expressed the opinion that it would be an interesting experiment for the students and was most willing to begin the lessons. By the end of the program she believed that the students had received a benefit, not only from the addition of the classical music, but also from the viewing of the Kandinsky prints. She also thought that the students had become more interested in their painting as a result of the experiment.

## **Discussion**

Seguin (1812–1880) believed that using the senses of seeing and feeling was an important aspect in the learning experience for students with severe intellectual disabilities. The forward thinking of Farrell (1870–1932)

emphasised the importance of the teacher and introduced individualised programs for students with severe disabilities, and Montessori (1870–1952), who advanced Seguin’s theories of programming throughout her educational career and applied many of his educational principles. These early educators have influenced the planning and the outcome of the Pictorial and Musical Visual Arts Program. In the present study, the importance of the teacher is paramount to the success of the program. By first gaining the student’s attention, the teacher is involved in the focusing of the student on the pictorial aspect of the program. The use of constant positive verbal reinforcement by the teacher, together with the addition in the classroom of the classical music background led to the eventual positive outcome for the students participating in the program.

Similar positive findings to those evidenced in the Pictorial and Musical Arts Program were shown by Dirr (1978), Morreau and Anderson (1984), Hallam and Price (1998), Merinda (1990), Winner (1993) in the U.S.A. and by Daveson and Edwards (1998), in Australia. The researchers all had similar positive outcomes to their research and all of them found that the students with severe intellectual disabilities benefited to some extent from their participation in the programs.

Although during this present research study, there was not a great amount of literature, based on valid and reliable measurement, showing the advantages of using music in programming for students with severe intellectual disabilities (see Stephenson, in press, 2005), by comparison, there seemed to be more evidence on the advantages of a pictorial addition for these students (Winner, 1993; Pierce & Schreibman, 1994). The importance of



a close teacher involvement with the student's participation in the lesson and the necessity of a strong program structure were also well documented in the research literature (Alberto & Troutman, 1995; Barry & King, 1999; Casey, 1994).

The Pictorial and Musical Visual Arts Program has relied strongly on the theories set down by the Behaviourist Model of instruction (Skinner, 1974). By adhering to the principles of Stimulus Control, Contingency Management and Precision-Teaching (Cole & Chan, 1990), the basic structure of the program was placed on a good theoretical background. Students participating in the study were judged as individuals and the program was structured to chart the students' behaviour during the lesson.

## **Implications**

### For Teachers

When creating visual arts programs for students with severe intellectual disabilities, teachers can use the pictorial addition to their program as a means of gaining the students' focus. The teacher can refer to the colours in the print that the students are about to use in their painting and, with repetition, give the students a chance of retaining and repeating this knowledge. Most teachers employ a number of means for establishing an interesting environment in the classroom, such as decorative wall hangings, posters and other classroom fittings. The use of a calming musical background can also add to this environment by producing a more restful

classroom atmosphere, in which the students with severe intellectual disabilities are encouraged to create their paintings. The present study shows that teachers of students with severe intellectual disabilities can improve the quality of painting, and reduce inappropriate behaviour by employing background classical music, such as Mozart's "Sonata for Two Pianos in D major". An implication is that similar improvements could be made for students with moderate disabilities.

This also applies to teachers in the regular school, who are able to use the Pictorial and Musical Visual Arts Program as an Art History/Painting lesson with Kandinsky's prints and Mozart's music. It was suggested by the regular teacher who participated in this study (see Appendix I) that the prints for stimulus 1 could include other well known artists and that stimulus 2 could also include other works of Mozart in the Pictorial and Musical Visual Arts Program for the regular class. This implies that the abstract visual art of other well known artists, together with a classical music background could be used to improve the visual art classroom for regular students.

### For Students

There is a clear implication that students with severe intellectual disabilities and possibly those with moderate disabilities, as well as regular students, can improve the quality of their painting and benefit more from their visual art classes. The Pictorial and Musical Visual Arts Program provided a well structured framework for students with severe intellectual disabilities, allowing them to select and name the colours of red, blue and yellow they would use in their painting. This gave them the

opportunity to use their ability to treat the painting exercise in a more personalised way. The cognitive action needed to make their own colour selection and the way in which they wanted to use the colours also gave them a sense of independence which helped to foster their self-esteem, when they were able to view the outcome of their creative efforts. In this way, the students were integrating their visual artwork with cognitive processing strategies that would help them to use their creative abilities in other creative activities.

### For Schools and Administrators

Visual Arts programs for special education are generally written by teachers. These programs have to be carefully thought out and must be well planned, with special consideration given to the many diverse disabilities that the special teacher may encounter within the class. Programs that work well within the regular school do not necessarily work as well in special education. The Pictorial and Musical Visual Arts Program is one that can be used in the visual arts class for both regular and special students, whether in separate or integrated classes. This could be an advantage for both schools and administrators.

In the Education Support school, the students with severe intellectual disabilities may improve their self-esteem and painting quality by the early introduction of the Pictorial and Musical Visual Arts Program to their weekly visual arts lesson. Because they will have access to teachers that guide them step-by-step in looking closely at certain colours that they will be using in their painting, they will be naming these colours and becoming familiar with

them, then adding these colours with a brush to art paper. The students will be given positive reinforcement from their teachers on their efforts and eventually will achieve a colourful painting, entirely produced by their own skills.

This sense of achievement can also be applied to the students in the regular school when receiving the Pictorial and Musical Visual Arts Program. The program is completely teacher orientated, and, therefore, does not require the addition of a music specialist to administer a CD to the musical intervention in the lesson. The benefit to both schools is in the satisfaction of their teachers and in the knowledge that their students are receiving the best possible visual arts education.

#### For Measurement of Painting Quality

Within the visual arts classroom of the regular secondary school, the class teacher is often called upon to make assessments of the students' paintings. In every work of art, the teacher will be looking for several necessary design elements, for the manner in which the elements are used and combined determines the quality of the artwork. There are seven main elements.

