Assessment in Special Education

A PRACTICAL APPROACH

Roger A. Pierangelo • George Giuliani

FIFTH EDITION

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PEARSON

This book is dedicated to my wife, Jackie, and my two children, Jacqueline and Scott, who provide me with the love and purpose for undertaking projects that I hope will enhance the lives of others. Their lovely presence in my life is a blessing. I also dedicate this book to my parents, who provided me with the secure and loving foundation from which to grow; my sister, Carol, who has always made me smile and laugh; and my brother-in-law, George, who has always been a very positive guiding light in my professional journey.
—R. P.

This book is dedicated to my wife, Anita, and our two children, Collin and Brittany, who give me the greatest life imaginable. The long hours and many years it took to finish this book would never have been possible without the support of my loving wife. Her constant encouragement, understanding, and love provided me with the strength I needed to accomplish my goals. I thank her with all my heart. I also dedicate this book to my parents, who have given me so much support and guidance throughout my life. Their words of encouragement and guidance have made my professional journey a very rewarding and successful experience.
—G. G.

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Dr. Giuliani is the author of multiple books in the field of special education, including two coauthored with Dr. Pierangelo from Pearson Education titled *Transition Services in Special Education: A Practical Approach* and *Learning Disabilities: A Practical Approach to Foundations, Assessment, Diagnosis, and Teaching*.

Preface

Assessment in Special Education: A Practical Approach, Fifth Edition, continues to represent a new and unique direction in college textbooks. This book is the result of several years of marketing analysis and experience. The format for this text is based on your needs as a student to have a practical, user-friendly, useful, and clearly understood textbook that also can be used as a reference once you enter the workplace. In our market research with undergraduate and graduate students, we found that

- 91 percent of those interviewed felt that most college texts were very difficult to read
- 87 percent found them difficult to understand
- 74 percent felt that most texts contained irrelevant and useless charts and tables
- 93 percent indicated that they could not see using the book as a practical reference tool after the course was over
- 71 percent felt that the formats were overwhelming
- 98 percent felt that most texts contained too much theory and not enough "practical information"
- 90 percent normally sold back their textbooks at the end of the semester because they had no practical value and would "just sit on a shelf"

We have tried to provide you with a "real-world story" or process for the area of assessment that has a beginning, a middle, and an end. Many assessment texts we have reviewed have approximately 15 or more chapters that are not connected, but rather offer students separate pieces that never show clearly the overall process in a straight line. In this text, we provide you with the practical tools necessary to understand the process of assessment in schools and to learn how to "put it all together."

Graduates of most assessment courses understand what constitutes validity and reliability, a description of the tests most often used in assessment, legal issues, and basic statistical terminology. Our textbook not only covers these areas, but it also focuses on the practical application of assessment in schools with discussions of interpreting results, diagnosing a suspected disability, writing a professional report, making recommendations from the data, presenting results to parents, and attending the eligibility committee meetings. From our market research, this is where our book is unique.

Other practical features of this text include the following:

- Content that reflects the Individuals with Disabilities Education Improvement Act (IDEIA)
- Combined coverage of formal and informal assessment
- Thorough discussion of all the most up-to-date tests used in school systems
- Opportunities to take test data and learn their practical application in both writing and recommendations
- Practical approaches to parent–teacher conferences and the sensitivity required in discussing test results with parents
- A step-by-step approach from identification of a high-risk child to placement
- Comprehensive coverage of the latest tests and evaluation procedures for all areas of exceptionality

- An emphasis on the application of information to meet the individual, often unique, requirements of students with special needs
- Coverage of assessment that spans infancy and preschool age through high school and into adulthood
- An overall practical focus to balance out the strong grounding in theory so necessary for understanding exceptionality
- Information about assessment vehicles, both formal and informal, to help you make informed decisions about which technique or tool is best with which students
- Numerous teaching–learning aids
- Samples of actual assessment, evaluation, and procedure forms utilized in school systems

After reading this textbook, you should have a thorough understanding of the assessment process in special education from start to finish. Assessment in special education is a step-by-step approach, and the goal of this text is to give you all the tools necessary to understand what really happens in the assessment process.

