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CREATIVITY AND INTELLIGENCE: A STUDY OF BRAZILIAN GIFTED AND TALENTED STUDENTS

Angela M. Rodrigues Virgolim, Ph.D.

University of Connecticut, 2005

Brazil faces the challenge of preparing teachers to work in gifted and talented education, which includes the development of a coherent conception of giftedness and a thorough understanding of students’ academic and social/emotional needs. Over the past several decades, many conceptions of intelligence and creativity have been offered by researchers and practitioners. However, the relationship between these constructs is still inconclusive. In Brazil, little research has investigated the creative abilities of Brazilian students, examined how creativity might be related to intelligence, or explored people’s conceptions of intelligence and creativity. Therefore, the present study investigated the relationship between intelligence and creativity test scores of identified gifted and talented students attending an enrichment program in the Federal District, Brazil, and determined how students and their resource room teachers perceived intelligence and creativity.

An ex post facto design was used to investigate the correlation between intelligence and creativity test scores of 100 identified gifted and talented students, ages 9-17, and 15 teachers in grades 4 through 8 of an enrichment program for gifted students in the Federal District. A Pearson product-moment correlation was computed to determine the magnitude and the degree of relationship between students’ scores on
Raven's Progressive Matrices – SPM and the Urban and Jellen's Test for Creative Thinking - Drawing Production - TCT-DP. Qualitative and quantitative methods were used to address students and teachers' perceptions of creativity and intelligence. Multiple case studies were used to gather data from students and their teachers; information on students' abilities, interests, learning styles, self-concept, and behavioral characteristics were coded and categorized for patterns and themes.

The results of the correlational analysis indicated a significant relationship between intelligence test scores and creativity test scores ($r=.21$, Effect Size=.04) among Brazilian gifted and talented students ($N=100$), with a small practical significance. Students and teachers perceived students' creative and intellectual abilities favorably. Teachers and students defined intelligence as reasoning and knowledge; teachers also acknowledged creative thought. Both teachers and students perceived creativity as divergent-thinking ability and recognized the role of knowledge in solving problems. Students and teachers considered creativity, intelligence, and giftedness as related constructs.
CREATIVITY AND INTELLIGENCE: A STUDY OF BRAZILIAN GIFTED AND TALENTED STUDENTS

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B.S., Universidade de Brasília, 1983
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A Dissertation
Submitted in Partial Fulfillment of the
Requirements for the Degree of
Doctor in Philosophy

University of Connecticut
2005
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CREATIVITY AND INTELLIGENCE: A STUDY OF BRAZILIAN GIFTED AND
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CHAPTER ONE

INTRODUCTION AND OVERVIEW OF THE RESEARCH

Introduction

During the last few decades of this century, a special interest in gifted and talented children has been noted worldwide. Educators and parents are focusing on the special needs and abilities of these children. In many countries, gifted and talented children are considered a national resource that may influence the modernization of society (Cropley, 1993b; Davis & Rimm, 2004). Programs and special legislation have been implemented in the United States and Canada, and several other countries, including Brazil (Colangelo & Davis, 1997; Davis & Rimm, 2004). However, the educational system in Brazil is vastly different in comparison to other countries such as United States, Canada, Israel, England and Germany. Thus, the quality of services provided for gifted and talented students, in both theory and practice, is still lacking. Brazilian universities offer few courses in gifted education and few materials, programs, and instrumentation developed for this purpose. In Brazil, publications focusing on gifted and talented education are scarce, although the need to enhance services for such students has been noted repeatedly (Alencar, 1988, 1995; Fleith & Virgolim, 1999; Machado & Raposo, 1989; Novaes, 1979; Virgolim, 1997).

Brazil faces the challenge of preparing teachers to work in gifted and talented education programs, which includes the development of a coherent conception of giftedness and a thorough understanding of students' academic and social/emotional needs. This is critical because teachers nominate children from regular classrooms for participation in these programs. Many educators in Brazil may share stereotypical
perceptions of gifted and talented children because they lack access to current conceptions of giftedness, as well as theoretical and practical approaches to identification and programming (Alencar, 1986).

Passow (1981) reminds us that gifted and talented students come in a variety of shapes, forms and sizes, with different degrees of talent, motivation and knowledge. All aspects of identification and programming are related to the underlying conception of giftedness. Educators need to understand the nature of giftedness, which is the starting point of all planning and programming efforts.

Although IQ tests are still the most widely used procedure for screening and identifying gifted and talented students, definitions of intelligence and conceptions of giftedness have changed over the years. A brief overview of changing conceptions of giftedness illustrates the move toward broader conceptions and the inclusion of non-cognitive traits. Marland (1971) called attention to a variety of abilities that should be included in a definition of giftedness: general intellectual ability, specific academic aptitude, creativity, leadership, visual and performing arts, and psychomotor ability. Renzulli (1978) proposed a three-ring conception of giftedness. Individuals who have achieved recognition because of their accomplishments and creative contributions possess a relatively well-defined set of traits: well above average ability (but not necessarily superior), task commitment, and creativity, which are brought to bear on one or a combination of specific performance areas.

Conceptions of intelligence and creativity have also changed. Gardner (1983) stated that human cognitive competence may be better described as a set of seven (or even more) intelligences, also called abilities, talents, or universal mental capabilities.
These intelligences are: linguistic, logical-mathematical, musical, spatial, bodily-kinesthetic, interpersonal, and intrapersonal. Sternberg (1986) identified analytic, synthetic, and practical intelligences as distinctive areas of cognitive functioning in which individuals may excel. And, finally, Brown (1989) stated that “the possibility that individual differences in creativity reflect differences in personality and motivation rather than cognitive variables needs to be reexamined in light of the current status of cognitive-trait approaches” (p. 29), and its importance has been emphasized by numerous theorists (Daniel, 1997; Davis & Rimm, 2004; Fleith & Alencar, 1992; Hocevar & Bachelor, 1989).

Sternberg (1985a) views intelligence as the mental abilities necessary for adaptation to, as well as shaping and selection of, any environmental context. He argues that the concept of an “intelligent person,” is a prototypically organized concept. A person is viewed as intelligent to the extent s/he resembles some implicit prototype of an intelligent person. This interpretation places cultural limitations on intelligence and different prototypes of intelligence may exist in other cultures. Sternberg (1997) considers the importance of understanding the nature and use of people’s implicit theories (or conceptions) of intelligence and creativity.

Csikszentmihalyi (1988) recommends abandoning the current Ptolemaic view of creativity, in which the person is the center of everything, for a more Copernican model, which regards the person as part of a system of mutual influence and information. He considers creativity as the result of three forces: a set of social institutions (or field) that selects what to preserve; a cultural, stable domain that preserves and transmits creations to other generations; and the individual who brings about some change in the domain that
the field considers creative. Therefore, to understand why some individuals are so productive in a particular domain involves assessing motivational and affective variables. These ideas are closely shared by other theorists (Alencar, 1993, 1999; Amabile, 1996; Renzulli & Reis, 1985, 1997; Silva, 1994).

The relationship between creativity and intelligence is influenced by definitions and the measures used to assess both constructs (Starko, 1995). While some theorists and researchers (e.g., Sen & Hagtvet, 1993) establish that creativity is intelligence, or part of it, others postulate that the production of novel, appropriate ideas is distinctive from the production of accurate, analytical but unoriginal ideas (Guilford, 1986). Haensly and Reynolds (1989) believe that intelligent thinking must include some degree of creative thinking and that there is a limited overlap with intelligence.

Porath (1997) posed a question that must be addressed in studying intelligence and creativity: “What does intelligence mean to gifted children?” Responses to this question are important to all aspects of programs and services for gifted and talented children. Betts (1986) and Burns (1990) also stressed the importance of focusing on children’s understanding of giftedness, creativity and development of potential.

The purposes of this study were to assess the relationship between intelligence test and creativity test scores among Brazilian gifted and talented students (grades 4-8) enrolled in an enrichment program, and to examine students’ and their teachers’ perceptions of creativity and intelligence.

**Statement of the Problem**

Over the past several decades, many conceptions of intelligence and creativity have been offered by researchers and practitioners. However, the relationship between
these constructs is still inconclusive (Yong, 1994). In Brazil, relatively little has been
done to investigate the creative abilities of Brazilian students or to examine how
creativity might be related to intelligence. Few attempts have been made to investigate
people’s conceptions of intelligence and creativity (Yang & Sternberg, 1997), or to
analyze the self-perceptions of non-cognitive traits affecting giftedness (e.g., personality
and motivation).

Since the cultural context is so important in how we define, identify, and serve
special populations, it is critical to obtain baseline data in response to the following
questions: What is creativity? What is intelligence? What are the characteristics of
Brazilian students identified as gifted and talented? What is the relationship between
creativity and intelligence? What are the manifestations of the behavioral characteristics
of gifted and talented students?

Therefore, the present study was designed to investigate the relationship between
intelligence and creativity test scores of identified gifted and talented students attending
an enrichment program in the Federal District, Brazil, and to determine how students and
their enrichment classroom teachers perceive intelligence and creativity.

Background of the Study

The starting point for the so-called modern study of creativity was Guilford’s
1950 presidential address to the congress of the American Psychological Association
(Brown 1989; Csikszentmihalyi, 1988; Morelock, 1996; Sternberg & Lubart, 1996;
Tannenbaum, 1983). Guilford called attention to the importance of creativity in
remarkable accomplishments, indicating that creativity is a universal ability that needs to
be recognized and developed. He also noted a weak correlation between scores on creativity and intelligence tests and the relative independence of these two constructs.

As one of the first researchers to propose a multidimensional view of intelligence, Guilford (1950) pointed out that “we must look well beyond the boundaries of the IQ if we are to fathom the domain of creativity” (p. 448). He also initiated discussions about the role of distinctive cognitive abilities (e.g., divergent production), which was not assessed in traditional tests of intelligence, and like other aspects of intelligence, could be developed (Guilford, 1975, 1979).

One classic study of the relationship between creativity and intelligence is Getzels and Jackson’s research (1961, 1962). These researchers examined two groups of adolescents. One group was high in intelligence, but not as high in creativity. The other group was high in creativity, but not as high in intelligence. The researchers were interested in their performance with respect to school achievement, perceptions of teachers, production of fantasies, and choice of adult career. Some of the research findings indicated a 23 point difference in average IQ scores between the two groups; the school achievement of both groups was equally superior to the population from which they were drawn; and the high IQ group were rated by their teachers as more desirable in class. These findings also suggested that teachers may respond differently to each group, despite their equal superiority in achievement (Getzels & Jackson, 1961).

MacKinnon (1962) conducted another classic study and found no relationship between intelligence and creativity among architects, and a low, positive relationship between these two variables among mathematicians. MacKinnon concluded that above a certain minimum level of intelligence (which varies among fields), being more intelligent
does not guarantee a corresponding increase in creativity, and that the more intelligent person is not necessarily the more creative one. This idea of a “threshold effect” in the intelligence-creativity relationship is corroborated by other researchers (Torrance & Wu, 1981; Yamamoto, 1964). However, since there are no universally agreed-on measures of creativity or intelligence, and each study may use completely different measures, it is inadvisable to draw any conclusions about the relationship between creativity and intelligence (Daniel, 1997; Hocevar & Bachelor, 1989; Starko, 1995).

Yong (1994) examined the relation between creativity and intelligence in 397 secondary students in Malaysia. His analysis showed that IQ scores did not correlate well with scores on creativity when the students were grouped into creativity-IQ groups. He also found that students who were both creative and intelligent had generally superior academic achievement when compared to the other groups; and that the creative students were more intelligent than the non-creative ones.

Yang and Sternberg (1997) state that it is important to understand the nature and use of people’s conceptions of intelligence and creativity, and to understand how people view these potentially interrelated constructs. In reviewing the literature, Sternberg (1985b) cites Yussen and Kane’s research, where children in the first through sixth grades were asked about their conceptions of intelligence. They found that the differentiation of the construct increases with the children’s age, with older ones perceiving intelligence as an internalized quality. Recognizing the influence of culture, Yang and Sternberg (1997) conducted two studies to investigate Taiwanese Chinese conceptions of intelligence. In the first study, people were asked to characterize an intelligent person. In a second study, they were asked to rate the attributes catalogued
from the first study according to the frequency or importance of the attribute. Five factors emerged from the frequency ratings: a) general cognitive ability; b) interpersonal intelligence; c) intrapersonal intelligence; d) intellectual self-promotion; and e) intellectual self-effacement. Four factors emerged from the ratings of importance: interpersonal and intrapersonal intelligence; intellectual enjoyment; intellectual self-assertion; and general cognitive ability. Yang and Sternberg called attention to the fact that in the Taiwanese culture, older adults placed greater emphasis on practical/contextual aspects of intelligence, while other cultures (Hispanic, for example) placed more emphasis on social aspects of intelligence. Yang and Sternberg stressed the importance of researching intelligence beyond the boundaries of North America to increase our understanding of cross-cultural conceptions of intelligence and associated value systems.

Moon, Feldhusen, and Dillon (1994) emphasized the importance of researching intelligence, creativity, and programming efforts to further understand how our perceptions of creativity and intelligence may influence programming efforts. After examining the long-term effects of an enrichment program based on the Purdue Three-Stage Model, the authors concluded that the program was successful in improving students’ thinking skills and problem solving abilities; and resulted in a positive impact on self-concept, motivation, and attitude toward school. Renzulli and Reis (1985) also emphasized the importance of evaluating gifted programs to monitor quality, growth and improvement, and suggest a triangulation of techniques to gather data from many different types of sources to validate information obtained.

**Research Questions**

The following research questions were addressed in this study:
1) What is the relationship between intelligence test scores and creativity test scores of identified gifted and talented students in Brazil?

2) How do teachers and students define intelligence and creativity and describe the behavioral manifestations of these constructs?

3) How do identified gifted and talented students and their teachers perceive students’ creative and intellectual abilities?

The goal of research question 1 was to provide quantitative data on the statistical and practical significance of the relationship between creativity test scores and intelligence test scores in a group of identified gifted and talented students in a specific cultural context. Responses to research questions 2 and 3 provided qualitative and quantitative data on teachers and students’ perceptions of intelligence and creativity and lend meaning to the self-perceptions of non-cognitive traits affecting giftedness (e.g., personality and motivation).

**Methods and Procedures**

**Research Design**

This study used an ex post facto design to address research question 1. The correlation between creativity and intelligence test scores among a group of identified gifted and talented students was investigated. Qualitative and quantitative methods were used to address research questions 2 and 3. Multiple case studies were used to gather data from students and their teachers.

**Sample**

The sample included 100 students, ages 9-17, and 15 teachers in grades 4 through 8 of an enrichment program for gifted and talented students developed in six urban public
schools in the Federal District, Brazil. As students in the program gained entry by other measures besides IQ scores, a restricted range of ability on the intelligence test was not a problem in this study. A purposive sample of 22 highly creative and/or highly intelligent students and their teachers was selected for interviews. Of 22 students, 13 were chosen for multiple case studies.

*Site Selection*

Students attended six urban schools in the Federal District (Brazil), in which an enrichment program for gifted and talented students has been developed. Teachers or parents nominate students for the program. Teachers in regular classrooms assessed the behavioral characteristics of children nominated in the following areas: intellectual ability; specific academic aptitude in science, math, social studies and Portuguese language; leadership; memory; attention; independence of thinking; and initiative. The students may be helped by an itinerant teacher who visits public schools regularly to promote the teachers’ understanding of the main characteristics of gifted and talented students, and to describe how to nominate students for the special program. One itinerant teacher served each “satellite city,” and one worked in Brasilia. The itinerant teacher maintained communications with schools where the gifted programs took place, worked with enrichment and regular teachers and met regularly with parents.

Once nominated, students identified in academic areas were evaluated at a diagnostic center (one center in Brasilia, and four centers in the satellite cities). Instrumentation used for this evaluation included the Wechsler Intelligence Scale for Children; the Raven’s Progressive Matrices (RPM), Standard Matrices and Colored Matrices, used according to the child’s age; and Goodenough’s Draw-a-Man Test.
Interest inventories and tests of personality traits were also administered, and interviews with children and their parents were conducted by a psychologist and teacher. Children who were talented in fine arts, drama and music were first observed by art and music teachers, and assessed only for their artistic abilities. Identified children (both academic and artistic areas) were enrolled in an enrichment program twice a week, 4 hours per day. (In Brazilian schools, children can be enrolled in the regular classroom during the morning — 7:30 - 12:30 — or in the afternoon — 1:30 - 6:30.) There were 22 resource teachers in the program, which included approximately 300 students enrolled in kindergarten through grade 8 across the centers. There were six enrichment (or resource) classrooms in the Federal District: two in Brasilia city and one in each satellite city (Gama, Planaltina, Taguatinga, and Ceilândia). Children attended the one closest to their home or parents’ workplace. All programs were conducted in public schools, but were independent of the administration of the school. The music program was available only in Brasilia city.

In enrichment classrooms, identified students developed a number of activities as extensions of the regular curriculum; in-depth materials were available to them in the regular curricular subjects. Students were also encouraged to develop interest-based projects. Children identified in an artistic area, such as music or arts, participated in a variety of activities related to music, visual arts, ceramics, drama, and creative writing.

*Instrumentation*

*Intelligence Test*

Students’ intelligence was assessed by the Raven’s Progressive Matrices, Standard form – SPM (Raven, 1938/1998), adapted and translated for a Brazilian
population. It consists of 60 problems (or matrices) in 5 sets of 12, representing arrangements of design elements into rows and columns with a missing part. The task is to choose the missing insert from given alternatives. Initial items are easier and require accuracy of discrimination. As items become progressively more difficult, they involve analogies, permutations and alternations of patterns and other logical relations as well. The untimed test is administered orally to individuals or groups. Reliability coefficients in groups of older children and adults range, in general, from .70 to .90, falling considerably below these values at lower score ranges. According to Anastasi and Urbina (1997), factorial analyses suggest that the Raven’s Progressive Matrices test is heavily loaded with a factor common to most intelligence measures, Spearman’s g or general intelligence. Correlations ranging between .40 and .75 can be found with the Raven’s and verbal and performance intelligence tests. Correlations tend to be higher with performance than with verbal tests.

Raven’s Progressive Matrices was selected because it is widely used and recommended for research on the identification of gifted students. The test provides data to help program developers differentiate between children who need special programming for intellectual exceptionality, and those who do not (Matthews, 1988).

Creativity Test

Students’ figural creative thinking ability was assessed by the Form A of the Test for Creative Thinking - Drawing Production - TCT-DP (Urban & Jellen, 1996). On the test, six figural segments are offered, stimulating further drawing in a free, open way. These segments are: a semi-circle; a point; a large right angle; a curved line; a broken
line; and a small open square outside the large square frame. The drawing production is evaluated by 14 subscales:

(1) Continuation (continuation or extension of the six given figural fragments);

(2) Completion (additions, completions, complements, supplements);

(3) New elements (any new figure, symbol or element);

(4) Connections with a line (connections between one figural fragment and another);

(5) Connections by theme (any figure contributing to a compositional theme or “gestalt”);

(6) Boundary breaking (use of the “small open square” located outside the square frame);

(7) Fragment independent (extensions and elements that break the boundaries of the “large square frame”);

(8) Perspective (any breaking-away from two-dimensionality);

(9) Humor and affectivity (humorous responses, affection, emotion, strong expressive power);

(10) Unconventionality A (any manipulation of the material);

(11) Unconventionality B (any surrealist, fictional, and/or abstract elements);

(12) Unconventionality C (any use of symbols and signs);

(13) Unconventionality D (use of unconventional figures); and

(14) Speed (a breakdown of points, beyond a certain score-limit, according to the time spent on the drawing production).

The subjects are asked “to complete the uncompleted drawing somebody else had begun but not finished, in whatever way they wish; everything is allowed and correct,
they are free to draw how and whatever they wish” (Urban & Jellen, 1996, p. 12). A total, final score allows for a global factor that reflects a holistic concept of creative thought. The maximum total point value of the TCT-DP is 72 points, and scores can be transformed into percentile ranks or T-scores. The authors reported coefficients within a range of .89-.98 for the reliability of the scores. The authors also reported the use of this instrument in various countries and cultures with data supporting satisfactory reliability and validity.

The Test for Creative Thinking - Drawing Production was selected for several reasons. It is a non-verbal, culture-fair instrument that was subjected to validity and reliability tests. The TCT-DP requires about 15 minutes or less for administration. Scoring and interpreting the results of each form takes another 1 to 3 minutes. The TCT-DP was administered by the researcher and supervised by an external trained researcher to ensure accuracy of the scoring and interpretation of the results.

Teachere and Students’ Interviews

Semi-structured interviews were conducted with a subsample of 22 students (highly creative and/or highly intelligent) and 15 resource room teachers to identify their attitudes and perceptions toward creativity and intelligence. All interviews were tape-recorded, transcribed, and translated from Portuguese to English. Additional observations made by the researcher during the interviews were noted. Field notes were kept of classroom observations and extracurricular events.

Multiple case studies were used to eliminate biases that might result from relying exclusively on one data-collection method, source or theory (Gall, Borg & Gall, 1996); to provide holistic and life-like information and to describe the real-life context in which an
intervention has occurred (Merriam, 1988). Multiple cases provided critical information on the relationship between creativity and intelligence in the cultural context of this study.

Four instruments were translated into Portuguese by the researcher and utilized for gathering additional data about the students’ creative and intellectual abilities: a) Total Talent Portfolio (Renzulli & Reis, 1997); b) The Learning Styles Inventory (Renzulli, & Smith, 1978); c) The Self- Perception Profile for Children (Harter, 1985); and d) Scales for Rating the Behavioral Characteristics of Superior Students – SRBCSS (Renzulli, Smith, Callahan, White & Hartman, 1977).

Students’ biographical data were collected in each school, including information regarding students’ age, grade, gender, ethnicity, home address, and educational level of primary caretakers. The researcher also examined students’ academic records.

Data Analyses

Correlational analyses were used to address research question 1. A Pearson product-moment correlation coefficient was computed to determine the magnitude and the degree of the relationship between intelligence and creativity scores. The Pearson product moment correlation was interpreted for possible statistical and practical significance. Effect size was calculated for the 100 students using r².

To address research questions 2 and 3, qualitative and quantitative procedures were used to analyze data from the interviews. The individual was the unit of analysis for this study. Comparative case study methods were used (Cohen & Manion, 1994; Merriam, 1988, Strauss & Corbin, 1990), and a cross-case analysis was completed. Merriam (1988) defines the qualitative case study as “an intensive, holistic description
and analysis of a single entity, phenomenon, or social unit” (p. 16). She describes four essential properties of a qualitative case study: a) it is particularistic, focusing on a particular way groups of people confront specific problems, taking a holistic view of the situation; b) descriptive, providing a rich, “thick” description of the phenomenon, interpreted in terms of cultural norms, values, attitudes and notions; c) heuristic, bringing a more complete understanding of the phenomenon; d) and inductive, allowing for generalizations, concepts and hypothesis.

Responses were coded and categorized according to techniques suggested by Miles and Huberman (1994) and analyzed for patterns and themes. They recommend three courses of analysis: a) data reduction, which is the process of selecting, focusing, simplifying, abstracting, and transforming the data as they emerge in field notes or transcriptions; b) data display, which is an organized, compressed assembly of information that permits conclusion drawing and action; and c) conclusion drawing and verification, which is noting regularities, patterns, explanations, possible configurations, causal flows, and propositions (pp. 1-11).

The following techniques were used to enhance the trustworthiness of this study: checking and re-checking data, value-free note taking, triangulation of sources of data, and keeping a researcher’s journal (Marshall & Rossman, 1995). Classroom observations maximize the researcher’s ability to grasp students’ motives, beliefs, and interests; provide opportunities to study the students’ environment; and understand the culture in a natural environment. During the direct observations, the researcher becomes the main source of understanding and interpreting data in the actual environment (Lincoln & Guba, 1985).
Limitations

This ex post facto study examined data using a correlational index that could not be manipulated by the researcher; therefore, it did not establish cause-and-effect relationships. Moreover, it was limited by the fact that there is no single definition of intelligence and creativity underlying these measures. Findings were reported with those limitations in mind.

Lincoln and Guba (1985) propose that qualitative research emphasizes the following to ensure validity: credibility (the way the study is conducted ensures the subject was accurately identified and described); transferability (the study should demonstrate the applicability of one set of findings to a different context); dependability (accounting for settings or situations in the study), and confirmability (stressing objectivity). The credibility and transferability of this study were strengthened due to multiple data collection methods, integrating measures of intelligence and creativity with interviews, observations, examination of records and classroom observations. Thorough description and adequate time spent in the field were also used to enhance credibility. The researcher includes a complete description of the research process, so other researchers can replicate the study (Merriam, 1988).

Another limitation of the present study was the use of instruments that were not developed specifically for the Brazilian culture. Again, multiple points of data collection have strengthened the similarities or differences among groups that are not artifacts produced by measuring instruments. However, caution should be exercised in generalizing the results to other cultures and settings.
Summary

This chapter presented an overview of the research and its main purposes. The research intended to investigate the relationship between intelligence and creativity test scores of identified gifted and talented students attending an enrichment program in the Federal District, Brazil, and to determine how students and their enrichment classroom teachers perceive intelligence and creativity. A background of the study involving the relationship of creativity and intelligence and perceptions of these two constructs were offered. The sample included 100 students and 15 teachers in grades 4 through 8 of an enrichment program for gifted and talented students developed in six urban public schools in the Federal District, Brazil. A purposive sample of 22 highly creative and/or highly intelligent students and their teachers was selected for interviews. Of the 22 students, case studies are presented for 13 students. Raven’s Progressive Matrices, and Urban and Jellen’s Creative Thinking – Drawing Production were selected to measure intelligence and creativity, respectively. A combination of quantitative and qualitative methods was used in this study. A Pearson product-moment correlation was computed to determine the magnitude and the degree of relationship between intelligence and creativity scores. Teachers and students’ responses on interviews and in other instruments for gathering information were coded and categorized for patterns and themes. Techniques used to enhance the trustworthiness and the major limitations of this study were presented.
CHAPTER TWO

REVIEW OF THE LITERATURE

This chapter reviews the theory and research relevant to the study. The first section presents an historical overview of intelligence, focusing on popular beliefs and myths related to giftedness; the historical aspects of intelligence and creativity; and the development of interest in high ability/creative individuals. The second section focuses on the contributions of Guilford to the field of creativity and discusses issues related to definition. The third section presents giftedness as a multifaceted construct. Definitions of giftedness are based on the work of Sternberg (1985a), Gardner (1983) and Renzulli (1978). The fourth section presents studies of the relationship between creativity and intelligence. Considerations about the role of creative thinking, threshold effect, the importance of creativity to the identification of gifted and talented individuals as well as people’s conceptions of both constructs are presented and discussed. The fifth and last section deals with perceptions of teachers and students about creativity, intelligence, and giftedness.

Historical Overview of Intelligence

Popular Beliefs and Myths Related to Giftedness

Individuals who stand out by virtue of their high abilities or outstanding deeds have always been a focus of people’s curiosity, which ranges from appreciation to antipathy or suspicion, depending on how they are viewed in their socio-cultural environments. Some individuals are prominent during their lifetime, but others live and die in complete anonymity (Tannenbaum, 1983). However, it is always society’s prerogative to determine which talents or abilities are valued or ignored, and these values
tend to change over time and within cultures. Some beliefs have survived and are the basis of existing myths.

Among ancient Greeks and medieval Europeans, for example, individuals who stood out as a result of their accomplishments or feats were considered to be inspired by muses and demons, and persecuted as heretics and burned as witches. In fact, any person who displayed unusual intellectual curiosity, interest in scientific activity or non-conforming behavior was likely to be persecuted. The Age of Reason and early Renaissance, however, brought other perspectives with the development of science. Theories derived from observation and classification substituted for the demons; and studies of the nature of the mind, conceived as a function of the brain and nervous system, led physicians to develop interest in individual differences in mental behavior. Lack of emotional control, absent-mindedness, preoccupation in thought, delusions or hallucinations, grandiose ideas, and novel insights represented, for the physicians at that time, deviation from the ideal archetype for mental functions. Therefore, any deviations of general expectations, whether in the direction of madness, lunacy or insanity, on one hand, or genius, originality or quickness of thought, on the other, was indicative of general instability. Consequently, for a long time, outstanding intellect was assumed to be accompanied by morbid, abnormal, nervous ailments (Grinder, 1985). This conception promoted the belief that precocious children were destined to be strange, physically weak, neurotic prodigies.

In the middle of the nineteenth century, discussions about heredity were introduced, influenced by French sociologist Moreau de Tours, who was considered an expert in mental pathology. According to Moreau, genius was the result of a morbid
deviation from an original type, from a neuropathic tree; and descendants, if exposed to the same influences, will “rapidly descend to the lowest degrees of degeneracy” (Grinder, 1985, p. 14). When Lombroso and Nisbet published their 1891 studies of famous men in history, a large number of whom were reported as suffering from some kind of behavioral instability (Tannenbaum, 1983), corroborating the argument for the link between genius and abnormality.

The connection between very high ability and insanity was also noted by the English noble Sir Frances Galton. Galton was interested in intellectual abilities and was influenced by the theory of evolution proposed by his cousin, Charles Darwin. Galton (1869) published *Hereditary Genius*, in which he attempted to demonstrate that mental abilities were transmitted in the same way as physical traits. Therefore, defending a theory of eugenics, Galton believed that humanity could be improved through selective breeding (Galton, 1869; Grinder, 1985; Snyderman & Rothman, 1988). He studied the hereditary transmission of eminence by comparing several generations of men over 50 years of age in the same family. His sample was obtained from census and biographical data presented in a handbook about men with good reputations in British society. He hypothesized that the variations in intellectual ability would follow the pattern of a normal probability curve. Therefore, he divided the probability distribution patterns into 14 intervals, 7 on each side of the mean, labeling the upper side groups A through G. People in group A, which was near the mean, constituted the larger group - about one in four people. Group F designated eminent people (about one in 4,000), whereas group G, designated as genius, was much smaller, including one person in 79,000. Using a singular kind of statistical analysis, Galton found that the distribution of ability followed kinship
patterns. He first tabulated the percentages by which eminent relatives fell within the grades of his interval scales. Then, he

...arranged his data on a square chart, stretched a silk thread from the center of the chart through clusters of data, and then measured the angle by which the thread deviated from the vertical. Since the tangent of a zero angle (no correlation) is zero, and since the tangent of the angle showing a perfect correlation (45°) is 1.00, Galton thus obtained indices of the magnitude of correlation between kinship and eminence. (Grinder, 1985, p. 17)

Galton became convinced that parents have tremendous power over the natural gifts of their children and that desirable kinds of genes (gemmules) could be passed immediately to progeny.

*The First Mental Tests*

Galton was convinced that most of the differences in achievement between men were the result of differences in natural ability that is intelligence. Therefore, for eugenics to become a practical reality, it was necessary to identify intelligent children at an early age (Snyderman & Rothman, 1988). Galton, following the empiricist tradition, believed that knowledge is acquired through one’s senses. Consequently, differences in perceptual speed and acuity would also be related to intelligence, conditioned by natural selection and by the law of distribution of ability in the same family. In 1884, Galton set up an anthropometric laboratory, initially as part of the International Health Exhibition in London, and later as part of the Science Museum in South Kensington, examining more than 9,000 visitors. His battery of mental tests (term coined by Cattell in 1890) measured simple sensory processes such as physical strength, pitch and sight sensitivity, color and perceptual discrimination, steadiness of hand and reaction time. For him, the more perceptive the senses, the larger the field upon which judgment and intellect can act.
(Grinder, 1985; Snyderman & Rothman, 1988). However, no relationships were found between these measures and eminence.

James Cattell, an American student of Wilhelm Wundt, worked with Galton in England, and later built replicas of Galton’s laboratory, first in Pennsylvania, and afterwards at Columbia University. The battery of mental tests developed by Galton was then used to investigate individual differences in sensory capacities under controlled conditions, attempting to find among the correlations an explanation for interdependence among mental processes. In 1901, an important paper was published by one of Cattell’s students, Clark Wissler. He was the first to use the coefficient of correlation to verify the relationship among a set of measures of simple sensory and memory processes. However, Wissler virtually found no correlation among these measures and academic performance. According to Brody (1992), Wissler’s study was extremely influential in America and did much to turn experimental psychology away from the study of intelligence for several decades.

Although these findings failed to show any correlation among the set of measures and academic grades used by the researchers as evidence of a complex intellectual activity, research by Cattell and Galton marked an important transition point in the history of giftedness. Galton and Cattell were pioneers in searching for explanations in quantitative, psychometric data, instead of subjective, anecdotal and retrospective speculation characteristic of previous works. Galton was the first to introduce statistics to the social sciences and to establish psychometrics as a method for the study of individual intellectual differences, notably for the study of superior abilities (Clark, 1992; Grinder, 1985; Snyderman & Rothman, 1988).
Although the importance of Galton's investigation should not be minimized, his work established a legacy about the belief of fixed intelligence. It was a general belief that intelligence would remain intact from birth to the day the person died, regardless of the influence of the environment. His ideas, broadly accepted at that time, locked society into a limited conception of intellectual development for more than a century, exerting remarked influence today (Clark, 1992).

Galton's work also had an impact on the concurrent studies conducted by Alfred Binet in his psychological laboratory in Sorbonne, France. However, Binet soon recognized that the most complex intellectual processes, like imagination and comprehension, could not be accessed by sensorial tests. An opportunity to empirically test this hypothesis appeared when he and his student Theodore Simon were invited by the Ministry of Public Instruction in Paris, in 1904, to develop tests to ensure that mentally handicapped children were not inadvertently placed in the same classrooms as normal children.

The test developed by these two researchers consisted of a 30-item scale, organized in order of difficulty, and standardized for children ages 3 through 11 in the Paris public schools. Test scores were not reported in terms of an absolute level of intelligence, but rather by the comparison of the mental age of the student (age-equivalent of highest question answered correctly) to his/her chronological age. Children who scored a year or two below their chronological age were labeled inferior or retarded; those who passed tests a year or two in advance of their chronological age were labeled superior or advanced (Grinder, 1985). In 1911, the German psychologist William Stern proposed the use of the term mental quotient in which a child's mental age is divided by
her/his chronological age. The intelligence quotient (IQ) is derived from this measure, and it is the mental quotient multiplied by 100 (Snyderman & Rothman, 1988).

The use of Binet-Simon scale had repercussions, mainly due to the connections to the objectives it proposed, showing good consistency with other indicators of intelligence, such as peer and teacher’ evaluations. Although Binet had not tried to define the construct, he recognized that “intelligence increases during childhood, and it was more fruitful for a psychology of individual differences to concentrate on relative levels of intelligence than try to measure such a nebulous concept in absolute terms” (Snyderman & Rothman, 1988, p. 15).

In 1910, H. H. Goddard translated the Binet-Simon scale into English and used it to test 400 mentally retarded children in a school in New Jersey. Amazed with the scale’s accuracy, he used it again in a sample of 2,000 normal children. Therefore, the transition from using the Binet-Simon scale with below-average children to normal and above-average children was successful (Colangelo & Davis, 1997; Davis & Rimm, 2004, 2004; Gallagher & Gallagher, 1994).

_The IQ Controversy as the Criterion for Giftedness_

Lewis Terman was interested in the study of superior abilities, and in 1916, as a professor of psychology at Stanford University, he published a revision of the 1911 Binet scale. The Stanford-Binet scale, as it came to be known, became the standard by which all later intelligence tests have been judged (Snyderman & Rothman, 1988).

The first significant research with respect to the superior mental abilities was, doubtless, Terman’s longitudinal study starting in 1921, sponsored by the United States federal government (Oden, 1968; Schneider, 2000; Terman, 1954). The sample included
1,528 elementary school students from California. The children (671 female, 857 male) were nominated by their teachers as highly intelligent, and studied in terms of race, gender, anthropometric measures, physical and health aspects, abilities, interests and personality traits. The cut-off score adopted by Terman was an IQ of 140 or above, the average IQ for the group being 151. The highest IQ was 201, scored by one female subject (Hastorf, 1997). The purpose of the study was to discover what gifted children were like throughout their lifespan and what factors influenced their development (Oden, 1968).

In the 84 years that the Terman group has been under observation, their development has been followed closely through surveys at regular intervals (Cox, 1926; Holahan & Sears, 1995; Schneider, 2000; Terman & Oden, 1947, 1959; Terman et al., 1925). The results, published in six volumes, indicated that children in Terman’s sample scored higher than typical children with respect to physique, health, social adjustment, moral attitudes and mastery of school subjects. Typical gifted children had diverse interests with an interest maturity level 2 or 3 years above the age norm. During the 8 decades of follow-up studies, it was observed that the incidence of mortality, ill health, insanity, delinquency and alcoholism was below the incidence found in the general population, while crime was practically non-existent. Moreover, in educational and vocational achievements, it was observed that the group, as a whole, ranked considerably above the general population (Hastorf, 1997; Oden 1968; Schneider, 2000; Terman, 1954; Terman, Burks, & Jensen, 1930). The results also showed that high potential individuals differed within their groups in many ways, therefore not forming a homogeneous group; the differences between the least and most successful individual
was indicative of the influence of parents’ socio-economic status and college level; and that IQ continued to grow during adulthood (Sisk, 1987).

The results demonstrated, according to Terman (1954), that IQ could be used from early ages to predict superior achievement in adults. However, he was wise to warn that IQ tests could not predict the direction the achievement would take in adults, since personality factors or “accidents of fortune will affect the fruition of exceptional ability” (Terman, 1954, p. 224). This concept was later defended by Tannenbaum (1983, 1986). After Terman’s death, his associates continued to follow the subjects (Alencar, 1986; Colangelo & Davis, 1997; Hastorf, 1997; Schneider, 2000).

Several criticisms have been made with respect to Terman’s sample and methodology, including the demographics of the sample. The sample was mainly White or Caucasian, upper-class children, in the same culture. While Jewish children tended to be overrepresented, minority children were underrepresented (Colangelo & Davis, 1997). Teacher nominations favored individuals with high academic ability to the detriment of children with high creative potential or leadership characteristics. Teachers may have been biased as they nominated more boys than girls. Environmental factors, such as socio-economic status and environmental influences were not controlled in accessing minority groups. In addition, at that time, intelligence was considered a fixed, unitary phenomenon, predictive of professional success. Davis and Rimm (2004) also believed that Terman’s conclusions about mental and social health of their sample led educators to neglect the counseling needs of gifted children.

On the other hand, Terman’s studies presented a more realistic view of gifted and talented, as defined by high IQ, and provided empirical and credible data, which for
many decades propelled and guided identification practices of gifted individuals. Moreover, Terman’s longitudinal observation study helped give birth to the gifted-child movement (Colangelo & Davis, 1997; Stanley, 1997).

However, Leta Hollingworth, professor at Columbia University, was the first researcher to emphasize the importance of an early education for gifted students, a task that schools should consider carefully. She believed that the first 12 years were the most critical period in the lives of gifted students. She also claimed that children above 140 IQ waste a good deal of their time in school, which failed to meet their intellectual needs. Consequently, they were likely to develop negative attitudes toward authority figures (Davis & Rimm, 2004, 2004; Silverman, 1996; Tannenbaum, 2000).

Hollingworth had innovative ideas with respect to programs for gifted children. She developed, in New York City, classes for homogeneous groups of high ability children with innovative curriculums. In the same way, she was not in favor of tracking children of all ability levels, since she believed that only children in the extremes required special grouping to meet their needs. She also advocated a curriculum emerging from children’s interests with the freedom to choose the most important subjects to study. According to Silverman (1996), “Hollingworth’s emphases on independent study, creativity, teaching major principles and biographical studies have become the backbone of modern curriculum for the gifted” (p. 22).

Tannenbaum (1983) believed that Terman and Hollingworth’s pioneer work led subsequent researchers in fruitful directions, for example: examining other factors of non-intellectual origin related to high-level achievement; explaining conditions present in the family, school and community that can foster or inhibit talent development; and
evaluating several educational influences in the development of a high potential child. The results of their studies were the foundation of subsequent programs for gifted and talented children.

The status of mental tests rose even more after being massively used in the selection of U.S. Army recruits during World War I, by a group of America's leading theorists, such as Terman, Goddard and Yerkes. Their publications promoted the public controversy about intelligence testing, and opened a continuing debate regarding heredity versus environment, the nature of intelligence and the use of tests, which has propelled research for the last 80 years.