**Line** - Line can be continuous, broken, implied, thick, thin, straight or curved.

**Shape** - Shape can create pattern. Shape can be regular or free form.

**Form** - Form is shape with depth, length and width. Forms have substance and occupy space.

- Space** - Space is three-dimensional in that it exists all around us. Forms have substance and occupy space. Unoccupied space is negative space.
- Value** - Value is the lightness or darkness of colour. Value can evoke mood or emotion.
- Texture** - Texture is the tactile quality of a surface. Texture can be real or implied.
- Colour** - Colour is a sensation in the eye caused by light. Colour can give a feeling of warmth or cold.

It is a feasible assumption that the seven elements listed above could be used in assessing painting quality for students in regular schools (N = 200+) using a Rasch computer program. The main reason why this would not be possible for the assessment of visual arts in Education Support schools for students with severe intellectual disabilities is the large number of these students who would be required to complete consecutive lessons for the project. It would, however, be possible to make a benchmark measure of painting quality using regular students. Then equate total scores on the items using a Rasch measurement for regular students with the total scores on the same items for the students with disabilities, and use the corresponding Rasch generated linear measures for the students with disabilities. This could be tried in any future study on this topic in order to obtain linear, uni-dimensional measures of painting quality to use in any comparison of teaching methods.

### Limitations of the Study

One of the main limitations of the present research study was the low number of students that could be provided by the Education Support schools. A large number of students could be provided by the regular schools, but this could not be matched because of the required small classes in the Education Support schools. It was a main condition of the study for comparison purposes, to keep the grade level to the lower primary, and this restriction also added to the age limit and the small number of students with severe intellectual disabilities that were available for the study.

Another limitation was due to the students from the Education Support schools who, for various reasons pertaining to their disabilities, failed to continue with the program. This necessitated the random removal of seven regular students from the program to keep the number even for comparison. A further limitation was when the researcher was attacked by one of the students with severe intellectual disabilities. Fortunately, this occurred at the end of a lesson and the student was taken out of the program permanently.

### Directions for Future Research

In special education, there is much that could be accomplished in further research in visual arts programs, and especially for students with autism. Observation in this study, where a number of the students were autistic, has shown that some of these students seemed to have the ability to produce quality paintings with the use of the Pictorial and Musical Visual Arts Program. Therefore, providing these students with more complex

programs, for instance the study of nature added to the Pictorial stimulus of the program, could be advantageous for the students, and further research could test this.

As this research study gives promising results for improving students' art in the painting area, it is believed that a more extensive study of the Pictorial and Musical Visual Arts Program, over time, may generate further ideas and possibilities for students with severe intellectual disabilities. For instance, the different types of classical music that could be trialed in order to study the various effects of the music on the students. For example, the effect of Mozart's music when it is played for the entire instructional program, instead of only during the second stimulus of the program, may also be an option for further research. Other types of classical music worth testing are themes from ballet, such as Swan Lake and the Nut-cracker Suite, also Pachelbel's 'Canon in D major', which has a very mood calming effect on students with intellectual disabilities (Riddoch, 2001). This would have the benefit of providing a musical variation in the art classroom.

Although the student grades in this study were confined to the lower primary level, it is believed that further study at the secondary level could be advantageous for both teachers and students, in both the special and regular art classes. Apart from advancing the program at the secondary level, it may also be possible to trial it in other states of Australia because, strictly, the results of the present study are only applicable to students at lower primary level in Perth.

Future research could be considered which would include students with other levels of disability, not only those who are considered to be severely intellectually disabled, but those who are considered to be mildly disabled, and also a study to include students with disabilities in the mainstream integrated visual arts class. The different types of student disability may also be considered as suitable for participants when trialing the Pictorial and Musical Visual Arts Program in the future. This could also have the advantage of greater numbers of students being available for the research project, and also the advantage of the data analysis being able to be analysed by the Rasch computer program which requires 200 + students in the data analysis.

#### For Theory

The structural theory of the Pictorial and Musical Visual Arts Program was based on the theoretical principles set down in the Behaviourist Model. This theoretical model advocates the use of stimulus control by using continuous prompts and positive reinforcement to initiate positive responses from the students. The Behaviourist Model also inspires the use of direct instruction by the teacher, where programs must be well structured and presented in a one-to-one format to stimulate the student's acquisition of skills. The mastery of materials and a strong sense of student involvement in a pleasant environment is also displayed in the Pictorial and Musical Visual Arts Program.

The program supports the use of continuous prompts, such as telling students to get on with their work when they become inattentive, and



positive reinforcement, when they apply themselves to their task. It also relies on direct instruction and a one-to-one format to stimulate the student's creativity. This theoretical base to the program relies on the students' completion of their own task in a positive manner, in a secure and pleasant environment. Behavioural corrective procedures for students with intellectual disabilities can be made by regular and systematic changes to the student's environment. Behaviourist theories also employ the observation and measurement of the students' behaviour when they are confronted with a series of different changes. These changes are constructed in such a way as to cause favourable and more appropriate behaviour in the student. Stimulus Control, Contingency Management and Precision-Teaching are some of the teaching methods used by the Behaviourist Model to cause appropriate behaviour in students with severe intellectual disabilities.

It must be noted that the students with severe intellectual disabilities also gained in their attention span by focusing on the Kandinsky prints. They appeared to be assisted in learning their colours, even to the point of discovering that blue and yellow makes green from viewing Kandinsky's print of the 'Mountain', which is predominantly green. This exercise was quite a learning curve for the students.

