# Introduction

When the first edition of this book was published several years ago, our understanding of "giftedness" was largely based on theories and research in behavioral and cognitive psychology. Neuroscientists had barely begun to use their scanning technologies to look inside the working brain of gifted and talented people. But during the first decade of this twenty-first century, the field of neuroscience has just exploded, splintering into new disciplines, such as social cognitive neuroscience and behavioral neuroscience. Of particular interest to educators is the emergence of educational neuroscience, an area that promises to enrich pedagogy with new insights into how we can translate research in the neurosciences into educational practice.

This book is designed to examine the needs of gifted and talented students, to uncover what more we are learning about the gifted brain, and to suggest strategies and programs that can help our best and brightest students achieve their full potential. Classroom teachers, education specialists, school and district administrators, college instructors, and parents should all find items of interest in *How the Gifted Brain Learns.* Although many books have been written about the gifted, this book focuses primarily on insights to be gained about the gifted brain from the current explosion of research in neuroscience. It also reviews research information about the gifted learner for prospective and current teachers and administrators so that they may consider alternative instructional approaches.

## WHAT DO WE MEAN BY GIFTED AND TALENTED?

Many terms are used to describe the student who demonstrates exceptional talent, and sometimes these terms themselves become a challenge to understand. *Gifted* is the most commonly used word, but it has hundreds of definitions, from legal to jargon. *Talented* usually describes an individual with a performance skill that has been refined through practice, such as music or dance. *Precocious* and *prodigy* are most commonly used to describe young children who display a high level of skill in a particular endeavor at a very early age.

In earlier times, *genius* was widely used, but it is now limited to the phenomenally gifted. *Superior* has recently come into vogue. Being a comparative term, it tempts one to ask superior to whom or to what, and to what degree. The vagueness of the term limits its usefulness in helping educators design an educational program for an individual student. *Exceptional* is an appropriate term when referring to a gifted child as being different from the regular school population, although it is also used to describe children with learning difficulties.

During the 1970s, the combined term *gifted and talented* came into common use. Although *gifted* and *talented* are often used interchangeably, Gagné (1985) differentiated between the two terms. For Gagné, *giftedness* is above-average aptitude (as measured by IQ tests) in creative and intellectual abilities, and *talent* is above-average performance in an area of human activity, such as music, mathematics, or literature.

In recent years, most researchers have moved away from defining *giftedness* solely in terms of IQ tests and have broadened its usage to include the characteristics of giftedness, such as creativity and motivation. Some definitions also consider the person's contributions to culture and society. People from diverse cultural and ethnic backgrounds may display their gifts and talents in ways that are recognized and valued by their own culture, but these individuals may not be recognized or valued by other cultures. Characteristics of gifted and talented children from across different ethnic groups have some common indicators (e.g., problem-solving ability, intense interest, and motivation) but each ethnicity has distinct and unique behavioral attributes. As a result, one of the greater concerns in the field of gifted education is the realization that gifted children from diverse cultural backgrounds, or who have some type of learning disability, will not be recognized as gifted in our schools.

The U.S. government added its own definition of giftedness in the No Child Left Behind Act of 2004. In Title IX, A, (22), gifted and talented students are defined as those "who give evidence of high achievement capability in areas such as intellectual, creative, artistic, or leadership capacity, or in specific academic fields, and who need services or activities not ordinarily provided by the school in order to fully develop those capabilities."

Given the various interpretations of the terminology used to describe students of high ability, I had to decide on a working definition that would be meaningful for all readers. For the purposes of this book, then, I use the term *gifted* to be an inclusive one in that it comprises high intellectual ability in academic areas as well as high levels of ability in areas of performance, such as music, theater, and dance. My simple definition is that a gifted person demonstrates (or has the potential for demonstrating) an exceptionally high level of performance in one or more areas of human endeavor. Not all readers may agree with this definition, and some may object that using it as an inclusive term de-emphasizes the importance of talent. That is certainly not my intent, which I think will become clear as one reads the book. However, to avoid any misinterpretation, and because the combined term is so widespread, many references to gifted and talented will be found in the text.