Evolution of the Concept of Intelligence

After more than one century of research in the field of mental abilities, it has become clear that intelligence maybe easier to measure than to understand or define (Snyderman & Rothman, 1988). Spearman, a disciple of Galton, began to use correlational techniques to investigate the relationship between various measures of intelligence: teachers and peer ratings, school grades, and sensory and memory test scores. He was impressed by the positive correlations found between grades of students in various school subjects, a discovery that contradicted many previous findings, such as Wissler's (Snyderman & Rothman, 1988). Spearman criticized these studies for their lack of a control group and for the inclusion of many different variables that might influence the results. Besides, any previous experiments calculated probable errors, and no corrections were made for the unreliability of measurements. In 1904, Spearman published a paper presenting techniques for calculating coefficients of correlation (Brody, 1992).
Spearman's theory posited that all measures of intelligence were related to a common general intellectual function, and the scores on a measure of intelligence could be separated into two components - a general, or $g$ component, and a specific, or $s$ component. While the $g$ component is determined by that which the measure has in common with all other measures of the common intellective function, the $s$ component is specific to each measure. It implies that the higher the ratio of $g$ to $s$ between any two measures of intelligence, the higher the correlation. This theory is known as the two-factor theory of intelligence.

Brody (1992) identified at least five important contributions of Spearman's theory to our understanding of individual differences in intelligence. First, he provided an explicit theoretical rationale for the construction of a test of intelligence, and emphasized that intelligence tests should contain subscales or measures that have high $g$-to-$s$ ratios. Second, his methods for analyzing correlation matrices were the foundation of factor analysis — a statistical technique that allows one to analyze the sources of variance of a particular measure by examining the pattern of correlations between two measures and other measures. It can be said that his method was the precursor of the use of construct validation procedures to access the validity of a measure. Third, Spearman conceived intelligence as a construct and a hypothetical entity, which could not be identified with any particular measure or subset of measures. Fourth, his theory contains a strong empirical claim that all measures of intelligence are measures of a single common theoretical entity, a supposition that is still in debate in contemporary research. Finally, Spearman may have been correct when he assumed the existence of a relationship between simple sensory discrimination tasks and intelligence, as hypothesized in
previous studies. However, he criticized the results of Wissler's research, first because of the intellectual homogeneity of his sample (Columbia University students), and second because of the lack of ideal conditions of measurements in the experiment, 3 subjects were tested at once, responding to 22 tests in 45 minutes.

Contemporary researchers, calculating again the findings obtained in the nineteenth century, found correlations of .38 and .39 between measures of sensory functioning and aggregated measures of intelligence (Brody, 1992). Eysenck and Jensen, among other psychologists, studied theories (e.g., Galton's) about the relationship between reaction time (or synaptic speed) and intelligence, as a result of an unchangeable environment (Winner, 1996). However, critics, such as Ceci (1990), point out that reaction time and other microlevel abilities can be influenced by other factors, such as person's knowledge, experience, attention and motivation, and can not be directly related to macrolevel factors (such as eminence, or IQ).

Therefore, diametrically opposed opinions have dominated the field of intelligence, and a consensus has not been reached. Thurstone, for example, disagreed with the existence of one single general factor, as proposed by Spearman (Snydeman & Rothman, 1988). Rather, Thurstone proposed that the same set of results in a given intelligence test could be factor analyzed to produce a small number of factors. In his 1935 book, *The Vectors of Mind*, he hypothesized that intelligence might consist of a small number of independent faculties, corresponding to different cognitive domains, each of them contributing in different degrees, depending on the individual's situation. Such faculties included: verbal ability, inductive or general reasoning, numerical ability, rote memory, perceptual speed, word fluency, spatial ability, and deductive reasoning,
elements still present in traditional measures of intelligence (Snyderman & Rothman, 1988).

However, Sternberg (1985a) pointed out that the differences between Spearman’s and Thurstone’s theories seem to be of emphasis rather than of substance. Later in their lives, Spearman was compelled to recognize the existence of group factors, while Thurstone was forced to acknowledge the existence of a higher-order general factor, connected, in some way, to the primary mental abilities (Snyderman & Rothman, 1988). In 1941, Cattell proposed reconciliation between the two theories by postulating the existence of a hierarchical structure of ability (Brody, 1992; Snyderman & Rothman, 1988). The g factor would be a general, common factor, presented in all measures of the ability, derivable from the relationships that exist among the more specialized factors postulated by Thurstone.

Currently there is no theoretical agreement on what g actually means or its utility (Neisser et al., 1996). Critics do not dispute the stability of test scores, nor the fact that they can predict school achievement rather effectively. They do argue that basing a concept of intelligence on test scores alone ignores many important aspects of mental ability.

One of the most important contributions to the study of intelligence emerged from the work of Jean Piaget, who sought to explain intellectual development as a result of changes in the cognitive function (Piaget, 1961). Piaget began his inquiry in a non-scientific way, selecting only three subjects to study (his own children) and no control group. However, he described the results of his observations in such a clear and detailed manner, that his evidence permitted him to explain important principles of growth and
development. Multiple subsequent studies have corroborated his principles as viable and useful (Clark, 1992; Wadsworth, 1993).

According to Piaget (1961), the cognitive processes emerge as a result of the reorganization of psychological structures resulting from the dynamic interaction of the child with his/her environment. The interaction among the critical variables to cognitive development (such as maturation, experience, social interaction and equilibration) regulates the direction of the child’s development (Wadsworth, 1993). The Piagetian tests, unlike the traditional psychometric tests used so far, aimed to assess not what we know (the product), but rather how we know or think (the process), and how people obtain and use information to solve problems and acquire knowledge (Weinberg, 1989).

Piaget was also one of the first theorists to establish an interactive theory of intelligence. According to him, the cognitive development equally depends on the genetic contributions as well as the quality of the environment in which the child lives. This position has numerous followers and, as pointed out by Plomin (1989), the most recent researchers support the notion that genetic influences on behavior are multifactorial, equally comprising the hereditary transmission and the environment. Although genetic factors, in general, account for no more than half of the variance of behavioral traits, it denotes probabilistic propensities rather than predetermined programming (Plomin, 1997). However, as pointed out by Neisser and his collaborators (1996), the pathways by which genes make their contributions to individual differences in intelligence are largely unknown. On the other hand, the exact way the environment contributes to those differences still remains a mystery.
Creativity Enters the Scene

The Contribution of J. P. Guilford

It is important to understand that the discussion in the current era refers not only to the value of psychometric tests, but that educators should be cautious in their use. Questioning the concept of intelligence was useful in providing evidence that other methods might facilitate the learning process and promote the development of potential. Educational interventions may also be planned to fulfill children's needs and help them deal with the rapid technological changes and the continuous challenges presented by new eras. Creative individuals are becoming more and more valuable in a changing society and, as pointed out by Toynbee, are nothing less than a life-sustaining force of civilization (cited in Tannenbaum, 1983). Alencar (1999) reminds us of the enormous waste of talent in our society. She points out that in the process of instructing and educating youngsters for the 21st century, new behaviors and attitudes are extremely necessary, as well as the capacity for innovation and to problem-solving.

Guilford's 1950 presidential address to the congress of the American Psychological Association (Brown 1989; Csikszentmihalyi, 1988; Morelock, 1996; Piirto, 1992; Sternberg & Lubart, 1996; Tannenbaum, 1983) called attention to the importance of creativity in remarkable accomplishments, indicating that creativity is a universal ability that needs to be recognized and developed. He also noted the weak correlation between scores on creativity and intelligence tests and the relative independence of those two constructs.

As one of the first people to propose a multidimensional view of intelligence, Guilford (1950) pointed out that "we must look well beyond the boundaries of the IQ if
we are to fathom the domain of creativity” (p. 448). He also initiated discussions about the role of distinctive cognitive abilities (e.g., divergent production), which was not assessed in traditional tests of intelligence, and like other aspects of intelligence, could be developed (Guilford, 1975, 1979). He proposed, in the mid 1950’s a structure-of-intellect model, composed of 120 intellectual factors, which described different types of cognitive capabilities. Each one may be described in terms of one single combination of five types of mental operations, four types of content, and six types of products, pictorially expressed in a cube format. In 1977, he extended the cube to 150 cells, and to 180 in 1988. Guilford (1979) defined intelligence as a systematic collection of abilities or functions to process different kinds of information in different forms, with respect to the content (substance) and the product (mental construct) as well.

In his model of intelligence (SOI-Structure of Intellect), Guilford (1950, 1975) suggests at least eight abilities that underlie creativity: fluency (the production of a large number of ideas); flexibility (the ability to easily change set); novelty (ability to have unusual ideas); complexity (numbers of interrelated ideas an individual can manipulate at once); sensitivity to problems (ability to see problems where others do not); and evaluation (the determination of the value of new ideas). These abilities were categorized as divergent thinking, which involves the capacity to invent new responses, as opposed to convergent thinking, which focuses on the ability to reproduce learned content with one right answer.

Guilford (1950) also stated that the first step in validating his tests should be by factorial validity, a form of construct validity, determined by factor analysis of test answers and by criterion validity. Brown (1989) observed that Guilford’s considerations
of validity of tests had an impact on the way researchers studied creativity thereafter. Feldhusen and Jarwan (2000) state that Guilford brought creativity factors into the realm of intelligence, with an extensive set of divergent thinking factors. Although Guilford’s theory has not been free of criticism (see Brody, 1992; Tannenbaum, 1983), he initiated contemporary discussions about the role of distinct cognitive abilities in the human intellect (divergent production), which was not part of traditional tests of intelligence, and like other aspects of intelligence, could be developed. Furthermore, several standardized tests for measuring creativity (e.g., Torrance Tests of Creative Thinking – TTCT, and Wallach and Kogan battery) were developed based on Guilford’s Structure-of-Intellect.

Definitions of Creativity

One of the few agreements among researchers in the field of creativity is that creativity is difficult to define (Gardner, 1988; Haensly & Reynolds, 1989; Halpern, 1996; Hunsaker & Callahan, 1995; Torrance, 1988; Treffinger, 1993). Psychologists have addressed the problem of definition from a variety of viewpoints, and in the past have centered their discussions on either the creative person or the creative process (Hennessey & Amabile, 1988).

Feldman, Csikszentmihalyi, and Gardner (1994) point out that creativity can be approached from several perspectives, each one bringing the possibility of new insights into the nature of creativity: a) from the person carrying out the work; b) from the product that arises from the efforts of the person; c) from the process that brings about the novel idea or product; d) or from the response of others to the existence of a new product.

These four categories were also analyzed by Tardif and Sternberg (1988) who analyzed the positions of 19 writers on creativity. According to Tardif and Sternberg,
classification of the *creative person* normally falls into three general areas. The first area involves cognitive characteristics, such as traits (relatively high intelligence, originality, verbal fluency), abilities (the ability to think metaphorically, independence of judgment, coping well with novelty, flexibility), and processing styles that creative individuals use to approach problems (questioning norms and assumptions in their domain, being alert to novelty and gaps in knowledge, using their knowledge as a base for new ideas). The second relates to personality and motivational qualities (willingness to confront hostility and take intellectual risks; perseverance; curiosity and inquisitiveness; being open to new experiences and growth; discipline and commitment to one’s work). The third is related to special events or experiences during one’s development (such as being a firstborn, having survived the loss of one or both parents early in life, experiencing unusual situations, being exposed to a wide range of ideas, learning outside of class for a large part of their education, having a future career image and definite role models, and mentors).

The second area emphasizes *products* of creative thoughts, including solutions to problems, responses on creativity tests, technological inventions and artifacts, novel ideas, paradigms and styles. The final product must be novel, and exhibit other characteristics, such as being powerful and generalizable, causing irreversible changes in the human environment, and being useful or valuable to society, or at least the restricted domain in which they are formed.

The third area, the *process*, focuses on the time constraints involved in the creation of a product, the opportunity to nourish the outcomes produced, the role of the
lengthier process of evolution on the final product, and the position of insight in the creative process.

Finally, the fourth area to approach creativity focuses on creative places (domains, fields and contexts). A field can affect creativity via three major ways: a) the general contributions and resources available to individuals within the field; b) the special effects a particular field may have in its domain and the nature of the creative expressions that result; and c) specific characteristics that either promote or inhibit creativity.

Torrance (1988) regards creativity as almost infinite, involving every sense—sight, smell, hearing, feeling, taste, and even the extrasensory. He describes creative thinking as “the process of sensing difficulties, problems, gaps in information, missing elements, something askew; making guesses and formulating hypotheses about these deficiencies; evaluating and testing these guesses and hypotheses; possibly revising and retesting them; and finally communicating the results” (p. 47).

Halpern (1996) considers someone as creative when he/she produces an outcome or a product that is both unusual and appropriate (or meaningful or useful or particularly good); in other words, creativity is defined by its consequences and not the process that led to the consequence. The unusualness and appropriateness of an idea varies along quantitative dimensions, or degrees. Creativity is not a single trait that people either have or don’t have, but a set of processes occurring in context, involving novelty in at least one of the processes that leads to creative outcomes—ways of identifying the existence of a problem, defining it, generating and evaluating possible solutions, and judging how uniquely and how well the problem is solved.
Csikszentmihalyi (1996) views creativity as “any act, idea, or product that changes an existing domain, or that transforms an existing domain into a new one” and a creative person is “someone whose thoughts or actions change a domain, or establish a new domain” (p. 28). To have any effect, an idea must be understandable to others, must be gathered by the experts in the field, and finally included in the cultural domain to which it belongs. Therefore, to Csikszentmihalyi (1996), it is important to shift the question from “What is creativity?” to “Where is it?”

In this sense, Csikszentmihalyi (1988, 1996; Feldman, Csikszentmihalyi, & Gardner, 1994; Csikszentmihalyi & Wolfe, 2000) believe that we cannot study creativity by isolating individuals and their work from the historical and social environment in which they act. Therefore, creativity is seen as the product of three main forces: field (a set of social institutions, that selects from the variations produced by individuals those that are worth conserving); domain (cultural field that will preserve and transmit the select new ideas or forms to the subsequent generations); and individual (who brings about some change in the domain, considered creative by the field).

Building on Csikszentmihalyi’s model, Gardner (1994a) defines a creative person as someone who “solves problems, fashions products, or poses new questions within a domain in a way that is initially considered to be unusual but is eventually accepted within at least one cultural group” (p. 71). His definition emphasizes equally on problem solving, problem finding, and the creation of products (such as scientific theories, works of art, building of institutions). He stresses that all creative work occurs in one or more domains, in which the achievement of expertise is required before the individual can execute significant creative work. Finally, no person, act, or product is creative or not
creative in itself. Gardner (1994b) consequently sees creativity as contextualized (the several forms of creativity are a result of the culture in which individuals live) and distributed (creativity does not reside exclusively within the brain, but it arises as a function of the human and artifact resources available to the person).

Amabile (1996) presents two complementary definitions of creativity, one consensual, that is readily applicable to empirical research, and another conceptual, which can be used in building a theoretical formulation of the creative process. The consensual definition of creativity (an explicit operational definition that implicitly underlies various assessment methodologies) is based on the creative product and states that:

A product or response is creative to the extent that appropriate observers independently agree it is creative. Appropriate observers are those familiar with the domain in which the product was created or the response articulated. Thus, creativity can be regarded as the quality of products or responses judged to be creative by appropriate observers, and it can also be regarded as the process by which something so judged is produced. (p. 33)

According to Amabile (1996), the conceptual definition of creativity comprises two essential elements:

A product or response will be judged as creative to the extent that (a) it is both a novel and appropriate, useful, correct or valuable response to the task at hand, and (b) the task is heuristic rather than algorithmic (c) algorithmic tasks are those for which the path to the solution is clear and straightforward—tasks for which an algorithmic exists. By contrast, heuristic tasks are those not having a clear and readily identifiable path to solution—tasks for which algorithms must be developed. (p. 35)

Amabile (1987, 1989, 1996) states that people will be most creative when they are intrinsically motivated in their work, demonstrating a passionate interest in something essentially for its own sake, because it is pleasant, satisfying, personally challenging or appealing. Likewise, the sense of competence (of mastering something), and self-
determination (the feeling that you are working on something that gives you pleasure), are essential to intrinsic motivation. By contrast, extrinsic motivation refers to the means to an end; the work only represents a way to earn money, gain recognition, satisfy someone else’s orders, or meet a deadline. While the intrinsically motivated state is conducive to creativity, the extrinsically motivated state is detrimental (Amabile, 1996, p.107).

Taking into consideration the effects of the environment on the creative process, Urban and Jellen (1996) propose a process-oriented definition of creativity from a more cognitive perspective:

Creativity means 1) the creation of a new, unusual, and surprising product as a solution of an insightfully and sensitively perceived problem or of a given problem whose implications have been perceived sensitively; 2) on the basis and by means of a sensible, insightful, and broad perception of existing, available and open data as well as of information searched for and acquired openly and purposefully; 3) by analyzing, by solution-oriented but highly flexible processing and utilizing unusual associations and new combinations of these information and with the help of data from own broad and comprehensive knowledge bases (experiences) and/or with imagined elements; 4) by synthesizing, structuring and composing the data, elements, and structures into a new solution-gestalt (whereby the processes in #3 and #4 may partially run simultaneously on different processing and consciousness levels); 5) a new solution-gestalt, which is elaborated as a product resp. [sic] in a product in whatever shape or form; 6) and which finally through communication may be grasped directly via the senses or via symbolic representation and experienced by others as meaningful and significant. (p. 9)

Urban and Jellen (1996) view creativity as non-linear, multidimensional, partially simultaneously occurring process dependent upon personality variables, like motivation, as well as on environmental conditions, such as material resources, and social obstacles. Urban’s model (Urban, 1990; Cropley & Urban, 2000), emphasizes 6 elements of creativity which form an interacting, mutually dependent system: a) divergent thinking and acting; b) general knowledge and a thinking base; c) a specific knowledge base and
area specific skills; d) focusing and task commitment; e) motivation and motives; and f) openness and tolerance of ambiguity. These elements of creativity form an interacting, mutually dependent system, conditional on the influences of the various environmental systems in which creative individuals become active.

The next section examines the several current definitions of giftedness, and the important role creativity exerts in these conceptions.

**Giftedness: A Multifaceted Construct**

*Definitions of Giftedness*

Definitions of giftedness abound in the literature. Persons who manifest exceptional abilities and obtain superior performance in any field of human endeavor are designated by a large variety of labels, including *gifted, able, genius, prodigy, precocious, excellent, expert, competent* and *proficient* (Gagné, 1993).

Sternberg and Davidson (1986), in their book *Conceptions of Giftedness*, provide 17 different conceptions of giftedness and reflect that:

Usefulness may be the only test we have of what makes for a better or worse conception of giftedness. Giftedness is something we invent, not something we discover. It is what one society or another wants it to be and hence its conceptualization can change over time and place. If the definition of giftedness is not useful, valuable talents may be wasted, and less valuable ones fostered and encouraged. It is thus important for all of us to understand just what it is we, and others, mean by the concept of giftedness. (pp. 3-4)

Although IQ tests are still the most widely used procedure for screening and identifying gifted and talented students, definitions of intelligence and conceptions of giftedness have changed over the years. A brief overview of changing conceptions of giftedness illustrates the move toward broader conceptions and the inclusion of non-cognitive traits.
An often-cited definition is the one presented by Marland in the U.S. Commissioner of Education’s 1971 report:

Gifted and talented children are those identified by professionally qualified persons who by virtue of outstanding abilities are capable of high performance. These are children who require differentiated educational programs and services beyond those normally provided by the regular school program in order to realize their contribution to self and society.

Children capable of high performance include those with demonstrated achievement and/or potential in any of the following areas: (a) general intellectual ability; (b) specific academic aptitude; (c) creative or productive thinking; (d) leadership ability; (e) visual and performing arts; (f) psychomotor ability. (p. ix)

Although Marland’s definition is useful for calling attention to a variety of abilities that should be included in a definition of giftedness, including creativity, it is criticized by several authors, such as Mönks and Mason (1993), Feldhusen and Jarwan (2000), Parker (1997) and Renzulli (1978, 1986), with respect to the following factors: a) the definition does not include non-intellective factors, for example motivation; b) the six categories included in the definition are not parallel (specific academic aptitude and talent for arts, for example, refer to fields of human effort in which talents and abilities are manifested, while the other categories are more nearly processes that can be manifested on performance areas; c) creativity and leadership can not be considered a part of a determined area of performance; d) this definition tends to be misinterpreted and practitioners continue to use high intelligence and scores on achievement tests as minimum requirements to place a student in special programs; and e) Marland’s definition fails to provide an operational definition of different kinds of giftedness.

Several authors defend the importance of defining the construct giftedness or talent, stressing that it is the definition that, in fact, determines which students will be selected for special programs (Davis & Rimm, 2004; Gagné, 1985; Hany, 1993).
Gagné (1995) is one of the authors who established a difference between

giftedness and talent. In his words,

Giftedness designates the manifestation of natural abilities (called “aptitudes” or “gifts”) in at least one ability domain to a degree that places subjects at least among the upper 15 percent of their age peers; the term talent designates the expression of systematically developed abilities or skills and knowledge in at least one field of human activity to a degree that places subjects at least among the upper 15 percent of the same-age, active members of the field(s). (p. 351)

Gagné (1995) posits that gifts and talents have a common source in the concept of ability, which have a clear genetic substratum, and are expressed in abilities of different levels of development. He proposes five aptitude domains: intellectual, creative, socio-affective, sensorimotor, and others (e.g.,extrasensory perception, gift of healing). The emergence of a particular talent (e.g., academics, games of strategy, technology, arts, social action, business, athletic and sports) results from the application of one or more aptitudes to the mastery of knowledge and skills in that particular field, mediated by the support of intrapersonal (e.g., motivation, temperament) and environmental (e.g., surroundings, persons, events) catalysts, as well as systematic learning and extensive practice (Gagné, 1993, 1995).

Incorporating the work of Dabrowski, Terrassier, Binet and Vygotsky, among others, the Columbus Group (Morelock, 1996; Silverman, 1993) defines giftedness as

...an asynchronous development in which advanced cognitive abilities and heightened intensity combine to create inner experiences and awareness that are qualitatively different from the norm. This asynchrony increases with higher intellectual capacity. The uniqueness of the gifted renders them particularly vulnerable and requires modifications in parenting, teaching, and counseling in order for them to develop optimally. (p. 8)

To this group, giftedness and talent are both needed concepts. While giftedness identifies the particular form of asynchronous development observed in children, talent
refers to multi-level potential for domain-specific creative-productivity, which can be fostered through appropriate identification and environmental support. Consequently, it can be assumed that "some level of talent is presented in all children, and it is our responsibility to discover and foster it in all children" (Morelock, 1996, p. 10).

Tannenbaum (1991, 1997) considers both the dynamic and static interactions of five elements essential to gifted behavior. The elements are: a) superior general intellect (high g factor); b) distinctive special aptitudes in any field of human endeavor; c) a supportive array of non-intellective traits (e.g., intrinsic motivation, independence, courage to take risks, positive self-concept and meta-learning—the ability to understand one's own thinking); d) a challenging and facilitative environment, which helps children to develop their potential in a caring environment; and e) chance—the smile of good fortune at critical periods of life. He stresses that no combination of four factors can compensate for a serious deficiency in the fifth, although different threshold levels vary with different talent domains.

Tannenbaum (1986, 1993, 2000) also classifies giftedness as consisting of four kinds of talents: scarcity, surplus, quota and anomalous. Scarcity talents are those presented in our society in short supply, especially because they demand high inventiveness and productivity. Scarcity talents are present in those inventors, scientists, leaders and other people who are symbols of excellence for making life easier, safer, healthier and more intelligible. Surplus talents are found in individuals who possess the rare ability to elevate people's sensibility and sensitiveness to new heights through productivity in arts, literature, music and philosophy. Such talents enrich the world and enhance the quality of life. Quota talent includes specialized, high-level skills needed to
provide goods and services for a limited market. This kind of talent emerges as a response to popular demands, but the number of positions or job openings for the relatively few who qualify also depend on supply, which can be irregular and geographically restricted. Finally, anomalous talent includes prodigious feats, some having practical value and others not, providing amusement and joy rather than benefits to humanity. Although recognized as a kind of excellence, it may include talents that a society may even disapprove of or give no value, and even anachronisms. Thus scarcity, surplus, quota, and anomalous types of giftedness are perceived and valued differently in gifted education. Theoretically, a society can accept all categories, but in practice, some types of talent receive priority attention.

Feldhusen (1992) focused on giftedness as an interaction. Talents appear from a general ability, as a result of a convergence of genetic dispositions, home and school experiences, learning styles and unique interests of the student. He considers genetics the determinants of development. Therefore, individuals who reach superior levels in the development of talent would exhibit them at a precocious age. Furthermore, abilities, aptitudes and intelligences will emerge as a result of experiences, motivation and learning styles of each person. Finally, talents will emerge when the abilities of creative insight meet a functional base of knowledge and abilities of metacognitive creativity.

According to Cropley (1993a), giftedness can be regarded as a changing from a quantitative model to a qualitative one; therefore, giftedness can be seen as involving not only exceptional or extraordinary expertise, but very good or highly effective performance. In other words, not only from a statistically uncommon level of performance, but also from a kind of performance that may lead to good solutions. The
emergence of giftedness is a process, depending on the circumstances of life, and on the individual’s personality, values, interests, self-image, motives and so on. Later these elements are shaped by the circumstances of life and the opportunities offered to an individual, as noted by Tannenbaum (1991). Crucial experiences provided by the environment (including the contact with models or mentors), may lead to fascination with an area, motivation to excel, and belief in oneself as capable of high levels of achievement.

Renzulli (1986) proposed that a definition of giftedness should include the following criteria: a) it should be based on the results of research on the characteristics of high ability individuals, and avoid romantic notions and opinions without scientific support; b) should serve as a guide to the selection and/or development of instruments and procedures for identification purposes; c) should give direction and be related in a logical fashion to the programs; d) should be able to generate research studies that will test the validity of the definition.

A consensus exists among researchers (Feldhusen & Jarwan, 2000; Gagné, 1985; Horowitz & O’Brien, 1985; Janos & Robinson, 1985) that the conflicting conceptions of giftedness, intelligence and talent are responsible for the disagreement in the field. The reasons for this disagreement are mainly due to the various approaches among the authors with regard to aspects such as: a) the variety of abilities and behaviors to which the term giftedness is applied; b) the measures of intelligence used; c) the cut-off point above which children are considered gifted; d) the nature of the comparison group.

The major tendency in the most contemporary discussions has been a change in the definition of the concept of giftedness to include not only intellectual giftedness, but
also non-school giftedness, as can been seen in areas such as sports and leadership, bridging the personal, affective and emotional elements as well (Cropley, 1993a). It is time to recognize that talents differ from culture to culture (Feldhusen, 1996) and that special abilities may occur in all socio-economic levels and among all ethnic groups (George, 1990; U.S. Department of Education, 1993). As educators, talented youth are served better by recognizing their specific aptitudes, establishing their levels of precocity, and by educational experiences at appropriate challenge levels (Reis, Burns, & Renzulli, 1992). In addition, talented youth can be counseled to find personal commitment to attain their goals.

Theories developed by Sternberg, Gardner, and Renzulli are presently the three major contributions to the field of giftedness as a multifaceted construct, where creativity plays an important role. Their theories will be described briefly.

*Sternberg’s Theory*

Robert Sternberg (1985a, 1986a, 1997) proposes a *triarchic* theory of intellectual giftedness, composed of three interrelated subtheories, combined to form an ample base for understanding intelligence and specifying the most appropriate measurement. He defines intelligence as “the mental capability of emitting contextually appropriate behavior at those regions in the experiential continuum that involve response to novelty or automatization of information processing as a function of metacomponents, performance components, and knowledge-acquisition components” (Sternberg, 1985a, p. 128).

The first subtheory presented in the triarchic model is the *componential subtheory*, which specifies the mechanisms or mental components responsible for the
planning, execution and evaluation of intelligent behavior. A component is defined as “an elementary information process that operates upon internal representations of objects or symbols” (Sternberg, 1985a, p. 97). It may translate sensory input into a conceptual representation, transform one conceptual representation into another, or translate conceptual representation of a motor output. Individual differences in general intelligence may be attributed to individual differences in the effectiveness with which general components are used (Sternberg, 1985a).

The second subtheory proposed by the triarchic model—*experiential subtheory*—proposes that a task measures the construct of intelligence to the extent that it requires the ability to deal with novelty and social demands and the ability to automatize information processing. The more intelligent a person might be, the quicker and more adequately she/he could deal with any novelty demanded by environment; more efficient the automatization of her/his performance, additional resources are then needed for a more demanding situation. Therefore, the two processes can operate side by side, and the more efficient the individual is in one of them, the more resourceful he/she will be dealing with the demands required by the other.

The third subtheory is the *contextual subtheory*, which includes five premises: a) Intelligence is related to relevant behaviors in a real-world environment; it can not be detached from the socio-cultural context; an individual can be considered intelligent in one culture, but not in other, depending on what is valued; b) Intelligence is purposive, related to an objective, no matter if it is conscious or not; c) Intelligence is adaptive, which implies the best fit between the individual and the environment, resulting in his/her satisfaction; d) Intelligence involves shaping the environment, modifying it, making it
more adequate; e) Intelligence involves active selection of an environment, which means that when the adaptation is impossible, and the modification fails, the individual may select an other environment in which he/she potentially fits better.

Sternberg (1997) stresses that the triarchic theory allows three types of giftedness: analytic, synthetic and practical. Giftedness in analytic skills involves being able to examine a problem and its parts, which involves high analytical reasoning. Therefore, people skillful in analytic reasoning tend to do well on conventional tests of intelligence. Giftedness in synthetic skills includes persons who are insightful, creative or just adept at coping with relatively novel situations. They may not have high IQs, but they are among people who made important contributions to the sciences, arts and the like. Practical giftedness encompasses people who are capable of applying their analytic or synthetic abilities in everyday, pragmatic situations. People may apply these abilities to negotiating successful relations with other people or to getting ahead in their occupations.

Sternberg (1986a, 1996b) believes that giftedness can be plural, rather than singular in nature. Conventional good test takers and good students tend to excel in analytical intelligence, but not necessarily in the creative and practical aspects of intelligence. In fact, schools, like conventional tests, tend to emphasize analytical skills far more than creative and practical skills. Moreover, some gifted individuals may be test-smart. Other gifted individuals may be skillful in dealing with novelty, but in a synthetic rather than analytic sense. Still others may be street-smart in external contexts, but not skillful in academic contexts.

In his work, Sternberg (1986a, 1986b, 1996a, 1996b, 1996c, 1997, 2000; Sternberg, Wagner, Williams & Horvath, 1995) has shown that there is more to cognitive
abilities required for success in schools and jobs than is measured by IQ and related constructs. Although psychometric measures are a reasonable predictor of success, they are not the only one. Tests can be useful, but should be used in conjunction with other predictors and with other tests that measure diverse abilities. Sternberg (1996b) does not believe that traditional intelligence tests satisfactorily represent the universe of tasks needed to assess intelligence. He considers as an artifact of the narrow range of kinds of tests customarily used to measure intelligence, which might disappear if tests were more broadly conceived and based on an ample, well-specified theory of intelligence. Therefore, Sternberg views successful people as those capable of presenting some blend of three types of giftedness, being able to coordinate these three aspects in a situation, and knowing when to use each one.

The triarchic theory is highly relevant to the assessment of superior intellectual ability. It points out that intelligence is not a unitary, simple construct, and indicates which abilities might be learned, stimulated or taught. In school settings, it is important for teachers to be sensitive to the students’ way of processing information; therefore, they can concentrate on students’ strengths and search for alternatives for weaknesses. Besides, this kind of strategy may help students to become more responsible for their own development.

*Gardner’s Theory*

Howard Gardner (1983, 1993, 1999; Hatch & Gardner, 1986; Ramos-Ford & Gardner, 1997) and his colleagues at Harvard Project Zero have developed a pluralistic theory of intelligence — Multiple Intelligences — which defines intelligence as “the ability or set of abilities that permit an individual to solve problems or fashion products
that are of consequence in a particular cultural setting” (Ramos-Ford & Gardner, 1997, p. 55). The theory establishes that the human cognitive competence can be described as a set of seven (or more) abilities, talents or universal mental capabilities. The intelligences are relatively independent, and the criteria used to select them were: knowledge about development in normal and gifted individuals, including prodigies and autistic savants; information about the loss of skills due to brain damage; cross-cultural estimates of cognition; psychometric studies in different cultures; and studies of the training and generalization of particular skills (Gardner, 1983). As a brief overview, the seven intelligences are:

- **Linguistic intelligence** is the one most measured in the traditional tests of intelligence, and involves verbal comprehension, syntax, semantics, and oral and written expression. In an adult, linguistic ability may be required to become a writer, novelist or lawyer; in children, the ability in this domain can be tested for his/her ability to tell rich, coherent stories and accurately report one's own experiences, rather than only repeat sentences or define words, as required in traditional verbal tests.

- **Musical intelligence** includes abilities such as pitch discrimination, sensitivity to rhythm, texture and timbre; the ability to hear and perform themes in music, and make musical compositions. Children express their musicality by singing, noticing the different sounds of the environment, and so on.

- **Logical-mathematical intelligence** is, like linguistic intelligence, the principal basis for IQ tests, and includes inductive and deductive reasoning, computing, among others, as required by a mathematician or physicist. However, some idiot
savants appear to have genuine calculating ability, despite their deficiencies in other areas. Children express logical-mathematical ability in their capacity to count, calculate or make math annotations.

- Spatial intelligence is the ability to represent and manipulate spatial configurations, as required by the architect, engineer, mechanic, navigator, sculptor, or chess player, in different ways. A young child can demonstrate spatial ability by his/her facility with puzzles or other games of spatial problem solving.

- Bodily-kinesthetic intelligence refers to the ability to use all or part of one’s body to model a product or execute a task; for example, using the body to express emotions (as in dance), play a game (as required in sports), create a new product (as in planning an invention) or to carry out delicate movements involving precise control (as used by a surgeon). The child with high bodily kinesthetic intelligence may move expressively in response to different musical and verbal stimuli or demonstrate keen athletic ability.

- Interpersonal intelligence is the ability to understand the actions and motivations of other people, especially their moods, motivations and intentions. A skilled adult with interpersonal intelligence—(as needed by therapists, teachers, salespersons, religious and political leaders) may perceive the intentions and desires of others, even when they try to hide them. Children with well-developed interpersonal skills can be perceived as leaders and organizers in the classroom. They show sensitivity to the feelings and needs of others.

- Intrapersonal intelligence refers to a person’s understanding of self, his/her own cognitive strengths and weaknesses, thinking styles, feelings, and range of
emotions, and eventually, the ability to use them to understand and direct his/her own behavior. A child may be compelled to focus on others, as a clue to discover her/himself as a person, and may be evidenced through music, language, visual art or another form of expressions of his/her personal knowledge.

Although Gardner identified seven intelligences, he states that more might exist. In 1998, Gardner presented an eighth intelligence, the naturalist intelligence, leaving open the possibility of another candidate intelligence centered on matters of a spiritual nature (Gardner, 1999). The naturalist intelligence refers to a distinctive cognitive capacity to recognize flora and fauna. Such capacity seems to rest in the ability to recognize patterns in the way things are organized. The recognition of species membership is the core of the naturalist’s intelligence. There is an ability among members of the species to recognize the existence of other adjacent species, and to sketch the relationships, formally or not, among the several species. Several roles, as diverse as hunter, fisher, farmer, gardener and cook, take advantage of this ability. Gardner (1999) states that other remote capacities, such as recognition of an automobile from the sound of the engine, a detection of a novel pattern in the scientific laboratory, or the perception of an artistic style, may use mechanisms that originally emerged because of their effectiveness in distinguishing between toxic and non-toxic plants or snakes. Moreover, the patterns of life observed by poets and social scientists may also be related to naturalist intelligence.

According to Gardner (1983), the autonomy of each intelligence means that the individual may have a high ability in one kind of intelligence, but not in another, a notion that contrasts with the traditional IQ measurements. In the same way, an individual who
is not so skillful in any of the intelligences can achieve a distinguished position in society — maybe by chance, as Tannenbaum (1997) points out. Other factors in the identification of a gifted individual can be influential in constituting a unique combination of capacities that can determine an individual’s success.

Therefore, the primary goals of *Harvard Project Zero* (Hatch & Gardner, 1986) are to move beyond the idea of a single intelligence to a range of competencies and to advance from tests to classroom assessments. To access the broad extent of human potential, it is essential to observe children’s real-world performance in particular domains and to learn more about their unique interests and cognitive styles. Assessing children in classrooms provides a comprehensive analysis of skills, abilities, and interests.

*Renzulli’s Theory*

Like Sternberg and Gardner, Joseph Renzulli (1978) believes that intelligence is multifaceted, and schools are in an essential position to develop and expand students’ abilities, aptitudes and talents. Society is always in need of persons who will solve problems by becoming producers of knowledge, rather than mere consumers of existing information.

According to Renzulli (1986), a student may be described by one of two broad categories of high ability: school-house giftedness and creative/productive giftedness. The first type can be also called test-taking or lesson-learning giftedness, since students are often identified by IQ tests for entrance into special programs. As the abilities measured by IQ tests are the same as those required in school learning situations, high IQ students are likely to get high grades in school. The emphasis in this kind of ability is
placed on deductive learning, structured training in the development of thinking processes and the acquisition, storage, and retrieval of information.

Conversely, creative/productivity implies the development of original materials or products. The emphasis is placed upon the use and application of information (content) and thinking process in an integrated, inductive, and real-problem-oriented manner. The student is seen as a first-hand inquirer who designs and solves challenging problems.

Renzulli (1986) believes giftedness can be developed in some people, if appropriate interaction takes place among the person, the environment, and a particular area of human endeavor. Therefore, Renzulli believes that the term gifted is inappropriate and detrimental to educational efforts of identifying and programming for high ability students. Consequently, he proposes to transfer the emphasis from the concept of being/not being gifted to the concern about developing gifted behaviors in those who have the highest potential to benefit from special education services.

What makes giftedness? According to Renzulli (1978), research has consistently shown that persons who have achieved recognition because of their unusual accomplishments and creative contributions possess a relatively well-defined set of three interacting clusters of traits: above average (not necessarily superior) general ability, task commitment and creativity, which are brought to bear on one or a combination of specific performance areas. Renzulli's three-ring conception stresses the fact that no single cluster makes giftedness, but rather the complex interaction among the three clusters of traits is the necessary ingredient for creative/productive accomplishment.

Above average ability refers to both general and specific abilities. General ability is defined as "capacity to process information, to integrate experiences that result in
appropriate and adaptive responses in new situations, and the capacity to engage in abstract thinking” (Renzulli, 1986, p. 8). Specific abilities consist of “the capacity to acquire knowledge, skill or the ability to perform in one or more activities of a specialized kind and within a restrictive range” (Renzulli, 1986, p. 8).

Task commitment refers to the energy a person invests in a problem or task or specific area of performance, and can be translated into terms such as perseverance, endurance, hard work, dedicated practice, or self confidence.

Creativity has been one of the most recognized traits in prominent individuals. However, due to the difficulty of finding reliable tests, alternative methods have been proposed, such as analyses of creative products and students’ self-reports. Nonetheless, it is a challenge to determine which factors lead the individual to use her/his intellectual, motivational and creative resources in such a way that it can be manifested in a high level of productivity.

Renzulli (1992) believes that, at the entrance of a new millennium, it is necessary to explore new paradigms of research that can focus the attention on the study of youngsters in situations of real-world learning, in the application of cognitive, affective and emotional processes.

*New Paradigm of Giftedness*

More than a century passed since the publication of Galton’s *Hereditary Genius* (Galton, 1869) and the development of IQ test by Binet. Until recently, tests have had a great influence in the western hemisphere regarding giftedness and creativity. Currently, there is a change in paradigms related to previous conceptions in these two areas. According to Sternberg (1986a) and Heller (1993), multiple components of giftedness,
and multiple types of giftedness must be addressed. It is more productive to focus on the
talents, strengths or special aptitudes than to search for a general kind of giftedness. The
goal of identification of gifted and talented children should be to provide them with a
variety of programs and educational services tailored to different types of giftedness
(Feldhusen & Jarwan, 2000; Hany, 1993; Renzulli & Reis, 1991). The identification
process should be viewed as a continuous process, sensitive to the development and
emergence of abilities. The process should focus on strengths, aptitudes and talents in
each child, as opposed to his/her weaknesses.

It is not, however, a matter of throwing out the baby with the bathwater. Borland
(1986) argues that if IQ tests were not used, a source of valuable information would be
eliminated for making decisions about the placement of children into programs for gifted
students. The underlying problem with IQ tests resides with the abusers, not with the
instrument. Therefore, he suggests: a) avoiding reliance on IQ tests alone and using them
in conjunction with other sources of information for making placement decisions; b)
avoiding the practice of combining data from various sources into a single composite
index that is psychometrically uninterpretable; c) avoiding the use of IQ’s derived from
group tests for making fine distinctions among scores; d) recognizing that IQ tests are
very sensitive of racial, ethnic, linguistic and socioeconomic differences; e) recognizing
the use of tests for inclusion, not exclusion.