Although the Pictorial and Musical Visual Arts Program was based on some theories set down by the Behaviourist Model, it also relied on the theories of a number of educators. It used the colour principles of Franz Cizek (1865 -1946), with the use of the colours of red yellow and blue, as being the most appropriate ones for children to use when painting. It observed the behaviourist principles of B. F. Skinner (1974) in which the

basics relied on a firm structure to the program, the involvement of the teacher and the use of positive reinforcement in a pleasant classroom environment. It also applied the musical theories of Alfred Tomatis (1952) (related by Campbell, 1997), whose work with students with severe intellectual disabilities gave birth to the theory that Mozart's compositions often managed a calming effect by improving spatial perception and communication for these students. It noted the psychological input of H. Gardner (1973/76/83/99) who believed that all human beings were capable of higher intelligence of some form, unless they were in a coma. All of these educators had an important effect on the formation of the Pictorial and Musical Visual Arts Program, not the least being that of Wassily Kandinsky (1886 -1944) who produced the spiritual and musically inspired paintings for the reproductions used in this study.

Therefore, the results of this study gave support to the Behaviourist Model with the use of prompts and positive reinforcement. The Pictorial and Musical Visual Arts Program used bright primary colours to help the students with severe intellectual disabilities gain focus and concentration. It also used a classical music background to improve the atmosphere of the art classroom, so that the students with severe intellectual disabilities could reach their potential in painting quality and gain improvement in their attitude and behaviour.



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## APPENDIX I

### SUMMARY OF TEACHER RESPONSES TO THE ART PROGRAM

At the conclusion of the Pictorial and Musical Visual Arts Program, the special education teachers who participated in the experiment were asked to give their comments on the effect it may have had on their students' painting quality and also on their attitude and behaviour during the six weeks experiment. The teachers agreed that the experiment had been a success as far as the addition of background music was concerned. They also agreed on students having gained in their painting quality, in that they seemed more concentrated and careful. It was interesting to note that the teachers thought that most of the students had become more interested in their painting as a result of the program. One of the teachers thought that the attitude and behaviour of the students in her class had not improved greatly over the six weeks, but the majority thought that the background music of Mozart had created a calming effect on their students, especially towards the end of the experiment.

The regular teacher did not fill in a regular weekly report, but she was very enthusiastic about the effect of the Pictorial and Musical Visual Arts Program, especially the background music, on her art class. She said that the students all enjoyed viewing the artist's print and suggested that other artists could be included for future lessons as well as other classical music for the students to enjoy. The teacher said that the introduction of classical music

had been a great success, and one little boy had said that the music of Mozart made him want to fly.

## APPENDIX IX

Table 8.2 a  
Non-Linear Painting Quality Scores (N = 24, I = 4) for Students with Severe  
 Intellectual Disabilities (Stimulus 1 Week 2)

Student	Easiest			Hardest		Total Raw Score
	Composition	Creativity	Colour Application	Colour Use		
103	4	3	3	3		13
102	3	3	3	3		12
112	3	3	3	3		12
113	3	3	3	3		12
116	3	3	3	3		12
117	3	3	3	3		12
126	3	3	3	2		11
105	3	3	2	2		10
106	3	3	2	2		10
114	3	3	2	2		10
122	3	3	2	2		10
123	3	3	2	2		10
125	3	3	2	2		10
104	2	2	2	2		8
107	2	2	2	2		8
109	2	2	2	2		8
110	2	2	2	2		8
115	2	2	2	2		8
119	2	2	2	2		8
120	2	2	2	2		8
121	2	2	2	2		8
124	2	2	2	2		8
101	2	2	2	2		7
108*	2	2	2	2		7

## APPENDIX X

Table 8.2 b  
Non-Linear Painting Quality Scores (N = 24, I = 4) for Students with Severe Intellectual Disabilities (Stimulus 2 Week 2)

Student	Easiest			Hardest		Total Raw Score
	Composition	Creativity	Colour Application	Colour Use		
102	4	4	3	3		14
103*	3	4	3	3		13
128	4	4	3	2		13
112	3	3	3	3		12
113	3	3	3	3		12
114*	4	3	3	2		12
116	3	3	3	3		12
117	3	3	3	3		12
126*	4	3	2	3		12
123	3	3	3	2		11
106	3	3	2	2		10
108	3	3	2	2		10
110	3	3	2	2		10
111	3	3	2	2		10
115	3	3	2	2		10
122	3	3	2	2		10
124	3	3	2	2		10
105*	2	3	2	2		9
119	3	2	2	2		9
120*	2	2	2	3		9
104	2	2	2	2		8
107	2	2	2	2		8
109	2	2	2	2		8
121	2	2	2	1		7



## APPENDIX XI

Table 8.2 c

Non-Linear Painting Quality Scores (N = 24, I = 4) for Students with Severe Intellectual Disabilities (Stimulus 1 Week 3)

Student	Easiest			Hardest		Total Raw Score
	Composition	Creativity	Colour Application	Colour Use		
102	3	3	3	3		12
105	3	3	3	3		12
106	3	3	3	3		12
116	3	3	3	3		12
124	3	3	3	3		12
124	3	3	3	3		12
125	3	3	3	3		12
121*	3	3	2	3		11
122*	3	3	2	3		11
123	3	3	3	2		11
126*	3	3	2	3		11
112*	3	3	2	3		11
120*	3	2	3	2		10
117	3	3	2	2		10
110	3	2	2	2		9
103*	2	3	2	2		9
107	2	2	2	2		8
109	2	2	2	2		8
113	2	2	2	2		8
114	2	2	2	2		8
115	2	2	2	2		8
104	2	2	2	2		8
119	2	2	2	2		8
101	2	2	2	1		7
108	1	1	1	1		7

## APPENDIX XII

Table 8.2 d

Non-Linear Painting Quality Scores (N = 24, I = 4) for Students with Severe Intellectual Disabilities (Stimulus 2 Week 3)