For the purposes of this book, a gifted person is defined as one who demonstrates an exceptionally high level of performance in one or more areas of human endeavor.

## Myths and Realities About Giftedness

Myths abound about the nature of giftedness, largely because public schools have not really had the resources to fully and accurately identify the gifted and to understand their needs. A prevailing notion for many years in public education has been that these students can take care of themselves and learn a great deal on their own. Consequently, schools have concentrated on providing a broad curriculum for mainstream students and then devoting a significant portion of remaining resources to students with learning difficulties. Little has been left over to identify or support the gifted, despite federal and state mandates to do so.

We are slowly gaining a greater understanding of the idiosyncracies of gifted children and the implications for parenting and teaching them. But to be successful at this, we must dispel the myths and look to credible research about the realities of being gifted and talented. The following list summarizes some myths and realities regarding gifted children (NAGC, 2009). Several of the topics are discussed in greater detail throughout the book.

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| **Myth #1:** Little is really known about how we learn. So how can we know about the gifted brain? | **Reality:** Research is providing a deeper understanding of how the human brain learns, including insights into the phenomenally gifted brain. See Chapter 1. |
| **Myth #2:** Academically gifted students have general intellectual power that makes them gifted in all areas. | **Reality:** Giftedness tends to be specific to a given domain of learning. Children can be gifted in one area and learning disabled in another. See Chapter 4. |
| **Myth #3:** *Gifted* refers just to academic ability, but *talented* refers to high ability in music and the arts. | **Reality:** There is no justification for this distinction. The domains of excellence are merely different, and in many cases the words can be used interchangeably. See Chapter 1. |
| **Myth #4:** Gifted students have lower self-esteem than nongifted students. | **Reality:** The majority of studies indicate that gifted students have a somewhat higher level of self-esteem than nongifted. However, they are at risk for isolation and loneliness, and they can become arrogant. See Chapters 1 and 4. |
| **Myth #5:** Giftedness in any domain requires a high IQ. | **Reality:** There is little evidence that giftedness in music or art requires an exceptional IQ. Moreover, IQ tests measure a narrow range of ability. See Chapters 1 and 7. |
| **Myth #6:** Acceleration options, such as grade skipping, early entrance, and early exit, tend to be harmful for gifted students. | **Reality:** Although it is important to consider the social and psychological adjustment of every student, there is little evidence that acceleration options are in any way detrimental. See Chapter 2. |
| **Myth #7:** Cooperative learning in heterogeneous groups provides academic benefits to gifted students and can be effectively substituted for specialized programs for academically talented students. | **Reality:** Recent studies show that gifted students receive greater academic benefit from being grouped with other gifted students. Cooperative learning can be a useful strategy, but it is not a replacement for specialized programs for academically talented students, such as new courses or acceleration options. See Chapter 2. |
| **Myth #8:** Giftedness is inborn, or giftedness is entirely the result of hard work. | **Reality:** True giftedness results from both genetic predispositions *and* hard work. See Chapter 1. |

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| **Myth #9:** Creativity tests are effective means of identifying artistically gifted and talented students. | **Reality:** Creativity tests measure problem-solving and divergent thinking skills, but have not proved valid in predicting the success of students with high abilities in the visual arts. See Chapters 1, 7, and 8. |
| **Myth #10:** Pushy parents who drive their children to overachieve create gifted children. | **Reality:** Gifted children are usually pushing their parents, who are trying to accommodate and nurture them. However, some parents do try to live vicariously through their children and lose sight of the child's emotional well-being. See Chapters 2 and 3. |
| **Myth #11:** Early reading and writing skills should keep pace with each other. | **Reality:** Although this is a commonly held belief, there is no relationship between reading and writing skills in the development of young talented children. See Chapter 5. |
| **Myth #12:** All children are gifted, and there is no special group of children that needs enriched or accelerated education. | **Reality:** Although all children have strengths and weaknesses, some have extreme strengths in one or more areas. Extreme giftedness creates a special education need the same way that a learning disability does. See Chapters 2 and 4. |
| **Myth #13:** Highly gifted children go on to become eminent and creative adults. | **Reality:** Many gifted children, even prodigies, do not become eminent in adulthood, and many eminent adults were not prodigies. See Chapters 1, 4, 5, and 7. |

Source: NAGC, 2009.