NEW TO THIS EDITION

Besides the features addressed above, *Assessment in Special Education: A Practical Approach*, Fifth Edition, has many new features. These include:

- Latest updated information regarding the major principles of assessment under IDEIA
- A new chapter specifically covering parental consent and evaluation principles under IDEIA
- Numerous videos reflecting the content of the topics being covered
- New appendices addressing independent educational evaluations, mediation, and due process hearings as they are related to assessment in special education
- Greater coverage of curriculum-based assessment (CBA) and curriculum-based measurement (CBM)
- New and updated information on cultural competency and its impact on the assessment process.
- Updated references in all chapters covering the most current research in the field of assessment
- Comprehensive coverage of how RTI plays a significant role in the assessment of a child for a suspected disability
- Analysis of the most current, valid, reliable, and popular intelligence, academic achievement, behavioral, perceptual, speech and language, early childhood, hearing, and physical and occupational therapy assessment measures
- Comprehensive coverage of functional behavioral assessments (FBA) and behavioral intervention plans (BIP)
- Latest information of eligibility in special education on all areas of classification and how the assessment process dictates classification
- Updated academic evaluation report writing section, with more samples to review
- Detailed information on IEP development and requirements under IDEIA

Acknowledgments

Dr. Roger Pierangelo extends thanks to the following: the faculty, administration, and staff in the Department of Graduate Special Education and Literacy at Long Island University; the late Bill Smyth, a truly gifted and "extraordinary ordinary" man; Helen Firestone, for her influence on his career and tireless support of him; and Ollie Simmons, for her friendship, loyalty, and great personality.

Dr. George Giuliani extends sincere thanks to all of his colleagues at Hofstra University in the School of Education. Dr. Giuliani would also like to thank the following: his brother, Roger, and sister, Claudia; mother-in-law, Ursula Jenkeleit; sisters-in-law Karin and Cindy; brothers-in-law Robert and Bob—all of whom have provided encouragement and reinforcement in all of his personal and professional endeavors.

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Brief Contents

Contents

PART I

Foundational Concepts in Assessment in Special Education

Welcome to the world of assessment in special education. We hope that you enjoy this book and find it very practical and user friendly. This book is divided into two parts. Part I (Chapters 1 through 4) presents an overview of the most important concepts, laws, statistics, and terms you need to know to understand the assessment process. Part II (Chapters 5 through 19) then takes you step by step through the assessment process as it happens every day in schools.

Chapter 1 presents you with an overview of key terms and definitions used in assessment in special education. We begin by discussing what defines assessment and its purposes. Then, a historical overview of federal legislation and landmark court cases in special education are presented. Following these laws and cases, we then discuss current federal legislation (Individuals with Disabilities Education Improvement Act) and how it influences children, parents, and special educators involved in the assessment process.

The chapter then continues with addressing the various classifications of children with disabilities and their prevalence rates. Finally, you will learn the basic steps involved in the assessment process that will be discussed in further detail in later chapters.

Chapter 2 focuses on various methods of assessment used in special education. This chapter presents an overview of both formal (norm-referenced tests) and informal assessment (criterion referenced tests, portfolios, curriculum-based assessment, dynamic assessment, and many others). Following a discussion of these methods, you will learn about the decision-making process involved in selecting the appropriate instrument for evaluating students.

Chapter 3 is an overview of the most basic statistical concepts you need to survive the special education process. To fully understand assessment, you must first become familiar with statistics. Statistics are very important in special education and we will guide you down a very methodical and comfortable road to teach you these concepts.

Finally, in **Chapter 4** we present basic scoring terminology used every day in assessment. These terms are very important in scoring and analyzing the results of the various measures you will use in the assessment process.

After reading the first four chapters, you will be ready for Part II of this text, which will lead you through a practical, step-by-step process involved in assessing children with special needs.