Student	Easiest			Hardest	
	Composition	Creativity	Colour Application	Colour Use	Total Raw Score
102	4	4	4	4	16
112	4	4	4	4	15
125	4	4	3	2	13
103	3	3	3	3	12
105	3	3	3	3	12
106	3	3	3	3	12
116	3	3	3	3	12
117	3	3	3	3	12
121	3	3	3	3	12
123	3	3	3	3	12
124	3	3	3	3	12
126	3	3	3	3	12
122	3	3	3	2	11
107	3	3	2	2	10
109	3	3	2	2	10
110	3	3	2	2	10
120	3	3	2	2	10
104	2	2	2	2	8
108	2	2	2	2	8
113	2	2	2	2	8
114	2	2	2	2	8
115	2	2	2	2	8
101	2	2	2	2	8
119	2	2	2	2	8

## APPENDIX XIII

Table 8.2 e  
Non-Linear Painting Quality Scores (N = 24, I = 4) for Students with Severe Intellectual Disabilities (Stimulus 1 Week 4)

Student	Easiest		Hardest		Total Raw Score
	Composition	Creativity	Colour Application	Colour Use	
102	4	4	3	3	14
105	4	4	3	3	14
126	4	4	3	2	13
125*	4	3	4	2	13
106	3	3	3	3	12
107	3	3	3	3	12
113	3	3	3	3	12
114	3	3	3	3	12
116	3	3	3	3	12
117	3	3	3	3	12
119	3	3	3	3	12
120	3	3	3	3	12
123	3	3	3	3	12
103*	3	3	2	3	11
110	3	3	3	2	11
112*	3	3	2	3	11
118*	3	3	2	3	11
122*	3	3	2	3	11
124*	3	3	2	3	11
115*	3	2	2	3	10
104*	2	3	2	2	9
109	3	2	2	2	9
101	2	2	2	2	8
121	2	2	2	2	8

## APPENDIX XIV

Table 8.2 f

Non-Linear Painting Quality Scores (N = 24, I = 4) for Students with Severe Intellectual Disabilities (Stimulus 2 Week 4)

Student	Easiest		Hardest		Total Raw Score
	Composition	Creativity	Colour Application	Colour Use	
102	4	4	4	4	16
103	4	4	4	4	16
105	4	4	4	4	16
116	4	4	4	3	15
106	4	4	3	3	14
114	4	4	3	3	14
126	4	4	3	3	14
125*	4	4	2	4	14
112	4	3	3	3	13
107	3	3	3	3	12
111	3	3	3	3	12
113	3	3	3	3	12
117	3	3	3	3	12
119	3	3	3	3	12
120	3	3	3	3	12
123	3	3	3	3	12
124	3	3	3	3	12
104	3	3	3	2	11
101	3	3	2	2	10
109	3	3	2	2	10
110	3	3	2	2	10
115*	3	2	3	2	10
122	3	3	2	2	10
121	2	2	2	2	8

## APPENDIX XV

Table 8.2 g  
Non-Linear Painting Quality Scores (N = 24, I = 4) for Students with Severe Intellectual Disabilities (Stimulus 1 Week 5)

Student	Easiest		Hardest		Total Raw Score
	Composition	Creativity	Colour Application	Colour Use	
125	4	4	3	4	15
103	4	4	3	3	14
102	4	4	3	3	14
104	3	3	3	3	12
105	3	3	3	3	12
106	3	3	3	3	12
109	3	3	3	3	12
115	3	3	3	3	12
119	3	3	3	3	12
112	3	3	2	2	10
114	3	3	2	2	10
116	3	3	2	2	10
120*	3	2	3	2	10
122	3	3	2	2	10
113	3	3	2	2	10
117*	2	3	2	2	9
108	3	2	2	2	9
110	3	2	2	2	9
101	2	2	2	2	8
107	2	2	2	2	8
121	2	2	2	2	8
123	2	2	2	2	8
124	2	2	2	2	8

## APPENDIX XVI

Table 8.2 h  
Non-Linear Painting Quality Scores (N = 24, I = 4) for Students with Severe Intellectual Disabilities (Stimulus 2 Week 5)

	Easiest			Hardest		
Student	Composition	Creativity	Colour Application	Colour Use	Total Raw Score	
102	4	4	4	4	16	
103	4	4	4	4	16	
125	4	4	3	4	15	
105	4	4	3	3	14	
116	4	4	3	3	14	
101	3	3	3	3	12	
106	3	3	3	3	12	
109	3	3	3	3	12	
112	3	3	3	3	12	
113	3	3	3	3	12	
115	3	3	3	3	12	
119	3	3	3	3	12	
121	3	3	3	3	12	
122	3	3	3	3	12	
124	3	3	3	3	12	
104	3	3	3	2	11	
117*	3	3	2	3	11	
123*	3	3	2	3	11	
114	3	3	2	2	10	
120	3	3	2	2	10	
108	3	3	2	2	10	
110	3	3	2	2	10	
107	2	2	2	2	9	

## APPENDIX XVII

Table 9.2 a

Non-Linear Guttman Attitude and Behaviour Scores for Students with  
Severe Intellectual Disabilities. (N = 24, Stimulus 1, Week 2)

Student	Easiest		Hardest		Total score
	Item 2	Item 8	Item 6	Item 3	
105	4	4	4	4	16
106	4	4	4	4	16
123	4	4	4	4	16
125	4	4	4	4	16
126	4	4	4	4	16
102	4	4	4	3	15
103	4	4	4	3	15
109	4	4	4	3	15
114	4	4	4	3	15
117	4	4	4	3	15
119	4	4	4	3	15
122	4	4	4	3	15
107	4	4	3	3	14
108	4	4	3	3	14
110*	3	4	4	3	14
112	4	4	3	3	14
115	4	4	4	2	14
116	4	4	4	2	14
113	4	3	3	3	13
121*	3	3	4	3	13
120	3	3	3	3	12
104	4	4	1	1	10
124*	3	3	3	1	10
101	4	1	1	1	7