## GIFTED AND TALENTED PROGRAMS IN TODAY'S SCHOOLS

Because some parents and educators believe that truly gifted children will remain gifted and fulfill their educational needs on their own, schools have historically done little to identify and encourage the gifted. As a result, potentially gifted students have gone through school without their gifts ever being recognized. This has been a long-standing problem as history will attest. Sir Isaac Newton was considered a poor student in grammar school. He left at age 14, was sent back at 19 because he read so much, and graduated at Cambridge without any distinction whatsoever. The poet Shelley was expelled from Oxford; James Whistler and Edgar Allen Poe were both expelled from West Point. Charles Darwin dropped out of medical school, and Edward Gibbon, the noted British historian, considered his education a waste of time.

Gregor Mendel, founder of the science of genetics, flunked his teacher's examination four times in a row and finally gave up trying. Thomas Edison's mother withdrew him from school after 3 months in the first grade because his teacher said he was "unable to perform." Winston Churchill ended up last in his class at the Harrow School. Albert Einstein found grammar school boring. It was his uncle, showing the boy tricks with numbers, who stimulated his interest in mathematics. For a long time and in many places, traditional

academic programs have often been poorly suited to humans of extraordinary potential. One is left to wonder how many Edisons did not survive their educational experiences.

Our society has not given the same attention to the education of the gifted as it has given to other special groups. For example, we spend millions every year for the mentally handicapped. But, too often, children of superior intellect spend their time in a commonplace school, assimilating a curricular diet far below their potential. Thus, gifted children pose one of our greatest present-day problems, beginning in the home and ultimately becoming a concern of the school. Teachers at all grade levels have the responsibility to recognize and plan for the needs of the gifted.

Currently, the process of identifying gifted students and the programs designed to address their needs vary greatly by grade level and school district. Gifted students who are not identified and served by these programs are not likely to ever have their needs fully met while in school. The loss of such potential is a serious blow to society as well as to the student and teacher. The student never feels fulfilled, loses self-esteem, and lacks direction. The teacher, meanwhile, is faced with student boredom, underachievement, and a litany of discipline problems that could have been avoided. One purpose of this book is to examine the current state of programs for the gifted and to suggest what we might do to make them better serve the gifts and talents of all students.

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## A Word About Elitism

Some parents, educators, and politicians object to any special programs for gifted children on the grounds of *elitism.* This word has acquired the negative connotations of snobbishness, selectivity, and unfair special attention at a time, critics say, when we should be emphasizing egalitarianism. Even some educators believe this notion of elitism has only been encouraged by federal efforts that emphasize increasing resources for less able students but do little to enhance programs for our most able students.

The reality is that gifted students are elite in the sense that they possess skills to a higher degree than most people in their class. The same is true for professional athletes, musical soloists, inventors, or physicians. Parents and schools must provide children with equal opportunity, not equal treatment. Treating all students as though they learned exactly the same way is folly. Therefore, schools have a responsibility to challenge gifted students to their fullest potential while, at the same time, challenging those who cry elitism to rethink the true meaning of the word and the real purpose of education.

# ABOUT THIS BOOK

The serious problems of the twenty-first century (e.g., dealing with climate change, protecting the environment, and managing population growth) will require the concerted efforts of our best minds. Thus, more attention needs to be given to clarifying what constitutes a comprehensive and effective gifted program and what steps schools can take to ensure a broad and rich variety of educational experiences for our most gifted students.

## Questions This Book Will Answer

This book will answer questions such as these:

- How different are the brains of gifted students from those of typical students?
- What kinds of strategies are particularly effective for students with specific gifts?

- What progress is brain research making in discovering the nature of intelligence and giftedness?
- Will brain research help us identify potentially gifted students sooner and more accurately?
- Are schools adequately challenging gifted students today? If not, what can we do about it?
- How can improving programs for the gifted and talented benefit other students?
- What can we do to identify and help gifted students who are underachievers?
- How can we identify students who are both gifted and learning disabled, and how can we help them?
- What insights are we gaining about students who are gifted in language, mathematics, and the arts?
- What progress are we making in identifying underrepresented minorities for gifted programs?