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1 Introduction to Assessment

KEY TERMS

Analysis
Annual review
Assessment
Autism
Child find
Collection
Committee on special education
CSE
Deaf–blindness
Deafness
Determination
Developmental delay
Disability
Due process
Education for All Handicapped Children Act (EHA)
Education of the Handicapped Act Amendments
Educational placement decisions
Eligibility committee
Eligibility and diagnosis
Emotional disturbance
Evaluation
Fourteenth Amendment
Hearing impairment
IEP
Independent educational evaluation (IEE)
Individualized education program (IEP)
Individuals with Disabilities Education Improvement Act (IDEIA)
Instructional planning
Intellectual disability
Least restrictive environment (LRE)
Multidisciplinary team
Multiple disabilities
Native language
Orthopedic impairment
Other health impairment
Prevalence
Reauthorization
Recommendation
Section 504 of the Rehabilitation Act of 1973
Special education
Specific learning disabilities
Speech or language impairments
Traumatic brain injury
Triennial review
Visual impairment

CHAPTER OBJECTIVES

This chapter presents a general overview of assessment. After reading this chapter, you should be able to do the following:

- Define assessment
- Understand the purpose of assessment
- Understand the landmark court cases in special education
- Know the various federal legislation pertaining to special education and individuals with disabilities:
  - Section 504 of the Vocational Rehabilitation Act
  - P.L. 94-142: The Education of All Handicapped Children Act
  - P.L. 99-457: Education of the Handicapped Act Amendments of 1986
  - P.L. 101-476: The Individuals with Disabilities Education Act (IDEA)
  - P.L. 105-17: The Individuals with Disabilities Education Act of 1997
  - P.L. 108-446: The Individuals with Disabilities Education Improvement Act (IDEIA) of 2004
- Understand the purposes of IDEIA

- Understand how to read IDEIA citations under the U.S.C. and C.F.R.
- Know the classifications under IDEIA
- Know the prevalence of children receiving special education services under IDEIA
- Understand the steps involved in the assessment process in special education

OVERVIEW OF ASSESSMENT

> Denise is in serious danger of failing fourth grade again. She appears to have difficulty following directions, completing assignments on time, progressing in reading and spelling, and interacting with her peers. Her teacher believes that Denise may have a learning disability and has made a referral to the district's Committee on Special Education.
>
> Robert has cerebral palsy and uses a wheelchair. He has recently moved into the community and enrolled in the local high school. His parents are concerned that Robert is not developing the mobility and daily living skills that he needs now and in the future. They request that the new school system evaluate Robert to identify his special needs.
>
> Juan has become severely withdrawn in the last year. His grades have been declining steadily, he is starting to skip school, and when the teacher calls on him in class, he responds rudely or not at all. The teacher is worried that Juan may have an emotional disorder. She makes a referral to the special education department.

Although these children are different from each other in very many ways, they may also share something in common. Each may be a student who has a disability that will require special education services in the school setting. Before decisions may be made about what those special education services will be, each child requires an evaluation conducted by specially trained educational personnel, which may include a school psychologist, a speech–language pathologist, special education and regular education teachers, social workers, and, when appropriate, medical personnel. This is true for any child suspected of having a disability.

As you watch the video titled "What is special education?," focus on the many services available to help children with special needs. This video presents a quick guide on the services and how parents can get them for their children.

https://www.youtube.com/watch?v=9DktV772njY

Assessment in **special education** is a process that involves collecting information about a student for the purpose of making decisions. It involves gathering information about a student's strengths and needs in all areas of concern. Assessment includes many formal and informal methods of evaluating student progress and behavior. Clearly, gathering information about a student using a variety of techniques and information sources should shed considerable light on strengths and needs, the nature of a suspected disability and its effect on educational performance, and realistic and appropriate instructional goals and objectives.

The professional involved in special education in today's schools plays a very critical role in the overall education of students with all types of disabilities. A comprehensive assessment completed by school professionals may address any aspect of a student's educational functioning (Pierangelo & Giuliani, 2012). The special educator's position is unique, in that he or she can play many different roles in the educational environment. Whatever their role, special educators encounter a variety of situations that require practical decisions and relevant suggestions. No matter which type of professional you become in the field of special education, it is always necessary to fully understand the assessment process and to be able to clearly communicate vital information to professionals, parents, and students.