## APPENDIX XVIII

Table 9.2 b

Non-Linear Guttman Attitude and Behaviour Scores for Students with Severe Intellectual Disabilities. (N = 24, Stimulus 2, Week 2)

Student	Easiest		Hardest		Total score
	Item 2	Item 8	Item 6	Item 3	
102	4	4	4	4	16
103	4	4	4	4	16
105	4	4	4	4	16
106	4	4	4	4	16
110	4	4	4	4	16
114	4	4	4	4	16
123	4	4	4	4	16
125	4	4	4	4	16
126	4	4	4	4	16
108	4	4	4	3	15
109	4	4	4	3	15
115	4	4	4	3	15
116	4	4	4	3	15
117	4	4	4	3	15
119	4	4	4	3	15
122	4	4	4	3	15
101*	4	3	4	3	14
107	4	3	4	3	14
112	4	3	4	3	14
120*	4	3	4	3	14



## APPENDIX XIX

Table 9.2 c

Non-Linear Guttman Attitude and Behaviour Scores for Students with  
Severe Intellectual Disabilities. (N = 24, Stimulus 1, Week 3)

Student	Easiest		Hardest		Total score
	Item 2	Item 8	Item 6	Item 3	
105	4	4	4	4	16
106	4	4	4	4	16
123	4	4	4	4	16
126	4	4	4	4	16
102	4	4	4	3	15
108	4	4	4	3	15
109	4	4	4	3	15
110	4	4	4	3	15
114	4	4	4	3	15
115	4	4	4	3	15
103	4	4	3	3	14
107	4	4	3	3	14
112	4	4	3	3	14
119	4	4	3	3	14
120*	4	3	4	3	14
125	4	4	3	3	14
113*	4	3	4	2	13
116	4	3	3	3	13
122*	4	3	4	2	13
124*	4	4	4	1	13
101	4	3	3	2	12
121*	2	4	2	2	12
104	4	3	2	1	10
117	4	2	2	2	10

## APPENDIX XX

Table 9.2 d

Non-Linear Guttman Attitude and Behaviour Scores for Students with  
Severe Intellectual Disabilities. (N = 24, Stimulus 2, Week 3)

Student	Easiest Item 2	Item 8	Item 6	Hardest Item 3	Total score
102	4	4	4	4	16
103	4	4	4	4	16
105	4	4	4	4	16
106	4	4	4	4	16
109	4	4	4	4	16
114	4	4	4	4	16
119	4	4	4	4	16
123	4	4	4	4	16
125	4	4	4	4	16
126	4	4	4	4	16
108	4	4	4	3	15
110	4	4	4	3	15
113	4	4	4	3	15
115	4	4	4	3	15
120	4	3	4	3	15
121	4	4	4	3	15
122	4	4	4	3	15
101*	4	3	4	3	14
104	4	4	3	3	14
107	4	4	3	3	14
116*	4	3	4	3	14
117*	4	3	4	3	14
124	4	3	4	3	14

## APPENDIX XXI

Table 9.2 e

Non-Linear Guttman Attitude and Behaviour Scores for Students with  
Severe Intellectual Disabilities. (N = 24, Stimulus 1, Week 4)

Student	Easiest		Hardest		Total score
	Item 2	Item 8	Item 6	Item 3	
106	4	4	4	4	16
112	4	4	4	4	16
123	4	4	4	4	16
126	4	4	4	4	16
116	4	4	4	3	15
125*	4	4	3	4	15
122*	4	3	4	3	14
103*	4	3	4	3	14
107	4	3	4	3	14
108	4	3	4	3	14
109	4	3	4	3	14
114*	4	3	4	3	14
117*	4	3	4	3	14
120*	4	3	4	3	14
101*	4	3	3	3	13
102	4	4	3	2	13
105*	3	3	4	3	13
113	4	4	3	2	13
119	4	3	3	3	13
121	3	3	4	3	13
110*	2	4	3	3	12
115	4	4	2	2	12
104	4	3	2	2	11
124*	1	4	1	1	7

## APPENDIX XXII

Table 9.2 f

Non-Linear Guttman Attitude and Behaviour Scores for Students with Severe Intellectual Disabilities. (N = 24, Stimulus 2, Week 4)

Student	Easiest		Hardest		Total score
	Item 2	Item 8	Item 6	Item 3	
103	4	4	4	4	16
105	4	4	4	4	16
106	4	4	4	4	16
119	4	4	4	4	16
122	4	4	4	4	16
123	4	4	4	4	16
125	4	4	4	4	16
126	4	4	4	4	16
102	4	4	4	3	15
109	4	4	4	3	15
114	4	4	4	3	15
116	4	4	4	3	15
121	4	4	4	3	15
104	4	4	3	3	14
107	4	4	3	3	14
108	4	4	3	3	14
110*	3	4	4	3	14
112	4	4	3	3	14
113	4	4	3	3	14
115	4	4	3	3	14
117*	3	3	4	4	14
120*	4	3	4	3	14
124*	2	4	1	1	8

## APPENDIX XXIII

Table 9.2 g

Non-Linear Guttman Attitude and Behaviour Scores for Students with  
Severe Intellectual Disabilities. (N = 24, Stimulus 1, Week 5)

Student	Easiest		Hardest		Total score
	Item 2	Item 8	Item 6	Item 3	
105	4	4	4	4	16
106	4	4	4	4	16
114	4	4	4	4	16
123	4	4	4	4	16
102	4	4	4	3	15
107	4	4	4	3	15
103*	4	3	4	3	14
119*	4	3	4	3	14
120	4	4	3	3	14
122*	4	3	4	3	14
104	4	3	3	3	13
115	4	3	3	3	13
116	4	3	3	3	13
117	4	3	3	3	13
121	4	3	3	3	13
124*	3	4	3	3	13
101	4	4	2	2	12
108	4	4	2	2	12
109*	4	2	4	2	12
112	4	4	2	2	12
113	4	4	2	2	12
125*	3	3	4	2	12
126	3	3	3	3	12
110*	3	2	4	3	11