## Chapter Contents

**Chapter 1. What Is a Gifted Brain?** This chapter looks at various conceptual schemes (e.g., psychological, socio-emotional) that attempt to define the nature of intelligence and giftedness. Of particular interest is the discussion over the long-standing debate about whether nature (i.e., genetic programming) or nurture (i.e., environment and upbringing) has greater impact on talent development. Several current models of giftedness are explained as well as a review of what current researchers suggest are the characteristics that gifted individuals are likely to display.

**Chapter 2. Challenging the Gifted Brain.** Here we examine specific suggestions for designing curricular and instructional strategies that are more likely to challenge the gifted brain. Because many teachers are faced with addressing the needs of gifted students within the context of the inclusive classroom, this chapter focuses on the concept of differentiated curriculum. Also discussed are acceleration, curriculum compacting, grouping formats, and other techniques that have been successful in developing the talents of gifted students.

**Chapter 3. Underachieving Gifted Students.** In this chapter, we investigate the various symptoms, causes, and types of underachievement in gifted students. A somewhat overlooked area of gifted education, this chapter presents ways of identifying these students and suggests strategies for reversing underachievement. Particular attention is paid to the growing number of underachieving minority students and to ways for addressing their needs.

**Chapter 4. The Twice-Exceptional Brain.** Although the notion that a person can be both gifted and learning disabled may seem strange, this chapter examines the twice-exceptional student. The difficulties of identifying these students along with some of the more common combinations of giftedness and learning disabilities are discussed—for example, gifted children with attention-deficit hyperactivity disorder or autism.

**Chapters 5, 6, and 7. Language, Mathematical, and Artistic Talent.** These chapters deal with attempts to understand the nature of giftedness in three specific areas: language, mathematics, and the arts, respectively. As scientific evidence accumulated over the last few decades suggesting that the human brain is pre-wired for language, mathematics, and artistic capabilities, research resources were directed toward investigating the cerebral nature of these activities. Consequently, we include these areas because they currently have the largest base of research studies among all the school disciplines. Furthermore, there is little evidence at this time to indicate that the brain is specifically wired for science, economics, or history. According to current thinking, it is more likely that high ability in these areas results from high ability in one or more of the pre-wired areas (e.g., mathematics for science, and language for history) coupled with intense personal interest in, say, scientific phenomena or historical events.

**Chapter 8. Putting It All Together.** Finally, this chapter suggests some ways of identifying gifted children and setting up a learning environment where gifted students, along with their classmates, can excel in the inclusive classroom. The effectiveness of current programs to aid gifted students in elementary and secondary schools is also discussed.

## Other Helpful Tools

**Applications.** At the end of each chapter is a section that offers suggestions on how to apply the research discussed in that chapter to educational practice. Although these applications can benefit all students, they often contain tips on how to challenge the gifted. Some of the applications contain specific classroom examples that have been used successfully by classroom teachers at the elementary and secondary levels.

**Glossary.** Many of the neuroscientific and psychological terms used in the text are described in a glossary.

**References.** Many of the citations in this extensive section are the original research reports published in peer-reviewed journals. These references will be particularly helpful for researchers and for those who would like more specific information on how the research studies were conducted.

**Resources.** This section offers some valuable Internet sites that will help teachers at all grade levels find many additional strategies for working with gifted students.

This book does *not* deal with exceptional performance in sports. How individuals become superb athletes is a separate and rich area of research. There are numerous books available that delve into this exciting field. Studies of athletic capabilities are beyond the scope of this book.

As we gain a greater understanding of the human brain, we may discover ways to identify gifted students more quickly and more accurately. This means that schools can begin to provide for student needs earlier and with greater effectiveness. Sometimes, these students are attempting to learn in environments that are designed to help but instead inadvertently frustrate their efforts. By looking for ways to differentiate the curriculum and by changing some of our instructional approaches, we may be able to move gifted students to exceptional levels of performance. My hope is that this book will encourage all school professionals and parents to learn more about how the brain learns so that they can work together for the benefit of all students.