The importance of assessment should never be underestimated. In special education, you will work with many professionals from different fields. You are part of a team, often

referred to as a **multidisciplinary team** (see Chapters 7 and 8), that tries to determine whether a disability is present in a student. The team's role is crucial because it helps determine the extent and direction of a child's personal journey through the special education experience. Consequently, the skills needed to offer a child the most global, accurate, and practical evaluation should be fully understood. The development of these skills should include a good working knowledge of the following components of the assessment process in order to determine the presence of a suspected disability:

- **Collection:** The process of tracing and gathering information from the many sources of background information on a child, such as school records, observation, parent intakes, and teacher reports
- **Analysis:** The processing and understanding of patterns in a child's educational, social, developmental, environmental, medical, and emotional history
- **Evaluation:** The determination of a child's strengths and limitations in specific areas, including academic, intellectual, psychological, emotional, perceptual, language, cognitive, and medical development
- **Determination:** The process of deciding that the presence of a suspected disability does or does not exist using knowledge of the criteria that constitute each category
- **Recommendation:** The professional suggestions and proposals concerning educational placement and program that need to be made to the school, teachers, and parents

PURPOSE OF ASSESSMENT

Assessment takes place when students experience difficulty meeting the demands of the general education curriculum and are referred for consideration for special education services. As will be discussed in great detail throughout this book, following a referral for a suspected disability of a child and with written parental or guardian permission, an individual multidisciplinary and comprehensive assessment is conducted. This means that formal tests, observations, and numerous assessments will be given. The results help to determine if special education is needed and whether factors unrelated to disabilities are affecting a child's school performance.

Assessment should be an active, ongoing process that has a clearly specified purpose. Assessment results provide information useful for determining or modifying a child's program, if necessary. The decisions that use assessment information are varied and complex, and they occur in and out of classrooms. Assessment plays a critical role in the determination of six important decisions (National Information Center for Children and Youths with Disabilities, 2000):

- Evaluation decisions: Information collected in the assessment process can provide detailed information of a student's strengths, weaknesses, and overall progress.
- Diagnostic decisions: Information collected in the assessment process can provide detailed information of the specific nature of the student's problems or disability.
- **Eligibility and diagnosis** decisions: Information collected in the assessment process can provide detailed information on whether a child is eligible for special education services.
- **IEP** development decisions: Information collected in the assessment process can provide detailed information so that an individualized education program (IEP) may be developed.
- **Educational placement decisions:** Information collected in the assessment process can provide detailed information so that appropriate decisions may be made about the child's educational placement.
- **Instructional planning** decisions: Information collected in the assessment process is critical in planning instruction appropriate to the child's special social, academic, physical, and management needs.

FEDERAL LEGISLATION AND LANDMARK COURT CASES IN SPECIAL EDUCATION

Generally, over the years, special education has been restructured and transformed by legislation. If we examine the history of special education and services for children with disabilities after World War II in the United States, the picture becomes clear as to why our nation needed a federal special education law (Giuliani, 2012).

Children with disabilities were, for the most part, unprotected and not given much of a chance in education. In 1948, only 12 percent of all children with disabilities received some form of special education (which also means that 88% of children with disabilities were receiving virtually nothing in terms of an appropriate education).

By the early 1950s, things were not much better for students with disabilities. During this time, state law either permitted or explicitly required the exclusion of the "weak minded" or individuals with physical disabilities. Many states that did educate such children provided separate facilities that isolated them from their peers. Special education services and programs were available in some school districts, but often, undesirable results occurred. For example, students in special classes were very often considered unable to perform academic tasks. Consequently, students with disabilities went to special schools or classes that focused on learning manual skills, such as weaving and bead stringing. Although programs existed, it was clear that discrimination was still as strong as ever for those with disabilities in schools.

As you watch the video "Brown v. Board of Education in PBS' The Supreme Court," take a step back in time to review the Supreme Court's historical rejection of the segregation in Southern schools through the Fourteenth Amendment of the U.S. Constitution in the case *Brown v. Board of Education of Topeka, Kansas.*

https://www.youtube.com/watch?v=TTGHLdr-iak

As you watch the video titled "What is the 14th Amendment?," focus on understanding the Fourteenth Amendment, its meaning and why it is called the "Equal Protection Clause.".

https://www.youtube.com/watch?v=ZL3p-votUTA

Legislation and court cases to prevent discrimination in education first came to notice in 1954 with the famous case ***Brown v. Board of Education of Topeka, Kansas.*** *Brown* was not a special education case, but it played a significant role in the development of special education laws to come.