## APPENDIX XXIV

Table 9.2 h

Non-Linear Guttman Attitude and Behaviour Scores for Students with  
Severe Intellectual Disabilities. (N = 24, Stimulus 2, Week 5)

Student	Easiest		Hardest		Total score
	Item 2	Item 8	Item 6	Item 3	
101	4	4	4	4	16
102	4	4	4	4	16
103	4	4	4	4	16
105	4	4	4	4	16
106	4	4	4	4	16
114	4	4	4	4	16
120	4	4	4	4	16
123	4	4	4	4	16
126	4	4	4	4	16
104*	4	4	3	4	15
107	4	4	3	4	15
108	4	4	4	3	15
112	4	4	4	3	15
115	4	4	4	3	15
116	4	4	4	3	15
117	4	4	4	3	15
119	4	4	4	3	15
122	4	4	4	3	15
125	4	4	4	3	15
109	4	4	4	2	14
110	4	4	4	2	14
121*	4	3	4	3	14
124	4	4	3	3	14
113	4	4	3	2	13

## APPENDIX XXV

Table 10.2 a

Guttman Score Pattern for Regular Students (N = 24, I = 4, Stimulus 2 Week 2)

Student	Item 4 Creativity	Item 3 Composition	Item 2 Colour app.	Item 1 Colour use	Total score
103	3	3	3	3	12
107	3	3	3	3	12
111	3	3	3	3	12
112	3	3	3	3	12
114	3	3	3	3	12
115	3	3	3	3	12
124	3	3	3	3	12
125	3	3	3	3	12
126	3	3	3	3	12
110	3	3	3	2	11
102	3	3	2	2	10
121*	3	2	2	3	10
101*	2	2	3	2	9
113*	2	2	3	2	9
122*	2	2	2	3	9
128	3	2	2	2	9
104	2	2	2	2	8
106	2	2	2	2	8
108	2	2	2	2	8
109	2	2	2	2	8
119	2	2	2	2	8
120	2	2	2	2	8
127	2	2	2	2	8
117	2	2	2	2	8

Note: 4/96 Judges' responses do not fit an ideal Guttman pattern

## APPENDIX XXVI

Table 10.2 b

Guttman Score Pattern for Regular Students (N = 24, I = 4, Stimulus 1 Week

3)

Student	Item 4 Creativity	Item 3 Composition	Item 2 Colour app.	Item 1 Colour use	Total score
113	4	4	3	3	14
103	3	3	3	3	12
111	3	3	3	3	12
114	3	3	3	3	12
115	3	3	3	3	12
107	3	3	3	2	11
120*	2	2	3	3	11
102	3	3	2	2	10
106	3	3	2	2	10
119	3	3	2	2	10
124	3	3	2	2	10
125	3	3	2	2	10
109*	2	2	2	3	9
122*	2	2	2	3	9
126*	2	2	2	3	9
101	2	2	2	2	8
104	2	2	2	2	8
110	2	2	2	2	8
112	2	2	2	2	8
117	2	2	2	2	8
121	2	2	2	2	8
127	2	2	2	2	8
108	1	1	1	1	4



## APPENDIX XXVII

Table 10.2 c

### Guttman Score Pattern for Regular Students (N = 24, I = 4, Stimulus 2 Week

3)

Student	Item 4 Creativity	Item 3 Composition	Item 2 Colour app.	Item 1 Colour use	Total score
103	4	4	3	3	14
113	4	4	3	3	14
101	3	3	3	3	12
109	3	3	3	3	12
115	3	3	3	3	12
119	3	3	3	3	12
125	3	3	3	3	12
126	3	3	3	3	12
127	3	3	3	3	12
102	3	3	3	2	11
107	3	3	3	2	11
121*	3	3	3	2	11
106*	2	2	3	3	10
111*	2	2	3	3	10
114*	2	2	3	3	10
110	3	2	2	2	9
104	2	2	2	2	8
112	2	2	2	2	8
117	2	2	2	2	8
120	2	2	2	2	8
122	2	2	2	2	8
124	2	2	2	2	8
128	2	2	2	2	8
108	1	1	1	1	4

Note: 4/96 did not fit an ideal Guttman pattern

## APPENDIX XXVIII

Table 10.2 d

Guttman Score Pattern for Regular Students (N = 24, I = 4, Stimulus 1 Week  
4)

Student	Item 4 Creativity	Item 3 Composition	Item 2 Colour app.	Item 1 Colour use	Totalscore
106	3	3	3	3	12
111	3	3	3	3	12
115	3	3	3	3	12
117	3	3	3	3	12
126	3	3	3	3	12
127	3	3	3	3	12
101*	2	2	3	3	10
102*	2	2	3	3	10
104*	2	2	2	3	9
119	2	2	2	3	9
120	2	2	2	3	9
121	2	2	2	3	9
122	2	2	2	3	9
125	2	2	2	3	9
103	2	2	2	2	8
107	2	2	2	2	8
108	2	2	2	2	8
109	2	2	2	2	8
110	2	2	2	2	8
112	2	2	2	2	8
113	2	2	2	2	8
114	2	2	2	2	8
124	2	2	2	2	8
128	2	2	2	2	8

Note: 3/96 Judges' responses did not fit an ideal Guttman pattern

## APPENDIX XXIX

Table 10.2 e

Guttman Score Pattern for Regular Students (N = 24, I = 4, Stimulus 2 Week 4)