Several researchers have demonstrated that the traditional measure of IQ is not a
good predictor of the future success of the individual, although it can be significantly
related to school achievement (Renzulli & Reis, 2000; Tannenbaum, 1991; Weinberg,
1989). Trost (1993), for example, does not believe there is a single predictor of
giftedness. He contends that superior performance is the product of a highly complex interaction of a variety of traits (such as cognitive abilities, motivational and emotional attributes, personality variables, high self-concept). These cognitive and non-cognitive abilities also interact with environmental factors, such as family, peers, school, and extracurricular activities (see Feldhusen, 1986; Gagné, 1985; Heller, 1993; Renzulli & Reis, 1997; Robinson & Chamrad, 1986; Tannenbaum, 1983). However, a need exists for more longitudinal studies (see Terman, 1954) to assess a broader spectrum of predictor variables in the complex phenomenon of giftedness. Better instruments are also needed to assess the motivational, affective and environmental variables that are essential for outstanding performances.

According to Feldhusen (1992) and Renzulli (1986), the identification process should be a continual process, in which teachers, parents, peers, and students play important roles as a variety of techniques and resources are used to meet students’ individual needs. Betts (1991) suggests that when the needs of gifted students are met, they will develop into autonomous learners, with positive abilities and attitudes in the cognitive, emotional and social domains. The students will be responsible for the development, implementation and evaluation of their own learning process. A student in a well-designed program should learn how to develop and explore abilities and talents, how to emphasize strengths, and how to coordinate and balance different aspects of abilities; and, as stressed by Sternberg (1997), how to recognize his/her metacomponents and develop them in an integrated way.

It is also necessary, as pointed out by Gardner (1993) and Renzulli (1992), to modify several traditional educational techniques, to understand giftedness in all its
facets, and to assess students in more appropriate ways. In this sense, the role played by a competent, motivated and passionate teacher, sensitive to the individual cognitive differences of students, cannot be overlooked.

**Intelligence and Creativity**

Cropley (1966), summarizing a number of studies that attempted to demonstrate whether creativity is or is not related to intelligence, observed that the opinions resulted in incompatible views. The source of the disagreement lies, in his opinion, in the doubtful validity and reliability of creativity measures. He also believes unstable measures do not yield stable factor structures. In Cropley’s study (1966) of 320 seventh grade students, to whom he administered a battery of both convergent and divergent tests, the results indicated the existence of a separate factor (creativity), but correlated (.514) to convergent tests (intelligence).

Shaughnessy, Jausovec and Lehtonen (1993) argued that creativity is an evasive construct to measure. No workable operational definition of creativity has emerged that can consistently be empirically tested. Furthermore, labeling creativity as an aspect or domain of giftedness is difficult because, in their opinion, “it focuses excessively on the product, often neglects the process, generally ignores the person and negates the socio-cultural environment” (p. 6).

One classic study of the relationship between creativity and intelligence is Getzels and Jackson’s research (1961, 1962). These researchers examined two groups of adolescents, one group was high in intelligence (top 20%) as measured by Binet’s IQ test, but not as high in creativity (below the top 20%), and the other group was high in cognitive functions (top 20%) represented by tests of creativity (based on Guilford’s test),
but not as high in intelligence (below the top 20%). The high creative group was comprised of 15 boys and 11 girls, with IQs ranging from 108 to 138 (mean=127). The high intelligence group was comprised of 17 boys and 11 girls with IQs ranging from 139 to 179 (mean=150). The researchers were interested in the nature of the performance of the groups with respect to school achievement, perceptions of teachers, production of fantasies, and choice of adult career.

Some of the research findings indicated the following: a) although there was a 23 point difference in average IQ scores between the two groups, the school achievement of both groups was equally superior to the population from which they were drawn; b) high IQ students were rated by their teachers as more desirable in class than average students, while the high creative students were not; c) in writing short stories for six Thematic Apperception Test-type pictures, the high creative group used significantly more stimulus-free themes, unexpected endings, humor, and playfulness in writing short stories; d) 16% of the high IQ group and 62% of the high creative group made unconventional career choices.

Getzels and Jackson’s study provided evidence that students who scored high in IQ tests are not necessarily those who score high in creativity tests, and both groups have high potential for school achievement. Moreover, the highly creative students are not seen by their teachers as a pleasure to have in class, which may be an educational disadvantage (Starko, 1995). The researchers tend to attribute these findings to the following ideas: a) maybe there is a "halo effect” due to the students’ IQs, which may lead teachers to respond differently to each group, despite equal superiority in achievement; and b) the nature of the highly creative students’ personal values, attitudes,
fantasies, and aspirations may not be those expected by teachers (Getzels & Jackson, 1961).

Yamamoto (1964) summarized five important findings from Getzels and Jackson's study that were supported by six studies conducted by Torrance and others: a) correlation between measures of creative thinking and intelligence is low (0.17 - 0.40) in general, unselected populations; b) correlation between these two measures is practically zero in selected (high ability) populations; c) correlation between these two measures seems to be slightly higher for girls than boys; d) if we identify the top 20% of the general population on the basis of intelligence quotient alone as traditionally done, we would be able to include only about 30% of those who are in the top 20% in creative thinking; therefore, our traditional gifted group has missed almost 70% of highly creative individuals; e) in many, but not all, cases, the academic achievement of those who are in the top 20% in creativity, but not in intelligence, is comparable to those who are in the top 20% in intelligence but not in creativity in spite of the fact that the former group fell far short (20 - 26 IQ points) in intelligence in comparison to the latter group.

Yamamoto (1964) examined the concept of a threshold of intelligence in the relationship between creative thinking abilities (determined by Torrance tests) and academic achievement (determined by Lorge-Thorndike Test) in elementary and secondary students. In each population, those in the top 20% of creative thinking were identified and divided into three groups: Low intelligence (below 120 IQ), Middle intelligence (between 120-135 IQ) and High intelligence (above 135 IQ). The threshold phenomenon was noted only in the secondary level. It was also noted that the High and Middle groups scored significantly better on the Iowa Tests of Educational Development
than did the Low group. The scores of the High and Middle groups were not significantly different.

Another classic study by MacKinnon (1962), found no relationship between intelligence and creativity among architects, and a low, positive relationship between these two variables among mathematicians. He concludes:

It is clear, however, that above a certain required minimum level of intelligence which varies from field to field and in some instances may be surprisingly low, being more intelligent does not guarantee a corresponding increasing in creativeness. It just is not true that the more intelligent person is necessarily the more creative one. (p. 488)

The idea of a “threshold effect” in the intelligence-creativity relationship is corroborated by some researchers. In a longitudinal study of adults’ creative achievements who were identified as creatively gifted and intellectually gifted as children, Torrance and Wu (1981) investigated the creative style of their life achievements (achievements of the kind that are not ordinarily publicly recognized and acknowledged) of 62 subjects. The following five measures of creative achievement were developed and used as criteria: a) number of high-school creative achievements (in the sciences, language arts, music, visual arts, dramatic arts, leadership and business); b) number of post high-school creative achievements (patentable inventions, published articles in journals, literary production and awards, the creation of a business, leadership achievements and the like); c) number of creative style of life achievements (organizing an action-oriented group, initiating a new educational venture, clothing design, learning new skills and the like); d) quality of the highest creative achievements (index based on the composite ratings of three qualified judges of the quality of creative achievements); and e) creativeness of a future career image (the composite rates of three judges of the creativeness of the future career images of the subjects based on responses of two
questions, one related to artistic career aspirations and other related to fantasies about future aspirations). Twenty-six subjects were considered creatively gifted (high creative, whose creativity index was in the upper 20%, but not in the upper 20% in IQ); 26 intellectually gifted (high IQ — upper 20% in IQ and below 20% in creativity); and 10% fell in the overlapping sample (high IQ/ high creative — both indexes in the upper 20%). They found that elementary school students identified as creatively gifted, but not intellectually gifted, equaled or surpassed those who were identified as intellectually gifted, but not creatively gifted, as well those who were identified as both creatively and intellectually gifted on the five measures. The authors expressed concern with respect to the most creative students who have been consistently eliminated for consideration in gifted programs using intelligence test scores as the sole criterion of selection.

More recently, Yong (1994) examined the relation between creativity (using The Torrance Tests of Creative Thinking, figural and verbal forms A) and intelligence (The Cattell Culture Fair Intelligence Test) among 181 boys and 216 girls from 5 secondary schools located in urban and suburban areas in Malaysia. His analysis showed that, for the whole sample, IQs did not correlate highly with scores on creativity when the students were grouped into creativity – IQ groups. However, differences were observed among students who were both highly creative and highly intelligent and students who were only highly creative or highly intelligent. Similarly, students who were both creative and intelligent had generally superior academic achievement when compared to the other groups. A t-test comparison was also made between creative and non-creative students, and the author found that the creative students were more intelligent than the non-creative ones.
Sen and Hagtvet (1993) conducted a study with 300 Norwegian students in grade 11 to examine the relationships among creativity (measured by the Torrance Tests of Creative Thinking), intelligence (measured by Raven's Progressive Matrices), personality (measured by Eysenck's Personality Questionnaire), and academic achievement. Pearson product-moment correlation was computed between composite creative scores and the other variables. The authors found that the correlation between scores on creativity and Raven's Matrices test for measuring intelligence was significant at 10% level \((r = .11)\), while all the other correlations were not significant. The subjects were then divided into two groups of high and low composite creativity scores. The results showed that creative students scored higher on the measures of theoretical and aesthetic value pattern of life, higher on academic achievement, and were extroverted. Sen and Hagtvet concluded that intelligence is a component of creative ability and agreed with other authors that intelligence is necessary, but not an index of high creativity. The more important finding is the way creative individuals use their intelligence effectively rather than the level of intelligence they may present.

The idea of a threshold effect in the intelligence-creativity relationship seems to be corroborated by Sen and Hagtvet (1993). However, since there are no universal measures of creativity or intelligence, and each study may use completely different measures, it is inadvisable to draw any conclusions (Daniel, 1997; Hocevar & Bachelor, 1989; Starko, 1995). However, Starko (1995) believes in the existence of a relationship, and establishes that:

...high levels of adult creative accomplishment seem to be accompanied by at least high-average intelligence. It is possible that there is a minimum threshold of intelligence that makes this level of creativity possible. It also appears that factors outside those measured by most IQ tests (such as
divergent thinking and motivation) affect both school achievement and creativity. Being alert to those factors may help us identify and nurture students whose abilities may not be fully assessed by traditional IQ testing. (p. 65)

Anastasi and Schaefer (1971) suggest the recognition of both terms *creativity* and *intelligence* as referring to ample, loosely defined, multiple concepts. Both provide convenient shortcuts in designating complex behavior domains of significant practice importance. Each comprises a plurality of identifiable traits, organized in a pattern of relationships that cut across the two domains.

*Conceptions of Intelligence and Creativity*

Yang and Sternberg (1997) state that it is important to understand the nature and use of different population’s conceptions of intelligence and creativity; and it is important to understand how people view these potentially interrelated constructs. In reviewing the literature, Sternberg (1985b) cites Yussen and Kane’s research, where children in the first through sixth grades were asked about their conceptions of intelligence. They found that the differentiation of the construct increases with the children’s age, with older ones perceiving intelligence as an internalized quality.

Recognizing the influence of culture, Yang and Sternberg (1997) conducted two studies to investigate Taiwanese Chinese conceptions of intelligence. In the first study, people were asked to characterize an intelligent person, and in a second study, to rate the attributes catalogued from the first study according to the frequency or importance of the attribute. Five factors emerged from the frequency ratings: a) general cognitive ability; b) interpersonal intelligence; c) intrapersonal intelligence; d) intellectual self-promotion, and e) intellectual self-effacement. Four factors emerged from the ratings of importance: interpersonal and intrapersonal intelligence; intellectual enjoyment; intellectual self-
assertion; and general cognitive ability. Yang and Sternberg called attention to the fact that in the Taiwanese culture, older adults placed greater emphasis on practical/contextual aspects of intelligence, while other cultures (Hispanic, for example) placed more emphasis on social aspects of intelligence. Yang and Sternberg stressed the importance of researching intelligence beyond the boundaries of North America to increase our understanding of cross-cultural conceptions of intelligence and associated value systems.

The identification of intelligent/creative people has become more complex when both giftedness and creativity are perceived as multifaceted processes, related to each other. Renzulli (1986), for example, remarks that students who possess well above-average (but not necessarily superior) ability and who also have the potential for developing task commitment and creativity are the persons who have the highest probability for displaying gifted behavior.

Perceptions of Teachers and Students

Teachers’ Perceptions of Giftedness

Although there has been much theoretical, methodological, and empirical writing on the multidimensional nature of ability, insufficient attention has been given to teachers’ views of dimensions of giftedness and talent (Guskin, Peng & Simon, 1992). Since many students are taught primarily by teachers who lack special training in gifted education, it seems important to understand how teachers perceive giftedness and talent. Do they perceive students who are gifted in one area to be talented in other areas? Do they think analytic and verbal students are talented in the arts?

Guskin, Peng and Majd-Jabbari (1988) addressed this and other questions to 111 prospective teachers and 79 experienced teachers. Given a list of 20 different areas in
which a 12-year-old might be outstanding, the subjects were asked to indicate the resemblance among them, using sorting, similarity ratings, and/or trait ratings. Data were analyzed using clustering, multidimensional scaling, and factor analysis approaches. Results showed that both prospective and experienced teachers differentiated among verbal, analytic, personal/social, artistic/creative, and motor skills. Both teacher groups perceived students who are talented in one skill as resembling those who are talented in another skill in the same area and differing from those who are talented in other areas. Furthermore, they did not expect students with analytic or verbal skills to be especially talented in the arts. In this study, teachers grouped the general term art or artistic ability with music and creativity by subject areas, while problem solving was grouped with mechanical ability and logical reasoning.

In another research study, Guskin, Peng and Simon (1992) examined how teachers’ judgments, expectancies, and decisions were influenced by hypothetical students’ patterns of giftedness and demographic characteristics. In this study, 158 were presented with six case studies of students with varying background (gender, race, socioeconomic status) and abilities (analytic, verbal, social, creative arts, motor and control). Subjects were then asked to indicate the likelihood that each student would present a set of 25 traits, making judgments about appropriate programming and resources they would recommend for each hypothetical student, and predict their level of success. The findings indicated differential predictions of success. Teachers more frequently expected students with verbal, analytic, and social abilities to be more successful than those in motor and creative arts.
Researchers also made more recommendations for special schools for those students in creative arts and less often for those with social and motor abilities. They also found that experienced teachers were more likely than prospective teachers to recommend advanced work and special classes, programs and schools. Furthermore, lower-class students were seen as less confident, less musical, and less popular than middle-class and Black students. Middle-class students were perceived as more attractive than students of other classes. When data on gender were analyzed, the most striking contrasts were for motor abilities, where teachers rated females higher than males on eight of the nine traits, the opposite occurring for social and verbal abilities.

According to these two studies (Guskin, Peng & Majd-Jabbari, 1988; Guskin, Peng & Simon, 1992), prospective and experienced teachers’ perceptions are also consistent with Gardner’s Multiple Intelligences theory. When they were exposed to relevant information about students’ accomplishments, teachers were not insensitive to multiple intelligences of students nor biased against recognizing talents in groups underrepresented in gifted programs. However, further investigations are required to explore the extent to which their conceptions relate to their day-to-day interactions, judgments, and decisions in their classrooms.

Comparing high school teachers’ perceptions of highly gifted students in the United States and West Germany, Busse, Dahme, Wagner and Wieczerkowsk (1986) found that the attributes most central to giftedness include logical thinking, intelligence, intellectual curiosity, and a quick intellectual grasp. Personal characteristics include independence, a lack of neuroticism, goal-oriented self-confidence, honesty, and high achievement motivation. American highly gifted students were described as more
dynamic, popular and more achievement-oriented than their German counterparts. German gifted students were described, however, as more self-centered and neurotic than the Americans.

Hunsaker (1994) was interested in teachers’ conceptions of giftedness when they considered students for nomination to g/t program; how well the conceptions matched their districts’ official definitions; and how teachers would address with any possible discrepancy between the district’s definitions and their own conceptions. Questionnaires and interviews were used and analyzed for patterns and themes. The most frequently mentioned characteristics in their definitions of giftedness were divergent thinking; convergent thinking ability (such as quick recall and abstract reasoning), curiosity, and an active intellect. Teachers believed that creativity plays a special role in giftedness, which constitutes a marked discrepancy between their perception toward giftedness and the official definitions within their school systems. Although creativity was stressed by their personal conceptions, teachers’ criteria for nomination focused more on classroom performance than creativity. Results also showed that the teachers had not actively worked to adjust the official conception more closely with their own conceptions. This inaction was attributed to three fundamental reasons: a) a lack of experience with gifted education; b) a degree of concern about final placement decisions; and c) how they will affect children and parents. Hunsaker (1994) discussed the importance of providing training opportunities for teachers. Training should go beyond discussions of characteristics of gifted individuals and include observational techniques, group decision-making, and in-process evaluation.
Teachers’ misconceptions of giftedness, and negative self-perceptions and feelings can result in inappropriate expectations for gifted students, influencing their judgments of children’s academic ability, and placing students at risk (Ablard, 1997; Galloway & Porath, 1997; Seeley, 1993; Starko, 1995). If gifted children are perceived as uncooperative, for example, they may be judged less competent, resulting in inappropriate educational provisions.

Creative thinking ability may mask giftedness in the classroom. A highly creative student may not be recognized as gifted by teachers or parents. Carroll and Howieson (1992), for example, found that teachers perceived intelligent and creative students in different ways. Intelligent youngsters were most often described as a “delight to teach,” hard working, diligent, and competent (a result also found by Getzels & Jackson, 1962), while creative counterparts were perceived as enthusiastic, lively, and disruptive.

Students’ Perceptions ofGiftedness

According to Porath (1997), Betts (1986), and Burns (1990), it is important to focus on children’s understanding of giftedness, creativity, and development of potential. Knowing how children view intelligence can affect motivation and self-confidence in academics.

Alexander (1985) examined common-sense notions of intelligence among gifted and non-gifted (non-identified) students. One hundred and twenty seven gifted students and 116 non-gifted students, ages 12-17 completed a questionnaire that asked their views of the concept of intelligence. The 10 most frequently appearing descriptors were: smartness, knowledge, learning capacity, understanding, thinking, high IQ, problem solving, reasoning, academic skills, and social skills. While gifted students defined
intelligence in terms of cognitive processes, non-gifted students highlighted social and academic attributes. When asked to describe visible signs of intelligence (if any) that could differentiate between intelligent and less intelligent people, verbal skills were stated by 50% of the gifted students and 47% of the non-gifted (e.g., use of extensive vocabularies, use of specialized, uncommon, or big words, and good grammar). Non-gifted students pointed out more physical differences than did gifted students (28% gifted and 34% non-gifted), such as: intelligent people dress preppy, wear glasses, talk about boring things, carry books, prefer to stay inside and study rather than to go outside and play. Information was also gathered on qualities that further differentiate between individuals of high and average intelligence. For gifted students, mental activity was indicated most frequently, followed by academic and social qualities. Physical qualities were generally rated as playing no role in distinguishing high and average intelligence. For non-gifted students, social qualities were emphasized more than academic factors, and they placed more emphasis on physical qualities and less on academic ones. Other information collected in this study explored the issue of how intelligence can be increased and by how much. This study investigated students’ implicit views of constancy or malleability of intelligence. Data showed that, according to the perceptions of the students, intelligence is a changeable entity. Intelligence was interpreted as a consequence of changes in an individual’s efforts and attitudes, and not merely as the effect of one’s genetic features. The students did not perceive high intelligence as a gift, but as the product of hard work and appropriate experiences.

Feldhusen, Wood, and Dai (1997) conducted a study for the following purposes: a) to identify the talents that characterize highly able students; b) to assess the presence of
multiple talents; c) to determine their views of their own abilities and the origins of those abilities; and d) to evaluate their perceptions of school experiences. A survey was administered to 305 gifted students attending a summer residential program at Purdue University. Talents identified by students were analyzed and categorized as follows: Academic, Artistic, Cognitive, Creative, Communication, Athletic-Physical, Games, Language Arts, Personal-Social, and Technical. The highest frequency of reports of talents recognized as strengths was in the Academic area, followed by Artistic, Athletic-Physical, Personal-Social, Language Arts, Communication, Cognitive, Games, and Creative. Girls reported artistic talents more than boys, while boys tended to report talent in games more often. These findings seem consistent with the gender role expectation that girls are more expressive and boys are more instrumental and competitive. In relation to age differences, there was an age-grade increase for the reports of communication talent, suggesting an increasing awareness of the importance of social and communication skills as students got older. On the other hand, the reports of athletic-physical and technical talents decreased at ages 14-15. This may suggest students become more realistic about their potential in other domains. The typical youngster perceives him/herself as having developed, on average, three talent strengths. They perceive the origin of their ability as no more than 50% hereditary and 50% environmental. They reported being bored in school about 2/3 of the time, which is probably due to their superior talents, high IQs, and precocity.

Manaster, Chan, Watt, and Wiehe (1994) were interested in assessing students’ views about the meaning of giftedness, advantages and disadvantages of being gifted, the way they viewed being gifted, and the perceived effect of the gifted label. An instrument
composed of open-ended questions was answered by 144 gifted adolescents attending a summer school program. Results showed that: a) Of the sample, 72% rated giftedness as a trait (personal, academic, and social attitudes, characteristics, dispositions and values, considered to be persistent and stable over the time), rather than performance (personal, academic, and social activities, considered to be changeable over the time); a third of the traits were talents (e.g., a special talent that God has given to you) and two thirds were abilities (e.g., ability to learn easily, to listen, to understand others' opinions); b) These gifted students perceive themselves as different from other students on academic traits, personal performance, and academic performance and more like others on social performance; c) Of the sample, 53% believed that the best thing about being gifted (receiving high regard, being respected, being listened to, and being believed) and the worst aspects (stereotyping, such as nerd or snob; jealousy and resentments; social isolation and alienation; excessive expectations; and being misunderstood) were also social in nature; d) The majority of the sample (64%) perceived themselves as generally better than others, academically talented, harder working and more motivated, or not having to work as hard as others to achieve, and therefore saw themselves as gifted. Being gifted was a positive experience for 79% of the students, while 26% do not perceive themselves as gifted; e) Most students recognized no special treatment from friends or parents because of their giftedness, but thought that teachers treated them differently, in a positive way. Manaster, Chan, Watt, and Wiehe (1994) noted that the gifted adolescents’ views of the gifted label and its effects are multifaceted. They saw many good, positive, supportive effects of giftedness and being labeled gifted, in spite of a few negative effects. The authors concluded that, as they mature, gifted adolescents
may realize the existence of positive and negative aspects in almost all social roles, statuses, and labels.

Summary

This chapter addressed the pertinent theory and research related to the study. An historical overview of the evolution of the constructs of intelligence, creativity, and giftedness were presented, and contributions of Galton, Cattell, Binet, Terman, Hollingworth, Spearman, Thurstone, Piaget, and Guilford were highlighted. Issues related to definition of these constructs were discussed, approached from several perspectives. Definitions of giftedness were offered and the theories of Sternberg (1985a), Gardner (1983) and Renzulli (1978) were described as major contributions to the field. A change in paradigms related to previous concepts involving the traditional measures of IQ and the multiple components of giftedness were addressed. The identification process is currently viewed as a continuous process, focusing on strengths, aptitudes, and talents in each student. Studies of the relationship between creativity and intelligence; considerations about the role of creative thinking; the threshold effect; the importance of creativity to the identification of gifted and talented individuals were presented and discussed in depth. Finally, perceptions of teachers and students about creativity, intelligence, and giftedness were described, enhancing the understanding of how people view these potentially interrelated constructs.
CHAPTER THREE

SITE DESCRIPTION AND THE ENRICHMENT PROGRAM

The following chapter provides data about the country and a description of the cities, communities, and schools in which this study took place. Particular physical and sociocultural characteristics of these settings provide important information regarding the environments in which the participants interact. The remainder of the chapter provides a description of the Brazilian education system, which will clarify some of the information students and teachers shared in this study. Also, it will provide rich information about the gifted and talented students' program and the educational philosophy that guides this program in the Federal District.

Brazil

Brazil, a Federal Republic, is the largest country in South America, occupying nearly one-half of the entire area of the continent. The republic has a common frontier with every country in South America except for Chile and Ecuador. Brazil is the fifth largest country in the world (after Russia, China, Canada, and the United States). Most of its people live near the Atlantic Ocean, notably in the great cities of São Paulo and Rio de Janeiro, but the capital, Brasília, is inland. Approximately 38% of the population is composed of Mulattoes (a race of mixed African and Portuguese ancestry). People of Portuguese descent are the second largest group (15%), followed by mixed races of European and South American (12%), Italian (11%), African (11%), and Spanish (10%), with the remaining 19% made up of other groups including Germans, Japanese, and Indigenous people. Table 1 presents demographic characteristics of Brazil.
Table 1

Demographic Characteristics of Brazil

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<tr>
<td>Federal Republic of Brazil</td>
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<tr>
<td>Capital: Brasília</td>
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<tr>
<td>Nationality: Brazilian</td>
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<tr>
<td>Language: Portuguese (official)</td>
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<tr>
<td>Composition: Caucasian 55.2%, Mulattoes 38.2%, African-Brazilian 6%, Asian-Brazilian 0.4%, Indigenous 0.2%</td>
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<td>Religion: Christian (Catholic 83%, other 10%), Spiritism, Judaism, Afro-Brazilian cults</td>
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<td>Location: eastern part of the continent</td>
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<td>Area: 8,514,876,599 km²</td>
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<td>Climate: equatorial, tropical, subtropical and semi-arid</td>
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<td>Density: 19.18 inhab./km².</td>
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<td>Illiteracy rate: 14.7% (1996).</td>
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| Main Cities | (1999): São Paulo (9,968,485), Rio de Janeiro (5,598,953), Salvador (2,302,832), Belo Horizonte (2,139,125), Fortaleza (2,097,757), Brasília (1,969,868), Curitiba (1,584,232), Recife (1,378,087), Porto Alegre (1,314,032) |

**Brasília**

Brasília, the capital of Brazil, is located in a Federal District of 5,814 km² (2,245 square miles), on Brazil’s central plateau. An outstanding example of a planned city constructed in a rural setting, Brasília is situated in a savanna at an elevation of 1,065 m (3,500 ft) along with the source of three large hydrographic basins – the Tocantins, Paraná, and São Francisco rivers. The annual temperature range is 14°–27°C (57°–81°F). October through May are the rainiest and hottest months. It is an exclusively urban area, with a territorial area of 473.07 km², having an estimated population of 204,590 inhabitants, which represents 10.95% of the total population of the Federal District. Its
demographic density is 432.47 inhab./km². Brasília is the site of the federal government administration, local government, and the headquarters of the three powers: Executive, Legislative, and Judicial.

The proposal to build a new capital in the interior of Brazil to stimulate economic development and to open up the center of Brazil was first made in 1763. A new federal district was designed in 1889, although it was not precisely located until 1956. In 1957, during the presidency of Juscelino Kubitschek de Oliveira, construction was, at last, authorized. In 1960, the seat of government was officially moved from Rio de Janeiro to Brasília. The city was officially inaugurated in April 1960, after 1,000 days of construction. In 1987, the city was certified by UNESCO as a World Historical Heritage, due to its architecture and for being the first planned city, in the 20th century, designed and built to be a capital.

Brasília is a remarkably modern city. Its layout, designed by the Brazilian urban planner Lúcio Costa, resembles a jetliner in shape. Along the "fuselage," which is the city’s main axis, are the offices of the national government; the "wings" (South and North) contain blocks of residential apartment buildings, commercial areas, and foreign embassies. In the confluence of the "wings" are the major buildings for banks, offices, and malls. Separated sectors for distinct activities were created, such as hotels, entertainment, embassies, hospitals, military installations, small industries, clubs, and publishing and printing businesses. As the city grows, other residential areas are created. The city’s major buildings, the luxurious landscapes, and greenery were designed by the noted architect Oscar Niemeyer. An artificial lake (Paranoá) borders the city on three sides. The presidential residence, Palácio da Alvorada (Palace of Dawn), is located on
one of the borders. Not far from it, is Vila Planalto, a district of working people of low socioeconomic class whose relatives made up the work force that constructed Brasília. Two major areas around Paranoá lake — Lago Sul (South Lake) and Lago Norte (North Lake) — and Cruzeiro, which were part of the original urban plan of Brasília, constitute, since 1994, separate cities.

Brasília is served by a growing network of roads linking it to all parts of the country, and it is connected by railroad to São Paulo, Rio de Janeiro, and other cities. Because of its relatively remote location, its airport is an important link with the rest of Brazil. The federal government is the major employer, followed by civil construction and tourism. Only a few industries are permitted in the Federal District, such as computer manufacturing (Brasília is an important center of software production), cement industry, and brewery factory, which are all located outside the urban area. In the agricultural area, soy is the main product, followed by vegetables and fruit cultivation. Nineteen rapidly growing communities called satellite cities surround the city. Many of them, although lacking in facilities, have a more vital commercial life than Brasília.

As part of the presidential plan of occupation of the inlands and the center of Brazil, Brasília started to receive an enormous contingent of migrants from all Brazilian states. Thus, government ministers and public workers from Rio de Janeiro city, Bank of Brazil employees, representatives of several foreign embassies, politicians and their advisers, military officials, and the families of the construction firm of Brasília (including its directors, employees, and workmen) were initially transferred to the new capital. Along with them, an always growing contingent of low-income families, proceeding mainly from the North and Northeast Brazil, has been attracted to Brasília because of the
jobs offered in construction, the distribution of lands by the government, and the promise of better jobs. These factors have caused the increase of the population of the outskirts of the Federal District. It is worth pointing out that living conditions in the Federal District are one of the most expensive in Brazil. Heavy industries are not allowed in the region, the construction area cannot absorb the enormous search for jobs, and the migrants' low educational level prevents them from getting more skilled work. All this contributes to the enormous socioeconomic disparities in this region.

**Satellite Cities Involved in This Study**

The four satellite cities involved in this study have distinctive characteristics. Taguatinga was projected in the Brasília original urban plan to serve as a dormitory-city for 25,000 inhabitants who commuted daily into the capital, supplying the work force. It was inaugurated 2 years before Brasília, in 1958. Now it is an area populated by middle and lower middle class families. Its territorial area is 121 km², with an estimated population of 227,570 inhabitants, representing 12.18% of the population of the Federal District, with a demographic density of 1,875.32 inhab./km². It is located 25 km from the center of Brasília. Its urban area is divided in Sectors: Central, Hotel, Industrial, Graphic, North, South, and Clear Waters Neighborhood. In 1971, it was reorganized, generating the community of Ceilândia. Around these two administrative areas there are large plantations of fruit, vegetables, and forests.

Ceilândia is the result of the first project of eradication of shantytowns of the Federal District. Founded in 1971, Ceilândia has a territorial area of 232 km², with a low-income population of 352,560 inhabitants. It is the largest population contingent of the Federal District, representing 18.87% of the total population. Its demographic density is
1,519.66 inhab./km$^2$. Ceilândia is 33 km from Brasília downtown, being composed of blocks M, N, O, P and Q, and an Industrial Sector, where only non-pollutant industries can settle.

Planaltina is the oldest city of the Federal District. It was first inhabited by farmers, cattle breeders, and agricultural producers who were attracted by the village location, in a good pasture area. Founded in 1859, it was incorporated in the Federal District in 1960. From that time up to 1971, more and more people moved to the city. Its territorial area is 1,537.20 km$^2$, with an estimated population of 119,010 inhabitants, representing 6.37% of the population of the Federal District, with demographic density of 77.42 inhab./km$^2$. It is 42 km from the center of Brasília and its urban area contains the following Sectors: Administrative, Education, Shops and Industries, Residential East, Traditional, Vila Vicentina, and Vale do Amanhecer (Dawn Valley).

In 1960, 30 families living near Paranoá dam were settled on a farm that was 35 km from Brasília. It was the start of Gama city, which later welcomed inhabitants coming from other satellite cities. In a territorial area of 276 km$^2$, Gama has an estimated population of 124,990 inhabitants, of low socioeconomic level, representing 6.69% of the total population of the Federal District. Its demographic density is 452.67 inhab./km$^2$. The city design resembles a beehive due its hexagonal format. Gama is formed by urban and rural areas. The urban area is divided into six Sectors: North, South, East, West, Central, and Industry. The rural area contains agricultural colonies.

**Socioeconomic and Educational Levels of the Communities**

Due to the socioeconomic characteristics of the 19 cities in the Federal District, they can be classified in five groups according to the family monthly average income. A
minimum wage (MW) corresponds to R$ 151.00 reais (one hundred and fifty-one reais),
the equivalent to approximately $77.00 U.S. According to a study carried out by
Codeplan — Company for the Development of the Central Plateau (Codeplan, 1997), the
Federal District can be divided into five socioeconomic groups, summarized in Table 2.
The first four groups are represented in this study: Brasilia is in the first group,
Taguatinga in the second, Gama in the third, and Planaltina and Ceilândia are in the
fourth group. Table 3 provides a summary of the education level of the population of
Brasília and the four satellite cities involved in this study.

Table 2

Federal District’s Socioeconomic Groups According to the Population’s Income Range

<table>
<thead>
<tr>
<th>Socio-economic Groups</th>
<th>Income range (MW)</th>
<th>Cities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>32.5 to 65.8</td>
<td>Brasília, Lago Norte, Lago Sul</td>
</tr>
<tr>
<td>Group 2</td>
<td>16.1 to 29.05</td>
<td>Cruzeiro, Guará, Núcleo Bandeirante, Taguatinga</td>
</tr>
<tr>
<td>Group 3</td>
<td>9.0 to 11.4</td>
<td>Gama, Sobradinho, Riacho Fundo, Candangolândia</td>
</tr>
<tr>
<td>Group 4</td>
<td>6.1 to 7.6</td>
<td>Brazlândia, Planaltina, Ceilândia, Samambaia</td>
</tr>
<tr>
<td>Group 5</td>
<td>4.6 to 5.3</td>
<td>Paranoá, Santa Maria, São Sebastião, Recanto das Emas</td>
</tr>
</tbody>
</table>

Note. Source: CODEPLAN/PISEF-DF
Table 3

Educational Level of Family Members in the Federal District – 1997

<table>
<thead>
<tr>
<th>City</th>
<th>Brasilia</th>
<th>Taguatinga</th>
<th>Gama</th>
<th>Ceilândia</th>
<th>Planaltina</th>
<th>Federal District Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iiterate</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Only read and write</td>
<td>1</td>
<td>2</td>
<td>11</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Kindergarten</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Incomplete Primary Level</td>
<td>23</td>
<td>40</td>
<td>41</td>
<td>46</td>
<td>54</td>
<td>41</td>
</tr>
<tr>
<td>Primary Level</td>
<td>5</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Incomplete Secondary Level</td>
<td>9</td>
<td>10</td>
<td>8</td>
<td>9</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Secondary Level</td>
<td>18</td>
<td>18</td>
<td>13</td>
<td>13</td>
<td>9</td>
<td>14</td>
</tr>
<tr>
<td>Incomplete University Degree</td>
<td>9</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>University Degree</td>
<td>24</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Graduate Level</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Children under seven years old without school</td>
<td>5</td>
<td>7</td>
<td>10</td>
<td>8</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Note. Source: CODEPLAN/PISEF-DF. Only some cities of the Federal District are represented.

As a whole, the population of the Federal District has a low level of education. Of the population, 85% had access to education. Among them, 47% reached primary level and 23% reached secondary level. However, only 6% accomplished primary level and 14% accomplished secondary level. Even taking into account that these data include adults, adolescents, and children that still were in primary or secondary level, the educational situation in the Federal District is evidenced by the low number of those who reached higher levels of education. A total of 11% of the Federal District inhabitants have reached university level, but only 7% graduated. A very small portion of the population (1%) has reached graduate level. These data mirror the existing social and economic differences among Brasilia and the satellite cities, as evidenced by the data on the distribution of the family income.
In Brasilia, where the higher income prevails, more than 50% of the population reached secondary and higher education levels, including graduate degrees. Less than 2% is in the lower education level comprised of those who are illiterate or only know how to read and write. However, 23% of the population has abandoned school before completing elementary or middle school. As a city of contrasts, Brasilia shows an interesting characteristic: while 28% of the population has not reached secondary level, a similar amount (26%) has reached the highest degree.

Taguatinga has an impressive percentage of people who have completed the secondary level (18%), the same percentage found in Brasilia. Among the other satellite cities, Taguatinga holds the highest percentage of inhabitants who have reached secondary and higher educational levels (29%), which represents more than one quarter of the population. However, almost 50% of Taguatinga’s population (48%) is in the lowest level of education.

The other face of this reality is represented by the cases of those satellite cities where the lowest levels of education prevail. Among them is Gama, where only 11% have only learned how to read and write, which is the highest percentage among the cities included in this study. Moreover, 5% of the population is illiterate and 41% have dropped-out school before completing elementary or middle school. However, some contrasts are observed. A segment of 13% of the population has completed secondary level, and 16% have reached the highest level of education. These data are significant, in the context of the Federal District.

Ceilândia is somewhat similar to Gama. Approximately the same percentage of the population has completed secondary level (13%) and quit high school (9%). Although
the level of illiteracy is similar (5%), a higher percentage of the population (46%) has not finished the primary level. Finally, less than 1% of the population has a university degree.

Planaltina residents have the lowest level of education among the satellite cities involved in this study. Although Gama and Ceilândia also present similar levels of illiteracy (around 5%), in Planaltina, 63% of the population is at the lowest level of education. Only 12% of the population has reached the secondary or higher level of education.

**Brazilian Education System**

The present Brazilian education system is an outcome of the evolution of a historical process of educational development, within the wider panorama of the socio-political and economic history of the country. From 1549, when the Jesuits launched Brazil’s educational system, until today, education has been through periods of decline and expansion. It should be acknowledged that in recent decades, Brazil has taken some important steps forward in education, particularly taking into account the historically high rates of illiteracy and accelerated population growth. Illiteracy fell from 50% in 1950 to around 17% in 1995, because in the past the elderly did not have access to education. This decrease is associated with the increase in the school attendance rate—around 92% of school age children are enrolled in primary education compared with 36% in 1950. Approximately 85% of the population aged 15 and over is literate.

At present, the education system is organized in 5 levels that cover Infant Education (subdivided into nursery school, pre-school, and reading and writing class), Primary Education (4 years of Elementary school and 4 years of Middle School), Secondary Education (3 years), Higher Education (university level), and Graduate
Education (Master’s and Doctoral level). All levels of public education in Brazil (including higher education) are free of charge. However, there is no free public transportation for students.

According to the Law 5692/71, primary education in Brazil is compulsory for children between the ages of 7 and 14. The federal government has traditionally distributed schoolbooks and school meals as well as funds for the construction and repair of school buildings. By doing so, it has tried to provide at least the minimum conditions to increase children’s access to school. Moreover, local governments have tried to decrease the level of absenteeism by giving families financial aid to keep their children in school.

The educational picture in Brazil is very complicated because the Federal Union, the States, and local authorities, all have wide-reaching autonomy in the organization of the teaching systems. In addition, alongside the State schools, there is a broad network of private schools, particularly in Higher Education.

The school year begins in February, and children have a one-month break in July and a two-month break in December and January. At the beginning of each semester, parents can choose to enroll their children in the morning (7:30 a.m. to 12:30) or afternoon (1:30 to 6:30 p.m.). At night, most of the public schools are open for a third period, from 7 to 11 p.m., for teenagers and adults wishing to complete Primary or Secondary Education and prepare for the university entrance exam. In addition, these schools are used during free periods to promote adult literacy.

Students usually have lunch/dinner at their own homes. There is a break during school period for snack and social contacts. Public school students are served a
nourishing meal. For some children, this will be the only meal they will receive during the day — good motivation for parents to make sure their children attend school.

At the age of 6, public school children learn how to read and write, although in private schools children can begin as early as age 5. It is very common for middle class children to attend kindergarten before elementary school.

Subjects are defined by the curriculum, and there are no elective disciplines. Mathematics, Portuguese (grammar and composition), science, social studies, fine arts, and physical education (PE) are considered basic disciplines and are mandatory in elementary school. There is usually one main teacher who teaches these basic disciplines, while specialized teachers teach fine arts and physical education. After fourth grade, geography, history, and a second language (usually English) are added to the curriculum and specialized teachers teach each discipline. In private schools, other subjects can be offered, such as computer classes, music, and dance. It is also a widespread practice in these schools to offer a wide range of extracurricular activities, such as sports (soccer, swimming, karate, gymnastics, basketball and volleyball), ballet, fine arts, homework supervision, and remedial classes for math and Portuguese. Biology, chemistry, physics, and Portuguese Literature are also added to the curriculum and studied in depth in high school level.