For much of the ninety years preceding the *Brown* case, race relations in the United States had been dominated by racial segregation. This policy had been endorsed in 1896 by the U.S. Supreme Court case of *Plessy versus Ferguson*. In *Plessy*, the Court held that that as long as the separate facilities for the separate races were "equal," the segregation did not violate the **Fourteenth Amendment** of the U.S. Constitution ("no state shall … deny to any person … the equal protection of the laws."). The concept of "separate but equal" was challenged in *Brown* as being unconstitutional.

On May 17, 1954, Chief Justice Earl Warren read the decision of the unanimous Court: "*We come then to the question presented: Does segregation of children in public schools solely on the basis of race, even though the physical facilities and other "tangible" factors may be equal, deprive the children of the minority group of equal educational opportunities? We believe that it does.…" "We conclude that in the field of public education the doctrine of 'separate but equal' has no place. Separate educational facilities are inherently unequal. Therefore, we hold that the plaintiffs and others similarly situated for whom the actions have been brought are, by reason of the segregation complained of, deprived of the equal protection of the laws guaranteed by the Fourteenth Amendment."*

The Supreme Court struck down the "separate but equal" doctrine of *Plessy* for public education, ruled in favor of the plaintiffs, and required the desegregation of schools across America.

The Court in *Brown* stated that segregation based on unalterable characteristics with the result being inequitable opportunities could not be upheld in the United States and demanded that such segregation end with *all deliberate speed.*

Brown set the precedent for future discrimination cases in education. People with disabilities were recognized as another group whose rights had been violated because of arbitrary discrimination. For children, the discrimination occurred because they were denied access to schools because of their disabilities.

Using *Brown* as their legal precedent, parents of students with disabilities claimed that their children's segregation and exclusion from school violated their opportunity for an equal education under the **Fourteenth Amendment** of the U.S. Constitution—The

Equal Protection Clause. If *Brown* could not segregate by race, then schools should not be able to segregate or otherwise discriminate by ability and disability.

During the early 1960s, there was a pervasive national concern with the rights of the individual, especially the rights of persons who had previously been discriminated against by the government. In fact, the rights of people with disabilities became a significant part of the larger social issue at the time. In the 1960s, parents began to become advocates for better educational opportunities for their children with disabilities. Parents started to speak out about how segregated special schools and classes were not the most appropriate educational setting for many students with disabilities. Consequently, some parents began to take legal action against their respective school districts when they felt their children's rights were being violated.

President John F. Kennedy also raised public awareness of individuals with mental and physical disabilities. President Kennedy, whose sister Rosemary was born with a cognitive disability, was a major champion of education for kids with disabilities. In 1961, he initiated a Presidential Panel on Mental Retardation. President Kennedy expressed his concern about the issues:

The manner in which our Nation cares for its citizens and conserves its manpower resources is more than an index to its concern for the less fortunate. It is a key to its future. Both wisdom and humanity dictate a deep interest in the physically handicapped, the mentally ill, and the mentally retarded. Yet, although we have made considerable progress in the treatment of physical handicaps, although we have attacked on a broad front the problems of mental illness, although we have made great strides in the battle against disease, we as a nation have for too long postponed an intensive search for solutions to the problems of the mentally retarded. That failure should be corrected (President's Panel on Mental Retardation, 1962).

In the early 1970s, two significant court cases paved the way toward future federal legislation protecting the rights of children with disabilities and their parents:

- ***PARC v. Commonwealth of Pennsylvania***
- ***Mills v. Board of Education of District of Columbia***

In *PARC*, the Court ruled that schools may not exclude students who have been classified with mental retardation. Also, the Court mandated that all students must be provided with a free appropriate public education (*PARC v. Commonwealth of Pennsylvania*, 343 F. Supp. 279, E.D. PA, 1972). Both of these holdings would play a fundamental role in the enactment of future federal special education laws.