Student	Item 4 Creativity	Item 3 Composition	Item 2 Colour app.	Item 1 Colour use	Total score
122	4	4	3	3	14
103	4	3	3	3	13
110	4	3	3	3	13
113	4	3	3	3	13
124	4	3	3	3	13
101	3	3	3	3	12
102	3	3	3	3	12
107	3	3	3	3	12
108	3	3	3	3	12
111	3	3	3	3	12
112	3	3	3	3	12
117	3	3	3	3	12
119	3	3	3	3	12
121	3	3	3	3	12
128	3	3	3	3	12
106	3	3	3	2	11
109*	3	3	2	3	11
114	3	3	3	2	11
127	3	3	2	2	10
104*	2	2	2	3	9
120*	2	2	2	3	9
125*	2	2	2	3	9
126*	2	2	2	3	9
115	2	2	2	2	8

Note: 5/96 Judges' responses did not fit an ideal Guttman pattern

## APPENDIX XXX

Table 10.2 f

Guttman Score Pattern for Regular Students (N = 24, I = 4, Stimulus 1 Week  
5)

Student	Item 4 Creativity	Item 3 Composition	Item 2 Colour app.	Item 1 Colour use	Total score
103	3	3	3	3	12
110	3	3	3	3	12
115	3	3	3	3	12
111	3	3	2	3	11
113	3	3	2	3	11
117	3	3	2	3	11
119	3	3	2	3	11
128	3	3	2	3	11
102*	2	2	3	3	10
106*	2	3	2	3	10
107	3	3	2	2	10
120*	3	2	3	2	10
126*	3	2	3	2	10
101*	2	2	2	3	9
104*	2	2	3	2	9
108*	2	2	3	2	9
109*	2	2	3	2	9
121*	2	2	3	2	9
122*	2	2	3	2	9
112	2	2	2	2	8
114	2	2	2	2	8
124	2	2	2	2	8
122	2	2	2	2	8
125*	1	1	1	2	5

Note: 11/96 Judges' responses did not fit an ideal Guttman pattern

## APPENDIX XXXI

Table 10.2 g

Guttman Score Pattern for Regular Students (N = 24, I = 4, Stimulus 2  
Week 5)

Student	Item 4	Item 3	Item 2	Item 1	Total score
	Creativity	Composition	Colour App.	Colour Use	
122	4	4	3	3	14
103	4	3	3	3	13
108	3	3	3	3	12
111	3	3	3	3	12
115	3	3	3	3	12
119	3	3	3	3	12
120	3	3	3	3	12
121	3	3	3	3	12
124	3	3	3	3	12
128	3	3	3	3	12
101*	3	2	3	3	11
106	3	3	3	2	11
107	3	3	3	2	11
111*	3	2	3	3	11
114	3	3	3	2	11
117*	3	2	3	3	11
126*	3	3	2	3	11
127	3	3	3	2	11
102*	2	2	3	3	10
109*	3	2	2	3	10
104*	2	2	2	3	9
112*	2	3	2	2	9
113	2	2	2	2	8
125	2	2	2	2	8

Note: 8/96 Judges' scores did not fit an ideal Guttman pattern

## APPENDIX XXXII

Table 10.2 h

Guttman Score Pattern for Regular Students (N = 24, I = 4, Stimulus 1  
Week 6)

Student	Item 4	Item 3	Item 2	Item 1	TotalScore
	Creativity	Composition	Colour App.	Colour Use	
108	4	4	3	3	14
101	3	3	3	3	12
104	3	3	3	3	12
106	3	3	3	3	12
107	3	3	3	3	12
115	3	3	3	3	12
125	3	3	3	3	12
126	3	3	3	3	12
102*	3	2	3	3	11
103*	3	3	2	3	11
112*	2	3	3	3	11
117	3	3	3	2	11
119*	3	2	3	3	11
120*	3	2	3	3	11
121	3	3	3	2	11
122*	3	2	3	3	11
128	3	3	3	2	11
109	3	3	2	2	10
110*	2	3	3	2	10
111*	3	2	2	3	10
113*	2	2	3	3	10
114*	2	2	3	3	10
127*	2	2	2	3	9
124	2	2	2	2	8

Note: 10/96 Judges' responses did not fit an ideal Guttman pattern

## APPENDIX XXXIII

Table 10.2 i

Guttman Score Pattern for Regular Students (N = 24, I = 4, Stimulus 2  
Week 6)

Student	Item 4	Item 3	Item 2	Item 1	TotalScore
	Creativity	Composition	Colour App.	Colour Use	
121	4	4	3	3	14
122	4	4	3	3	14
103	4	3	3	3	13
106	4	3	3	3	13
107	4	3	3	3	13
106	4	3	3	3	13
116	4	3	3	3	13
117	4	3	3	3	13
120	4	3	3	3	13
101	3	3	3	3	12
104	3	3	3	3	12
110	3	3	3	3	12
112	3	3	3	3	12
114	3	3	3	3	12
115	3	3	3	3	12
125	3	3	3	3	12
126	3	3	3	3	12
102*	3	2	3	3	11
113*	2	3	3	3	11
119*	3	2	3	3	11
124	3	3	3	2	11
128	3	3	3	2	11
107*	2	3	2	3	10
127	2	3	2	3	10

Note: Judges' responses do not fit an ideal Guttman pattern in the lowest quarter of students and in the top three quarters, otherwise it is satisfactory.

## APPENDIX XXXIV

### LESSON PLAN

### CURRICULUM AREA - Visual Art

#### Project - Abstract Painting

#### Topic - Colour Expression

**Teacher's Intention** To introduce students to abstract art forms and colour sequencing by visual contact with a famous artists' works, and to create a calming mood through presenting music in the classroom.

**Learning Objectives** On completing this lesson each pupil will be able to understand the meaning of non-representational art. They will have some idea of spatial concepts and colour co-ordination in their own painting, and be able to relate to the sound of music and apply its effects in their artwork. These objectives may not apply to all special education students.

**Preparation** Primary colour paints, Red, blue and yellow. A3 art paper, 1 piece with students first name & No. 1 on the back and 1 piece with name and No. 2, water, brushes, aprons for students where applicable, colour print of Kandinsky's 'The Park', classical music CD (applicable to each lesson provided by researcher). Extra art paper if needed.