After high school, students face a new challenge: the university entrance exam. It comprises all the main subjects: mathematics, Portuguese (grammar, literature, and composition), history, geography, chemistry, biology, physics, and a second language—English, French, or Spanish. The number of candidates is very high (some courses have
about 100 candidates per vacancy). It is common for students to enroll in a private one-semester preparatory course before taking the exams.

**Special Education: Gifted and Talented Program**

In 1971, Brasilia held the First National Conference on Gifted Children, in which educators from several States made important recommendations to the Minister of Education, for example, the need for early identification, special programs, and in-service training for teachers. At that time, a definition of gifted and talented children was established, according to that set forth by the U.S. Office of Education (Brasil, 1995):

Gifted and talented children are those who demonstrate high performance and/or high potential in any of the following areas, in isolation or combination: (a) general intellectual ability; (b) specific academic aptitude; (c) creative thinking; (d) leadership ability; (e) visual and performing arts; and (f) psychomotor ability. (p. 17)

In 1973, the *National Center of Special Education* – CENESP – was founded, whose purposes were twofold: a) to provide in-service for teachers; and b) to disseminate information regarding gifted students, ideal learning environments and existing gifted programs. In 1987, this Center was replaced by the Special Education Secretary—SEESP, which is directly linked to the Ministry of Education.

In 1977, as recommended by the II Congress on Giftedness in Rio de Janeiro, the Brazilian Association for the Gifted and Talented (ABSD) was founded. In subsequent years, until its dissolution in 2002, branches were created in several other States, such as Bahia, Minas Gerais, São Paulo, Espírito Santo, Rio Grande do Sul, and the Federal District. Every 2 years, a Congress on Giftedness was organized by the ABSD, and programs for the gifted and talented were presented and discussed.

In 1977, the Federal District organized a program about the special needs of gifted students to give technical support to institutions for the development of research,
identification, and education of these students. Lectures, courses, workshops for adults and children, conferences, newspapers, and guidelines were provided on a regular basis by the Federal District team, with the support of the Institute of Psychology at the University of Brasília.

In 1987, the Federal Council of Education created a special committee, formed by specialists from Rio de Janeiro, São Paulo, and Brasília, who could also count on the assistance of Dr. Erika Landau, from Tel-Aviv, Israel. The committee established procedures for the identification of gifted and talented students, suggesting the use of a variety of evaluative methods, such as: nomination by teachers, parents, and school specialists; achievement tests, creativity, intelligence, and specific aptitude tests. They also suggested alternatives to services, such as enrichment and acceleration procedures, special activity programs, individual and group activities, a more flexible curriculum, and special centers for the evaluation of gifted and talented students. Another suggestion was to encourage universities to conduct research in the field. These suggestions were added to the Law in 1987 (Brasil, 1987).

In 2003, as a result of the dissolution of the several branches of the Brazilian Association for the Gifted and Talented, the Brazilian Council for Giftedness – ConBraSD – was created in the Federal District. It is a Brazilian Non-Governmental Organization, representing national and international educators, researchers, and institutions, interested in the education of gifted and talented students.
The Gifted and Talented Program in the Federal District

The Educational Foundation of the Federal District – FEDF - in Brasília city is the branch of Government responsible for education in almost 600 public schools (kindergarten to high school).

The enrichment program of FEDF is offered only to public school identified students in grades 1-8. There is an experimental academic program for kindergarten children in Brasilia. Students attend regular school for one period of the day and the resource room for the other, for 4 hours, twice a week.

The enrichment program exists in six enrichment (or resource) classrooms: two in Brasília (one academic and two artistic classrooms) and one academic classroom in each of the following satellite cities: Taguatinga, Ceilândia, Planaltina, and Gama. There is one main teacher for grades 1-4, while specialized teachers work with Portuguese, Math, Sciences, and Fine Arts/Drama for grades 5-8. In Brasilia, there is also a music program, developed in the two artistic classrooms located in Park Schools for children in grades 1-8. All programs are conducted in urban public schools, but are independent of the school administration. Teachers hold classes in a resource room and may use other facilities, such as the library, science laboratory, and sports court.

Description of the Resource Rooms

The physical facilities of public schools in the Federal District follow a very similar design. Most of the schools are built with small flat blocks of masonry, painted yellow or white. They have white asbestos roofs, yellow iron doors and windows, cement floors, and white internal brick walls. The buildings are bound by small gardens, composed of bushes and typical native plants. High stone or bricks walls or iron fences
surround schools with the main gate opening to an internal parking lot, often with no asphalt. At the main gate, there is always a security guard, controlling students and visitors entering and exiting. Schools in satellite cities have, without exception, a couple of policemen patrolling the parking lot and the school entrance. All schools have a cafeteria, teachers' room, principal's room, school office, and copying room. Some of them also have a library, science laboratory, and auditorium. Most of them have a sports court for physical education.

The resource classrooms are, in general, of small or medium size, with little illumination or ventilation, and few pieces of furniture. A blackboard is on the front wall. Separate chairs and individual tables with white Formica tops are available.

Although sharing a similar design, each resource room is unique. The Brasilia resource room is the only class, in a public school, for handicapped children and adolescents. The area reserved for students with high academic ability has three separate rooms for different age groups, a small library, and a science laboratory. There are six teachers: one for kindergarten, two for grades 1-4, and three for grades 5-8. Approximately 31 students in grades 5-8 are taught math, Portuguese, and science. There are also rooms reserved for the team of psychologists and educators who work with the screening and diagnostic team for students who need special teaching.

Two schools that offer an arts program for regular public school students are called Park School. This program, available only in Brasilia city, offers classes of fine arts, drama, music, and physical education once a week for grades 1-4, and twice a week for grades 5-8. Park School occasionally offers clubs such as band, dance, folklore, photography, cartoon design, and chess. The South Park School was closed for
renovations during this study. The North Park School provided one room for the gifted program, where 13 students (grades 1-8) work together with three teachers (fine arts, drama, and music). There are a variety of materials for classes (such as canvas and paints, clay, paper of different sizes and textures, newspapers, scrap material, some musical instruments, clothes and other accessories for drama). The auditorium of the school is regularly used for rehearsals and plays. The resource room teachers may also use some of the school’s musical instruments. Students with exceptional abilities in music may attend the Brasília School of Music where they receive specialized training.

The resource room in Taguatinga is comprised of two adjoining rooms; one is reserved for grades 1-4, and the other for grades 5-8. Both rooms are shared with other classes, a steel cabinet separating them. Three teachers work together with 30 students in grades 5-8 teaching math, Portuguese, and sciences. One teacher in the academic program for grades 1-4 also works the artistically talented students in grades 5-8.

Ceilândia is the only school located in an outlying area of the city. The resource room is comprised of two connected rooms where three teachers (sciences, math/computer science, and fine arts) teach 18 students in grades 5-8. One teacher teaches Portuguese for the students in grades 1-8. It is the only resource room equipped with four computers and a printer. Although they are old models obtained through donations, they have been adapted by one of the teachers for the group’s needs and one of them is connected to the Internet. Some software was bought by the teachers or obtained by donations.

In Planaltina, the program for high ability students is implemented in two rooms: one for the academically talented students (grades 1-8) and one for students talented in
Fine Arts. Thirty-three students are separated in clusters of grades 1-4 and 5-8. Four teachers work with the students in sciences, Portuguese, mathematics, and fine arts. It is the only resource room in which a full-time psychologist works with group dynamics in all grades.

The Gama resource room was located in a school far from downtown. The room selected for the program was situated inside the library. Children had to maintain a low tone of voice and were not allowed to move freely. During this research study, the resource room was transferred to a large and modern school on the south side of the city. Three teachers alternate work with 12 students in grades 1-8. The room is divided in three sections for science/math, Portuguese, and fine arts.

The gifted and talented program has a few resources and equipment such as: sets of chess and board games, pencils, paints, easels, cardboards, books, magazines, newspapers, and some material for experiments. Teachers make most of the educational games.

*Description of the Program*

The program has the following objectives: a) to provide a special service to identified students; b) to guide the identification and diagnostic processes of potentially gifted students; and c) to expand, gradually, the specific service for gifted students (Fundação Educacional do Distrito Federal, 1990).

The program involves in-depth studies and enriched curriculum, as established by the document *Educational Service to the Gifted Student* (Fundação Educacional do Distrito Federal, 1990):

In-depth study focuses on concepts, principles, and problems of a subject, in a deeper and detailed way, and not just on knowledge and understanding levels.
Enrichment implies complementary and subsidiary information on a subject; exercises and activities that allow the application of the subject learned in practical situations; development of intellectual and motor abilities related to the subject. (Fundação Educacional do Distrito Federal, 1990, pp. 09)

**Identification Process**

The identification of gifted students is conducted by the diagnostic team of the Regional Teaching Board (one in Brasilia and one in each satellite city). The team comprises teachers with majors in Clinical Psychology and Pedagogy, under the technical coordination of the Special Teaching Division. It also involves principals; teachers (grade K- 8); itinerant teachers; specialists in music, fine and performance arts; parents and students.

The identification process is based on the students’ strengths in the following areas: intellectual, academic, creative, leadership, fine arts, drama, and music. Two instruments, *The Characteristic Scale* and the *Scale for Talent Evaluation* were developed by the Fundação Educacional do Distrito Federal to help this process. Parents and students are interviewed about students’ interests, school performance, social and family life. Students nominated in academic areas complete psychological tests (such as: Wechsler Intelligence Scale for Children – WISC; Raven’s Progressive Matrices; Columbia Mental Maturity Scale; Bender Visual Motor Gestalt Test). If a student is nominated in fine arts, performance and musical areas, the fine arts, performance or music specialist in Park Schools systematically observes the student for two months, and then completes the Scale for Talent Evaluation in each specific area.

The diagnostic team, if necessary, meets representatives of the Special Teaching Division for a case study. If the student is identified as gifted, the team completes an educational report (which is put on file), and they fill in a Synthesis Form with the
identification results. The Synthesis Form presents students' biographical data, general
information observed at the psychological and educational interviews, intellectual/artistic
aspects and the more obvious behavioral characteristics, areas of student's interest, level
of intellectual ability, school achievement, extra-curricular activities, and
recommendations. Then the Synthesis Form is forwarded to the Special Teaching
Division, to the regular school principal, where the student studies, and to the Resource
Room teachers where the student should receive specific service.

Specific Educational Service

Students identified as gifted participate in an In-Depth/Enrichment Study Group
in the resource room. The objective of this group is to provide gifted students
opportunities to further study subjects such as Portuguese, mathematics and sciences.
Teachers encourage students to pursue their talents and abilities. Teachers and students
also plan social-cultural field trips related to the in-depth studies.

In the resource room program, teachers act as facilitators in the students' learning
process. Enrichment teachers should facilitate students' learning; guide students'
projects; provide students with materials such as films, slides, lectures, and activities;
organize field trips and social-cultural programs; maintain communication with parents,
coordinator, itinerant teachers, and the Regional Teaching Board. The student chooses or
proposes activities that he/she wants to develop. Therefore, individual or small group
projects can be accomplished in the resource room, library, laboratory, or other suitable
setting, depending on the activity to be developed. If a student needs more advanced
opportunities in music or language areas, he/she is sent to the Brasília Music School,
Language Center, or other centers indicated by the Educational Foundation.
Itinerant teachers maintain a close link with personnel, parents, and students involved in the program. They provide regular school teachers and principals basic information about giftedness; guide teachers in the observation and recognition of the behavioral characteristics of a potentially gifted student; follow-up identified students and assist them as needed; and report annually the progress of gifted students in the program, making suggestions and recommendations.

The education coordinator provides training for personnel who work with gifted students during the school year: in-service training for beginners, and itinerant teachers; annual courses on gifted education; study groups; orientation and evaluation meetings with teachers who assist gifted students; seminars, congresses, and lectures.

Summary

This chapter presented some data about Brazil and its capital, Brasília, along with a description of the satellite cities and schools participating in this study. The major objective of this chapter was to offer information regarding the context in which the participants interacted, such as the physical, socioeconomic, and educational characteristics of these settings. Description of the Brazilian education system, information about the gifted and talented students programs in Brazil, the educational philosophy and identification process that guides the Federal District program were presented, clarifying some of the information students and teachers shared in this study.
CHAPTER FOUR

RESEARCH METHODOLOGY

Research Design

This study focused on: a) the relationship between intelligence and creativity tests scores of a specific group of Brazilian gifted and talented students; and b) the analysis of students’ and enrichment classroom teachers’ perceptions of intelligence and creativity. Given the research questions, a combination of quantitative and qualitative methods was used.

Quantitative Approach

For the purposes of this study, a correlational design was used to address the first research question. A correlational design is appropriate in circumstances where variables are very complex and do not lend themselves to controlled manipulation (Isaac & Michael, 1995). A correlational design aims to investigate the extent to which variations in one factor correspond to variations in other factors, without necessarily establishing cause-and-effect relationships between the variables. Among the advantages of a correlational approach is that it serves as a powerful exploratory tool; it does not require large samples; and it allows for the study of behavior in more realistic settings (Cohen & Manion, 1994), which are particularly suitable in this study.

The goal of the research question 1 was to provide quantitative data on the correlation between creativity and intelligence test scores among Brazilian gifted and talented students.
Qualitative Approach

Given the nature of the research questions 2 and 3, qualitative approaches were appropriate. Qualitative research, also called naturalistic inquiry model, has roots in the social sciences (e.g., sociology, psychology, and anthropology), humanities, and interdisciplinary studies, and its use has been widespread in education (Gall, Borg, & Gall, 1996). According to Strauss and Corbin (1990), qualitative methods can be used a) to reveal and comprehend what lies behind any phenomenon about which little is yet known (e.g., the behavioral characteristics of Brazilian gifted and talented students), b) to obtain novel and fresh perspectives on current knowledge (e.g., teachers’ and students’ perceptions of intelligence and creativity), and c) to give the complex details of phenomena that are difficult to communicate with quantitative methods (e.g., students’ and teachers’ perceptions of non-cognitive traits affecting giftedness). Within this process, the researcher becomes the main source of understanding and interpreting data in the actual environment (Lincoln & Guba, 1985).

In accordance with Lincoln and Guba (1985), the naturalistic paradigm in qualitative research is based on the following five axioms (or basic beliefs): a) there are multiple constructed realities that can be studied only holistically; b) the inquirer and the object of inquiry interact to influence one another; c) the aim of inquiry is to develop an idiographic body of knowledge in the form of working hypotheses that describe the individual case; d) all entities are in a state of mutual simultaneous shaping, so that it is impossible to distinguish causes from effects; e) inquiry is influenced by the inquirer values; the choice of the paradigm that guides the investigation into the problem; the choice of the substantive theory utilized to guide the collection and analysis of data and
interpretation of findings; the values that are intrinsic in the context; and congruence to produce meaningful results.

Miles and Huberman (1994) suggest some recurring features of naturalist research: a) qualitative research is conducted in situations that are reflexive of everyday life of individuals, groups, or organizations; b) the researcher’s role is to gain an integrated overview of the context under study; c) the researcher attempts to capture data on the perceptions of others through a process of empathetic understanding; d) the researcher may isolates themes and expressions used by informants, maintaining their original forms throughout the study; e) the researcher attempts to explain the ways people in particular settings understand and manage their day-to-day situations; f) interpretation of the material gathered is linked to theoretical approaches on grounds of internal consistency; and g) most analysis is done with words, broken into semiotic segments and organized to allow the researcher to contrast, compare, analyze and bestow patterns upon them.

According to Merriam (1988), qualitative case study is the ideal design for understanding and interpreting observations of educational phenomena. She defines qualitative case study as “an intensive, holistic description and analysis of a single entity, phenomenon, or social unit” (p. 16). Gall, Borg and Gall (1996) believe that the researcher must figure out how to view the phenomenon as the participants view it. Typically, this perspective can be obtained through direct observation of the participants as they behave naturally in the field, and through informal conversations with them. At the same time, case researchers generally maintain their own perspective as investigators
of the phenomenon. This perspective promotes conceptual and theoretical sense of the cases, which was essential in this study.

Merriam (1988) describes four essential properties of a qualitative case study: a) it is particularistic, focusing on a particular phenomenon, and conveying important revelations about the phenomenon and its significance; b) descriptive, providing a rich, "thick" description of the phenomenon under investigation, giving a complete, literal description of the incident or entity being studied; c) heuristic, bringing a more complete understanding of the phenomenon, giving to it new meaning, extending the reader's experience, or confirming what is known; d) and inductive, allowing for generalizations, concepts and hypothesis, discovering new relationships, perception, and understanding.

Qualitative case studies were used in this study for four main reasons: a) to eliminate biases that might result from relying exclusively on one data-collection method (Gall, Borg & Gall, 1996); b) to provide holistic and life-like information; c) to describe the real-life context in which an intervention has occurred (Merriam, 1988); and d) to locate perceptions and meanings people place on the events, processes, and structures of their lives, and connecting these meanings to the social world around them (Miles & Huberman, 1994). In this research, 13 cases were provided to offer critical information on teachers and students’ perceptions of creativity and intelligence in the cultural context of this study.

As previously noted, a qualitative research design allows multiple methods to collect data about a phenomenon, which can enhance the validity of case studies findings through triangulation. This process is described by Gall, Borg, and Gall (1996):

It is a process of using multiple data-collection methods, data sources, analysts, or theories to check the validity of case study findings.
Triangulation helps to eliminate biases that might result from relying exclusively on any one data-collection method, source, analyst, or theory (p. 574).

Miles and Huberman (1994) suggest achieving triangulation through the use of a combination of qualitative and quantitative approaches. Several reasons are appointed for the use of different methods in different components of a study: a) to expand the scope and breath of a study; b) enable corroboration of each method via triangulation; c) elaborate or develop analysis, helping validate, interpret, clarify and illustrate findings; and d) initiate new line of thinking and provide fresh insight. Firestone (as cited in Miles & Huberman, 1994) suggests that,

... one the one hand, quantitative studies “persuade” the reader through de-emphasizing individual judgment and stressing the use of established procedures, leading to more precise and generalizable results. On the other hand, qualitative research persuades through rich depiction and strategic comparison across cases, thereby overcoming the “abstraction inherent in quantitative studies.” (p. 41)

Lincoln and Guba (1985) propose that qualitative research emphasizes the following aspects to ensure validity (internal and external), reliability and objectivity: credibility (the way the study is conducted ensures the subject was accurately identified and described, increasing the probability that credible findings will be produced); transferability (the study should provide a wide range of information that can demonstrate the applicability of one set of findings to a different context); dependability (accounting for settings or situations in the study), and confirmability (stressing objectivity).

The credibility and transferability of this study were strengthened using a collection of varied and extensive data. The objectives were: to produce an in-depth understanding of the phenomenological object of study; to maximize the researcher’s ability to grasp students’ motives, beliefs, and interests; to provide opportunities to study
the students' environment; to understand the culture in a natural environment; to enhance the trustworthiness of this study. Field notes were kept of classroom observations and extracurricular events in the researcher's journal (Marshall & Rossman, 1995).

The researcher also examined students' academic records and profiles, and documents related to the program policies as well. Thorough description and adequate time spent in the field were also used to enhance credibility. The researcher included a complete description of the research process, so other researchers can replicate the study (Merriam, 1988).

**Sample**

A two-stage sampling procedure was used in this study. The first stage was the selection of participants from the total sample of gifted and talented students attending the enrichment program of Educational Foundation of Federal District (FEDF) and their resource room teachers. The second stage was the selection of a subsample of highly creative and/or highly intelligent students for case studies.

In May 1998, there were 26 resource room teachers (5 males, 21 females) in the program, which included 228 students (168 males, 60 females) enrolled in kindergarten through grade 8 across the centers. The number of teachers and students involved in the enrichment programs across grades 1-8 is presented in Table 4. There were 8 students in the kindergarten program (only in Brasília resource room), 133 in grades 1 to 4, and 141 in grades 5 to 8. In Park School (North), Planaltina, and Gama, teachers prefer to work with multi-age groups and organize the groups according to the activities. As nominations and assessments are continuous processes, the student population varies.
Table 4

Number of Teachers and Students in the FEDF Enrichment Program

<table>
<thead>
<tr>
<th>Place</th>
<th>Grade</th>
<th>Teachers' Gender</th>
<th>Students' Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Brasília</td>
<td>K</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1-4</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>5-8</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1-4</td>
<td>0</td>
<td>3 (a)</td>
</tr>
<tr>
<td>Park School North</td>
<td>4-8</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Park School South</td>
<td>5-8</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Satellites cities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taguatinga</td>
<td>1-4</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>5-8</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1-4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Ceilândia</td>
<td>5-8</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1-4</td>
<td>1 (a)</td>
<td>4 (a)</td>
</tr>
<tr>
<td>Planaltina</td>
<td>5-8</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Gama</td>
<td>1-4</td>
<td>0</td>
<td>3 (a)</td>
</tr>
<tr>
<td></td>
<td>5-8</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>5</td>
<td>21</td>
</tr>
</tbody>
</table>

Note. (a) Teachers work with students in levels 1-8

For the purposes of this study, gifted and talented students and their respective enrichment teachers had to meet one of the following criteria:

1) Students and their teachers were involved in grades 5–8;

2) Students attended the same program in grades 5–8, but were enrolled in another grade;

3) Teachers were part of a team in grades 1–8.

Therefore, participants in the first stage included 100 students, ages 9–17 (mean=12), grades 5 through 8, and 15 resource room teachers. Nine grade-4 were also
included in the students’ sample, because of advanced academic or artistic work (see Table 5). All parents completed informed consent forms giving permission to their children to participate in the study. (See Appendix A for the translated version of Parents’ Letter and Permission Form)

Table 5

Student Sample by Age, Grade and Resource Room

<table>
<thead>
<tr>
<th>Students</th>
<th>N</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>10</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>11</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>12</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>13</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>14</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>15</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>17</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>68</strong></td>
</tr>
<tr>
<td><strong>Grade</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>32</td>
<td>21</td>
</tr>
<tr>
<td>6</td>
<td>20</td>
<td>17</td>
</tr>
<tr>
<td>7</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td>8</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>68</strong></td>
</tr>
<tr>
<td><strong>Resource Room</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brasília</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Park School</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Ceilândia</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Taguatinga</td>
<td>27</td>
<td>17</td>
</tr>
<tr>
<td>Planaltina</td>
<td>27</td>
<td>18</td>
</tr>
<tr>
<td>Gama</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>68</strong></td>
</tr>
</tbody>
</table>
Most students (48%) qualified for the program based on their intellectual abilities, while 32% qualified based on their artistic abilities. Of the total sample, 20% of the students qualified in both areas. Of the sample, 32% were in the program for one year and 30% were in the program less than one year.

Most of the students (88%) live in a satellite city, according to the following distribution: 25% in Taguatinga, 3% in Ceilândia, 27% in Planaltina, 9% in Gama, and 24% in other satellite cities. Only 12% of the students live in Brasilia. One of the characteristics of the program is that children may attend the enrichment classroom closest to their home or parents' workplace. Therefore, most students (75%) live and study in the same city. Fifteen percent of the students involved in Brasilia’s resource room live in a satellite city, while 10% of students attend a program in one satellite city, but live in another satellite city. Only 5% of the sample lives in rural areas.

Table 6 shows the percentage of parents by education level and profession. The educational profile of the parents shows that 26% of fathers and 22% of mothers have reached the university level. A slightly larger percentage of mothers (32%) and fathers (27%) completed secondary level. Only 12% of fathers and 10% of mothers completed the primary level. A few mothers (3%) and fathers (1%) are illiterate. Table 6 also shows that most students' fathers (88%) and mothers (55%) have a job. Students report that, among the fathers, 29% work in the lower income group as service workers (e.g., guard, mechanic, electrician, bricklayer, gardener, driver); 22% work in the higher income group in the scientific, artistic or technical area (e.g., lawyer, journalist, psychologist, technician, taxi owner, nurse); 14% work as administrators (manager, bank clerk, accountant, secretary); 13% in commerce (e.g., salesperson, dealer, watchmaker,
merchant, store clerk); 10% work in military and civil (e.g., military, policeman, public servant, inspector). Among the mothers, most of them (42%) are housewives; 19% work as teachers; 12% work as service workers (e.g., dressmaker, hair dresser, manicure, waitress, housemaid); 8% work in the scientific, artistic or technical area (e.g., psychologist, journalist, computer technician, librarian); 6% work as military and civil worker (e.g., public servant, administrative agent); 5% work as administrators (manager, typist, secretary, clerk assistant); and 5% in commerce (e.g., storekeeper, salesperson).

Table 6

**Educational Level and Profession of Parents**

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Fathers</th>
<th>Mothers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Primary Level - Incomplete degree</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>Primary Level - Complete degree</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Secondary Level - Incomplete degree</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Secondary Level – Complete degree</td>
<td>27</td>
<td>32</td>
</tr>
<tr>
<td>University Degree</td>
<td>26</td>
<td>22</td>
</tr>
<tr>
<td>Not known</td>
<td>7</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Profession</th>
<th>Fathers</th>
<th>Mothers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service workers</td>
<td>29</td>
<td>12</td>
</tr>
<tr>
<td>Scientific, artistic or technical area</td>
<td>22</td>
<td>8</td>
</tr>
<tr>
<td>Administrators</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>Commerce</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>Military and civil</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Housewives</td>
<td>0</td>
<td>42</td>
</tr>
<tr>
<td>Teachers</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>Others (retired, deceased)</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Not known</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

Total: 100 100
Most students have no siblings in the program (83%), 14% have one sibling identified, and 3% have two or more siblings in the resource rooms. Most students (33%) are the youngest child in the family, although there are a large percentage of eldest children among them (30%), while 24% are the middle child, and 13% are the only child.

From the sample of 26 teachers in grades 5 – 8, 15 (14 female, 1 male) were selected for interviews (see Table 7). This sample was smaller than expected, due to staff changes. All selected teachers have higher education, and two of them hold two university degrees. Most teachers (67%) have more than 15 years of teaching experience in regular schools, while four teachers (27%) have 4 to 10 years of experience. Only one teacher (7%), who is also a psychologist, has no previous experience in teaching. Most of them (67%) have up to 3 years of teaching experience in resource rooms. Five teachers (33%) were in this program for more than 5 years, one has 10 years of experience.

Table 7

Teachers' Demographic Information

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Age</th>
<th>Resource Room</th>
<th>Teaching Experience</th>
<th>Years in Enrichment Classroom</th>
<th>Teaching Area</th>
<th>Academic Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice</td>
<td>26</td>
<td>Celiândia</td>
<td>7</td>
<td>3</td>
<td>Fine Arts</td>
<td>Artistic Education</td>
</tr>
<tr>
<td>Ana</td>
<td>44</td>
<td>Gama</td>
<td>22</td>
<td>2</td>
<td>Math/Sciences</td>
<td>Pedagogy &amp; Biology</td>
</tr>
<tr>
<td>Bernardo</td>
<td>39</td>
<td>Celiândia</td>
<td>12</td>
<td>10</td>
<td>Sciences/Math/Biology</td>
<td>Sciences-Biology</td>
</tr>
<tr>
<td>Cristina</td>
<td>44</td>
<td>Gama</td>
<td>21</td>
<td>5</td>
<td>Fine Arts</td>
<td>Artistic Education</td>
</tr>
<tr>
<td>Eliane</td>
<td>23</td>
<td>Brasília</td>
<td>4</td>
<td>1</td>
<td>Portuguese</td>
<td>Portuguese-Literatur-</td>
</tr>
<tr>
<td>Eulália</td>
<td>43</td>
<td>Taguatinga</td>
<td>17</td>
<td>3</td>
<td>Portuguese</td>
<td>Portuguese-Literatur-</td>
</tr>
<tr>
<td>Florinda</td>
<td>43</td>
<td>Taguatinga</td>
<td>9</td>
<td>0.5</td>
<td>Fine Arts/Drama</td>
<td>Artistic Education</td>
</tr>
<tr>
<td>Iara</td>
<td>46</td>
<td>Planaltina</td>
<td>23</td>
<td>5</td>
<td>Portuguese</td>
<td>Pedagogy</td>
</tr>
<tr>
<td>Irene</td>
<td>42</td>
<td>Planaltina</td>
<td>22</td>
<td>3</td>
<td>Portuguese</td>
<td>Pedagogy</td>
</tr>
<tr>
<td>Jandira</td>
<td>38</td>
<td>Planaltina</td>
<td>16</td>
<td>7</td>
<td>Fine Arts</td>
<td>Artistic Education</td>
</tr>
<tr>
<td>M. Graças</td>
<td>32</td>
<td>Planaltina</td>
<td>0</td>
<td>1</td>
<td>Psychology</td>
<td>Psychology</td>
</tr>
<tr>
<td>M. Isabel</td>
<td>37</td>
<td>Park School</td>
<td>20</td>
<td>1</td>
<td>Drama</td>
<td>Artistic Education</td>
</tr>
<tr>
<td>Orlanda</td>
<td>44</td>
<td>Gama</td>
<td>20</td>
<td>7</td>
<td>Portuguese</td>
<td>Portuguese-Literatur-</td>
</tr>
<tr>
<td>Renata</td>
<td>41</td>
<td>Park School</td>
<td>27</td>
<td>not informed</td>
<td>Music</td>
<td>Portuguese-Literatur- Music-masters degree</td>
</tr>
<tr>
<td>Suzana</td>
<td>50</td>
<td>Park School</td>
<td>22</td>
<td>2</td>
<td>Fine Arts</td>
<td>Artistic Ed. &amp; Music</td>
</tr>
</tbody>
</table>


In the second stage of the sampling procedure, a purposive sample of 22 highly creative and/or highly intelligent students was selected from interview. The objectives of the purposive sample (Gall, Borg, & Gall, 1996) in this study were threefold: a) to achieve an in-depth understanding of selected individuals; b) to increase the scope or range of the data collected; c) to collect thick, rich descriptions of the participants’ perceptions related to research questions 2 and 3.

To select a purposive sample of highly creative and/or highly intelligent students for the interviews, the following criteria were used:

1) Student’s intelligence score was at percentile 95 or higher on the Raven’s SPM test, corresponding to Level 1 (< 95 = superior intelligence); or

2) Student’s creativity score was D (above average) or higher level on the TCT-DP.

Of the students, 58 met the criteria. Teachers contacted students and 22 were available for the interviews. Among them, 13 students were selected for multiple case studies. According to Miles and Huberman (1994),

Samples in qualitative studies are usually not wholly specified, but can evolve once fieldwork begins. Initial choices of informants lead you to similar and different ones; observing one class of events invites comparison with another; and understanding one key relationship the setting reveal facets to be studied in others. This is conceptually-driven sequential sampling. (p. 27)

**Instruments**

**Intelligence Test**

Students’ intelligence was assessed by the Raven’s Progressive Matrices, Standard form – SPM (Raven, 1938/1998), adapted, and translated for a Brazilian population. It is presented in a book format and consists of 60 problems (or matrices) in five sets of twelve, representing arrangements of design elements into rows and columns with a missing part. The task is to choose the missing insert from given alternatives. As
items become progressively more difficult, they involve analogies, permutations, and alternations of patterns, and other logical relations as well.

The standard response sheet is quickly scored by using a pattern-scoring key. Total score equals the number of correct answers. Scores can be transformed to percentiles ranks, according to the students' age and grade. The manual suggests the use of eight levels: Level 1 \((x \geq 95 = \text{superior intelligence})\); Level 2+ \((90 \leq x < 95 = \text{distinctly above average intelligence})\); Level 2 \((75 \leq x < 90 = \text{above average intelligence})\); Level 3+ \((50 \leq x < 75 = \text{average intelligence})\); Level 3- \((25 \leq x < 50 = \text{average intelligence})\); Level 4 \((10 \leq x < 25 = \text{below average intelligence})\); Level 4- \((5 < x < 10 = \text{distinctly below average intelligence})\) and Level 5 \((x \leq 5 = \text{indication of mental deficiency})\). The test takes about 45 minutes.

Reliability coefficients in groups of older children and adults range, in general, from .70 to .90, falling considerably below these values at lower score ranges. According to Anastasi and Urbina (1997), factor analyses suggest that the Raven's Progressive Matrices test is heavily loaded with a factor common to most intelligence measures, Spearman's \(g\) or general intelligence. Correlations ranging between .40 and .75 can be found with the Raven's verbal and performance intelligence tests. Correlations tend to be higher with performance than verbal tests.

Raven's Progressive Matrices was selected because it is widely used and recommended for research on the identification of gifted students (Matthews, 1988; Mills & Tissot, 1995). It is also widely used in Brazil and the norms table presents data for Brazilian samples.
Creativity Test

The Test for Creative Thinking – Drawing Production – TCT-DP (Urban & Jellen, 1996), Form A and B, assessed students’ figural creative thinking ability. Both tests include six figural segments to stimulate drawing in a free, open way. These segments are: semi-circle; point; large right angle; curved line; broken line; and a small open square outside the large square frame.

Instead of concepts, symbols, or holistic figures, Urban and Jellen (1996) decided to use figural fragments, which included only vague, conventional meanings, allowing for flexibility in responses. Investigating drawings from gifted and talented student populations and persons of various age and ability levels, from various countries, Urban and Jellen (1996) conclude that...

...the simple, basic, unique design gives rise to a multitude of differing creative responses.... At the same time, the given figural fragments have enough suggestibility to trigger more stereotypical responses from students with lower degrees of creativity. (pp. 11-12)

Instruction was given to participants according to TCT-DP testing manual:

In front of you is an incomplete drawing. The artist who started it was interrupted before he or she actually knew what should become of it. You are asked to continue with this incomplete drawing. You are allowed to draw whatever you wish! You can’t draw anything wrong. Everything you put on the paper is correct. When you finish your drawing, please, give me a sign, so that I can take it. If you know a name or a title or a theme for your drawing, please, write it above your drawing. (pp. 14-15)

As time was a critical factor for the evaluation, it was strictly monitored. Students were asked to write down the beginning time at the right corner of the test sheet. As soon as they finished the Form A, they hand it to the researcher for recording the ending time and receiving the Form B. After 15 minutes, they were advised to finish their work.

The drawing production was evaluated according to 14 characteristics:
1) Continuation (any use, continuation, or extension of the six given figural fragments).

2) Completion (any additions, completions, complements, supplements made to the used, continued, or extended figural fragments).

3) New elements (any new figure, symbol, or element).

4) Connections made with a line (connections between one figural fragment or figure and another).

5) Connections made to produce a theme (any figure contributing to a compositional theme or "gestalt").

6) Boundary breaking that is fragment dependent (any use, continuation, or extension of the "small open square" located outside the square frame).

7) Boundary breaking that is fragment independent (extensions and elements that break the boundaries of the "large square frame").

8) Perspective (any breaking-away from two-dimensionality).

9) Humor and affectivity (any drawing that elicits a humorous response, affection, emotion, or strong expressive power).

10) Unconventionality A (any manipulation of the material).

11) Unconventionality B (any surrealistic, fictional, and/or abstract elements or drawings).

12) Unconventionality C (any usage of symbols or signs).

13) Unconventionality D (usage of non-stereotypical, unconventional figures).

14) Speed (a breakdown of points, beyond a certain score-limit, according to the time spent on the drawing production).
Points for the 14 categories were recorded. Zero to 6 points can be attributed to any use of the fragments in categories 1 to 9 and 14, and 0 or 3 points in categories 10 to 13. A total, final score allows for a global factor that reflects a holistic concept of creative thought. The maximum total point value of the TCT-DP is 72 points, and scores can be transformed into percentile ranks or T-scores. Tables are available according to age, grade, or special school groups. In this study, the age and grade tables were used for comparisons. For the purpose of a rough classification of the results, a screening-classification scheme provides for seven groups: A (far below average); B (below average); C (average); D (above average); E (far above average); F (extremely high above average) and G (phenomenal). The classification group E, F, and G include the upper 10%, and groups F and G the upper 2.5%.

Urban and Jellen (1996) reported coefficients within a range of .89-.98 for the reliability of the scores. The authors also reported the use of this instrument in various countries and cultures (such as Germany, Poland, Hungary, Australia, USA, England, Philippines, Nigeria, Zimbabwe, People’s Republic of China, and South Africa), with data supporting satisfactory reliability and validity. A comparison of TCT-DP scores with IQ scores in several studies conducted by various researchers resulted in a zero (or non-significant) correlation, which may support the test’s validity. For example, the authors reported the Wolanska and Nečka’s 1990 study, where a non-significant correlation ($r=.14$) was obtained, in a group of Polish gifted and talented students, between the TCT-DP and Raven’s Progressive Matrices (Urban & Jellen, 1996). Another study, reported by the authors, assessed validity through the rating and judging by teachers. In this study, teachers were asked to rank their students according to their creativity. Significant
correlation coefficients were found, ranging from .44 to .82, between the TCT-DP and the teachers' assessment, although the authors recommend caution in interpreting these results (Urban & Jellen, 1996, p. 51).

The Test for Creative Thinking - Drawing Production was selected in this study for several reasons. It is a non-verbal, culture-fair instrument that has been subjected to validity and reliability tests. It also can be presented in a friendly, relaxed, interested, and low-threat atmosphere, especially suitable for working with young adolescents. The TCT-DP requires about 15 minutes or less for administration. Scoring and interpreting results of each form takes another 1 to 3 minutes.

This TCT-DP was administered by the researcher and supervised by an external trained researcher to ensure accuracy of the scoring and interpretation of the results.

Assessment Procedures

The researcher administered creativity and intelligence tests in groups, which varied from 2 to 12 students. All sessions followed a systematic procedure: the researcher introduced herself to the students, talked about the purposes of the research study, and students were asked to work alone and quietly, trying not to disturb others. Teachers were free to stay in the room, if they wished. An Individual Record Form, created by the researcher, was utilized for gathering demographic data regarding students' age, school, grade, gender, resource room, date of entrance to the program, home address, profession, and educational level of primary caretakers, birth order, and number of siblings at the program (see Appendix B for a translated version). After completing the demographic data form, the creativity test, Forms A and B, was administered according to the manual (Urban & Jellen, 1996). Students who finished sooner than others could engage in other
quiet activity (e.g., reading, chess or drawing), while waiting for others to complete tasks. Systematic instructions for the intelligence test were given right after completion of the creativity test, according also to the manual (Raven, 1938/1998). After the administration of the tests, the researcher spent time talking freely with the students. The overall climate during the sessions was relaxed and open to students’ questions and comments.

**Interviews**

Semi-structured interviews were conducted to identify students and teachers’ perceptions about creativity, intelligence, and giftedness. Becoming more familiar with the participants’ perceptions facilitated the researcher’s ability to see the world of school from their perspectives. All interviews were tape-recorded and transcribed, and additional observations made by the researcher during the interviews were noted. Participants were assured confidentiality and anonymity of their responses at the interview.

**Teachers’ Interviews**

Semi-structured interviews (see protocol interview in Appendix C for a translated version) were scheduled and conducted with a subsample of 15 teachers in grades 5 to 8. Teachers’ interviews lasted from 1 to 2 hours, depending on the teachers’ involvement with the subject. During the interview time, six areas were explored: a) teachers’ professional data (academic background, professional experience and training in gifted and talented area); b) self-perception and personality traits; c) motivation to teach in the program and challenges offered to their students; d) perception of creativity; e) perception of intelligence; and f) perceptions of giftedness. Teachers were also asked to make comments about their most motivated, creative, and intelligent students.
Students’ Interviews

Semi-structured interviews (see translated protocol interview in Appendix D) were scheduled and conducted with 22 students (highly creative and/or highly intelligent). Students’ interviews lasted about 45 minutes. During this time, six areas were explored: a) self-perception and personality traits; b) school areas: strengths and weaknesses; c) motivation to excel; d) perception of creativity; e) perceptions of intelligence; f) perception of giftedness. All interviews were tape-recorded and transcribed, and additional observations made by the researcher during the interviews were noted.

In addition to the interviews, four other instruments were translated to Portuguese by the researcher and utilized for gathering additional data about the students: a) Total Talent Portfolio (Renzulli & Reis, 1997); b) The Self-Perception Profile for Children (What I am like and How important are these things to how you feel about yourself as a person) (Harter, 1985); c) The Learning Styles Inventory (Renzulli, & Smith, 1978); and d) Scales for Rating the Behavioral Characteristics of Superior Students - SRBCSS (Renzulli, Smith, White, Callahan, & Hartman, 1976).