Mills involved the practice of suspending, expelling and excluding "exceptional children" from the D.C. public schools. In *Mills*, the Court held that: "*No child eligible for a publicly supported education in the District of Columbia public schools shall be excluded from a regular public school assignment.… The District of Columbia shall provide to each child of school age a free and suitable publicly supported education regardless of the degree of the child's mental, physical or emotional disability or impairment*" *(Mills v. Board of Education of District of Columbia*, 348 Supp. 866, CD. DC 1972).

Mills set forth future guidelines for federal legislation by rejecting the District's argument that funds were insufficient to educate students with disabilities. The court in *Mills* mandated that students with disabilities receive special education services regardless of the school district's financial capability, stating that: "*Insufficient resources may not be the basis for exclusion*" *(Mills v. Board of Education of District of Columbia*, 348 Supp. 866, CD. DC 1972).

PARC and *Mills* set the stage for enactment of federal laws to protect the rights of children with disabilities and their parents. As a result of these cases and other historical court cases at the time, federal legislation for all individuals with disabilities began to develop in the early 1970s.

The Rehabilitation Act of 1973, 29 U.S.C. 701 *et seq*, is a civil rights law that made discrimination against individuals illegal to those receiving federal funding or grants. All public elementary and secondary schools and most postsecondary institutions receive

As you watch the video titled "President John F. Kennedy's 51st News Conference, March 6, 1963," think about the important first steps taken by President Kennedy in making the country aware of the needs of those with cognitive disabilities.

https://www.youtube.com/watch?v=4yhSzjmNjjI

As you watch the video titled "Digital Storytelling: PARC vs. Commonwealth of Pennsylvania," think about how *PARC v. Commonwealth of Pennsylvania* played a significant role in future federal legislation, especially as it set the stage for the new concept of a Free Appropriate Public Education (FAPE) for individuals with disabilities.

https://www.youtube.com/watch?v=QtFmp3XduaQ

As you watch the video titled "Mills versus Board of Education District of Columbia 1972," think about how *Mills v. Board of Education District of Columbia* played a significant role in future federal legislation, especially as it set the stage for the new concepts of Zero Reject and a Free Appropriate Public Education (FAPE) for individuals with disabilities.

https://www.youtube.com/watch?v=M7vyKkyQkTM

federal subsidies and grants and therefore must comply with the Rehabilitation Act of 1973. **Section 504 of the Rehabilitation Act of 1973** ensures students of equal opportunity to all school activities. The law prohibits discrimination against students with disabilities in federally funded programs: *"Individuals with disabilities cannot be excluded from participation in, denied benefits of, or subjected to discrimination under any program or activity receiving federal financial assistance."*

As you watch the video titled "FAQ Friday: What is the difference between a Section 504 and IDEA?," Janice Meyer shares the key differences between 504 and IDEA. In the video, learn about the importance of Section 504 for those students with disabilities who are not eligible for special education and what rights they are afforded.

https://www.youtube.com/watch?v=hlzix3fn02g

Because of the victories that were being won for students with disabilities in the 1960s and early 1970s, as well as the enactment of the Rehabilitation Act of 1973, parents and student advocates began to lobby Congress for federal laws and money that would ensure students with disabilities got an education that would meet their needs. Years of exclusion, segregation, and denial of basic educational opportunities to students with disabilities and their families set an imperative for a civil rights law guaranteeing these students access to the education system.

In 1975, a Congressional investigation revealed that:

- Over 4 million children with disabilities in the United States were not receiving appropriate educational services
- Because of the lack of adequate services in the public school system, families were often forced to find services outside the public school system, often at a great distance from their homes at their own expense

Congress determined that it is in the national interest that the federal government assists state and local efforts to provide programs to meet the educational needs of children with disabilities. Congress recognized the necessity of special education for children with disabilities and was concerned about the widespread discrimination.

On November 29, 1975, President Gerald Ford signed into law the **Education for All Handicapped Children Act** (EHA), Public Law 94-142.