#### **Methods of Achieving Objectives**

1. Settle students and explain what the lesson is about and what is expected of them.
2. Produce the Kandinsky print (each student will receive a print) and give a very short biographical description of the artist, his style of painting and how the students will be using some of the



colours in the print in their own painting.

3. After the students have all had a chance to focus on the print ask them to paint a picture on paper marked no. 1. Allow 15 minutes for this activity. Remove the art paper, replacing it with another piece for each student with the student's name and no.2 on it, and turn on the music CD.
4. The students then have another chance to focus on the print, the teacher pointing out the vibrant colours again, and mentioning that the artist enjoyed painting to music. Teacher asks students to do another painting, allowing 15 minutes for painting time. Remove the painting.
5. Constant attention must be given to the students throughout the painting stage to ensure that all the students receive positive reinforcement, advice and encouragement to stay on task. The teacher may give no assistance with the painting.

### **Teachers Lesson Evaluation**

## APPENDIX XXXV

To the Principal.

Dear Sir/Madam,

I am conducting a Ph.D. research project on 'The Effect of a New Pictorial and Musical Visual Arts Program for Students with Severe Disabilities on Quality of Painting, Attitude and Behaviour'. The research aims to develop the student's appreciation of fine art at an early age, and provide a stimulating visual arts program to assist them in maximising their potential.

This forty-five minute program requires the participation of six to ten students with severe intellectual disabilities preferably under the age of twelve years for one art lesson per week, over a period of six weeks. The program is simple to implement and would be monitored by the usual class teacher. The students will produce two abstract paintings during each lesson. The students will receive a colourful pictorial stimulus (a print of Kandinsky's "The Park") and be asked to do a painting, they will then look at the print again and do a second painting, this time accompanied by classical music softly played in the background. Over the period the program runs, other suitable prints and classical music will be used and the researcher will supply all prints and CDs for the project.

During the visual arts program I wish to complete a behaviour chart on each of the students taking part. This chart will note any effects that the program may have on the students each week. I also wish to videotape the art lessons to compare to the behaviour chart, and will provide a video camera if the school does not have one. It would also give further reliability to my findings if I could have access to the case histories of the participating students.

The teacher will be required to give an interview (15 minutes) to discuss the program and answer a short questionnaire before the study commences. Participation in the program is voluntary and teachers are free to withdraw their consent at any time if they desire to do so. Names of the students and teachers will not be used. All paintings will be collected each week by the researcher. The paintings will be marked, and at the completion of the project returned to the school. The painting's marks and the attitude and behaviour charts will be subjected to a Rasch computer program of measurement.

It is hoped that this new Pictorial and Musical Program will be a useful teaching tool and a benefit to students with both severe and mild intellectual disabilities.

Thank you for your cooperation,

Yours faithfully,

Jane Riddoch, B.A., Grad., Dip. Ed., M. Ed.

School of Education, Edith Cowan University.

## APPENDIX XXXVI

To the Teacher.

Dear Sir/Madam,

I am conducting a Ph.D. research project on 'The Effect of a New Pictorial and Musical Visual Arts Program for Students with Severe Disabilities on Quality of Painting, Attitude and Behaviour'. The research aims to develop the student's appreciation of fine art at an early age, and provide a stimulating visual arts program to assist them in maximising their potential.

This forty-five minute program requires the participation of six to ten students with severe intellectual disabilities preferably under the age of twelve years, for one art lesson per week over a period of six weeks. The program is simple to implement and would be monitored by the usual class teacher. The students will produce two abstract paintings during each lesson. The students will receive a colourful pictorial stimulus (a print of Kandinsky's "The Park") and be asked to do a painting, they will then look at the print again and do a second painting, this time accompanied by classical music softly played in the background. Over the period the program runs, other suitable prints and classical music will be used and the researcher will supply all prints and CDs for the project.

During the visual arts program I wish to complete a behaviour chart on each of the students taking part. This chart will note any effects that the program may have on the students each week. I also wish to videotape the art lessons to compare to the behaviour chart, and will provide a video camera if the school does not have one. It would also give further reliability to my findings if I could have access to the case histories of the participating students.

The teacher will be required to give an interview (15 minutes) to discuss the program and answer a short questionnaire before the study commences. Participation in the program is voluntary and teachers are free to withdraw their consent at any time if they desire to do so. Names of the students and teachers will not be used. All paintings will be collected each week by the researcher. The paintings will be marked, and at the completion of the project returned to the school. The painting's marks and the attitude and behaviour charts will be subjected to a Rasch computer program of measurement.

Thank you for your cooperation,

Yours faithfully,

Jane Riddoch B. A., Grad. Dip. Ed., M. Ed.

School of Education, Edith Cowan University.

## APPENDIX XXXVII

To the Parents or Guardian,

I would like you to allow your child..... to take part in a research project in visual art education at.....School.

The project entitled 'The effects of a New Pictorial and Musical Visual Arts Program for Students with Disabilities on Quality of Painting, Attitudes and Behaviour' is being undertaken as part of the requirements of a PhD. at Edith Cowan University. The research aims to develop the student's appreciation of fine art at an early age, and provide a stimulating art program to assist them in maximising their potential.

The children will have one forty-five minute art lesson per week for six weeks. During this lesson they will be required to do two abstract paintings, which will be monitored by their usual art teacher. The students will receive a colourful pictorial stimulus (such as a print of Kandinsky's, "The Park") and be asked to do a painting, they will then look at the print again and do a second painting, this time accompanied by classical music softly played in the background. All artwork will be numbered for marking and the student's identity kept private. Participation in this art program is voluntary and you can withdraw your child at any time.

Thank you for your cooperation,

Yours faithfully,

Jane Riddoch, B.A., Grad. Dip. Ed., M.Ed.

School of Education, Edith Cowan University.