Total Talent Portfolio

The Total Talent Portfolio – TTP (Renzulli & Reis, 1997) focuses on students’ abilities, interests, and learning styles. In this study, TTP was used to gather information on students’ strength areas, level of performance in areas of aptitude, interests, and instructional styles preferences.
The Self-Perception Profile for Children

This instrument (What I am like and How important are these things to how you feel about yourself as a person) (Harter, 1985) assessed children’s judgments about their competence and worth as a person. The instrument (the students’ version is entitled “What I am like”) contains 36 items, tapping five specific domains (scholastic competence, social acceptance, athletic competence, physical appearance, and behavioral conduct) and a sense of a global self-esteem or self-worth. Scholastic competence refers to the child’s perception of his/her competence or ability within the realm of scholastic performance. Social acceptance concerns the degree to which the child is accepted by peers or feels popular. The items in athletic competence refer to content relevant to sports and outdoor games. Physical appearance concerns the degree to which the child is happy with the way he/she looks. Behavioral conduct refers to the degree to which children like the way they behave, do the right thing, act the way they are supposed to and avoid getting into trouble. And global self-worth taps the extent to which the child likes oneself as a person, is happy the way one is leading one’s life, and is generally happy.

Items are presented in two opposing sentences describing characteristics of a child (e.g., “Some kids feel that they are very good at their school work” BUT “Other kids worry about whether they can do the school work assigned to them”). The child is first asked to decide which sentence is most like him or her, and then asked whether this is only sort of true or really true for him or her. The items are scored on a scale from 1 to 4, where a score of 1 indicates low perceived competence and a score of 4 reflects high-perceived competence.
This instrument also includes a separate procedure for rating the importance of items: "How important are these things to how you feel about yourself as a person?" The scale is presented in the same format as "What I am like" and contains 10 items reflecting the same domains. The child is also asked to check the statement that is more like him/her (e.g., "Some kids think it is important to do well at schoolwork in order to feel good as a person" BUT "Other kids don't think how well they do at schoolwork is that important"). The procedure involves calculating the discrepancy between a child's competence/adequacy judgments on The Self-Perception Profile and his/her judgments on the importance of each of the five domains. According to Harter (1985),

If the child is competent at areas judged important, then there will be little discrepancy and the child should have an accompanying self-worth score that is high. In contrast, if the child feels that certain domains are very important, but that his or her competence levels are low in this area, there would be a discrepancy between importance and competence, a discrepancy that should result in low self-worth. (p. 24)

A qualitative look at the way students perceive themselves adds interesting information, facilitating the researcher's ability to see the world from their perspective.

Learning Styles Inventory

The Learning Styles Inventory - Student Form (LSI) (Renzulli, & Smith, 1978) is designed to measure students' preferences for particular modes of instruction within the classroom. The inventory is composed of 65 items referring to nine instructional strategies most preferred by individual students as they interact with curriculum material:

1) Projects (e.g., working with other students on a project with little help from the teacher).

2) Drill and Recitation (e.g., giving answers out loud to questions asked by the teacher).
3) Peer Teaching (e.g., having a friend help you learn material you are finding difficult to understand).

4) Discussion (e.g., having a class discussion on a topic suggested by the teacher).

5) Teaching Games (e.g., playing a board game that helps you practice one of your school subjects);

6) Independent Study (e.g., studying on your own to learn new information).

7) Programmed Instruction (e.g., working on assignments where you fill in the missing word to complete a sentence).

8) Lecture (e.g., hearing the teacher explain new information).

9) Simulation (e.g., being a member of a panel that discusses how to solve classroom problems).

Items are organized in the form of a Likert-type questionnaire, coded in the following manner: 4 = Really like; 3 = Like; 2 = Not sure; 1 = Dislike; 0 = Really dislike. Students check the number corresponding to the way they feel about each activity. In this study, LSI was used qualitatively to gather information about the ways the selected group of students would like to pursue various learning experiences.

_Scales for Rating the Behavioral Characteristics of Superior Students_

The Scales for Rating the Behavioral Characteristics of Superior Students – SRBCSS (Renzulli, Smith, White, Callahan, & Hartman, 1976) is an objective and systematic instrument developed to guide teacher judgment in the identification process. It was designed to be a supplementary source used in conjunction with other criteria in the process of identifying gifted, talented, and creative youth. In this study, this instrument was used to obtain teachers' judgments of students' characteristics on 9
dimensions: learning, motivation, creativity, leadership, art, drama, communication (precision and expressiveness), and planning. The 95 items presented across the dimensions were derived from the research literature dealing with characteristics of gifted and creative persons. The teacher's task is to read carefully each statement and place an X in the appropriate box according to the frequency the characteristics cited are observed in particular students. The specific response options are: a) seldom or never; b) occasionally; c) to a considerable degree; and d) almost all the time.

Separate scores for each of the 9 dimensions can be obtained easily, revealing students' special abilities areas. For the purposes of this study, the SRBCSS was used to identify teachers' perceptions of students' behavioral characteristics.

**Data Analyses**

*Correlational Analysis*

Statistical Package for the Social Sciences (SPSS, 1999) software program was used to screen the data and analyze research question 1. Normality, linearity, and homogeneity of variance were checked for the measures of creativity and intelligence. Because all assumptions of Pearson correlation were met, no transformations were needed. Correlational analyses were used to address the research question 1. A Pearson product-moment correlation coefficient was computed to determine the magnitude and the degree of the relationship between intelligence and creativity test scores. A Pearson product moment correlation was interpreted for possible statistical and practical significance. Effect size was calculated for the 100 students using $r^2$ (Shavelson, 1996).
Qualitative Analysis

To address research questions 2 and 3, qualitative and quantitative procedures were used to analyze data from the interviews. The individual was the unit of analysis for this study. The collected data were analyzed using the case study method of analysis (Cohen & Manion, 1994; Merriam, 1988, Miles & Huberman, 1994).

Responses were coded and categorized according to techniques suggested by Miles and Huberman (1994) and analyzed for patterns and themes. Miles and Huberman distinguish three major operations in data analyses: data reduction, data display, and conclusions drawing/verification. Data reduction is a form of analysis that selects, focuses, simplifies, abstracts, and transforms data from transcripts and field notes. Three main processes were used in this study: a) Coding. It is the process of reviewing field notes, dissecting them in a meaningful way, and reflecting upon them, while keeping the relations between the parts intact. Coding involves assigning units of meaning – codes – to the descriptive or inferential information compiled during a study; categorizing them; and clustering the segments relating to a particular research question, hypothesis, construct, or theme; b) Pattern coding. It refers to explanatory or inferential codes that identify an emergent theme, configuration, or explanation. Pattern coding reduces amounts of data into a smaller number of analytic units; helps the researcher elaborate a more integrate schema for understanding local incidents and interactions; and lays the groundwork for cross-case analysis by surfacing common themes and directional processes; c) Sequential analysis. It involves condensing organized units into narratives or cases synopses, disclosing the essential in each person's experience; looking across a
data set within single or multiple cases; compacting descriptions of the most common characteristics of transcriptions; and integrating theories in an explanatory framework.

Data display is a form of analysis that compresses and orders data to permit drawing coherent conclusions. Data display (e.g., matrices and networks) is useful in exploratory work; helps the researcher against the overload and potential for bias that appears in analyzing extended amount of text; helps in understanding the flow and sequence of events and processes; and emphasizes variables and their interaction.

Conclusion drawing and verification is the third form of analysis proposed by Miles and Huberman (1994). It refers to the process of noting regularities, patterns, explanations, possible configurations, causal flows, and propositions. The use of several tactics is focused on confirming or verifying meanings and initial conclusions, avoiding bias, and assuring the quality of conclusions.

**Summary**

This chapter described the research methodology employed in this study. A combination of quantitative and qualitative methods was used to address two major topics: a) the relationship between intelligence and creativity tests scores of a specific group of Brazilian gifted and talented students; and b) the analysis of students’ and enrichment classroom teachers’ perceptions of intelligence and creativity. A correlational design was used in the quantitative study to investigate the extent to which variations in one construct (intelligence tests scores) correspond to variations in the other construct (creativity tests scores). A qualitative approach was used to describe the behavioral characteristics of a group of Brazilian gifted and talented students; to obtain knowledge on teachers’ and students’ perceptions of intelligence and creativity; and to clarify
students' and teachers' perceptions of non-cognitive traits affecting giftedness (such as personality traits and self-concept). The sampling procedure used for selection of participants of this study and biographical data of the participants were presented. Assessment procedures included creativity and intelligence tests; instruments for estimating students' abilities, interests, learning styles self-concept, and behavioral characteristics; interviews; and analysis of documents, field notes and school documents. Data were analyzed using a Pearson product-moment correlation coefficient for the first research question; and Miles and Huberman's (1994) suggestions for coding and categorizing responses were used to address research questions 2 and 3.
CHAPTER FIVE

RESULTS

In this chapter, the results of the study are presented. This study focused on: a) the relationship between intelligence and creativity tests scores of Brazilian gifted and talented students; b) the analysis of students’ and resource room teachers’ perceptions of intelligence and creativity.

To address research question 1, a correlational design was used as an exploratory tool to investigate the extent to which variations in one factor (intelligence test scores) correspond to variations in other factor (creativity test scores) among Brazilian gifted and talented students.

To address research questions 2 and 3, qualitative and quantitative techniques were used in an attempt to map out the richness and complexity of data by studying them from several perspectives. Core categories emerged from field notes, classroom observations, school documents, interviews, tests, and rating scales. Cross-case analysis was used to see processes and outcomes across many cases; to develop more sophisticated descriptions; and to formulate powerful explanations (Miles & Huberan, 1994), enhancing the description of the real-life context in which this study occurred.

Research Question 1

*What is the relationship between intelligence test scores and creativity test scores of identified gifted and talented students in Brazil?*

The Statistical Package for Social Sciences (SPSS, 1998) was used for screening data and subsequent analyses. A Pearson product-moment correlation coefficient was computed to investigate the relationship between the scores from Raven’s Progressive
Matrices, Standard form – SPM (Raven, 1938/1998) and the Test for Creative Thinking - Drawing Production - TCT-DP (Urban & Jellen, 1996). Assumptions of normality, linearity, and homogeneity of variance were satisfactory. No outliers were identified in this study.

The analyses indicated a positive, significant correlation ($r=.21$, $p<.05$) between intelligence test scores and creativity test scores for the total sample ($n=100$) (see Table 8). The effect size was $0.04$, which is considered small for correlational analysis, according to Cohen (1988).

Table 8

Pearson Correlations for Intelligence and Creativity Test Scores

<table>
<thead>
<tr>
<th></th>
<th>Raven’s SPM</th>
<th>TCT-DP Form A</th>
<th>TCT-DP Form B</th>
<th>TCT-DP Composite (A+B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raven’s SPM</td>
<td>1</td>
<td>.20*</td>
<td>0.16</td>
<td>.21*</td>
</tr>
<tr>
<td>TCT-DP Form A</td>
<td>.20*</td>
<td>1</td>
<td>.56**</td>
<td>.88**</td>
</tr>
<tr>
<td>TCT-DP Form B</td>
<td>0.16</td>
<td>.56**</td>
<td>1</td>
<td>.89**</td>
</tr>
<tr>
<td>TCT-DP Composite (A+B)</td>
<td>.20*</td>
<td>.88**</td>
<td>.88**</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. $N=100$. * $p<.05$ ** $p<.01$

Correlational analyses were also conducted with two sub-samples: a) 35 students who performed above the 95th percentile on the Raven’s test; and b) 65 students who performed equal or below the 95th percentile on the same test. No significant correlations were found between intelligence and creativity tests scores obtained by either students who performed above ($r=.24$; $p>.05$) or below ($r=.21$; $p>.05$) the 95th percentile on the Raven’s test.
Research Question 2

*How do identified gifted and talented students and their teachers perceive students' creative and intellectual abilities?*

To address this research question, four instruments were translated into Portuguese by the researcher and utilized for gathering additional data about the students’ creative and intellectual abilities: a) Total Talent Portfolio (Renzulli & Reis, 1997); b) The Learning Styles Inventory (Renzulli, & Smith, 1978); c) The Self-Perception Profile for Children (Harter, 1985); and d) Scales for Rating the Behavioral Characteristics of Superior Students – SRBCSS (Renzulli, Smith, Callahan, White & Hartman, 1977). Prior to the interviews, students were asked to complete the first three instruments under the resource room teacher’s supervision. Completed Total Talent Portfolios were used during interviews to discuss students’ strengths and weaknesses, highlighting their abilities, interests, and style preferences. Teachers completed the Scales for Rating the Behavioral Characteristics of Superior Students – SRBCSS.

This section is divided in two parts. The first part comprises teachers’ perceptions of students’ behavioral characteristics. The second part describes the major findings related to students’ perceptions of their cognitive characteristics: abilities, interests, and learning styles; personality variables; and creative and intellectual characteristics.

*Teacher’s Perceptions of Students’ Cognitive Characteristics*

Among the purposive sample of 22 highly creative and/or highly intelligent students and their teachers (N=15) interviewed for this study, 13 students were selected for cross-case analysis, as data saturation was reached. According to Merriam (1988),

The final product of a case study is shaped by the data that are collected and the analysis that accompanies the entire process. Without ongoing analysis,
one runs the risk of ending up with data that are unfocused, repetitious, and overwhelming in the sheer volume of material that needs to be processed. (p. 124)

The first part of this section includes case studies of these students based on the results of the Scales for Rating the Behavioral Characteristics of Superior Students – SRBCSS and teachers’ interviews. Data from teachers’ perceptions of students’ cognitive characteristics were analyzed. The objectives were: to produce an in-depth understanding of the teachers’ perceptions of students’ behavioral characteristics; to maximize the researcher’s ability to comprehend students’ motives, characteristics and interests; to provide opportunities to study the students in the real-life context in which this study occurs; to understand the culture in a natural environment; and to enhance the trustworthiness of this study.

The creative and intellectual abilities of these 13 students were analyzed according to their scores on creativity and intelligence tests. Table 9 presents creativity and intelligence test scores of students on both Urban and Jellen’s TCT-DP (composite) and Raven’s SPM. Eight students scored above average (D – F) at TCT-DP. Four of these students obtained the highest scores (F; percentile ranks 97.5th – 99th) which places them among the upper 2.5% highly creative students.

The range of intelligence scores at SPM among this group varied from 90th (which corresponds to Level 2+, medium intelligence) to equal or above 95th (Level 1, superior intelligence). Eight students scored at Level 1 and were placed among the upper 1% group. Only one student (Lídia) of the upper 2.5% highly creative was also classified at the upper 1% (equal or above the 95th percentile) group. Only one student (Rubens) of the upper 1% highly creative group scored at Level 3+ (average level) of intelligence.
Table 9

Students' Creativity and Intelligence Test Scores on the SPM and TCT-DP

<table>
<thead>
<tr>
<th>Students n=13</th>
<th>TCT-DP (A+B) Classification</th>
<th>Raven - SPM Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lídia</td>
<td>F</td>
<td>95</td>
</tr>
<tr>
<td>Cadu</td>
<td>F</td>
<td>90</td>
</tr>
<tr>
<td>Dino</td>
<td>F</td>
<td>90</td>
</tr>
<tr>
<td>Rubens</td>
<td>F</td>
<td>50</td>
</tr>
<tr>
<td>Henrique</td>
<td>E</td>
<td>95</td>
</tr>
<tr>
<td>Dunga</td>
<td>D</td>
<td>95</td>
</tr>
<tr>
<td>Caio</td>
<td>D</td>
<td>90</td>
</tr>
<tr>
<td>Sena</td>
<td>D</td>
<td>90</td>
</tr>
<tr>
<td>Alex</td>
<td>C</td>
<td>95</td>
</tr>
<tr>
<td>Jair</td>
<td>C</td>
<td>95</td>
</tr>
<tr>
<td>Túlio</td>
<td>C</td>
<td>95</td>
</tr>
<tr>
<td>Leandro</td>
<td>B</td>
<td>95</td>
</tr>
<tr>
<td>Emília</td>
<td>A</td>
<td>95</td>
</tr>
</tbody>
</table>

Table 10 presents an overview of the teachers' estimates of the students' characteristics (n=13) rated by the resource room teachers on the SRBCSS: Learning, Motivation, Creativity, Leadership, Artistic, Dramatics, Communication/Precision, Communication/Expressiveness, and Planning. Students' scores reflect the degree to which teachers observed the presence of each dimension. In some cases, more than one teacher completed the scale for the same student; they discussed their individual results and then provided one set of ratings.
Table 10

Students’ Characteristics Rated by the Resource Teachers on SRBCSS

<table>
<thead>
<tr>
<th>Students</th>
<th>Learning</th>
<th>Motivation</th>
<th>Creativity</th>
<th>Leadership</th>
<th>Artistic</th>
<th>Dramatics</th>
<th>Precision</th>
<th>Expressiveness</th>
<th>Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=11</td>
<td>32</td>
<td>36</td>
<td>40</td>
<td>40</td>
<td>44</td>
<td>40</td>
<td>44</td>
<td>16</td>
<td>60</td>
</tr>
<tr>
<td>Alex</td>
<td>26</td>
<td>26</td>
<td>34</td>
<td>36</td>
<td>33</td>
<td>40</td>
<td>33</td>
<td>15</td>
<td>40</td>
</tr>
<tr>
<td>Cadu</td>
<td>21</td>
<td>25</td>
<td>22</td>
<td>34</td>
<td>38</td>
<td>15</td>
<td>32</td>
<td>5</td>
<td>53</td>
</tr>
<tr>
<td>Caio</td>
<td>28</td>
<td>29</td>
<td>34</td>
<td>39</td>
<td>30</td>
<td>35</td>
<td>30</td>
<td>13</td>
<td>58</td>
</tr>
<tr>
<td>Dino</td>
<td>22</td>
<td>33</td>
<td>33</td>
<td>39</td>
<td>29</td>
<td>36</td>
<td>28</td>
<td>9</td>
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</tr>
<tr>
<td>Dunga</td>
<td>28</td>
<td>25</td>
<td>33</td>
<td>28</td>
<td>24</td>
<td>26</td>
<td>29</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>Emília</td>
<td>21</td>
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<td>Henrique</td>
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<td>Jair</td>
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<td>30</td>
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<td>Leandro</td>
<td>32</td>
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<td>17</td>
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<tr>
<td>Lídia</td>
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<td>28</td>
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<td>24</td>
<td>27</td>
<td>17</td>
<td>36</td>
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<td>Rubens</td>
<td>21</td>
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<td>27</td>
<td>43</td>
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<td>Sena</td>
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<td>Túlio</td>
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<td>27</td>
<td>34</td>
<td>32</td>
<td>16</td>
<td>42</td>
</tr>
</tbody>
</table>

| N        | 26.0     | 26.1       | 20.6       | 33.5       | 31.5     | 27.4      | 33.8      | 11.4           | 44.2     |

All students were rated above the mean in two or more areas. Six students (Henrique, Jair, Alex, Caio, Sena, and Dino) were rated above the mean in five or more areas. Two students (Henrique and Jair) were rated above the mean in all areas. Five students (Henrique, Sena, Túlio, Alex, and Leandro) reached the highest possible score in one or two areas (Expressiveness, Learning, Dramatics, and Leadership).

It is worthwhile to note that the four students who scored highest on Urban and Jellen’s creativity test (Lídia, Cadu, Dino, and Rubens) were not rated high in Creativity by their teachers on the SRBCSS. In fact, among them, only Dino was rated above the mean in the Creativity scale.

Students who received the highest teachers ratings on the Learning scale by their teachers (Leandro, Túlio, Henrique, and Jair) scored at Level 1 on the Raven’s intelligence test. Conversely, almost all students who scored at Level 1 on the
intelligence test were rated equal or above the mean on the Learning scale. However, Lídia and Emilia, who also scored at Level 1, were rated below the mean by their teachers on the Learning scale at the SRBCSS. Teachers rated more students at or above the mean on the areas of Creativity, Leadership, Expressiveness, and Planning. Precision was the area in which teachers rated few students at or above the mean.

A Pearson product-moment correlation coefficient was computed to investigate the relationship among three scales of SRBCSS: Learning, Creativity and Motivation and the scores from both tests used in the study, i.e., Raven's intelligence test, and Urban and Jellen's creativity test – composite (n=20). Analysis showed no significant correlation among Raven's test scores for learning (r=.32; p>.05), motivation (r=.08; p>.05), and creativity (r=.07; p>.05). No significant correlation was found among Urban and Jellen's test scores for learning (r=-.23; p>.05), motivation (r=.17; p>.05), and creativity (r=-.17; p>.05).

Multiple Regression analysis was used to investigate the relation between Raven's test scores and the three scales of SRBCSS (learning, motivation, and creativity). Analysis showed that the variance on Raven's scores can not be accounted for by the set of predictors (learning: b=.57, p=.12; motivation: b=-.14, p=.62; creativity: b=-.25, p=.44).

Case Studies

Thirteen case studies were created to describe teachers' perceptions of students' behavioral characteristics on the SRBCSS, teachers' comments about students' profiles, and students' strengths, interests, abilities, and personality traits. A chart for each case synopsis organizes information about participants' biographical data, nomination area
(academic or art program), results of the creativity and intelligence tests and ratings on the SRBCSS to enhance the description of the gifted and talented students’ profiles.

Lídia

<table>
<thead>
<tr>
<th>Parents' profession &amp; Educational level</th>
<th>Raven's SPM</th>
<th>TCT-DP (A+B)</th>
<th>SRBCSS highest ratings (earned / total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father: School guard - Primary level</td>
<td>95 Level 1 of intelligence</td>
<td>F Extremely high above average level of creativity</td>
<td>precision (36 / 44) motivation (28 / 36)</td>
</tr>
<tr>
<td>Mother: Housewife - Secondary level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Siblings:</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Position: oldest</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Student's perception: Talents: Math; Drawings. Strengths: Portuguese; Math; Social Studies; Sciences; Art. Interests: Math; Drawing; Geography. Preferred style: Independent Study. Ways to learn: Talking with others; Reliving/Pretending; Making/doing/moving activities; Working alone; Choices and options.

Lídia was in the resource room for less than a year. She was the oldest sister of Jair and Túlio, also in this study. This would be her last year in the program. Lídia was going to high school next year and the enrichment program in Taguatinga did not include secondary students. She was tested for the program after her two brothers were identified and selected. Her youngest sister was accepted for the kindergarten program.

Lídia had a positive self-concept. She was pleased with herself as a person and happy with her own behavior. She felt good about her schoolwork and believed she was just as smart as her peers. Although she recognized herself as popular, she did not have as many friends as she wished. She felt that she was good looking, happy with her physical appearance and her life. She was not as self-confident when it came to sports, and she did not do well at new outdoor games. Teachers agreed Lídia was easy to get along with and
cooperative in class. She thought the best thing she ever did at school was helping students with math difficulties.

Her strongest behavioral characteristics, observed almost all the time by her teachers, were related to precision on communication, and motivation. Lídia was able to explain thoughts and needs precisely and clearly. She had strong verbal facility, and a rich vocabulary. She was well motivated in school activities. She became absorbed in certain themes and was persistent in accomplishing her tasks. Lídia liked drawing, and could concentrate for long periods on art projects.

Lídia liked all subjects, especially math, sciences (physics and chemistry), and arts. Lídia also liked to illustrate her geography assignments. She was not fond of Portuguese, because of the number of rules and exceptions to memorize. During her spare time, Lídia liked to draw, work with computers and read books with advanced content. Lídia was perceived as well-informed about a variety of topics as a good student. She liked working with numbers and earned the highest marks in math. She showed great interested in astronomy. She was very curious, and liked to ask questions when she wanted to know more; as she was shy, she preferred to ask questions after class. She considered herself intelligent because she tried to improve her own knowledge. Teachers said that Lídia had a good memory and was very clever in grasping underlying principles. However, they do not perceive Lídia as particularly strong student, as they gave her low rates in the learning scale of SRBCSS (e.g., has rapid insight into cause-effect relationships; tries to discover the how and why of things; reasons things out for herself; sees logical and common sense answers). She had an ideal student profile, according to
her Portuguese teacher, Eulália. She was well-behaved, paid attention to the class and valued teachers' work.

Lídia perceived herself as observant, a person who wanted to share opinions and to solve problems. She was interested in many social problems, such as politics, that her friends did not care about. She felt different at her regular school, because some of her classmates called her a nerd. She was quite concerned with moral values and often evaluated events, people, and situations. For example, although Lídia liked her school, she criticized the principal, who did not inform parents when their children were absent. Lídia thought the principal should be more aware of students' lives. She thought the resource room needed books, computers, pencils, and paints. Travel to the resource room should be supported by the government through free transportation passes. She preferred a more creative way of teaching and learning, where students had to find solutions or had several ways to find them.

Lídia believed she was creative, because she liked to invent new games and cookie recipes. She created her own drawings, instead of copying them. Teachers said that she strived toward perfection, was self-critical and often dissatisfied with her own products. Lídia set high standards of quality and often reworked a creation to refine it. She liked to organize and bring structure to things, people, and situations. However, teachers did not recognize her creativity or artistic abilities. On the creativity scale from SRBCSS, they gave her low ratings in items such as: displays a good deal of intellectual playfulness; fantasizes and uses imagination to manipulate ideas; exhibits a keen sense of humor; is adventurous and speculative. On the artistic scale she also received low rates in items such as: likes to participate in art activities; is eager to visually express ideas;
arrives at unconventional solutions to artistic problems; is sensitive to the environment and is a keen observer; and elaborates on ideas from other people as opposed to copying them.

However, on Urban and Jellen’s creativity tests, Lídia’s drawings were neat, original, and full of rich details and shapes. On Form A, she created a huge, detailed aquarium in a living room, full of different kind of fish, plants, and rocks. The second drawing, on Form B, she drew a playground scene. There was a bench near an old tree, and a pregnant woman with her face partially hidden by the large square frame of the test stimulus. Behind the tree, there was a Popsicle vendor pushing his cart; only his legs and feet were visible. A girl wearing a fancy hat was portrayed from her back, at the bottom of the page, watching the scene.

Lídia was motivated to excel because she was ambitious and wanted to succeed in life. She wanted to apply to the Air Force Institute of Technology and pursue a military career to its highest degree, like her grandfather, who was a general. She was very fond of astronomy, but never had an opportunity to use a telescope, nor to visit Brasília’s Planetarium. Fine arts and drawing were hobbies she would pursue in her spare time, as they were not profitable. She had a business mind. Her family was facing financial problems; her father might lose his job as a school guard, and she wanted to help them financially. She was not thinking about marriage, but in the future, she wanted to own a car and a house, and pursue an education.
*Cadu*

<table>
<thead>
<tr>
<th>Parents' profession &amp; Educational level</th>
<th>Raven's SPM</th>
<th>TCT-DP (A+B)</th>
<th>SRBCSS highest ratings (earned / total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father - Farmer - Primary level</td>
<td>90</td>
<td>F</td>
<td>planning (53 / 60)</td>
</tr>
<tr>
<td>Mother - Housewife - Incomplete</td>
<td>Level 2 + of intelligence</td>
<td>Extremely high above average level of creativity</td>
<td>artistic (38 / 44)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>leadership (34 / 40)</td>
</tr>
</tbody>
</table>

**Student's perception:**

**Talents:** Fine arts; compositions.

**Strengths:** Science/ Biology; Art;

**PE. Interests:** Compositions; wars; countries; science experiments; chemistry; painting; soccer.

**Preferred style:** Peer teaching.

**Ways to learn:** Talking with others; Listening to a speaker; Reading; Computers; Working with a partner; Working in a group; Choices and options.

Cadu had been in Planaltina’s Arts program for 4 years. In his opinion, the enrichment program was excellent. He was originally selected for the arts program, but he discovered other talents in math, Portuguese (poetry), and science. He enjoyed all subjects, especially Portuguese (creative writing) and science (chemistry). He liked to ask questions in chemistry and perceived that the science teacher also liked him. He was also very motivated in arts and athletics.

Cadu revealed that he did not like to study or to pay attention in class. He used to study the day before the test, and earned reasonable grades. He recently failed in math and English, but was not concerned. In his spare time, he liked to paint and play soccer.

He excelled in athletic activities; he was well coordinated and enjoyed all sorts of athletic games, especially Physical Education and soccer. In fact, he was planning to follow a career as a PE teacher.
Teachers observed that planning was Cadu’s strongest behavioral characteristic. According to them, Cadu was able to decide the resources necessary to accomplish a task, to anticipate all the steps needed to reach his purpose and the consequences of his actions.

Teachers also observed his artistic way of thinking. Cadu’s Art teacher, Jandira, said he produced fantastic, original drawings. Cadu liked to express his ideas visually in art activities. His artwork was rich and usually incorporated a large number of elements and techniques. On the creativity test, Cadu made two interconnected, impressive drawings. On Form A, he designed “the future world,” a skyline city full of satellite discs and futuristic forms; and on Form B, he created “the old world,” with castle towers, chariots and trees.

Teachers recognized Cadu’s leadership abilities. He was self-confident, cooperative, dependable, and responsible (although he used to say he lacked responsibility). Cadu had good verbal skills, explained things precisely, and expressed thoughts and needs accurately.

Cadu was able to concentrate for long periods on art projects. He was perceived as persistent in accomplishing his tasks and attempting to reach perfection. They also said Cadu required little direction and preferred to work independently. However, Cadu liked working with a partner or a group, rather than adults, although he was very good at working alone.

Teachers found Cadu to be very critical and perfectionist, with a creative way of thinking. He presented a non-conforming attitude, accepted disorder and did not fear being different. He criticized constructively, and always offers critical evaluation. He
says: "I like to defend my opinions. I don't like to lose. I never question my brother's opinions, but he likes to question mine. It is a mental exercise between us."

Several of these traits were evident during his interview. Although he found the regular school reasonable, he commented that they gave more importance to non-educational matters (e.g., wearing school uniforms). Cadu was very concerned about drug problems and violence at school. He did not go to parties very often, fearing violence in his neighborhood. Cadu liked to joke and play, and sometimes he disturbed the teachers' classes. Cadu criticized the traditional way of teaching at his school: teachers writing on the blackboard. He defended his idea of a school environment where teachers were friendlier.

Cadu wanted to study more. He considered it a challenge to finish high school and earn a Physical Education degree in college. In the future, he pictured himself as a single man, living close to his parents, and teaching PE classes.

_Dino_

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<table>
<thead>
<tr>
<th>Parents' profession &amp; Educational level</th>
<th>Raven's SPM</th>
<th>TCT-DP (A+B)</th>
<th>SRBCSS highest ratings (earned / total)</th>
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<tr>
<td>Father: Lawyer - University degree</td>
<td>Housewife - Incomplete Secondary level</td>
<td>90 Level 2+ of intelligence</td>
<td>F Extremely high above average level of creativity</td>
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_Student's perception:_ **Talents:** Fine arts; Drama. **Strengths:** Science; Art; Music; Portuguese; Social Studies. **Interests:** Fine Arts; Chemistry. **Preferred styles:** Simulation; Lecture; Programmed Instruction. **Ways to learn:** all - except for Working alone.

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Dino in the resource room for 5 months. Dino’s high ability was assessed and he was accepted for the Taguatinga’s artistic and academic programs.
In general, Dino had a high self-esteem. Dino was happy with his physical appearance and considered himself good looking. He was a well-behaved boy and did everything according to what was expected from him. He had a positive scholastic self-concept; he was very good at his schoolwork, was able to remember things easily, and did very well in his classroom. Dino found it easy to make friends, although he would like to have many more friends. He felt that most people of his age liked him. He was pleased with himself and liked the way he was leading his life.

After being nominated for the g/t program, Dino began to like school. He went to the resource room as much as he could, because it was located in his school. The classroom teacher used to excuse him from PE classes, which he did not like, and from the arts class to go to the resource room for more advanced work.

Teachers considered leadership behavior his strongest characteristic. He carried responsibility well, was self-confident with his classmates and adults; seemed comfortable and even happy when asked to show his work to the class. He was very cooperative with teachers and classmates and participated in school activities. Dino had strong verbal abilities and could express himself well. He adapted readily to new situations; was flexible in thought and enjoyed changes in the routine.

Dino was perceived as highly motivated when he was involved in certain topics or problems. He was persistent in seeking task completion, especially in the arts. He needed little external motivation to follow through on exciting work; was perfectionist and self-critical and was not easily satisfied with his own products. He was able to work independently, requiring little direction from teachers, but usually preferred to work with his friends.
According to both teachers, Florinda (Arts) and Eulália (Portuguese), Dino has an ideal student profile. Eulália thought he was creative and very good at drawing. His writing ability was good; and although he was not outstanding in Portuguese, he wrote well and his handwriting was particularly beautiful. He was weak in math, though. For Dino, math was a challenge, because it was sometimes a little difficult and he wanted to improve his math abilities. Dino liked every subject and believed he was good at each one. He did not like sports and PE; he hated soccer, although he felt that he could play well if he cared about it. Everything involving fine arts and drama drew his attention. Dino volunteered to participate in classroom plays and liked to make up plays from stories. He was skilled in using gestures and facial expressions to communicate feelings and improvise.

All teachers recognized Dino's creativity. He was a curious boy, constantly asking questions and expressing opinions. Dino displayed a great deal of intellectual playfulness; he was often concerned with adapting, improving, and modifying ideas.

Dino liked to express ideas visually and to participate in all arts activities; he was creative, original, and used balance and order in his artwork. He was particularly sensitive to the environment and was a keen observer. He was sensitive to beauty and to aesthetic characteristics of things, which were very appealing to him. For example, as a suggestion for improving the regular school, he would redecorate everything, building roomier classrooms surrounded by trees.

Teachers said that Dino was able to concentrate for long periods on arts projects. He was critical of his own work; he set high standards of quality and refined his drawings as often as he could. Dino collected the Spice Girls magazines, and made several sketches
using different perspectives and a variety of materials and techniques. With these paintings he won several prizes at arts expositions in school and the community. His best memory of school was a Spice Girls canvas painting he completed at the resource room, which his father thought was special.

His drawings demanded attention from everybody, and several of them were displayed on the classroom walls. Unlike children of his age, Dino’s drawings included scenes with great realism, showing volume, depth, and perspective. Most of the time he showed figures from different perspectives (such as a figure depicted from the back, showing his vision of a scene; or a girl seated on the side of a piano, swinging her legs). Dino drew girls on both forms of Urban and Jellen’s creativity test and produced rich and detailed artistic work; on form A, his three-dimensional drawing showed perspective, humor, affectivity, use of symbol-loaded theme, all included into a non-stereotypical compositional whole; this drawing was scored beyond upper limit of norm-sample (G = phenomenal level of creativity).

Teachers said he liked to draw more than anything in the world. However, teachers did not acknowledge his artistic abilities. On the artistic scale on SRBCSS, teachers did not mark any characteristic as observed almost all the time; and they gave him low ratings on items such as: arrives at unique, unconventional solutions to artistic problems as opposed to traditional, conventional ones; tends to select art media for free activity or classroom projects; shows an interest in other student's work – spends time studying and discussing their work; and elaborates on ideas from other people – uses them as a start point as opposed to copying them.
Dino also described himself as an artist, a draftsman, or a painter; it was the way he defined his world. He painted and drew as much as he could; he was interested in other students' work and liked to discuss their creation. He taught other classmates artistic techniques he had just learned and monitored their progress, too. He considered his classmate, Doug, the best artist in the resource room, as influential to his own artistic work. They worked together and Doug gave him several ideas for his drawings.

Dino was motivated to do well in his classroom because he wanted to have a better future, to be able to have children and raise them. Challenges, for him, were related to things he wanted to accomplish, as doing better in math. He showed great maturity for his age when he said: "Everything in the world is amusement, even a fight." A challenge, for him, was to be an actor or some well-known painter like Leonardo da Vinci.

His teacher, Florinda commented he had several family problems, since his parents had separated. Dino saw his father on school vacations. He lived with his mother, a stepfather, and a brother. His stepfather was strict, preventing him for going inside the house at night. They lived in a rural area and Dino had his own bedroom outside the house, near the garage. He never complained. Teachers thought he was very polite and took special care of his mother and little brother. When he was younger, Dino wanted to be a pilot. Later, he pictured himself as an artist, a painter, or actor.
Rubens was nominated for the resource room in grade 2. He was the youngest child of six and all of his siblings worked to provide for the family. Rubens had a high self-concept in most areas, except for athletics. He was a well-behaved boy concerned with proper behavior. Rubens was pleased with himself as a person, the way he was leading his life and the way he looked. He had many friends, but wanted more. Rubens believed he was intelligent, quiet, handsome, and cheerful. He enjoyed being involved in the program, but did not like to be called gifted. He liked his schoolwork and thought he was just as smart as other students. He liked physical education, but he was not good at outdoor games.

Rubens liked painting and drawing. His artistic ability was his most evident behavioral characteristic. Rubens said his hobby was drawing, since he was very young. He liked to participate in all art activities and was eager to express his ideas visually. Rubens incorporated a large number of elements in his artwork, experimented with a variety of materials and techniques, and often found unconventional solutions to artistic problems. He concentrated for long periods of time on art projects. Rubens was
particularly sensitive to the environment, and a perceptive observer; his artwork demonstrated sense of balance and order.

    His drawings were very detailed and presented several artistic qualities, such as realism, volume, depth, perspective, and different orientation. Rubens drew two warriors on each form of the creativity test. On Form A, the warrior wore a long coat tied at the shoulder with a detailed buckle. On top of the buckle, he included an impressive eagle-like bird. The second warrior was a close-up view at an angle. The 8 minutes of drawing produced rich and expressive details, showing his artistic abilities.

    Rubens liked most subjects, except for physics, chemistry, and biology. He was almost failing physics. His strongest areas were arts, where he earned the highest marks, and history. Rubens had good verbal abilities and was usually well understood. He liked to discover the how and why of things, and asked many provocative questions. Teachers said he had a quick insight into cause-effect relationships. He liked to ask questions in all disciplines, when he needed more information. Although shy, he displayed a good deal of intellectual playfulness and good humor. He elaborated on ideas from other people and used them as a starting point for his own imaginative and inventive ideas. Rubens said that the best thing he ever did at school was a Science Fair project; he made a pirate radio that really worked and was awarded a gold medal.

    Rubens was very sensitive to beauty and aesthetic characteristics. According to his teachers, he became absorbed in what he was doing, and was persistent in accomplishing assignments. The fine arts teacher, Alice, perceived him as the most motivated student. Rubens was critical of his own work, set high standards of quality, and often reworked his drawings. He strived toward perfection and was not easily satisfied
with his own products. He recognized his own mistakes and always tried to improve, sometimes with the help of others or by consulting various books. Rubens believed he was creative. He recognized that artwork was difficult, because of his perfectionism. He also liked to create stories and work on them until everything was perfect. Rubens could easily tell stories using descriptive words to add color, emotion, and beauty.

Rubens liked his school, and criticized it constructively. He complained that his school was disorganized, and he found it difficult to concentrate in class. He also criticized the traditional method of teaching. In his opinion, teachers should be more organized, cheerful, and friendly, and provide more options for students.

The art teacher explained that Rubens had a very difficult home situation. Rubens witnessed the bus accident in which his father was killed. Teachers said that Rubens eventually overcame his emotional problems because of his involvement in the resource room program. Rubens won a Donald Duck drawing competition and a ticket to Disneyland, but his mother would not let him to travel. Rubens never complained.

What motivated Rubens to excel and to do well at school was having the opportunity to express a variety of feelings when he was drawing. He said: “If I paint without any feelings, nothing comes out.” Rubens faced several challenges: learn how to concentrate in his classroom; passing physics; and finding a good job in the future. He wanted to work as a cartoon designer.
Henrique

<table>
<thead>
<tr>
<th>Parents' profession &amp; Educational level</th>
<th>Raven's SPM</th>
<th>TCT-DP (A+B)</th>
<th>SRBCSS highest ratings (earned / total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father</td>
<td>Mother</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanic - Incomplete</td>
<td>Housewife - Incomplete</td>
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<td></td>
</tr>
<tr>
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<td>Primary level</td>
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</tr>
<tr>
<td>Siblings:</td>
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</tr>
<tr>
<td>Position:</td>
<td>youngest</td>
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</tr>
</tbody>
</table>

Student's perception: Talents: Math; computers. Strengths: Math; Science. Interests: Math; electricity; computers. Preferred style: Games. Ways to learn: Talking with others; Reading; Watching; Games; Working with adult; Choices and options.

Henrique had been at resource room for 4 years. He liked math, computers, and developing computer games. His teachers were unanimous in saying that he was the most creative, intelligent and motivated student in the resource room. Henrique displayed several strong characteristics, observed almost all the time by his teachers, such as leadership, expressiveness, learning, creativity, precision in communication, motivation, and planning abilities.

Henrique liked his school and teachers. He was especially fond of his resource room math/computer teacher, Sammy. Henrique was responsible, flexible, sociable, and cooperative in class. Henrique was self confident with his classmates and adults. He considered himself talkative and open, not shy, and a fine person. He tended to direct the activity in which he was involved. According to his teachers, he participated in most social activities connected in the school. Henrique excelled in athletic activities; was well coordinated and enjoyed athletic games, especially soccer and swimming.

Henrique liked all subjects, but preferred math, sciences, computers, reading, history and geography. Teachers considered computers his strongest area. Henrique
required little direction from teachers and worked independently, which was his preferred way to learn. He liked to receive extra work when he finished his schoolwork.

Teachers said that Henrique displayed a great deal of curiosity about many things. He liked to ask questions and was interested in all subjects. Teachers seemed to like his class participation. He expressed his opinions and offered unique, clever responses to problems and questions. Henrique heard others say he was creative; he did not like to boast about his abilities. His art teacher, Alice, said he was very intelligent and creative for his age. His classmates praised him for the dialogues he created in plays at school.

Henrique displayed a good deal of intellectual playfulness and liked to use his imagination to manipulate ideas, adapt, improvise, and modify things. Bernardo, the Science teacher, said he discovered how to develop a computer program, using Logo language, after only a few lessons. He was perfectly able to teach it to other classmates.

He liked the g/t program. He did not brag about it because he found it wrong to show off. He felt good about being gifted, although his classmates used to pick on him; they demanded information, and certain behavior from him. Henrique did not feel different from anyone. He was active, lively, had good grades, paid attention, and participated in class. He had a keen sense of humor and talked during the classes; his teachers said he participated too much at the wrong time.

Henrique displayed an advanced vocabulary for age or grade level, with good expression, elaboration, and fluency. He described things in appropriate words, and expressed ideas in a variety of ways. He was well-informed about a variety of topics, especially related to computers and electricity, well beyond the usual interests of youngsters of his age. Henrique was perceptive and alert, tried to understand complicated
material by analyzing its parts; reasoned things out for himself; recognized logical and common sense answers. Henrique learned how to type and to handle computer software, using his brother’s computer. Ceilândia was, at that time, the only resource room with computer classes and his teacher, Sammy, motivated him to develop computer programs, which he did easily. He had a good memory, and fast understanding of complicated problems. He liked to try to discover how things worked, and grasp underlying principles.

Henrique liked to create things. He remembered that the best thing he had done at school was a game, a project dealing with electricity. The science teacher gave the students an opportunity to develop an invention. Henrique designed an electrical device that lit up when calculations were correct. It was a group project, in which everybody participated. This project involved freedom of choice, integration with the group, and inversion of roles (students teaching teachers), which pleased him.

Henrique recognized various methods for accomplishing a goal and could pinpoint potential areas of difficulty. He understood consequences of actions, and was good at strategy games where it was necessary to anticipate several moves ahead. He liked chess; he would like to compete in a chess championship, which was a rare event at school. The last time his regular classroom teacher did not allow him to participate in the championship. He wanted to play in a resource room contest, with teacher Sammy’s guidance.

Henrique criticized constructively; for example, he thought the resource room should have modern computers, but was humble in his remarks: “I would try to arrange more modern computers, but we know that this would be very difficult, and we have to be happy with what is supplied.” Henrique was easily bored with routine tasks. He also
criticized the traditional way of teaching; in his opinion, a good student was good for the teachers' self-image: "People think they are teaching well, because all the students have good grades." Teachers should challenge their students, motivate them, give them a chance to compete, and prepare them for the university entrance exam. They had to be different from the traditional type of teacher, who comes to the classroom, writes on the blackboard, explains, students answer, and teacher corrects.

He was interested in many social problems, more than usual for his age. Henrique often was self-assertive and stubborn in his beliefs, and quite concerned with moral values. He criticized his classmates at school, who vandalized the bathroom that was recently fixed and redecorated. In his opinion, school staff would watch over violent students to prevent vandalism and to make school a safer place.

Henrique was motivated to excel at school to please his family and to feel appreciated by them. He also wanted to be successful. When he saw a computer for the first time, he wanted to be knowledgeable in this area and to get a good job. His biggest challenges were to pass a test for a technical course in high school (computer course) and pass the university entrance exam. He also wanted to skip the next grade, and the principal offered an opportunity for some bright students to take a test. He was anxious because of this test, but humble, in case he did not pass: "I accept what life has to offer me!" In the future, he pictured himself as a graduate in Computer Sciences, married, with children and a comfortable life.
Dunga

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<tr>
<th>Parents' profession &amp; Educational level</th>
<th>Raven's SPM</th>
<th>TCT-DP (A+B)</th>
<th>SRBCSS highest ratings (earned / total)</th>
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<td>D Above average level of creativity</td>
<td>learning (28 / 32) creativity (33 / 40) expressiveness (13 / 16)</td>
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<td>Siblings: 0</td>
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<td>Position: only child</td>
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Student's perception: Talents: Drama· Strengths: Portuguese; Math; History; PE. Interests: Geography and maps; Drama; Creative writing; Technology. Preferred style: Discussion. Ways to learn: Talking with others; Reading; making/doing activities; Working with a partner/ in a group; Choices and options/ Detailed instructions.

Dunga was selected for the resource room program a year ago. He liked math, Portuguese, geography, drama, English, and PE, and he had excellent grades in history, geography, and English. His strongest characteristic was Learning, observed almost all the time by his teachers. He presented an advanced vocabulary for his grade level, quick recall of information, and a general knowledge about several topics. He had a quick reasoning ability and tried to discover how things work. Dunga was curious about many things and was constantly asking questions when needed. He was interested in technology and recently discovered Mechatronic Engineering. He saw a documentary on TV showing the work of some engineers at the São Paulo University; they combined the mechanical and the electronic parts of a device to create cars. Dunga would like to work as a Mechatronic engineer.

Teachers recognized his creativity and sharp sense of humor. Dunga described himself as a clown. He was clever, humorous, creative, and critical. On one of his drawing at Urban and Jellen’s creativity test, he illustrated his good humor in a cartoon.
depicting a sunny day at a hospital building. There was a person playing an accordion just in front of a sign: “Silence! Hospital. It is forbidden to play accordion.” In front of the hospital’s emergency room, he drew two lines of people. The sign for one line said “attendance” and had a dozen of people; the other sign said “payment” and had just one person.

His leadership characteristics were also noted. Dunga was perceived as self-confident with classmates and adults; he seemed comfortable when asked to show his work to the class. Dunga was sociable and tended to direct the activity in which he was involved. Dunga was a nonconforming adolescent, perceived by his teachers as individualistic, and comfortable with disorder; he did not fear being different. He was uninhibited in expressing his viewpoint and divergence of opinions.

Dunga complained about both schools. He found his regular school a violent place, with many fights among students. He would arrange for a monitor to watch students during break, as a suggestion to improve his school. He perceived his school as a very restricted place, too. Some teachers were very strict, and he would like to change that, too. He liked the resource room. However, in the academic program, students could not choose the activity they wanted to do; there were very few options. However, he did not know what to do at the resource room when the teacher had not prepared any activity that was appealing to him. He said that sometimes there was nothing to do at the program and he was not challenged.

Dunga knew that the Portuguese teacher had nominated him for the resource room, but he found it odd because he was not very interested in writing or reading. He perceived himself as talented in drama, and had taken courses for young actors. In the
future, he also planned to be an actor. Teachers said that Dunga was expressive in using his body language to convey non-verbal information, was skilful in telling a story or imitating others; and used voice expressively to enhance meaning. However, they gave him low ratings on most items of the dramatics scale on SRBCSS (e.g., is able to evoke emotional responses from listeners - could get people to laugh, to frown, to feel tense, etc.; commands and holds the attention of a group when speaking; handles body with ease and poise for his particular age; and volunteers to participate in classroom plays or skits).

Dunga preferred to work independently with little direction from teachers. He would like to have more opportunities to learn through games, simulations, and computers. However, while the regular classroom used more lecture and drill and recitation methods, which he did not like, the resource room used more projects and independent study, which were his less preferred ways to learn.

It was not a surprise that he felt unmotivated. The art teacher, Jandira, confirmed that he did not like Fine Arts and working with his hands. He preferred to work with communication and sciences. According to the Portuguese teacher, Irene, Dunga had a quick mind, but he talked too much. She said: “If you want him to do something right through the end, you have to catch him with a tie.”

Dunga wanted to succeed in life. He found his school life very difficult. This difficulty seemed to be related to lack of motivation in school. For Dunga, school and the resource room did not tap into his interests. Although he was interested in working with maps and geography, none of the resource room teachers mentioned it.
Caio had been attending the Planaltina’s Arts program for 2 years. Caio’s ability was not confirmed during the evaluation. The Planaltina’s Diagnostic Team suggested 2-months of observation in the academic and artistic programs.

Alex, his twin brother, attended the same resource room and they seemed to share the same interests. Resource room teachers used to talk about them and their abilities. One of their teachers said: “Alex and Caio have demonstrated great interest in arts. One of the twins prefers more dramatic arts, and the other, fine arts, but both are very motivated.” They wanted to do everything together, which was difficult for their teachers. During Alex’s interview, Caio stood at the door and refused to leave his brother alone for the session. Teachers said that Caio stayed near Alex, as he wanted to protect his brother.

Caio displayed several strong characteristics, observed almost all the time by his teachers: leadership, planning, dramatics, learning, and expressiveness in communication. Caio is an extroverted child, with great ability for social interaction. His teachers said he displayed a great deal of leadership. Caio was responsible, dependable and self confident with children of his own age as well as adults. Caio define himself as playful and
cheerful. He had a good relationship with his classmates and was cooperative in class. He adapted readily to new situations, was sociable and generally liked to direct the activity in which he was engaged. Caio participated in most social activities connected with the school. He excelled in athletic activities, especially soccer.

Caio earned excellent grades in academic subjects (especially math, geography, and sciences). He liked all subjects and was good at most of them. He did not like to study for a test, but he paid attention in class. Teachers recognized that Caio had quick ability to remember information, and a fast perception of cause-effect relationships. It was easy for him to calculate – for example, giving the year a person was born, he could tell the age automatically. He could also complete a very detailed puzzle very quickly. He liked to ask many questions, especially when he did not understand a subject, such as in Portuguese. He was perceptive of the environment; analyzed complicated information; and recognized logical and common sense answers.

Caio believed he was intelligent, but sometimes do not earn good grades. Caio’s best recollection of school was when he knew he had passed his courses. He had previously failed a math test and was afraid of failing again. He was very concerned with grades. He said: “I would like to get the best grades in all subjects; that would be great!” At school, the project he wanted to accomplish was making a volcano. Nevertheless, there were no materials at school and he could not find a teacher to tell him how to make the lava.

Caio was also outstanding when it came to planning abilities. Teachers perceived him as organized in his work, taking into account the resources necessary to accomplish goals. He was good at strategy games, such as chess and was good at anticipating
consequences. His math teacher was organizing a school chess tournament, and Caio wanted to compete.

According to the arts teacher, Jandira, Caio demonstrated great interest in Fine Arts and was very motivated. He needed little external motivation to pursue challenge activities. Caio liked to participate in art activities and was enthusiastic to express ideas in a visual way. He demonstrated strong dramatics characteristics. Caio liked to participate in classroom plays, where he could use gestures and facial expressions to communicate feelings or imitate others. Caio was also able to create original plays or invent plays from stories. He used colorful and imaginative figures of speech when he was telling a story.

Caio was also described as creative by his teachers. They said he displayed a great deal of curiosity about many things; he was constantly asking questions, generating a large number of unique ideas or solutions to problems and questions. Caio was uninhibited in expressing his opinion; he was sometimes obstinate. Teachers said he displayed a good deal of intellectual playfulness and ability to fantasize, manipulate, change, and elaborate upon ideas. However, Caio did not perceive himself as creative as his brother Alex (who had a lower score on the creativity test); but he thought they had similar abilities (his brother had a higher score on the intelligence test). Teachers said he probably had low self-esteem.

Caio worked well independently and required little direction from teachers. He also preferred to learn with others, and through games and dramatization. Caio was quite concerned with right and wrong, good and bad; often evaluating events, people, and situations.
Caio was motivated to excel at school because an inner voice told him to get good grades, to succeed in life, and to get a good job. He wanted to be a lawyer and live independently. His dreams involved buying a house for his mother and siblings (they would no longer be living with the grandfather). He pictured himself as a lawyer or judge. He knew he had to work to be successful in the future and accomplish his dreams.

_Sena_

<table>
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<tr>
<th>Parents' profession &amp; Educational level</th>
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<th>TCT-DP (A+B)</th>
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_Student's perception:_ *Talents:* Fine arts, music and drama; Portuguese, science. *Strengths:* Fine arts, drama, music; reading and writing. *Preferred style:* Independent Study. *Ways to learn:* Talking with others; Games; Reading; Pretending; Working alone.

_Sena_ was at the resource room for less than a year. He was recommended to the resource room by his mother, and was accepted for a 2-month period of observation. During his first month, his teachers were impressed by his multiple talents in fine arts (painting, drawing, and sculpture), drama, creativity (a cartoon character with well-defined personality traits), chess, and leadership. Students' productions were exhibited at the city mall. Sena showed his leadership and dramatic abilities in helping teachers organize the event, speaking before a group of people, and maintaining a stage presence. His displays included several sculptures, drawings, paintings, and illustrations of his cartoon characters for the class newspaper.
After observing Sena for 2 months, Gama’s Diagnostic Team decided he did not meet program requirements. However, the resource room teachers did not agree with this conclusion and decided to appeal to the Secretary of Special Education. A group of psychologists and experts discussed Sena’s case study and accepted him for the program because of his motivation, leadership, and art abilities.

Sena selected high ratings global and scholastic self-concepts. He was positive about his schoolwork and his ability to do well in class. However, he was not as confident about his social abilities, although he found it easy to make new friends. His athletic, physical, and behavioral self-concepts were low. Sena was not happy with the way he looked, especially with his weight. He did not like athletic activities; he was not well coordinated and did not enjoy athletic games.

Sena described himself as cheerful, amusing, and playful. His resource room teachers saw him as uninhibited in expressing opinions, self confident and comfortable when asked to show his work to the class.

His dramatics abilities were noticed by his teachers. He created original plays or invented plays from stories; he could easily tell a story and used gestures and facial expressions to communicate feelings effectively. He liked to do several things at the same time. He could easily command the attention of a group when speaking, evoking emotional responses from listeners. He was adept at role-playing, and liked to improvise; he could readily identify himself with the moods and motivations of characters; and mimic the way people expressed themselves. He was an interesting storyteller. In school, Sena liked participating in or writing plays, and painting cartoon characters on the school walls during art class.
In the resource room, the Portuguese teacher helped him with a literature project. He wrote a novel about a boy who was playing chess and fell asleep; when he woke up, he was inside the chess game and was challenged by several adventures. The teacher was looking for an editor to publish his novel and a cartoonist to help him improve his drawings.

Sena taught himself to read when he was 3. Portuguese, history, geography, sciences, arts, drama, and music were his strongest subjects. He disliked math, although earning average or higher grades. He also loved to work with a video camera. He made puppets and drawings to be captured on a video camera, adding special effects, which he learned from TV. At home, Sena liked to create stories for his puppets and to invent frames for his pictures.

His leadership abilities were noted by all his teachers. Sena took responsibility well; was well liked by his classmates and cooperative in class. He had strong verbal skills. He was flexible and adapted readily to new situations. Sena participated in most social activities connected with the school. Sena attended the I Congress of Gifted and Talented Youngsters in Porto Alegre, representing the gifted and talented students of the Federal District.

Sena liked to be in the program and it was an opportunity to make new friends. The Fine Arts teacher, Cristina, thought Sena was smart and very motivated; however, his perfectionism demanded a lot from him. Ana, the Science teacher, believed Sena was creative, intelligent, and very concerned with social issues. Orlanda, who taught Portuguese, believed Sena had enormous creative potential. She was committed to helping him create and illustrate his book.
Sena thought he was creative and intelligent; he liked to invent things and set his imagination free. Teachers said he worked more creatively when he was painting, drawing, writing, or making cartoons. Sena displayed a good deal of intellectual playfulness, a keen sense of humor and liked to use his imagination to manipulate ideas.

Sena liked his regular school very much; it was a government experimental program based on Vygotsky’s method. The school did not grade the students’ work; they used a general evaluation, focusing on the learning process and the students’ personality traits, such as motivation and good behavior. Although Sena felt good about being in a program for gifted students, he did not feel comfortable with peer pressure to do well in every subject. He did not think he was an ideal student because he liked to chat in classes and did not have good grades in every subject, although he was attentive and did his homework. Teachers complained that he talked too much and daydreamed. He criticized the traditional way of teaching. He would like teachers to explain content carefully, and be aware of individual needs.

Sena was motivated to overcome the challenges of life. He wanted to be successful. He was motivated by working with community groups, such as his church’s theater group. He was in charge of writing, directing and acting in community plays. In the future, he wanted to earn three university degrees, in acting, music, and fine arts. He hoped to work as a drama teacher, make movies, and act in films.
Jair was at the resource room for almost 1 year. He was the 4th child and had four brothers and sisters; three of them were attending the same resource room – Lídia and Túlio, also in this study, and Debbie, 4-years-old, had recently been identified.

Jair’s strongest characteristics, observed almost all the time by his teachers, were in the following areas: learning, precision in communication, creativity, leadership, motivation, and planning. According to Eulália, the Portuguese language teacher, Jair was motivated and intelligent, the ideal student in her opinion; he needed to study only a little, and with little instruction he grasped everything easily.

Jair took responsibility well. Teachers agreed that he was dependable, flexible and adapted readily to new situations. He showed self-confidence and a strong self-concept, especially towards his abilities at school and the way he conducted his life. He was well liked by his classmates and cooperative in class. In regular school, students called him names (such as star crazy, genius) and it bothered him. As he grew older, he got used to
it. Jair seemed to enjoy being around other people; was sociable and preferred not to be alone. Teachers perceived Jair as responsible, polite, imaginative, and creative.

Jair began to work in the resource room when he was in the 5th grade, but had been quickly accelerated to the 6th grade 3 months later. Learning was his strongest area. The resource room teachers said Jair liked his school and everything in it. Teachers observed that Jair preferred to work independently, and required little direction from them. As a matter of fact, Jair adapted well to all learning styles, except peer teaching. He liked all forms of studying and learning. He was knowledgeable about a variety of topics, such as the origin of universe and characteristics of our solar system, and demonstrated unusual interests for his age. He reads advanced material in astronomy and likes to discuss theories with his science teacher. He was particularly good in math; had a good memory and he was thrilled with the opportunity to know more in class. He liked to discover the functioning of things; and asked many provocative questions. He thought that teachers liked students who asked questions. Jair was also observant; he was able to notice the teachers’ little mistakes, and tell them all the time. It was like a game for him. He felt disappointed when a teacher would not allow him to participate in class or give him a chance to speak. He liked to show others what he knew.

Jair was very motivated and became absorbed and involved in certain themes. Teachers said that sometimes it was difficult getting him to move on to another topic. He strived toward perfection; he was self-critical and was not contented with his own speed or products.

Teachers recognized his creative abilities. He was curious about many things, and was often asking questions about anything and everything. He generated a large number
of ideas or solutions to problems and offered unusual responses to them. He displayed intellectual vivacity and liked to use his imagination to play with ideas. Jair liked to write poems and other texts, which he did very well, according to the Portuguese teacher. His poems expressed sensitivity to beauty and aesthetic taste.

One of the most apparent features in Jair’s behavior was the way he expressed himself and communicated with adults and classmates. He used advanced, rich vocabulary for his age; he expressed his thoughts precisely and clearly. His verbal abilities were evident since he was little. Jair remembered his kindergarten graduation. The principal asked students how they felt about graduation, and he was the only one who had the courage to speak. He asked for the microphone (he was 6 years old) and publicly thanked everyone for the diploma, expressing his thoughts with clarity. He made a good impression on the audience.

In his spare time, Jair liked to read. His mother collected books from donations and selected them carefully, refusing those that were not suitable for her family’s needs. He liked to read everything, but usually preferred adult level books; he did not avoid difficult material and often selected biographies, encyclopedias, and atlases. He used to read computer manuals and other related materials, so he could learn by himself. Teachers said that the family got a computer last year, donated by a famous journalist, who was astonished by the variety of abilities of the 5 children. The journalist wrote an extensive report on them. The donated computer eventually broke and the family did not have money for repairs. Jair’s parents, although poorly educated, proudly strived to attend to their children’s different needs.
Jair demonstrated great sensitivity. In his ideal school, teachers should get to know students more, and share their sentimental side and emotions. Jair liked the enrichment program. He wanted to spend more time there (he suggested a longer schedule), and have more teachers who allow students to work more with their creativity to make useful things.

Teachers commented about Jair’s planning characteristics. They said Jair liked to plan his work carefully, allowing time to execute all steps involved in a process. Jair was very organized and liked to bring structure to his environment. For example, he would improve the regular school by separating students into different classes, according to behaviors. He did not like the noise in his classroom, because it disturbed students who wanted to concentrate. He would like more male teachers in his school.

Jair was quite concerned with moral values; often evaluating situations, people, and events. He worried about the pollution in the world. He believed that students had to be responsible, understand the content quickly, and discuss it with teachers. He did not say he was intelligent because he was humble.

Jair excelled at school because he worked hard. It was his opinion that everybody who was intelligent worked hard, which made life easier. People were influenced by others, especially friends, to use their intelligence. Jair considered it important to get good grades, to have a good job in the future, to be successful in life. In the future, he pictured himself as a successful man with a job after graduation. He considered several professions: teacher, ambassador, diplomat, and lawyer, but he had not made up his mind.
Túlio had been at the resource room program for more than a year. He was the third child of a family of 5 children, all of them attending the resource room. (Lídia and Jair were also in this study.)

Túlio described himself as creative, smart, and intelligent. However, he rated himself low on self-concept scales, and average behavioral and scholastic self-concepts. He was a well-behaved boy, trying to do the right thing. He had some confidence in his school performance. He was well liked by his classmates and cooperative in class. Túlio participated in most social activities connected with the school. He liked to participate in the program, and did not care about being called gifted by his classmates; he just stayed quiet when his friends said they did not believe he was gifted.

Túlio’s strongest behavioral characteristics, observed almost all the time by his teachers, were learning, expressiveness in communication, and dramatics. His teachers found him very intelligent; with minimal instruction, he grasped concepts easily. Túlio spoke and read when he was two and a half. He liked to ask questions and to discover the how and why of things. He had a good memory, good reasoning abilities, and rapid
understanding of complicated material. His teachers said he often offered unique, clever solutions to problems. Túlio displayed a great deal of curiosity about many things. He recently learned about classical music and could describe the instruments used in a concert. He also liked to read movies screenplays before watching them on TV. He liked storyboards, cartoon characters, and was learning how to draw three-dimensional figures. He talked about things he liked with excitement.

Túlio liked all disciplines, but his preferred subjects were English, Commercial and Service Practices, and History. He earned good grades in all subjects and liked to ask questions when needed. He liked all learning situations involving games, simulation, making/pretending activities, and computers. In his spare time, Túlio enjoyed playing video-games or computer games.

One of most evident features of Túlio’s behavior was his verbal ability. Túlio displayed an advanced vocabulary for his age. He used words in a meaningful way, showing elaboration and fluency of thought. He used to speak, write, and express thoughts clearly and concisely. The Portuguese teacher, Eulália, thought Túlio wrote well and creatively, including poems, and compositions. He liked to produce acrostics and puns. He was a motivating storyteller and held the attention of a group when speaking. Túlio’s dramatics abilities were well recognized. He liked role-playing, improvising, and acting out situations spontaneously. He used voice expressively to enhance meaning of stories; and added body language the express the moods and motivations of characters.

He read a great deal on his own; he read everything about computers. He usually preferred adult level books. He read about famous Brazilian’s cartoonists, such as Ziraldo and Maurício de Souza. Reading allowed him to travel through the stories, giving him a
sense of autonomy. He said: “Books give me a sense of freedom, of traveling. The most annoying thing is when I have to get off this trip.”

Túlio was uninhibited in expressing his opinion and viewpoints. He was particularly perceptive to the environment; and was a keen observer for the unusual. Túlio described his classroom with fine sense of humor: “My classroom is also like this, when the teacher is angry, students become suddenly very quiet; they shut up, they lift their eyes upward, and fake they are saints. Then, when the teacher turns her back, the paper war begins.” Túlio reckoned an ideal student would be quiet, unless he was answering questions. His ideal teacher should be friendly, talk to the students, and use good, educational games.

Túlio was quite concerned with right and wrong, good and bad; he often appraised events, and situations. He liked his school, but complained about the pedagogical system, such as the lack of a more challenging curriculum; and the lack of resources, such as computer labs and books. He criticized the government, because they did not distribute free books for every grade, forcing underprivileged families to buy them. He loved the enrichment program but noted the lack of some material resources. Túlio believed that schools should have at least one computer, one TV and one VCR for educational purposes.

According to the Art teacher, Florinda, Túlio was motivated to succeed. Florinda reckoned he had characteristics to be a President of the Republic; he wrote a platform for the position. Túlio was highly connected to world events. He was charismatic and teachers were very enthusiastic about him. Túlio was interested in many social problems
and liked to discuss philosophical problems, such as why humans exist. He used to go to
church to better understand some theological issues.

Túlio was motivated to excel at school because of his future career. He wanted to
go to college and graduate. He would like to have the opportunity to take a computer
course, but found it difficult because of the expenses. It would be a challenge to learn
how to do a home-page on the Internet. For the future, his plans included to be the owner
of a game company and to be a hacker to defend the privacy of the Internet.

Alex

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<th>TCT-DP (A+B)</th>
<th>SRBCSS highest ratings (earned / total)</th>
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Student's perception: Talents: Drawing; math; science; Geography. Strengths: Math; social
studies; science; art; PE. Interest: Stars. Preferred style: Games. Ways to learn: Talking to
others; Reading; Games; Reliving/ Pretending; Working with a partner; Working with an adult;
Choices and options.

Alex was at the resource room Arts program for 2 years. His ability was not
confirmed during the evaluation. The Planaltina's Diagnostic Team suggested gathering
more information through 2 months of observation in the resource room for drama class.
As there was no drama course in Planaltina (analogous to the Park Schools' program), he
was recommended for the Planaltina's Arts program.

Alex had a strong self-concept in the areas of physical, athletic, and global self-
worth. He reported being generally happy, pleased with himself, his life and with his
physical appearance. Alex described himself as a good-humored person, playful and
friendly. He was good at sports, had many friends, and would like to have many more. Alex was worried about his performance in class and the schoolwork assigned to him, but he did very well. He also gave high importance to behavior and commented that sometimes he did not act the way he was supposed to, and found it hard to behave himself. During his interview, he mentioned that sometimes a student, in spite of his/her intelligence, was not recommended for the resource room due to bad behavior. It seemed that Alex felt he was smart, but afraid of failure (pressure, perfectionism).

Teachers perceived Alex as a good student, easy to deal with, friendly, humorous and an active participant in class. He was very motivated in his schoolwork and interested in getting good grades in all subjects. He liked science, astronomy and everything related to the human body. He was very curious, and liked to ask questions about everything. Teachers considered that his strongest behavioral characteristics were related to drama, expressiveness in communication, leadership, and creativity.

Alex demonstrated a strong interest in Arts and was highly motivated, according to his Arts teacher, Jandira. Alex preferred dramatic arts and was very talented. The Portuguese language teacher, Irene, thought Alex was very intelligent; she commented that the twin brothers, Caio and Alex, were not very good in academic subjects. However, that changed later, mainly in math. Like his brother, Caio found it easy to calculate – for example, the age of a person from the year he/she was born – and quickly completed detailed puzzles.

According to the teachers, Alex liked to participate in classroom plays; he was good at expressing information non-verbally, using gestures, facial expressions, and body language to communicate his feelings. He liked role-playing and improvising, and
creating original plays from stories. Alex also displayed a good deal of intellectual playfulness and was very creative; he liked drawing cartoons and writing imaginative stories with them.

Alex also showed strong leadership characteristics. He was sociable, self-confident, and cooperative in the classroom, easy to get along with and well liked by his classmates. He had strong verbal skills and liked to lead activities. Teachers said he used to participate in most social activities connected with the school.

Alex was spontaneous in expressing his opinions, and sometimes vigorous in expressing divergence. He liked to be in the resource room, but was not comfortable with the gifted label. He was resented with classmates’ pressure to know everything and do not commit mistakes. He said: “For me, the gifted person has to understand things, and not necessarily memorize everything.” He thought he was intelligent, because he was good in all subjects and worked hard. He criticizes the traditional way of teaching and would like to have more playful, participative teachers; and less boring homework, which could capture student’s attention.

Alex wants to succeed at school and in his professional life. He wanted to be a cartoonist or a lawyer.
Leandro

Leandro, 13 male, grade 6 - Taguatinga

Parents' profession & Educational level

<table>
<thead>
<tr>
<th>Raven's SPM</th>
<th>TCT-DP (A+B)</th>
<th>SRBCSS highest ratings (earned / total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father</td>
<td>Mother</td>
<td>95+ Level 1 of intelligence B</td>
</tr>
<tr>
<td>Master builder- Incomplete Primary level</td>
<td>Housewife - Incomplete Primary level</td>
<td>Below average level of creativity</td>
</tr>
<tr>
<td>Siblings: 3</td>
<td>Position: youngest</td>
<td></td>
</tr>
</tbody>
</table>

Student's perception: Talents: Writing. Strengths: Portuguese; math; social studies (history; geography); science. Interests: Biology; Philosophy. Preferred style: Independent Study and Programmed Instruction. Ways to learn: Talking with others; Listening to a speaker; Computers; Making/doing/moving activities.

Leandro attended the resource room program for 1 year. His 14 year-old brother was also in the same resource room. Leandro was a small kid, and looked younger than he was. He was self-assured about his behavioral and scholastic self-concepts. Leandro took responsibility well and participated in most social activities connected with the school. He was happy with himself as a person and with his physical appearance.

However, he was introverted and insecure about his social relationships and had a low social self-concept. He did not perceive himself as popular and would like to have more friends. Leandro did not believe that he was good at athletics. In games and sports, he used to watch instead of playing and did not do well at new outdoor games.

Leandro defined himself as friendly, intelligent, and cooperative. Leandro liked to be part of school, but sometimes resented being called gifted. He felt different, a little bit embarrassed, depending on the situation.

His strongest characteristic was learning, observed all the time by his teachers. He was described as intelligent, able to grasp things easily, and needed little instruction from teachers. He liked reading, geography, math, and biology. He had a good memory and
was knowledgeable about a variety of topics, well beyond the usual interests of
youngsters of his age, such as Philosophy, Psychology, and Sociology. Leandro showed
good intellectual reasoning for formulating cause-effect relationships, building
hypothesis, and working with analogies and metaphors. He liked to write acrostics, puns,
and work with math challenge games. He had a quick grasp of underlying principles and
liked to discover how things worked, putting together parts of devices, and observing
their functioning. Leandro was always trying to understand complicated material,
reasoned things out for himself and discerned logical and common sense solutions.

Leandro had an advanced vocabulary for his age, and used terms in a meaningful
way, especially in his texts. He exhibited ample curiosity about many things, and usually
read books to satisfy his curiosity. Teachers said he was fluent in generating ideas and
solutions to problems and offered unusual responses to them. Leandro thought he was
creative because he had his own opinion about things and was original. He was
intellectually witty and liked to use his imagination to manipulate ideas and enrich his
written compositions. He liked to illustrate his own texts. He was also creative in his
composition. He was perfectionist, and self-critical of his own production. He lacked
confidence in himself, although he always seemed to know everything. Teachers said he
used to write very well, but his handwriting was difficult to understand, which also
reflected his personality.

He was also perceived as a very motivated student. Leandro could become
absorbed and genuinely involved in certain topics or problems that caught his attention.
He was very quiet, shy and did not like to ask questions in class. His preferred learning
styles were Independent Study and Programmed Instruction. He liked to work with
adults. However, he loved to help his peers with their class work. The best thing he had done at school was helping people with math problems. He was organized and liked to bring structure to people and situations.

In his spare time, Leandro liked to read; he used to prefer adult level books, such as the Jostein Gaarder’s novel, *Sophie’s World*. His sister, who studied philosophy at the university, discussed philosophical theories with him. He had a great interest in several “adult” problems and social issues, more than usual for his age level. Challenge, for him, was to work for social equality in society. It would make a great difference in his life and he found it important to fight for it in his adulthood.

Leandro was quite concerned with moral values and often evaluated events, people, and things. Nonconforming, Leandro assessed critically the traditional teaching process. He was not happy with the teaching methods; he would like to have teachers who would pay attention to education, would be more centered in the students’ learning process, and would be able to revise the subject with the students. However, he did not have a teacher like this. He would like a different school where they teach by experimentation and manipulation of materials. The enrichment program would be better if it had school games made by the students, computers, and books.

Leandro’s family motivated him to do well at school, buying him books and helping him to satisfy his thirst for information. The books stimulated his curiosity and gave him more motivation to search for excellence at school. In the future, he pictured himself graduating in psychology and seeking another university degree.
Emilia

<table>
<thead>
<tr>
<th>Parents' profession &amp; Educational level</th>
<th>Raven's SPM</th>
<th>TCT-DP (A+B)</th>
<th>SRBCSS highest ratings (earned / total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father Food technician-Incomplete Secondary level</td>
<td>95+ Level 1 of intelligence</td>
<td>A Far below average level of creativity</td>
<td>leadership (38 / 40) artistic (38 / 44) planning (48 / 60)</td>
</tr>
<tr>
<td>Mother Housewife-Incomplete Primary level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Siblings: 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Position: oldest</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Student's perception: Talents: Good memory and learning academic subjects with ease. Strengths: Portuguese; math; social studies; science; art; English. Interest: Math equations; reading; history. Preferred styles: Peer teaching; Lecture. Ways to learn: Talking with others; Working with a partner; Listening to a speaker.

Emilia was at the enrichment program for 1 year. She described herself as cheerful, affectionate, and persistent. She felt praised and privileged to be chosen for the program, and comfortable with the gifted label. The ideal student, in her perception, was like her, creative, studious, attentive, liked to please the teacher, and rewarded the teacher’s work. Emília liked her Portuguese teacher because she was knowledgeable, proposed different activities and explored students’ abilities. The resource room Portuguese language teacher, Eulália, said Emília was an ideal student. She wrote very well, had strong social relationships, and was open-minded. She seemed to have no conflicts at all in her life. She was always in a good mood, and sometimes she called Eulália at home only to say she was missing her. She liked games and chess, and she was very polite.

Emilia showed several characteristics of leadership, as observed by her teachers. Emília participated in most social activities at the school. The best thing she remembered about school was related to the Science Fair, where she could manipulate experiments (she did a physical experiment with primary colors) and present information to the public.
(such as the mouth hygiene). She liked experiments and the opportunity to show what she had learned. Emilia carried responsibility well.

Teachers recognized Emilia’s artistic characteristics, although the art teacher suggested that she needed more practice with her drawing skills. Emilia liked to participate in art activities, and try out different media. Emília was a very motivated girl, according to both teacher, Florinda (Arts) and Eulália (Portuguese). She liked fine arts, drama, and music. Teachers said she often arrived at unique solutions to artistic problems. However, Emilia did not perceive herself as creative in arts. She liked to receive exact, detailed instruction for doing something. Emilia liked to draw, but she found it hard to create without a theme to follow, or someone’s suggestions. She concentrated for long periods on art projects and her artwork revealed balance and order. Self-critical, she set high standards of quality, and often elaborated upon her creations. She was persistent in seeking task completion, and strived toward perfection. She felt more creative when she was in drama class and could connect drama and comedy to school plays.

Teachers said Emília presented some strong planning characteristics. She was able to organize well her work, and plan the steps of a project, taking into account time and sequence. She could anticipate consequences of actions and was good at establishing priorities when organizing activities. Emília liked strategies games, such as chess and War and liked to participate in school tournaments.

Emilia’s strongest self-concept was scholastic. She was confident that she had an excellent memory. She thought she was intelligent because she learned things easily. Emília liked all subjects, specially Portuguese, history, and math. She usually got the
highest grades in all subjects and was the top student at her class. She was an avid reader, and liked to read about social issues and history. She was good at writing, and had repeatedly received praise for the quality of her compositions. She said: “This week I wrote a composition about unemployment; I received the best grade on it. I love to read, and when it is an interesting theme, I don’t want to stop. When I am interested in a topic, I like to write about it.” She had strong verbal abilities; in her interview, she used meaningful, rich words to express her feelings and thoughts. She complained about the repetition of content (as had happened in the history class) and her need to go deeper in the subject. Emilia was curious about the content; she got excited about studying different things. She asked questions to clarify her comprehension in all subjects.

However, teachers did not recognize her Learning characteristics on SRBCSS. Teachers gave her low ratings on verbal skills (has unusually advanced vocabulary for age or grade level; uses terms in a meaningful way; has verbal behavior characterized by "richness" of expression, elaboration, and fluency), stock of information (possesses a large storehouse of information about a variety of topics, beyond the usual interests of youngsters his age) and reading (reads a great deal on his own; usually prefers adult level books; does not avoid difficult material; may show a preference for biography, autobiography, encyclopedias, and atlases).

Emilia’s preferred learning style was peer teaching; she knew how to explain things to others well. However, Emilia’s resource room teachers mentioned that she preferred to work independently and required little direction from adults. Emilia stressed in the Total Talent Portfolio and interview that she did not prefer Independent Study and Projects, which were often used in the enrichment program.
Emilia was motivated to excel at school for two reasons: she wanted to honor her parents; and she wanted to be successful. She was very respectful of her parents, helped her mother with the housework, and attended church.

Studying was not a challenge for her, because it was too easy. Most challenges were related to her family. His father was a baker and, although having 20 years of experience, lost his job as a food technician manager at a big market. He had to accept a job as a bricklayer. She helped as she could, saving money for the bus fair, helping her mother. She knew how hard she had to work to get a good job in the future. She pictured herself, then, married, with a united family, working as a physician. She wanted to go to medical school or choose some emerging field, where she could apply her talents and abilities.

Students’ Perceptions of Creative and Intellectual Characteristics

The second part of this chapter presents a cross-case analysis of the major findings related to the following aspects of students’ perceptions: (1) Abilities, interests and learning styles; (2) Personality variables; (3) Creative and intellectual characteristics. (1) Abilities, Interests and Learning Styles

Students’ perceptions of their talents were influenced by their abilities, interests, and learning style preferences, which played important role in the identification of students’ strengths and were influential in the development of their cognitive and non-cognitive traits.

The Total Talent Portfolio described students’ approaches to learning, general and specific interests, preferences and strengths, activities outside school, family activities, or projects at home, perceived talents, and future plans and projects. Data analysis revealed
that students, in general, enjoyed all subjects. They enjoyed school and found it difficult to select disciplines they did not like. With respect to general interests, almost all students were interested in geography and science, followed by performing arts (fine arts, drama, and music), history, and technology. More than half of the students were interested in math, creative writing, chemistry, physics, athletics, and social action.

Table 11 presents students’ preferences and strengths in different subject areas. Students may be very strong in one area without being particularly fond of it. While the majority of the students selected science, geography, and arts as the disciplines in which they excelled, only half of them liked these disciplines. Almost all of the students said they liked writing, but only a few admitted being good at it. Of the students who thought they were good readers, just a few declared to be fond of this subject. They also liked working with writing and grammar in Portuguese.

Table 11

Students’ Preferences and Strengths in Subject Areas

<table>
<thead>
<tr>
<th>Preferences &amp; Strengths</th>
<th>Good at it</th>
<th>Like it</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Science</td>
<td>11</td>
<td>84.6</td>
</tr>
<tr>
<td>Geography</td>
<td>10</td>
<td>76.9</td>
</tr>
<tr>
<td>Arts</td>
<td>10</td>
<td>76.9</td>
</tr>
<tr>
<td>Reading</td>
<td>9</td>
<td>69.2</td>
</tr>
<tr>
<td>Mathematics</td>
<td>8</td>
<td>61.5</td>
</tr>
<tr>
<td>History</td>
<td>8</td>
<td>61.5</td>
</tr>
<tr>
<td>PE</td>
<td>4</td>
<td>30.8</td>
</tr>
<tr>
<td>Grammar</td>
<td>4</td>
<td>30.8</td>
</tr>
<tr>
<td>Music</td>
<td>4</td>
<td>30.8</td>
</tr>
<tr>
<td>Writing</td>
<td>3</td>
<td>23.1</td>
</tr>
<tr>
<td>English</td>
<td>2</td>
<td>15.4</td>
</tr>
<tr>
<td>Astronomy</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Note. n=13. Students chose multiple responses. Therefore, responses do not add to 100%.
According to their Total Talent Portfolios, the special topics students liked and were interested in were related to the arts and science. The special topics in the arts were paintings, drawings, drama, music, singing, comic strips, and sculpture. More than half of the students enjoyed science experiments, astronomy, genetics, human systems, and chemistry. A number of students mentioned special topics they liked the most in math (equations, calculation, and geometry) and social studies (wars, maps, regions, and countries). Students talked about their strongest content area during the interviews:

I like almost everything; I am good at reading, math, history, etc. I am better in geography and sciences. My grades are not so bad; they are between 6.5 and 9.0. I am not the type to study for a test, but I pay attention in class. I also have talent for physical education; I play soccer a lot. (*Caio, 11/male/grade 6*)

I like it very much to deal with numbers. I find it fascinating; it is a challenge to work with equations. But here in the resource room I don't work with math, only with arts. [Do you get good grades in math?] I do. In the last two months I got 9.5, and last year I got 10 in math. (*Lidia, 15/female/grade 8*)

Students’ learning styles were documented in the Learning Styles Inventory and the Total Talent Portfolio. The majority of students favored Discussion, as showed in Table 12. Programmed Instruction, Peer Teaching, Games, and Lecture are other styles students liked. Students did not prefer Projects and Independent Study, which were the teaching styles often used in the resource rooms. Lecture and Drill, and Recitation were the predominant teaching methods in the general education program.
Table 12

Students' Learning Styles Preferences

<table>
<thead>
<tr>
<th>Learning Style</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion</td>
<td>11</td>
<td>84.6</td>
</tr>
<tr>
<td>Programmed Instruction</td>
<td>10</td>
<td>76.9</td>
</tr>
<tr>
<td>Peer Teaching</td>
<td>10</td>
<td>76.9</td>
</tr>
<tr>
<td>Games</td>
<td>9</td>
<td>69.2</td>
</tr>
<tr>
<td>Lecture</td>
<td>9</td>
<td>69.2</td>
</tr>
<tr>
<td>Drill and Recitation</td>
<td>8</td>
<td>61.5</td>
</tr>
<tr>
<td>Simulation</td>
<td>7</td>
<td>53.8</td>
</tr>
<tr>
<td>Independent Study</td>
<td>6</td>
<td>46.2</td>
</tr>
<tr>
<td>Projects</td>
<td>4</td>
<td>30.8</td>
</tr>
</tbody>
</table>

Note. n=13. Students chose multiple responses. Therefore, responses do not add to 100%

Students also chose their most preferred ways of learning in the Total Talent Portfolio. Most students liked learning through Making/doing/moving activities, followed by Talking with others. More than half of the students also liked Choices and options, Working in a group, and Listening to a speaker (see Table 13). Although students liked these ways of learning, they did not consider themselves being good at them. Students thought they were good at Games, Reading, and Working alone; however, most students did not like Working alone.
Table 13

Students' Most Preferred Ways to Learn – Total Talent Portfolio

<table>
<thead>
<tr>
<th>Ways to learn</th>
<th>Like</th>
<th></th>
<th>Good at it</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
<td>%</td>
</tr>
<tr>
<td>Making/doing/moving activities</td>
<td>10</td>
<td>76.9</td>
<td>2</td>
<td>15.4</td>
</tr>
<tr>
<td>Talking with others</td>
<td>9</td>
<td>69.2</td>
<td>5</td>
<td>38.5</td>
</tr>
<tr>
<td>Choices and options</td>
<td>8</td>
<td>61.5</td>
<td>4</td>
<td>30.8</td>
</tr>
<tr>
<td>Working in a group</td>
<td>7</td>
<td>53.8</td>
<td>4</td>
<td>30.8</td>
</tr>
<tr>
<td>Listening to a speaker</td>
<td>7</td>
<td>53.8</td>
<td>7</td>
<td>53.8</td>
</tr>
<tr>
<td>Games</td>
<td>6</td>
<td>46.2</td>
<td>10</td>
<td>76.9</td>
</tr>
<tr>
<td>Reliving/Pretending</td>
<td>6</td>
<td>46.2</td>
<td>7</td>
<td>53.8</td>
</tr>
<tr>
<td>Computers</td>
<td>6</td>
<td>46.2</td>
<td>5</td>
<td>38.5</td>
</tr>
<tr>
<td>Working with a partner</td>
<td>6</td>
<td>46.2</td>
<td>5</td>
<td>38.5</td>
</tr>
<tr>
<td>Reading</td>
<td>5</td>
<td>38.5</td>
<td>8</td>
<td>61.5</td>
</tr>
<tr>
<td>Watching/Viewing</td>
<td>5</td>
<td>38.5</td>
<td>7</td>
<td>53.8</td>
</tr>
<tr>
<td>Working with an adult</td>
<td>5</td>
<td>38.5</td>
<td>7</td>
<td>53.8</td>
</tr>
<tr>
<td>Detailed directions</td>
<td>4</td>
<td>30.8</td>
<td>6</td>
<td>46.2</td>
</tr>
<tr>
<td>Working alone</td>
<td>2</td>
<td>15.4</td>
<td>8</td>
<td>61.5</td>
</tr>
</tbody>
</table>

Note: n=13. Students chose multiple responses. Therefore, responses do not add to 100%

Students were asked to describe the best thing they ever had done in school.

Almost half of the students described activities related to their academic abilities and artistic skills. Students described academic activities such as: homework routine at 2nd grade; a composition that was praised by the teacher; a Science Fair project on mouth hygiene; a game developed with electrical circuits. Some students described the activities:

One day I made a small project, like a game. It was in Science class. The teacher said that we would have a class where we would be in command, that we could give that class for the teachers. Then, she divided the class in small groups, and we chose to work with electricity. Everybody in our group worked a lot on this project. On one side it had some calculations, and on the other the results. Then, I placed a lamp, and one of the threads of the lamp was placed on the calculation side, another on the results. If the calculations
were correct, the light went on, and if it was not right, the light went out. I got the main idea from a book, *Young Scientists*. I saw a small illustration, and I made a very big one. (Henrique, 12/ male/ grade 7)

I made a composition about the treaty of Brazil’s new divisions, and my work was the most beautiful – I mean, it was not made on computer, but was neat. The teacher said to the whole class that it was the most beautiful work in content. (Túlio, 11/ male/ grade 6)

Other activities students considered as the most interesting things they had accomplished at school were related to their artistic abilities, such as: an especially well-done canvas painting completed in just a few days; the presentation of artwork at a Science Fair; three dimensional drawings for the art teacher. Students said:

A picture of Spice Girls that I’ve painted this year. I am talking about a real painting, which is now in Minas Gerais. I took it to show my father, who lives there, and my mother asked me to give it as a gift to him. I was a little behind in finishing it because I was absent of the resource room for several days. So, I began and finished my painting in one day. (Dino, 10/ male/ grade 4)

Last year, when I participated in the Science Fair, I presented the spinner. It is a drawing of the primary colors; when we spin it, the secondary and tertiary colors appear. The experiment was cool, presented by the resource room students. I like this kind of thing, to carry out tests and to show them; it is great! (Emília, 14/ female/ grade 7)

Other students expressed that their most significant work at school was related to their interpersonal abilities, such as helping others, being useful at class. They commented:

In 7th grade I was nominated math coordinator in class. The teacher chose me and another girl, because we had the best grades in that semester in class, and he asked us to help the others to do their homework, like a monitor. I was noticing who had doubts, so I was there and explained it, and this lasted the whole year. I felt wonderful helping people, but I never had another opportunity. (Lidia, 15/ female/ grade 8)

The best thing is when I can help people in the subjects they have some difficulty, especially in math. I like this teaching role, to teach math problems, to help the guys when they don’t understand the content. (Leandro, 13/ male/, grade 6)
Students said they liked things in school that were different from their routine and involved active participation. They enjoyed opportunities to validate their own abilities, to make meaningful choices, extra-curricular activities, challenges, and the role as teachers.

(2) Personality Variables

The gifted students portrayed themselves in very positive ways. The majority of students described themselves as playful and talkative (clown; good sense of humor; amusing and cheerful); sociable (friendly, cool, fine, affectionate, helpful and cooperative); and tenacious (stubborn, likes to defend or give opinions; persistent; and responsible). Students also referred to themselves as affable (polite, sincere, open, respectful and humble); clever (intelligent, problem-solver, and smart). Two students listed their perception of their own characteristics:

Sincere, humble, a little bit stubborn. I also like to defend my opinions. I don't like to lose; I like to win in my opinions. For example, I never question my brother's opinions, but he likes to question mine. It is a mental exercise between us. (Cadu, 17/ male/ grade 8)

Cheerful, affectionate, fighter. I go for what I want, until I get what I want. (Emilia, 14/ female/ grade 7)

Self-concept

The Self-Perception Profile for Children (Harter, 1985) assessed children's judgments about their competence and worth as a person, as described in the Chapter Four. Table 14 depicts the strongest and the most important self-concept of students, according to The Self-Perception Profile for Children (n=9). Four students did not complete the instrument correctly. Data analysis indicated that the students' strongest self-concept were Global Self-Worth and Scholastic Competence, followed by Behavioral conduct.
Table 14

**Strongest and Most Important Self-Concept – Self-Perception Profile for Children (n=9)**

<table>
<thead>
<tr>
<th>Domains</th>
<th>Strongest</th>
<th>Most important</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Global Self-worth</td>
<td>7</td>
<td>78</td>
</tr>
<tr>
<td>Scholastic competence</td>
<td>7</td>
<td>78</td>
</tr>
<tr>
<td>Behavioral conduct</td>
<td>6</td>
<td>67</td>
</tr>
<tr>
<td>Physical appearance</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>Athletic competence</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Social acceptance</td>
<td>1</td>
<td>11</td>
</tr>
</tbody>
</table>

Global Self-Worth domain is the extent to which children like themselves and are happy with their lives. Scholastic Competence refers to children's perception of their competence or ability within the realm of scholastic performance. Behavioral Conduct refers to the degree to which children like the way they behave, do the right thing, act the way they are supposed to and avoid getting into trouble.

Scholastic Competence was the most important self-concept, closely followed by Behavioral Conduct. It is important to note that these domains were selected by more than half of the students. Students documented their strengths in the two areas and they also agreed they were the most important domains.

Although students reported sensitivity toward being different or labeled as gifted, they had a strong global self-concept. The majority of participants referred to jokes, nicknames, mockery, pressure to excel in several areas, and expressions of different interests as the most common ways their peers reacted toward them in the school. However, most of them said giftedness was part of their lives and they just had to live
with it. Involvement in the gifted program positively influenced their global self-concept.

One student commented:

I find it good to be at the resource room, because everybody is friendly, and we are all in the same boat. In 7th grade they used to call me geek. But I stayed in my place, I let it go. I have some interests that my friends don't have, or they are not interested, so I feel different. Some subjects, as politics, depending on the case I give more priority to it than to some chats with my classmates; and I sometimes find the chats boring, foolishness, or I think it is not the right time to think about it. *(Lidia, 15/female/grade 8)*

Motivation to Excel

Students described their motivation in school. For the majority of participants in this study, their motivation to excel at school was predominantly extrinsic. A determination to succeed in their professional future; to meet their family expectations; to graduate and go to high school and college were their goals. Students said:

I want to excel to honor my parents, because we know that nowadays this issue is very difficult. It is also because I want to be somebody in life, take a different direction; because today several students are interested in going to high school and everything else, but they can't get a job. You have to grow in life, be somebody different, and get a good job, a good life. *(Emilia, 14/female/grade 7)*

It is my conscience that tells me. It is a voice inside me to get good grades, to pass the school year; to get a job, to be successful in life, to buy permanent things. When you have good grades, then you realize that you have a future, and you are going to be a good person, you are going to get a job. In the future, I want to have a good job, and earn some money. I want to be a lawyer. *(Caio, 11/male/grade 6)*

One student expressed an intrinsic motivation to excel:

It is the feeling that I have when I am drawing: happiness, sadness, hate, those feelings come out in the painting. If I paint without any feelings, nothing comes out *(Rubens, 15/male/grade 8)*.

(3) Creative and Intellectual Characteristics

Data analysis showed that the majority of the students perceived themselves in very positive ways in relation to their creative abilities. They were more creative when
they were using their imagination (writing a composition; adapting and creating stories; using their imagination); and thinking in divergent ways (having a lot of interesting ideas; inventing something new; having different and original ideas for their artistic activities; cooking new recipes; finding a different strategy at chess; elaborating upon ideas). Some students talked about their creative abilities:

I do. I create stories, I invent things, when I can't do something, I invent other ways of doing it. I have a lot of imagination. That's why I like puppets; I set my imagination free, and I create stories playing with my puppets. I like to create new things, to be able to create, not always to be in the same routine. (Sena, 12/male/grade 6)

I am very creative. But in the end it is very tiresome, because I like to create stories, to elaborate them, and I don't get tired until everything is perfect; I keep doing it the way I want, that I have planned. (Rubens, 15/male/grade 8)

Yes, I am creative, because I like to invent games, other things. For example, in the kitchen, I like to make candies, and I mix two recipes to see what comes out. When I draw, I like to do it in a more original way instead of following a theme or copying. I think it is better if we do it like this, because we are waking up our abilities. (Lidia, 15/female/grade 8)

Students were asked how they perceived their intellectual abilities. Most students considered themselves intelligent because of their knowledge. They performed well in school tests; earned good grades; learned easily; improved their knowledge; paid attention in class; knew how to explain things to others well; memorized details; questioned everything and were well informed. Their personality traits also helped them to succeed. They were hardworking, motivated, worked hard, understood other people and helped them. Student shared their perceptions about intelligence:

I am intelligent, I learn things easily, and I also know how to explain things to others well. I try to take advantage of the opportunities I have. I am very interested in what I do at school. (Emilia, 14/female/grade 7)

Some students believed they were intelligent because of their creativity. They had different points of view; created knowledge; and used their imagination to solve
problems. Other perceived intelligence as a basic trait that everyone possesses. Two students discussed their opinions:

I consider myself a common person, like all the others, but who has developed his intelligence. Everybody has the same capacity to have a high IQ; even the dumbest person has this capacity; but he/she has to develop it. And some develop it more than others. (Túlio, 11/ male/ grade 6)

I think I am intelligent. It is like I explained to you before. To be intelligent you can not copy, or cheat on tests. I am intelligent, I am a painter, these kind of things, but only because of my imagination, everything comes from my imagination. I dream and I draw what comes to my imagination. An intelligent person is also creative; but he/she has to dominate it. I have dominated it. (Dino, 10/ male/ grade 4)

**Research Question 3**

*How do teachers and students define intelligence and creativity and describe the behavioral manifestations of these constructs?*

This section will describe teachers and students' perceptions of creativity, intelligence, and giftedness and the core categories that emerged in the analysis of the information gathered during this study.

*Teachers’ Perceptions of Intelligence*

Teachers (N=15) were asked to define intelligence. Their responses were organized by the following categories: intelligence as reasoning and knowledge; and intelligence as creative thought.

*(1) Intelligence as Reasoning and Knowledge*

Teachers defined intelligence as the capacity a person has to maintain information, and develop and transfer the experience to another situation in the process of learning. Intelligent students were those who did not need to study. They learned things easily and with little effort; they grasped concepts quickly. Teachers explained their perspectives:
It is the capacity you have to keep the information, of developing and transferring that experience you had in another situation, which is almost the same thing as learning. (Cristina, Fine Arts)

More intelligent persons get to do everything they want more easily. A student who has a well sharpened intelligence and goes to school takes a good advantage of the little time of class, with little explanation, little stimulation, he finds it easier to catch things. (Suzana, Fine Arts)

It is to do things with ease; it is the person who learns easily, and does everything with little effort. My intelligent students need to study too little or nearly nothing, and with little instruction they grasp everything easily. (Eulália, Portuguese language)

Resource room teachers also indicated that intelligence was the ability to create and develop concepts and ideas without repetition. One teacher explained her definition:

Intelligence is the capacity to develop your own concepts and ideas. It is not intelligent if you read 10 books and later on repeat all those concepts. For me, to be intelligent is to be capable to create your own concept, your own ideology, and your own point of view. (Eliane, Portuguese language)

Intelligence was described by some teachers as an innate trait, which everybody possesses in different degrees. They perceived intelligence as something deeper, basic, which allowed people to create and function in the world. One of the teachers expressed it in a metaphorical way:

Intelligence is something deeper, basic. The intelligence is like wallpaper, it is from it that you can create, and you can act. (Iara, Portuguese language)

Therefore, intelligence was perceived as a gift that a person was born with. It was regarded as unique and multifaceted. Although inherited, teachers believed it was developed through knowledge acquisition and experiences, as indicated by their comments:

It is a gift that a person is born with, but she can improve and develop it by the means of information she gets in her lifetime. It can happen through her experiences, her readings, sharing experiences with others, so things can be improved. (Irene, Portuguese language)
Intelligence is something intrinsic, internal. It is the two things: unique and multifaceted. The difference is in how people see it and how they use it. It is an individual, innate thing, but it is more than that. Everybody possesses it, but in different degrees. (*Alice, Fine Arts*)

(2) *Intelligence as Creative Thought*

For several teachers in this study, intelligence was related to creativity. Intelligence was the ability to think, and to create. Therefore, intelligence helped people find solutions, solve problems, and recognized problems that needed attention. Teachers explained:

Intelligence is something complex. It is a good ability to think, to reason, to innovate. I think intelligence can be stimulated. I think it is an inborn ability; it can be developed, but part of it is inherited. It is like creativity, because it involves innovation, since an intelligent person who does not receive any stimulus can have his/her intelligence stagnated. I think both are related. (*Jandira, Artistic Education*)

Intelligence and creativity are related, in my opinion. Intelligence is creativity. It is the ability to solve problems, or even to create problems. (*Maria das Graças, Psychologist*)

I think intelligence is the capacity that a person has to find solutions for situations. I think there is no possibility to have creativity without intelligence, and there is no intelligence without creativity; I think the two are very connected. Intelligence is creative starting from the moment you grasp the facts. (*Orlanda, Portuguese language*)

(3) *Intelligent Persons*

Teachers were asked to nominate an intelligent person. Some teachers nominated more than one person. Results showed that choices were diverse: They nominated more often scientists (Carl Sagan, Lavoisier, Stephen Hawkins, and Einstein) and artists (Jorge Amado, Leonardo Boff, Paulo Coelho, Chiquinha Gonzaga, and Chico Buarque). Teachers nominated people recognized as geniuses in the world, because they were visionary and creative. One teacher said:
I would say Burle Marx, Carl Sagan, and Stephen Hawkins; I think they are very intelligent, each in one way. I am very impressed by Stephen Hawkins, because of his extraordinary capacity and the changes he brought to the field of physics. His book, The Universe in a Nutshell, is very interesting. (Alice, Fine Arts)

Teachers acknowledged that some people were chosen because of their ability to apply knowledge of their fields in music and literature, which reaches all people. They explained their choices:

Chico Buarque. His music, his lyrics touch us inside; I think he reaches every layer in society, the rich and the poor, those who have formal education or not. He does not use complicated words, but a simple, beautiful vocabulary. It is a sign of high intelligence. (Jandira, Artistic Education)

I think writers in general, Jorge Amado, for example, has great ideas for his books; he uses his intelligence, and he can be recognized by the quality of literature he produces. (Maria Isabela, Fine Arts and Drama)

Finally, teachers stressed that intelligent people are those who create original ideas and demonstrated interpersonal abilities, such as: the ability to do things for others; to sustain a family with a few resources; to show persistent behavior; and to motivate students. One teacher commented:

I would say so many names, like Einstein, Lavoisier, and Chiquinha Gonzaga; those are names globally recognized. In another level I consider my mother. In spite of being semi-illiterate, she was a very intelligent person. She had been through a lot of pressure in her life, but she knew how to do what she liked without imposing it; she attracted people with her kindness. She sustained all the family. Intelligence is to have this persistence. (Orlanda, Portuguese language)

Teachers’ Perceptions of Creativity

(1) Creativity as Divergent-Thinking Ability

Teachers were also asked to define creativity. The major theme that emerged from the data analysis was creativity as divergent-thinking ability. Creativity is doing things in different and imaginative ways, to see alternatives, as indicated by the majority of
teachers. Several teachers stressed keywords in their definitions of creativity, such as invention, change, product improvement, and transformation. Creativity was described as the ability to transform objects or materials from one state to another. Some teachers believed it was not necessary to be famous or recognized to be creative. Invention and transformation were stressed in the teachers' definitions:

I think it is to transform, for example, a paper into some object, a newspaper page into a sculpture; I think it is to transform objects, materials, from a state to another, not with such sophisticated material, but with anything. It is to invent something in very simple, ordinary way. (Suzana, Fine Arts)

For me, a creative person is someone who tries to change something that is not perfect to something ideal, a thing that is not very good, to make an improvement on it. The person is not happy with the situation, so he or she wants to change it, to transform it. Creativity involves a certain invention. (Maria Isabela, Fine Arts and Drama)

I say that creativity is when you have a mark on a blank paper and you can transform this mark into a number of other things. Creativity, for me, comes from the transformation. I believe that nothing else can be created; everything was already created, and now things have to be transformed. I think the creator is that great transformer. I told you that I was very poor until my adolescence. It was incredible to see my colleagues very well dressed and I was buying my clothes on sale. But I always create something interesting. Sometimes an earring, I transformed it into a fastener, or a fastener into an earring or a pendant; a scarf transformed into a belt. I think I am creative in those things. I am not the type of person who makes a "boom" in creativity, but in small day-to-day things. That is what I find interesting in my work with my students. I show them that to be creative it is not necessary to be a star, and everything that they are doing is interesting, is creative. (Orlanda, Portuguese language)

Therefore, creativity involves modifying or changing things in innovative ways. Concepts or products that already exist are enhanced; unusual things are made with limited resources, such as scrap materials; the most common things are viewed differently, which goes beyond the common. Teachers expressed their viewpoints:

Creativity involves invention, to create new things, to transform. It is to get a concept that already exists and work beyond it, to make it broader, involving more aspects. I think that the creative student is not afraid to expose his ideas,
the way he likes to work and think. He/she is not afraid to do different things, to work with the material in a different way that nobody has done before. In my area, the creative student is the one who likes to invent stories, to dramatize situations, and even to create a different technique. (*Jandira, Artistic Education*)

It is what the student does in a different way. Like R, who makes fantastic things with little resources, using scrap materials. He does something very unusual with anything he has; he is an innovator. (*Eulália, Portuguese language*)

Creativity is the ability to improvise, to respond quickly in an original way, and to create solutions to problems, as described by teachers:

Creativity is for you to have the time of improvisation, which comes from nothing. When I am giving classes I think am very creative, because I am able to do it, to change fast. If I see that it is not right I am able to move fast to another approach, I try to find a way. (*Renata, Music*)

Creativity is also the ability to be original, to create solutions and problems, to solve things in an unusual way. (*Maria das Graças, Psychologist*)

Some teachers also stressed affective, emotional, and personal traits in their definitions of creativity. Motivation, flexibility of mind, willingness to take risks, courage, fluid imagination, excitement, and joy of the search and discovery of new things, and good sense of humor were personality traits that described creative people:

Creativity is something explosive, because it is something interior, a lit flame that sometimes increases. It is to see the most common things in a different way, it goes beyond the common. Everybody has that, but not everybody is aware of that; some suffocate this creativity by not believing in themselves. Creativity is exhibited in those people who let all this appear. Creativity is also to see different alternatives for things. (*Alice, Fine Arts*)

Creativity enters at any moment, any project, but it is not regularly addressed at the school. Each person has his creativity, his motivation, and likes to elaborate things in different degrees. One shines more in one area than another. (*Bernardo, Biology*)

Creativity is the power to change things with good sense of humor. In order to be creative you have to have a very good sense of humor. I like to create. I don't like normal things or things that are already there, ready. I like novelty;
for me, routine is not very good. I change everything that I can around me, to see how they would be if it were different. (Eliane, Portuguese language)

(2) Creative Persons

To investigate teachers' definitions of creativity, they were asked to nominate a creative person on the national or international scene. Their choices were diverse; some teachers nominated more than one person. Artists (e.g., Escher, Ioko Ono, and Burle Marx) were nominated more often as creative persons, followed by school personnel, and other people (e.g., any person who lives with minimum wage in Brazil).

Teachers nominated creative persons because of one major trait, which is applied knowledge. Most of the teachers believed creative people were knowledgeable in some discipline, solved practical problems, and used logical thinking. Teachers said:

The person who I find very creative is B. M., a professor at University of Brasilia. She is shy, but very creative. She is a great teacher of history of the arts. She has a great knowledge in this area; we are crazy about what she says. (Florinda, Fine Arts and Drama)

In Brazil it is a person who lives with the minimum wage. Historically, there is Leonardo da Vinci. He had the gift to be curious about humanity. He was a person who always looked for something that had not been done before, but always starting from something. He was a very intelligent person. (Cristina, Fine Arts)

The creative person has the ability to solve problems he/she confronts in life; in this way, it can be equated to wisdom, curiosity, intelligence, and motivation to do things that have not been done before. One teacher shared her perception of creativity:

I say "my mother" because of her life history. She had 10 children; my father abandoned her, and she worked with dignity to sustain us in a very good way. I think she is a heroine, a wise, creative person; creative even in the form of food. I find food a sacred thing. Those things that, today, are seen as alternatives in the kitchen, she always did it. More than 40 years ago she did it for us to survive, not to be hungry, and not to die from hunger. I think she was creative. If we had nothing to eat, she found a way; for example, the banana tree flower, which today is seen as alternative food, she used to cook it for us. Today they have discovered its nutritious value, but a long time ago
we knew this, we never had anemia problems, nothing, I think due to her creativity. She is a non-educated person, but she was creative, I admire her, I have the highest respect for her. *(Maria Isabel, Fine Arts and Drama)*

For some teachers, a creative person was essentially an artist who applied his/her knowledge in drawings or paintings, manual work, music, writing or in entertainment. A creative person was capable of innovation and improvisation, had very original ideas, and was versatile. Curiosity, humor, sensuality, inspiration, and intrinsic motivation were some of the personality traits presented by creative people, as described by teachers:

*A creative person is Burle Marx [a Brazilian architect/designer]; he has this fire, this lit flame, he doesn’t hold back. He sees several possibilities for creation; he seems very aware of his interior disposition to create. *(Alice, Fine Arts)**

I think he [Jô Soares, a Brazilian humorist and entertainer] is very expansive, he has very original ideas. People are not used to an entertainer as expansive as he is. He dances, he is a versatile man. The other day he set a wrestling ring on the stage, put gelatin on the floor, and he went inside. It was hilarious! I think he has very creative ideas. *(Jandira, Artistic Education)*

I would say Yoko Ono. I have a great admiration for her since she was with John Lennon. She is an extremely creative, sensual person. She is a humanist, an environmentalist, very interesting. I saw her work in an art exhibition. *(Florinda, Fine Arts and Drama)*

I would choose someone in the music field. I think a person needs a lot of creativity to produce good music. When you listen to Beethoven, you can see it is a different quality of music. Today there is nothing so creative; I think nobody has this kind of creativity in the present days. But I find musicians naturally creative in their compositions, I mean, when you listen to a good song you think: how was it possible for a person to create that? It depends so much on inspiration and innovation to produce a piece of music that nobody has created before. I consider musicians creative in general, and painters, too; there is so much creativity in paintings. *(Eulália, Portuguese language)*

Besides reasoning abilities, teachers also recognized that solving problems involved creative thought and divergent thinking abilities. Therefore, creative people are perceived as capable of new inventions, or modifying or transforming things in original ways. The new inventions make other people’s lives easier, according to teachers:
She is very creative [her piano teacher]. She created the group method for piano. It was an enormous progress for the area. Until then, piano classes were individual and very selective. Starting from her, I had the notion of how to do it. Until I took this course, I didn't know this technique; then, for me, it was a fundamental thing that changed my way of seeing piano, of teaching in group and everything. (Renata, Music)

Even the work Leonardo da Vinci has left, his manuscripts, everything was advanced. He idealized them and everything was all right; he thought about the helicopter, which at that time did not exist. For me, he was always ahead of his time, he imagined things that are useful now, are possible. (Bernardo, Biology)

(3) Importance of Creativity

Teachers were asked if it was important for a teacher to be creative. All teachers stressed the importance of creativity in classrooms in two ways: focusing on the teaching and learning process; and focusing on students. Slightly more than a half of the teachers emphasized that creativity was fundamental to education; otherwise, it would be monotonous, and boring. Teachers explained things in different ways and changed the classroom routine. One teacher expressed her opinion:

Creativity is fundamental. Have you already thought of doing the same thing every day in the same way? You must always change a thing that you are already working on and to modify that. You cannot always do things the same way; you cannot always have the same routine. (Cristina, Fine Arts)

Creativity enabled teachers to move forward, and to do something different. In doing so, teachers had more opportunities to adequately address students’ special needs. Teachers said:

When I was a student, I found it extremely tiresome to attend classes that were taught the same way. I liked classes when teachers gave us the chance to be creative. So, I think, for a teacher this is essential. When one reflects about this, the teacher is an actor and the students are the audience. And if he always gives the same show, one day they get tired and people won't want to attend it anymore, because everybody already knows it. Now if he renews every day, if he always has a new text, he will get the students’ attention; and he has to have this, it is essential. (Eliane, Portuguese language)
Creativity is fundamental, indispensable. It is necessary, for the teacher to be creative, that he/she wants something more, wants to progress, has the possibility to do something different. Creativity gives an extra vision of what we already have, of what the person actually is. *Alice, Fine Arts*

Several teachers emphasized that creativity was important to motivate students, to get their attention, and to develop their potential and imagination. Two teachers explained:

*The role of creativity in class is primordial. The teacher will work with children, and each one has a different characteristic. He/she needs a knack to do this, to go ahead without disturbing anyone of them and conquering all of them and to make everyone successful. He has to be creative to work on a team, under the conditions he works, together with other teachers, without making noise, without disturbing the other classes. And he also has to be creative to pass on to the children, the will of discovering things, the curiosity is essential. *Florinda, Fine Arts and Drama**

*I think so, in every area. Creativity is not exclusive to arts, nor of a talent area. I think the Portuguese and math teachers should have a way to attract the student; how can he teach 2+2 in one single way, without motivating students, without showing a colored object, a three-dimensional object? I think creativity in classrooms should be law. It is the only way to fully develop students’ potential. *Maria Isabela, Fine Arts and Drama**

Creativity is essential when a teacher has to work without resources at all, which was a reality for resource room teachers. Teachers stressed that creativity was vital to situations in which they did not have resources or support from other teachers at school.

*The Portuguese language teacher said:*

*The reality is that teachers don’t always have resources; don’t always have posters and books. Then, you have to work with your own intelligence and creativity. *Eliane, Portuguese language**

Teachers’ training is important for promoting creativity in school. One teacher described common practice among teachers, especially in arts, that can be detrimental to students’ creativity:

*[Creativity] is important, and it should be more developed in teacher training courses, or still in college. In arts, it is usual teachers give students a Xerox*
drawing for coloring with the right colors. Some of them even do not know they are inhibiting the student's creativity. The student sees the teacher's drawing, perfect, and beautiful, and then she thinks her own drawing is ugly. Her own creativity will be in jeopardy. She will begin to reproduce the teacher's drawings and can think that she will never reach the point of drawing like the teacher. (Jandira, Artistic Education)

Teachers' Conceptions of Giftedness

Teachers were also asked about their personal definitions of giftedness, and the extent to which intelligence, creativity and giftedness were or were not related. Resource room teachers stressed their uncertainty about a separation of the terms creativity, intelligence, and giftedness. Nevertheless, they agreed that giftedness included expressions of creativity and intelligence, as described metaphorically by one teacher:

Intelligence, giftedness, and creativity are organs of a same organism; one contributes to the development of the other. The three are together, although a person can be gifted without knowing it. (Alice, Fine Arts)

There was a consensus among the definitions presented by the resource room teachers that giftedness represented intelligence or a higher capacity in certain area. Teachers emphasized that a gifted person was advanced in relation to others in the same field due to his/her ability to complete tasks easily, as teachers commented:

Gifted is a kid who finds things easier than the others, who is ahead of the others in some area, in some aspect. He finds things easier than the others do. He/she is not “super,” the plus, the best, unless he/she works a lot on something to be the best one. (Cristina, Fine Arts)

Giftedness is the expression of a talented person doing things with ease in a determined area. She has a gift, a “fair hand” in some area, which is easy for her. (Irene, Portuguese Language)

Teachers understood that giftedness was not evenly distributed in multiple disciplines. Therefore, high ability students were not expected to demonstrate the same level of interest, knowledge, or ability across disciplines. Teachers said:
Gifted is that kid who is not just an Einstein. They are sometimes good in some disciplines and weak in others; sometimes have a talent for certain things and not for another. Some have a general giftedness, but they are not geniuses. People sometimes discriminate against the gifted when they do not get good grades in everything; they demand high performance in all areas (Suzana, Fine Arts).

[Giftedness is] a special capacity to develop a special area. I don't believe that a gifted person is better than others, he only has a special capacity; and may be in one area. There is this myth that a gifted student does well in everything. We know that it is not like this. They won't be good in everything; on the contrary, they will sometimes have more difficulty than others. This is different from genius because nobody is good at everything. (Eliane, Portuguese language)

Several teachers also highlighted in their definitions that giftedness was an inborn potential, a natural gift, which could be stimulated through challenging experiences in the resource room. Two teachers commented:

Gifted is a person with a talent, a grace, a blessing from God. That person came with a load of positive energy, and I think this child needs to be taken care of, since early years. (Florinda, Fine Arts and Drama)

There are also natural talents, inborn gifts, but we can stimulate those, too. Giftedness is a potential that has to be developed, and people have to mobilize resources to help him/her to develop his/her potential. It is worthwhile to invest in the potential the kid has in that area. (Maria das Graças, Psychologist)

Some definitions of giftedness were related to high IQ or the idea of genius. In the following definition, the teacher made it clear that the gifted child will succeed anyway, in spite of environmental stimulus or support. Inborn high ability will prevail over difficulties in life:

Giftedness is those great people, the big ones, with high IQ. It is a gift, not everybody has it, and it is something special. A person can really develop her mind when motivated; if she fights, even without resources, she can go ahead, and she can make it, because she can count on an ability she has. Even if she is not in a program, she can make it because of things she can learn from other people, family, or society. However, it is a dangerous thing for very intelligent people. If they cannot count on other resources to go to the good side, she can get lost and go to the evil side. (Iara, Portuguese language)
Teachers also perceived giftedness as the result of the confluence of intellectual and creative abilities. Teachers noted people's knowledge and outstanding talents applied to their fields; their creativity expressed by the capacity to invent, transform, and discover something different; and their social contributions to society. Teachers commented about gifted people:

I think about those people who have created things are gifted; they have an outstanding level of intelligence. Graham Bell, who invented the telephone, was very intelligent, and also the guy who invented the airplane. Those are inventions of very bright people. (Iara, Portuguese language)

In soccer we have Pelé as a gifted person. I think because he is more famous, he stands out as a world figure. And he is giving back to society; and he is a role model for kids. (Eulália, Portuguese language)

Dulcina de Moraes died two years ago. She founded the Dulcina theaters in Brasília and in Rio. She left Rio de Janeiro, she had a theater, she was at that time the great lady of the theater, and she came to Brasília at the beginning of its construction, and she built a college and a theater. She invested in education and art. Although she had not accumulated money, she left a wonderful legacy. And she is intelligent because of her capacity to transform; she transformed the common, she transformed drama, she made lots of important things in this area. Then, in her conception, these three things were interconnected: intelligence, creativity, and giftedness. And all of them involve this creation, this transformation. It depends on the way you are seeing the world. (Eliane, Portuguese language)

The definition of giftedness for some teachers was seeing the world in a different way, which frequently makes high ability students feel misunderstood in their age group. Teachers also stressed that creative productivity was required to label someone as gifted. Gifted persons were more intelligent and more sensitive and wanted to make a difference in society. One teacher explained:

A person is gifted when she creates something that produces a benefit for society. If the student is still discovering what he/she wants to do or to create, he/she has characteristics of giftedness, but he/she is still not a gifted student. (Orlanda, Portuguese language)
Some teachers also highlighted the fact that gifted students expressed their high ability by means of effort, persistence, and motivation in certain areas or activities. One teacher expressed his opinion:

The gifted [individual] is very intelligent, but not everybody puts that into practice, because of lack of motivation; then, he/she stays in mediocre phase, without interest. Talent is the expression of what someone is capable of doing when motivated. \textit{(Bernardo, Biology)}

By providing above average ability students with appropriate experiences in the resource room, teachers expected that other talent areas would flourish, as indicated in this statement:

It is not necessary to be a genius, but he/she has something else in that area. All teachers here work in this direction, trying to work with students in several areas, so they can have the opportunity to discover a talent in another area. \textit{(Maria das Graças, Psychologist)}

\textbf{Students' Perceptions of Intelligence}

\textit{(1) Intelligence as Reasoning and Knowledge}

During the interviews, students (n=13) defined intelligence and described the behavioral manifestation. One major category emerged from analyses of their perceptions: intelligence as reasoning and knowledge.

For the majority of the students, intelligence was mainly perceived as reasoning ability, which allows the individual to make judgments based on facts and knowledge. Students associated intelligent behavior with the ability to learn, think logically, memorize information, and solve problems. Their definitions included the following:

Intelligence is to memorize things, to keep the information. \textit{(Jair, 10/ male/ grade 4)}

Intelligence is to understand things. \textit{(Lídia, 15/ female/ grade 8)}

It is the ability to process knowledge. It is related to memory and learning abilities. \textit{(Túlio, 11/ male/ grade 6)}
Students also associated intelligence with the ability to learn faster and more easily than other students. An intelligent person was perceived as getting good grades in everything and mastering all subjects. They said:

Intelligent is to be a nerd. It is somebody who knows everything. (*Caio, 11/male/grade 6*)

Intelligence is to know a lot, know how to listen. It is a lack of ignorance; it is to recognize things, to question everything. (*Rubens, 15/male/grade 8*)

Students suggested that the phenomenon involved effort, hard work, enthusiasm, independence of thought, and autonomy. For these students, an intelligent person was connected to what happens around him/her. One student noted that knowledge is not enough; an intelligent person can be knowledgeable, but has to know how to use this knowledge appropriately. Students believed you must be motivated to learn:

It is a person who knows how to learn…. To be intelligent is also to be good in everything, in all the subjects; the person has to learn and work hard, mainly, but always knowing everything. (*Alex, 11/male/grade 6*)

For being intelligent, he/she doesn't only need to get good grades, but be well informed, try his best to know things, to be interested, because, by doing so, you will be developing intelligence. Maybe you are not intelligent for the other people, but you are trying to develop it. (*Dunga, 13/male/grade 8*)

It is a person who knows how to take advantage of the opportunities she has, an interested person; she likes doing what she does. Everybody has the same intelligence, but it depends on each one to explore this intelligence. It depends on how interested each person is. The person will explore it; if she wants to be intelligent, she will be; if not, she won't be. This depends on her. (*Emilia, 14/female/grade 7*)

More than half of the students perceived intelligence as an inherited trait. It is a biological process that allows human beings to perform basic activities, such as walking, listening, and talking. One student explained that “the intelligent person has it already in her head”; and another said: “Everybody is intelligent; there is no such a thing as a stupid person.” This student commented:
Everybody is intelligent; everybody is born with a talent. Everybody has basic intelligence already. I think intelligence is the ability to do something. People are born with it. If a person doesn’t have intelligence, she won’t know how to speak; she won’t know how to use her mouth to make sounds. (Henrique, 12/ male/ grade 7)

Students believed that intelligence can be improved by means of stimulation, experience and practice. Therefore, everybody is intelligent to a certain level and can expand his/her intelligence by just working on it. The quotations below explain students’ viewpoints:

It is to understand things. It is the basis of everything. When you begin to understand, this is intelligence. It doesn't mean that if you don't understand you are not intelligent. I think everybody is intelligent, but each one develops it in different areas. Some people can be more intelligent than others, but in different areas. It doesn't mean that those who get lower grades in class are not intelligent. They can know more than me in other subjects. (Lidia, 15/ female/ grade 8)

I think it is something that has to be developed. Nobody is dumb; the intelligence needs to be worked on, or developed. I learned how to write and read when I was three. But it is not that I am more intelligent than others; it is that my mother worked more with me. A non-motivated person has the tendency to not be intelligent. But for me, nobody is dumb, or without intelligence; everybody has intelligence deep inside; it needs only to be worked on. Like anything you know, you have just to refine it to know more. (Sena, 12/ male/, grade 6)

Students believed that it was necessary to have a strong knowledge base in any field to generate new ideas. Therefore, very intelligent people are also inventive; they seek ways to improve something that is faulty or imprecise. Intelligence and creativity are connected as students noted:

Intelligence is your ability, things that you can do. For example, P., he is very intelligent. He draws. Sometimes the person can be very intelligent and show it through the drawing. It is an artistic expression of his intelligence. (Leandro (13/ male/, grade 6)

I am intelligent, I am a painter, these kinds of things, but only because of my imagination, everything comes from my imagination. I dream and I draw
what comes to my imagination. An intelligent person is also creative; but he/she has to dominate it. I have dominated it. (*Dino, 10/male/grade 4*)

(2) Intelligent Persons

Several interview questions were designed to clarify the meaning of intelligence for students in this study. Therefore, they were asked to nominate an intelligent person, in the past or present. Some students nominated more than 1 person. Nominations included school people, family members, scientists, and inventors (*Einstein, Darwin, and Leonardo da Vinci*).

Students nominated intelligent persons based on their ability to reason, learn, memorize, and solve problems in their fields. According to these students, intelligent people were knowledgeable, well informed, solved problems, memorized information, learned easily, earned very good grades, knew the subject well and questioned everything. Students said:

An intelligent person is a student in my classroom who doesn't get very good grades, but I think he is very intelligent. He is informed, and he knows things. He says a lot of things in the classroom that nobody understands. Sometimes he is the only person that knows the subject. (*Dunga, 13/male/grade 8*)

My annoying brother Jair. My mother is always talking about him; she always says he is intelligent... Well, they say that he is intelligent, he gets things easily, but for me he is a normal person like anyone else. He gets very high grades, and a lot of people come to look at his grades. Let me see... Charles Darwin. Do you know that he got low grades in the school? [Why do you think he is intelligent?] Because he developed his intelligence from nothing. This is the case of a person that developed his memory from nothing, from zero. [You spoke about memory again. So, intelligence is related to memory]. That's right. (*Túlio, 11/male/grade 6*)

My classmate Gabriela. She seems like a calculator; she knows everything, she doesn't commit any mistake, and she is always ahead of everybody; she is the best student in math. (*Sena, 12/male/grade 6*)

Other nominations were focused on knowledge applied to artistic abilities. In this sense, people were considered intelligent because they mastered a technique that allows
them to draw, write in a sensitive way, or to express themselves artistically. Students commented:

My sister D. I don't know if it is true, but in our school, they say that she writes a poem every day. [Then, a person that writes a poem is also intelligent.] Yes. Because she makes an effort with her intelligence. (Jair, 10/ male/ grade 4)

Paulo Coelho [Brazilian writer]. Besides being creative, his books really touch you. I already read The Diary of a Magician. (Henrique, 12/ male/ grade 7)

Douglas. I think he is the best here. He draws well, everything is easy for him. (Dino, 10/ male/ grade 4)

Students also nominated intelligent people based on their creativity. Intelligent persons were inventive, adjusted and adapted the environment, discovered new things, created new theories, pursued their visions, offered innovative ideas, produced new inventions and transformed ideas into new creations. They said:

Intelligence and creativity are different sides, but they join to do certain things, such as a story. Mauricio de Souza is also an example, Ziraldo, too, and to write a poem is the same thing. They join the two things to produce something else. They are intelligent. (Jair, 10/ male/ grade 4)

Everybody is intelligent, but very intelligent, Picasso. No, Picasso no, Leonardo da Vinci, he was very inventive. (Leandro (13/ male/, grade 6)

Some students nominated people due to their interpersonal traits. Intelligent person demonstrated persistence, effort, determination, attention to their surroundings, persuasiveness, and ability to benefit from situations. The following students explained their opinions:

I consider intelligent a person who struggles to study, who studies a lot. (Jair, 10/ male/ grade 4)

My classmate L; she is a very intelligent person. She is determined, she fights for things. (Emília, 14/ female/ grade 7)
M. again. Besides being creative, she is intelligent. I think like this, to be intelligent, people have to think beyond themselves, tied up to what happens around them. This is the beginning of intelligence, because, with that, you can seek forms to improve something that is imperfect. In life, it is not enough knowing things, but you also have to know how to act before that. [Anybody else? ] The school principal. She always tries to find other ways to improve her school, joining the school with the community. She is attentive to the surroundings where she lives, she understands the situation, knows what is good or bad for the school. (Lidia, 15/female/grade 8)

Students' Perceptions of Creativity

(1) Creativity as Divergent-Thinking Ability

Students described their personal definitions of creativity. An analysis of their answers revealed one major theme: creativity as divergent-thinking ability. The majority of students believed that creativity always involves generating multiple, disparate, uncommon and elaborate ideas in response to problems. The creator is a great inventor, who transforms, modifies, and improves upon ideas. Students perceived that invention depends on generating and transforming ideas and products. Therefore, creativity does not always require something entirely new; it can be an improvement of others' inventions. It also involves changing things and bringing novelty to the field, an aspect highlighted by the following student:

It is to modify something; for example, it is to take this pencil, describe it, do something with it, modify it, do things with just one element, invent. It can be a thing that already exists; and you modify it until turning it into a new thing. (Cadu, 17/male/grade 8)

Originality is the aspect of divergent thinking that students most often used in their definitions of creativity. A creative person is original; he/she poses questions that are not usually asked; invents things and transforms ideas in unique way. To be original, a new idea has to be unusual and innovative, according to the following students:
When I can't do something, I invent other ways of doing it. In my cartoons, I never copy anything; I myself create my characters, my jokes. (Sena, 12/ male, grade 6)

Creativity is to do things in a different way. To draw people's attention; for example, the work field today demands a lot of creativity. (Emilia, 14/ female, grade 7)

Creativity also involves fluency of ideas, which come from imagination and inspiration. According to these students, it is the ability to generate and connect several ideas and let the imagination go free. Students expressed their opinions:

Creativity is to have several ideas, connecting them to generate others. Creativity occurs when you are able to imagine and have a lot of ideas. A creative person is like the reader of a book, someone who goes to the author’s imagination, learns from the other’s ideas, and is inspired by someone else. (Jair, 10/ male, grade 4)

Creativity is to give wings to our mind, to fly; we are going inside of ourselves. It is to have imagination. (Dino, 10/ male, grade 4)

Creativity is to have your own opinion. When you are creative, you can have a different world, a world that goes your way, the way that you invented (Leandro, 13/ male, grade 6).

Therefore, imagination and inspiration help creators invent other ways of doing things; to create fantastic, incredible stories; and allow people to enjoy their creations.

(2) Creative Persons

Some of the interview questions were designed to clarify the meaning of creativity for students in this study. Therefore, they were asked to nominate a creative person, either on the national or international scene. Students nominated more than one person. Results showed that most students nominated artists (e.g., Disney, Spielberg, Charles Dickens), followed by inventors and scientists (e.g., Einstein, Leonardo da Vinci, Benjamin Franklin), and family members as creative persons.
The major characteristics of nominees included originality, fluent ideas, and active imaginations. Students perceived creative persons as those who invent, modify, or transform things in original, innovative ways. They emphasized people who discovered something completely new, were ahead of their time, and were considered pioneers by subsequent generations. Students also nominated people for their ability to use their imagination to achieve their goals. They recognized people who shaped the world through their original inventions, products, or ideas. Creative people imagine a world the way they would like it and look for new ways to make it happen. Students explained their nominations:

Einstein, because of the theory of relativity. These scientists were pioneers; they looked for so many things! I think that is creativity. They imagined what it would be, how it would be, and they looked for a new form to communicate what they had discovered. It is transformation of things. (*Lidia, 15/ female/ grade 8*)

Leonardo da Vinci. He did everything he wanted to, he imagined the piston, he drew the project for an airplane, and I think he was the guy who invented the bicycle. I think that everything people value is important. He was recognized later by his talent. (*Dunga, 13/ male/ grade 8*)

For several students, a creative person is essentially an artist, who creates wonderful drawings, paintings or sculptures; writes beautiful poetry; entertain people with humor; and develops special effects to make things seem real on movies. Two students said:

Walt Disney. He made awesome drawings! Duck Donald, Goofy, Mickey Mouse, for example. This one was the most difficult to draw. I also like Mauricio de Souza's drawings. (*Alex, 11/ male/ grade 6*)

I would say my mother, my brother; ah, and Spielberg. I find him very creative for the films he makes, the special effects he added, and because he created several things, as he did in Jurassic Park; he created a program, the special effects, to make this movie so real. [And why are your mother and brother creative?] My mother creates things for parties, she invents things,
and she draws. My brother also, he draws poster advertisements. *(Sena, 12/male/ grade 6)*

The creative person finds it easy to invent things, is more prepared to generate new ideas, and has the ability to use their knowledge to solve problems. In this sense, it can be equated to intelligent behavior. One student talked about his perception of creativity:

Benjamin Franklin, for sure, because he invented the lightning conductor and because he gave the first steps for the conquest of electricity. He didn't discover it, he only learned how to use it; he was very intelligent, and creative. *(Henrique, 12/male/ grade 7)*

*(3) The importance of Creativity*

During the interview, students were asked about the importance of creativity. The majority of children stated that creativity was important to develop in several contexts. They believed creativity made life more interesting and easier; helped people solve problems and escape from daily routines; and directed people to professional success. Students explained:

Yes, creativity gets us out of problems. You get some work to do and you can do it easily, because you can change it a little bit, you can change the pattern of that work; so, if you are more creative, it will be good for you, for the person who receives it, and for society; it is very important. *(Cadu, 17/male/ grade 8)*

Nowadays, if you are not creative, your own life can be boring; if I am doing nothing, or if I am not a creative person, I won't think of anything to do, I will be here for the rest of my life. But if I am creative, I will soon invent something to do. [In terms of your profession, and also of your life, do you think it is important?] It depends on the profession; for example, if I were a painter, it would be extremely essential that I was creative. If I paint without creativity, I won't be successful. *(Henrique, 12/male/ grade 7)*

I think it is important, because marketing today is very competitive and it always wants innovative things. Some years ago it was not like that, it was more theory; but today you have to improve more, know a little more of everything, if you want to get on; and if you are not creative, you don't find a place in the market. *(Lidia, 15/female/ grade 8)*
Students considered creativity as a way of changing teachers’ traditional teaching approach (i.e., teachers writing on the blackboard; lectures, drill and recitation as the major teaching styles) for a more playful and flexible way of teaching. Creativity transformed classrooms into a place for more dialogue; improved the participation of students in class; activities became more pleasant; and content was taught in more original ways. Students found it easier to learn and earn good grades when the teaching method was more creative. The following students said:

Most of the time, yes. A teacher, for example, has to be creative, there is no way out. There are many schoolteachers who are not creative; they don't know how to teach drawing, how to do something to decorate the school. As I want to be an arts teacher, a recreation teacher, it is essential for me to be creative. (Sena, 12/ male/, grade 6)

I would demand a reform in the teaching method, a different method that teaches through experiences. A school that was more active in these things; different, creative. (Leandro, 13/ male/ grade 6)

I have a very creative teacher. He likes to give a different type of class; he uses as examples things that happen daily, in sports or politics, for instance. He is my science teacher. He is playful, extroverted, but serious; he imposes respect, nobody messes with his class. Sometimes he jokes during the class, and we all became relaxed; we learn without noticing it, without the obligation to learn. We all enjoy his class, he is open, creative and uses more dialogue. That is what is lacking in the school. (Cadu, 17/ male/ grade 8).

It is important to be creative because, at school, I can get a better grade. If someone knows the subject well and is creative, his/her grades will be better (Caio, 11/ male/ grade 6).

Students’ Conceptions of Giftedness

Students were also asked about their personal definitions of giftedness, and the extent to which intelligence, creativity and giftedness were or were not related. All students agreed that giftedness denoted a higher ability in a certain area, verified when a person becomes well known for his intelligence. Students believed that giftedness occurs
when someone develops his/her capacity to a higher level than others do, and it can be expressed in one or more areas. Two students described their conceptions:

It is to have intelligent thought. (*Caio, 11*/ male/ grade 6)

The gifted person is good in at least one area, but not in everything; and he/she can improve his/her abilities. A gifted person is the one who refines his knowledge, more than an intelligent person. (*Túlio, 11*/ male/ grade 6)

A gifted person learns content easily and quickly; and finds things easier than an average person. Students said:

Gifted is a person who only dominates things faster than the others and learns with ease, with no effort. (*Dino, 10*/ male/ grade 4)

It is the kind of person who finds it easier to do something than the average person. (*Henrique, 12*/ male/ grade 7)

[Giftedness] is the ability of our mind to understand all the school content easily. (*Jair, 10*/ male/ grade 4)

Students believed that people who have to study hard to do well in class were not considered gifted and were not nominated for the resource room. The following comments of Caio’s interview were illustrative:

Caio = Giftedness is to have intelligent thought.
Researcher = Then, someone who is very intelligent is also gifted? Is that what you mean?
C = No, not always. In my class there are some girls who get only 9.5 or 10, only high grades.
R = And aren’t they gifted?
C = No.
R = Why? You have just said that a gifted person is intelligent, and that intelligent people get good grades.
C = Yes, but I don’t know if it is because they make a lot of effort for it or if it is from their heads.
R = So, making an effort means that you are not gifted? Why not?
C = The intelligent person has it already in their head. [sic]

Following this line of thought, some students believed that giftedness is an inborn trait. Giftedness was perceived by some students as something a person has or has not, a
trait given at birth or by God, a biological trait they were born with. Therefore, it was not necessary to make an effort to discover their talent. They just needed opportunities to explore their abilities. One student emphasized this viewpoint:

I think everybody is gifted, but many people don’t know how to explore it well. Some people demonstrate faster that they are gifted. I think everybody is the same, only that some take more time to discover it. [Do you think that everybody is gifted?] That’s right; each one has talent, which God gave them. Some people stand out more in the creative area, others in the intelligence area, in the sports area, too. (Emilia, 14/female/grade 7)

However, other students believed just the opposite. For Alex, for example, gifted people are hard workers, motivated and try very hard to achieve:

Gifted is a student who works hard in class to have good grades. My twin brother and I, plus two other boys in my class are the ones who work the hardest. (Alex, 11/male/grade 6)

In their definitions of giftedness, students suggested that giftedness was equal to intelligence or creativity. However, being creative or intelligent does not guarantee giftedness; it is necessary to have at least one area of high ability. On the other hand, people can be gifted due to their creative or intelligent accomplishments, as the following students summarized their opinions:

Giftedness is to do something better than the others, for example, to be a soccer expert. It is somebody who has something more than a lot of people. It is necessary to be creative to be gifted, but it is not the same thing. Everybody is creative in a certain way, but not everybody is gifted. (Rubens, 15/male/grade 8)

Giftedness is this association, a marriage between creativity and intelligence. If both are worked in the same way, if we know how to join both of them, so we have giftedness. There are lots of people who are intelligent, who know how to do things, but don’t have creativity to create anything. There are lots of people who are creative and who are not intelligent enough to do other things. They can be together but they also have different paths. (Sena, 12/male/grade 6)
Summary

This chapter described the results of the study, according to the following research questions: (1) What is the relationship between intelligence test scores and creativity test scores of identified gifted and talented students in Brazil? (2) How do identified gifted and talented students and their teachers perceive students’ creative and intellectual abilities? (3) How do teachers and students define intelligence and creativity and describe the behavioral manifestations of these constructs?

To address the first research question 1, a Pearson product-moment correlation coefficient was computed to investigate the relationship between the scores from Raven’s Progressive Matrices – SPM and the Test for Creative Thinking - Drawing Production - TCT-DP. The analyses indicated a positive, significant correlation (r=.21, p<.05) between intelligence test scores and creativity test scores for the total sample, with a small effect size.

Qualitative and quantitative procedures were used to address the research question 2. Teachers rated students’ behavioral characteristics on 9 areas of the SRBCSS. All students were rated above the mean at least in 2 areas. Only 2 students were rated above the mean in all areas. Among the students who scored highest on the Urban and Jellen’s creativity test, only one student was rated above the mean on the SRBCSS Creativity scale. Conversely, all students who were rated high on the SRBCSS Learning scale had also scored at Level 1 on the Raven’s intelligence test. Two students who scored at Level 1 on the intelligence test were rated below the mean by their teachers on the Learning scale on the SRBCSS. According to teachers’ perception, the majority of students had
higher ratings on Creativity, Leadership, Expressiveness, and Planning areas, than Precision on Communication.

A Pearson product-moment correlation coefficient was computed to investigate the relationship among three scales of SRBCSS – Learning, Creativity, and Motivation – and students’ scores on the intelligence and creativity tests. No significant correlations were found. Multiple regression analysis was computed to investigate the relationship between Raven’s test scores and the three scales of SRBCSS (Learning, Motivation, and Creativity). Analysis showed that the variation on the SRBCSS scores did not predict the intelligence test scores.

Thirteen case studies were presented, revealing teachers’ perceptions of students’ behavioral characteristics and their comments on students’ profiles. A cross-case analysis summarized data gathered on students’ strengths, interests, abilities, and personality traits.

Students’ perceptions of their own creative and intellectual characteristics were analyzed across cases. Students, in general, enjoyed all subjects and the school context; and were more interested in geography and science, performing arts, history, and technology. While the majority of the students selected science, geography, and arts as the disciplines in which they excelled, only half of them liked these disciplines. Students’ favorite learning styles were Discussion, followed by Programmed Instruction, Peer Teaching, Games, and Lecture. Students did not prefer Projects and Independent Study, which were the teaching styles more often used in the resource rooms. Lecture and Drill, and Recitation were the predominant teaching methods in the general education program. Most students indicated that they preferred ways of learning were through Making/
doing/ moving activities, followed by Talking with others. Students considered as the most interesting things they had accomplished at school were related to their academic abilities, artistic skills and involving interpersonal abilities, such as helping others and being useful at class. They liked activities that were different from their school routine; involved active participation; offered opportunities to validate their own abilities, provided challenging and meaningful choices; and participated in extra-curricular activities.

Gifted students portrayed themselves in very positive ways. The majority of students described themselves as playful and talkative, sociable, and tenacious. Although students reported sensitivity toward being different or labeled as gifted, they rated themselves high on Self-Perception Profile for Children: Global Self-Worth, Scholastic Competence, and Behavioral Conduct. They had strong self-concepts, in spite of their peers’ pressure, mockery, and expression of different interests. Students were extrinsically motivated to excel at school; determined to succeed in their professional future; meet their family expectations; and complete high school and college. The majority of the students perceived their creative and intellectual abilities in very positive ways. They were more creative when they used their imaginations and divergent thinking. Most students considered themselves intelligent because of their knowledge, personality traits, and creativity.

To address research question 3 qualitative procedures were used to analyze data from the interviews regarding perceptions of intelligence, creativity, and giftedness.

(1) Teachers’ perceptions. Two core categories emerged from teachers’ definition of intelligence: intelligence as reasoning and knowledge (to learn things easily; to
memorize information; grasp concepts quickly; and the ability to create and develop concepts and ideas without repetition); and intelligence as creative thought (the ability to think, and to create, find solutions, solve problems, and recognize problems that needed attention). Intelligent persons were visionary and creative; had the ability to apply knowledge of their fields; create original ideas and demonstrate interpersonal abilities.

Teachers defined creativity as divergent-thinking ability (doing things in different and imaginative ways, seeing alternatives; transforming objects or materials; improvising, responding quickly in an original way, and creating solutions to problems). Creative persons were knowledgeable in some discipline, solved practical problems, used logical thinking; and were capable of new inventions, or modifying or transforming things in original ways. Curiosity, humor, sensuality, inspiration, and intrinsic motivation were some of the personality traits presented by creative people. Teachers emphasized that creativity was fundamental to prevent boredom in education; to change the classroom routine; to enable teachers to adequately address students’ special needs; to motivate students; to get their attention; and to develop their potential and imagination; and to work with limited resources.

Resource room teachers stressed that giftedness included expressions of creativity and intelligence; it represented intelligence or a higher capacity in certain area. Teachers agreed that a gifted person was advanced in relation to others in the same field due to his/her ability to complete tasks easily; talents were not evenly distributed in multiple disciplines. Giftedness was an inborn potential, which could be stimulated. It was the confluence of intellectual and creative abilities applied to fields of study and expressed by the capacity to invent, transform, and discover something different. Gifted persons
were more intelligent and more sensitive and wanted to make a difference in society; they expressed their high ability by means of effort, persistence, and motivation in certain areas or activities.

(2) Students' perceptions. Students also defined intelligence as reasoning and knowledge. Intelligent behavior was associated with the ability to learn faster and more easily than other students; to think logically; memorize information; solve problems; earn good grades in everything and master all subjects. It involved effort, hard work, enthusiasm, independence of thought, and autonomy. Intelligence was an inherited, biological process that allows human beings to perform basic activities; can be improved by means of stimulation, experience, and practice. Students believed that a strong knowledge base in any field helps an intelligent person to generate new ideas and improve something that is faulty or imprecise. According to students, intelligent people were knowledgeable, memorized information, learned easily, earned very good grades, questioned everything, and solved problems. Intelligent persons were able to apply knowledge to their artistic abilities. They were inventive, adjusted and adapted the environment, offered innovative ideas, produced new inventions and transformed ideas into new creations. Intelligent people demonstrated persistence, effort, determination, attention to their surroundings, persuasiveness, and the ability to benefit from situations.

Creativity was perceived as divergent-thinking ability and involved novelty; originality; and fluency of ideas, which resulted from imagination and inspiration. Creative persons have fluent ideas, and are able to invent, modify, or transform things in innovative ways. They are ahead of their time, use their imagination to achieve their goals, and are intelligent in applying their knowledge in artistic fields to solve problems.
Creativity was important to develop in several contexts. Students believed creativity made life more interesting and easier; helped people solve problems and escape from daily routines; directed people to professional success; and changed teachers’ traditional teaching approaches.

All students agreed that **giftedness** denoted a higher ability in a certain area, verified when a person becomes well known for his/her intelligence. Giftedness occurs when someone develops his/her capacity to a higher level than others; learn content easily and quickly; and find things easier than other people. People can be gifted due to their creativity or intelligence; they just need opportunities to explore their inborn abilities. However, being creative or intelligent does not guarantee giftedness; it is necessary to have at least one area of high ability.
CHAPTER SIX

DISCUSSION AND IMPLICATIONS

This chapter discusses the significance of the study, the major research findings, and implications. Limitations and suggestions for further research are also presented. This study addressed the relationship between intelligence and creativity tests scores of Brazilian gifted and talented students and analyzed students and resource room teachers’ perceptions of intelligence and creativity.

Rationale and Significance of the Study

In spite the efforts from the Ministry of Education and its Special Education Office, Brazil still faces the challenge of preparing teachers to work in gifted and talented education. Several reasons may explain the resistance to developing special programs for gifted and talented students: shortage of experts, limited number of publications, lack of courses offered in Brazilian universities, and a shortage of resources (Alencar, Blumen-Pardo & Castellanos-Simons, 2000; Alencar, 1995; Fleith & Virgolim, 1999; Maia-Pinto & Fleith, 2002). In the last 5 years, there has been more interest in establishing gifted and talented programs in the Federal District. Research studies by Aspesi (2003), Chagas (2003), Maia-Pinto (2002), Maia-Pinto and Fleith (2002), and Ourofino (2005) highlighted the stereotypical perceptions of gifted and talented children among educators; provided empirical evidence on behavioral characteristics of gifted and talented students in the Federal District; and emphasized the importance of addressing educational and emotional needs. However, few researchers have focused on creativity, intelligence, and non-cognitive factors that affect giftedness. Therefore, this study investigated the relationship between intelligence and creativity test scores of identified gifted and
talented students attending six enrichment programs in the Federal District, Brazil, and determined how students and their resource room teachers perceived intelligence and creativity. The sample included 100 students, ages 9-17, and 15 teachers in grades 4 through 8. The correlation between creativity and intelligence test scores among a group of identified gifted and talented students was also investigated. Qualitative and quantitative methods were used to address students and teachers' perceptions of creativity and intelligence (Miles & Huberman, 1994). Multiple case studies (n=13) were used to gather data from students and their teachers.

**Research Findings**

**Research Question 1: What is the relationship between intelligence test scores and creativity test scores of identified gifted and talented students in Brazil?**

The results of the correlational analysis indicated a significant relationship between intelligence test scores and creativity test scores (r=.21) among Brazilian gifted and talented students (N=100). However, the practical significance was small. In a similar analysis, Urban and Jellen (1985, 1996) found no correlations between TCT-DP and intelligence tests (such as the Raven's SPM) in German and Polish samples. Lubart (1994) found that typical correlations between creativity and intelligence test scores were weak (around r=.20), which is corroborated by this study. When a subset of data from this study was analyzed, there were no significant correlations between intelligence and creativity tests scores of students who performed above or below the 95th percentile on the Raven's intelligence test. Therefore, the current study findings do not reflect earlier research results by MacKinnon (1962), Torrance and Wu (1981), and Yamamoto (1964) who found that creativity and intelligence were strongly related at lower levels of
intelligence, and relatively independent processes among highly intelligent students. However, it must be acknowledged that there were multiple definitions of intelligence and creativity underlying various instruments used in research studies. Creativity and intelligence tests elicit different types of responses. The study corroborated that creativity is a distinct category of mental functioning that has limited overlap with intelligence (Haensly & Reynolds, 1989). Professionals in the field of gifted education should promote the maximum development of both processes; and encourage students to fully express their creative and intellectual abilities.

**Research Question 2: How do identified gifted and talented students and their teachers perceive students’ creative and intellectual abilities?**

The abilities, interests, and learning styles preferences of students were assessed and a cross case analysis of 13 students was completed. Students and teachers perceived students’ creative and intellectual abilities favorably. Most students considered themselves intelligent because of their knowledge, personality traits, and creativity. Resource rooms were viewed as places for talent development, where students had opportunities to learn and apply their interests in various disciplines.

Teachers believed their students were creative, intelligent, and motivated. Students had positive attitudes about learning and education. Teachers’ ratings on the Scales for Rating the Behavioral Characteristics of Superior Students did not always reflect the test scores on Raven’s Progressive Matrices and Urban and Jellen’s Test of Creative Thinking. Teachers may be more familiar with students’ learning abilities than their creative abilities in classrooms, therefore the ratings varied. They may have limited opportunities to observe students engaged in creative or motivating classroom activities.
Since sample size was small (n=13), caution should be exercised in interpreting these data. It is also important to note that the rating scales included specific behaviors that may favor verbal behaviors, while non-verbal instruments assessed students’ intelligence and creativity. The verbal and non-verbal instruments may account for discrepant ratings. Renzulli, Hartman and Callahan (1971) found a moderate correlation (r=.61, p<.01) between the Learning Scale on the SRBCSS with scores from standardized tests of intelligence, and a low, positive correlation between the Creativity Scale with scores from the Torrance Tests of Creative Thinking (TTCT); however, they found no correlations between the Creativity Scale and the figural sub-scores of the TTCT.

Students (n=13) perceived their personal characteristics very positively. They described themselves as playful and talkative, sociable, and tenacious. They revealed strong global self-concepts on the Self-Perception Profile for Children and rated behavioral conduct and scholastic competence as important. Discipline and knowledge were two aspects highly advocated by teachers and strongly emphasized in traditional classrooms. Students maintained positive classroom behaviors, and, in some cases, exerted their independence and non-conformity, which are characteristics of creative students (e.g., Alencar & Fleith, 2001; Cropley & Urban, 2000).

Although students in this study were positive about their involvement in the enrichment programs for high ability students, they were aware of the negative comments from other students. Clark (1992), Colangelo and Brower (1987), Grenier (1985), Janos, Fung and Robinson (1985), Ring and Shaughnessy (1993), and Robinson (1986) noted the possible negative effects of labeling on self-concept, self-image and expectations. The
label of “gifted” may affect teachers’ perceptions of students’ learning potentials and behaviors.

**Research Question 3: How do students and teachers define intelligence and creativity and describe the behavioral manifestations of these constructs?**

Qualitative analysis revealed two main categories that emerged from teachers’ definitions of intelligence: reasoning and knowledge, and creative thought. Students also defined intelligence as reasoning and knowledge. Teachers emphasized creative aspects of intelligence, but this category did not emerge from student data.

Teachers’ definitions of intelligence were reminiscent of Reznick’s (1997) who defined intelligence as encompassing the ability to solve problems, generate creative ideas, recognize emergent categories and patterns, and speed of neural conduction. While students’ definitions of intelligence were similar to that of Baltes (1988), who described intelligence as a confluence of knowledge and motivational achievement. Baltes emphasized innate intellectual capacity, problem solving ability, and knowledge systems.

Both teachers and students perceived creativity as divergent thinking ability. According to Hocevar and Bachelor (1989), the most popular and widely used approach to defining creativity is divergent thinking. Fryer and Collings (1991) found that half of the 1,028 British teachers maintained this perception, but also associated creativity with imagination, self-expression, discovery, seeing connections and invention, which were also evident in this study.

Students and teachers’ definitions of creativity recognized the role of knowledge in solving problems. Treffinger, Renzulli, and Feldhusen (1971) had long ago called attention to the importance of linking divergent thinking with creative problem solving;
they affirmed that "while divergent-thinking measures certainly do not tell the entire story about creativity, it is quite likely that these measures do assess intellectual abilities which play an important role in creativity" (p. 108). Cropley and Urban (2000) established that creativity does not occur in a vacuum, and emphasized the central role of area-relevant knowledge and skills in creativity. Lubart (1994) remarked that creativity is moderately domain specific and can occur in virtually any domain of human abilities.

Students and teachers held similar perceptions of the importance of creativity. Students focused the importance of creativity on their social lives (e.g., creativity makes life more interesting and easier; helps people escape from routines and solve practical problems; and motivates people to be successful), while teachers emphasized the importance of creativity in educational contexts. Cropley and Urban (2000) noted the relevance and effectiveness of producing novel ideas. Sternberg and Lubart (1995) asserted that an appropriate product satisfies problem constraints, fulfills a need, and is useful. The higher the quality and importance of the product, the more creative it tends to be. Students and teachers' definitions provided additional insights into the appropriateness of creating products, especially in the teaching and learning process, which support the key components of Renzulli's (1992) ideal act of learning, which emphasizes the teacher's romance with the discipline and instructional techniques to motivate students; learner interests; and curriculum that appeals to imagination.

Resource room teachers and students considered creativity, intelligence, and giftedness as related constructs. While students stressed the intellectual aspect of giftedness, teachers viewed giftedness as the confluence of intellectual and creative abilities applied to various disciplines. Teachers' perceptions of giftedness supported
Marland's (1971) definition of giftedness and that of the Ministry of Education in Brasil (Brasil, 1987), which acknowledge giftedness as potential observed across several domains. Maia-Pinto and Fleith (2002) found that Brazilian private and public school teachers in the Federal District defined giftedness as high ability or performance; ease of learning; high levels of knowledge; and superior intellectual ability, which resembles the students' definitions. Teachers' definitions reflected Renzulli's (1986) three-ring conception of giftedness, which acknowledges that above-average ability is often a criterion for identifying talent pool students, but creativity and task commitment are also critical to applying one's talents and abilities.

Students and teachers' perceptions of creativity, intelligence, and giftedness may influence the way they perceive students' educational needs for quality programs and services. The more program and services are linked to IQ testing, the narrower the scope of the program for fewer qualified students (Galloway & Porath, 1997). The cultural context is so important in defining, identifying, and serving special populations. Findings from this study highlight the need to prepare teachers to work in gifted and talented education. They must have opportunities to develop a coherent conception of giftedness and a thorough understanding of students' academic and social/emotional needs.

**Limitations**

The scoring of Urban and Jellen's creativity test may have been a limitation in this study. The test requires several judgments and interpretations. In Brazil, a limited number of researchers are trained to use this particular test, which prevented the researcher from having more than one rater to judge the accuracy of scoring data.
Therefore, the impact of the lack of inter-rater reliability data may be viewed as a limitation.

The use of instruments not developed specifically for the Brazilian culture may have affected the generalizability of the findings. The restricted number of intelligence and creativity tests developed in Brazil limited the choices of suitable instruments for this research.

Several self-report instruments were used for this research study, which is a limitation. However, multiple approaches to data collection and analysis ensured the accuracy corroboration of student information.

Another limitation is the number of students enrolled in academic program, as opposed to the art program. The current identification process is strongly based on the use of IQ tests. Teachers who nominate students for the programs may have more familiarity with academic than artistic abilities in the school settings, which may affect the nomination rates.

And finally, as each program was developed in different cities, the commonalities of programs and services varied, which may also have been a limitation of this study.

**Suggestions for Future Research**

**The results of this study suggested additional research topics.**

1) Teachers' perceptions of creativity, intelligence, and giftedness may affect judgments about gifted students and result in inappropriate expectations. A research study should be conducted to compare teachers' perceptions of creativity, intelligence, and giftedness and their academic expectations of gifted and students.
2) The relationship between creativity and intelligence in Brazilian high ability students should be investigated further. As Urban and Jellen's creativity test is relatively new, further research should compare it with the Torrance Tests of Creative Thinking.

3) Teachers and psychologists' perceptions of creativity, intelligence, and giftedness should be assessed to identify factors that influence student nomination and identification for special programs.

4) The current research study used several instruments that may be of value in designing a new approach to assessing the talents and abilities of students with high potential. A study could be designed and implemented to assess the efficacy of using non-verbal measures of intelligence and creativity, as well as self-report measures.

5) In-depth investigations should be conducted to determine how teachers, students and parents perceive giftedness and how their expectations contribute to the development of their students' intellectual and creative abilities.
REFERENCES


Grinder, R. E. (1985). The gifted in our midst: By their divine deeds, neuroses, and mental test scores we have known them. In F. D. Horowitz & M. O'Brien (Eds.), The gifted and talented: Developmental perspectives (pp. 5-35). Washington, DC: American Psychological Association.


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APPENDIX A

Letter to Parents and Parents’ Permission Form (English Version)

Dear parent or guardian,

I am a graduate student in the Educational Psychology Program at the University of Connecticut (USA). I am very interested in studying the relationship between intelligence and creativity among Brazilian gifted and talented students attending the Enrichment Program in the Federal District. I would like to learn more about students' and teachers' perceptions of intelligence and creativity. Information gained from this study will be used to help teachers understand and educate gifted and talented students more effectively.

I would like to request your permission for your child to participate in this study. Students will be asked to complete instruments on creativity and intelligence, and to answer questions about creativity, intelligence, and the enrichment program.

Your child's responses will be considered strictly confidential. Responses will not be provided to the school or included in your child's school records. Parents are free to withdraw their consent and to discontinue their child's participation from the study any time; the child is also free to refuse to answer any questions or to withdraw at any time.

The contact persons for this study are Prof. José Raphael Miranda, the coordinator of the Special Education Department of the Educational Foundation of the Federal District in Brasilia, and the principal of the school where your child attends the Enrichment Program. If you give permission to have your child participate in this study, please complete the attached parental permission form and have your child return it to Mr./Mrs. __________, principal of the school by _____. Your cooperation and prompt return of this form is appreciated.

If you have any questions or concerns regarding this study, you may contact me at the address below. Thank you for your interest in assisting me in this important research.

Sincerely,

Angela Virgolin
Department of School and Development Psychology– PED
University of Brasilia
Campus Darcy Ribeiro – Asa Norte - Brasilia – DF – Brazil
Phone: (61) 3307-2625

E. Jean Gubbins
The National Research Center on the Gifted and Talented
2131 Hillside Road Unit 3007
Storrs, CT 06269-3007 – USA
Phone: 860-486-4676
Parental Permission Form

I give permission to my child to participate in the study on the relationship of creativity and intelligence being conducted by Angela M. R. Virgolin, a doctoral candidate at the University of Connecticut.

I understand students will be asked to participate in interview sessions during free time or after school, and will not miss any class time to participate in this study. I understand that all information collected during this project will be confidential and used only for research purposes. I also understand that Mrs. Virgolin will examine my child's records and administer creativity and intelligence tests. The scores, however, will not be provided to the school, nor included in my child's school records. I understand that Mr./Mrs. __________, principal of the school where my child attends the Enrichment Program, is the contact person for the study and I may contact Ms. Virgolin, Prof. José Raphael Miranda or Mr./Mrs. __________ if I have any questions or concerns. I may withdraw my consent and discontinue my child's participation in this study at any time.

In addition, my child is free to withdraw from the study at any time.

__________________________________________  __/__/__
Signature of Parent or Legal Guardian          Date

Student's name: _____________________________ Grade: _____
APPENDIX B

Students’ Individual Record Form (English Version)

Full Name: ____________________________________________

Age: _______ Years and ___ Months - Date of Birth: _______ / _______ / _______

Regular School: ____________________________________________

City: ____________________________ Grade: _____ Day Period: ________

Resource Room: ____________________________________________

City: ____________________________________________________ Day Period: ________

Days at resource room: ____________________________________________

When did you enter to the program? ____________________________________________

Address: ________________________________________________________

City: ____________________________________________________ Phone: ________

Father’s profession: ____________________________________________

Education (check one):

☐ Primary level (complete) - ☐ Primary level (incomplete)
☐ Secondary Level (complete) - ☐ Secondary Level (incomplete) -
☐ University level ☐ no education

Mother’s profession: ____________________________________________

Education (check one):

☐ Primary level (complete) - ☐ Primary level (incomplete)
☐ Secondary Level (complete) - ☐ Secondary Level (incomplete) -
☐ University level ☐ no education

Do you have brothers and sisters? ______

How many are males? ______ How many are females? ______

Which is your position among your brothers and sisters? (The oldest, the 2nd etc.) ______

Number of brothers or sisters in the enrichment program ________________________________

Draw here the genealogic tree of your family: Use symbols: Ξ for females - and Ψ for males and include the age of your brothers and sisters. Include yourself in the drawing.

(Children) ⇒  Ξ Ψ (Mother and Father)
APPENDIX C

Semi-Structured Interview – Teachers’ Protocol (English Version)

TEACHERS

Name / Age / Academic background / Professional experience - Years of teaching experience - Years in Enrichment classroom - Personal training: courses in the area of gifted/creativity

Exploratory Questions:

☐ Attitudes toward the program:
☐ What do you like about the enrichment program?
☐ If you ran this school, what suggestions do you have to improve this program?
☐ What will you do to improve the quality of your work in the resource room?
☐ Describe the ideal enrichment program.
☐ What kind of support do you consider important to the optimal development of your work in the classroom (parents, administrators, community, etc.)?

Self-perception and personality traits:

☐ Give me three descriptive words that best describe you.
☐ What personality traits do you think are important in a good enrichment teacher? Do you think you fit this description?
☐ What personality traits are important to develop in your students? How do you develop these traits?
☐ What type of student would you like to have in class?
☐ Describe your ideal student. Do you have students who fit this description?

Creativity:

☐ Do you consider yourself creative? Why?
☐ Name a creative person. Why did you choose this person?
☐ Do you think it is important to a teacher to be creative? Why?
☐ What activities help students develop their creativity? What else do you think you need to do to improve their creative abilities?
☐ Name your most creative students and tell me about their accomplishments.

Intelligence:

☐ What is intelligence?
☐ Name an intelligent person. Why did you choose this person?
☐ What is your personal definition of giftedness? Do you think all your students fit this definition?
☐ What activities do you promote to help students develop their abilities? What else do you think you need to improve their intellectual abilities?
☐ Name your most intelligent students and tell me about their accomplishments.

Motivation:

☐ What motivates you to teach in this program?
☐ How do you motivate your students? What else do you need to improve motivation in your students?
☐ Name your most motivated students and tell me about what challenges them.
APPENDIX D

Semi-Structured Interview – Students’ Protocol (English Version)

STUDENTS

Exploratory Questions

Attitudes toward the program:
- What do you think about your regular school? The enrichment program?
- Describe the ideal school/program.
- If you ran this school, what suggestions do you have to improve this program?

Self-perception and personality traits:
- Give me three descriptive words that best describe you.
- How do you feel about being involved in this program? What type of students do you think your teachers would like to have in class? Do you think you fit this description?
- What type of teacher would you like to have in class?
- Describe your ideal teacher. Do you have teachers who fit this description?

Strengths/Weaknesses:
- What subjects/topics/activities do you like best? Why?
- What subjects/topics/activities do you like the least?
- What are your strongest subjects/topics/activities?
- Do you like to ask questions in class – in what subject?
- Do you remember the best thing you ever did in school, and why?
- Do you have any special hobbies and projects?

Creativity:
- Do you consider yourself creative? Why?
- What is creativity?
- Name a creative person. Why did you choose this person?
- Do you think it is important to be creative? Why?
- What activity lets you be more creative?
- Where do you work more creatively?
- Who helps you to be more creative?
- Name the most creative person in your classroom and tell me why you think so.

Intelligence:
- What is intelligence?
- Do you consider yourself intelligent? Why?
- Name an intelligent person. Why did you choose this person?
- What is giftedness?
- Name the most intelligent person in your classroom and why you think so.

Motivation:
- What motivates you to excel (do well in school)?
- What activities do you like to do at home or in school?
- What is your biggest challenge?
- What do you think you will be doing for a living (professionally) in 15 years? If you have enough money and time, what would you like to do in the future?