The passage of Public Law 94-142 was the end result of many years of litigation and state legislation to protect and promote the civil rights of all students with disabilities. This federal law required states to provide a free appropriate public education for students with disabilities no matter how serious the disability. P.L. 94-142 was the first law to clearly define the rights of students with disabilities. Some of the key provisions of P.L. 94-142 were:

- Was the first law to clearly define the rights of students with disabilities to free appropriate public education (FAPE)
- Required the school systems to include the parents and guardians when meeting about the student or making decisions about his or her education
- Mandated an individualized education program (IEP) for every student with a disability (The IEP must include short and long-term goals for the student, as well as ensure that the necessary services and products are available to the student.)
- Required that students be placed in the **least restrictive environment** (LRE)
- Ensured that students with disabilities be given nondiscriminatory tests (tests that take into consideration the **native language** of the student and the effects of the disability)
- Required **due process** procedures to be in place (to protect families and students)

In 1986, the Education for All Handicapped Children Act was amended by Public Law 99-457, the **Education of the Handicapped Act Amendments** (The act of amending and renewing a law is known as **reauthorization**). These amendments, which are also known as the Early Intervention Amendments to Public Law 94-142, extended FAPE to all students aged 3 to 5 by October 1991 in all states that wanted to participate (all 50 wanted to and did, even states that did not have public schooling for students at those ages). Provisions were also included to help states develop early intervention programs for infants and toddlers with disabilities; this part of the legislation became known as the Part H Program (*Note:* In 1997, the section of the law that applies to infants and toddlers changed to Part C).

In 1990, the Education for All Handicapped Children Act was once again reauthorized by Public Law 101-476. Most obvious was the legislation's change of name to IDEA—The Individuals with Disabilities Education Act. IDEA continued to uphold the provisions set forth in P.L. 94-142. Notice IDEA changed the terms in the previous law as follows:

- from "children" to "individuals"
- from "handicapped" to "with disabilities"

IDEA reaffirmed P.L. 94-142's requirements of a free appropriate public education through an individualized education program with related services and due process procedures. This act also supported the amendments to P.L. 94-142 that expanded the entitlement in all states to ages 3 to 21, designated assistive technology as a related service in IEPs, strengthened the law's commitment to greater inclusion in community schools (least restrictive placement), provided funding for infant and toddler early intervention programs, and required that by age 16 every student have explicitly written in the IEP a plan for transition to employment or postsecondary education.

The newest amendments of IDEA were the Individuals with Disabilities Education Act Amendments of 1997 (P.L. 105-17). These amendments restructured IDEA into four parts: Part A addressed general provisions; Part B covered assistance for education of all students with disabilities; Part C covered infants and toddlers with disabilities; and Part D addressed national activities to improve the education of students with disabilities.

On December 3, 2004, the **Individuals with Disabilities Education Improvement Act** was enacted into law as Public Law 108–446. The statute, as passed by Congress and signed by President George W. Bush, reauthorized and made significant changes to the Individuals with Disabilities Education Act. It is now Public Law 108-446 and can be found in 20 U.S.C. 1400-1482.

INDIVIDUALS WITH DISABILITIES EDUCATION IMPROVEMENT ACT (IDEIA)

IDEIA is an acronym for the Individuals with Disabilities Education Improvement Act, our nation's special education law. Originally passed in 1975 under the title, Education for All Handicapped Children's Act (Public Law 94-142), IDEIA is the U.S. federal law that governs how states must provide special education to children with disabilities. IDEIA requires school districts to provide a "free appropriate public education" (FAPE) to eligible children with disabilities [34 C.F.R. 300.8; 20 U.S.C. 1401(3); 1401(30)]. A FAPE means that special education and related services are to be provided as described in an individualized education program (IEP) and under public supervision to a child at no cost to the parents [34 C.F.R. 300.17; 20 U.S.C. 1401(9)].

The law has been amended and renewed several times, a process called reauthorization. Today, IDEIA is Public Law 108-446 and is often referred to as IDEA 2004 or simply IDEA. Throughout this book, we will be using "IDEIA" to represent the Individuals with Disabilities Education Improvement Act.

Purpose of IDEIA

IDEIA states that its purposes are:

- To ensure that all students with disabilities have available to them a free appropriate public education that emphasizes special education and related services designed to meet their unique needs and prepare them for further education, employment, and independent living
- To ensure that the rights of students with disabilities and their parents or guardians are protected

As you watch the video titled "Celebrating 35 Years of IDEA," remember that the Individuals with Disabilities Education Act is the legislative foundation for all services that students with disabilities receive in schools today. At the 35th anniversary of its passage, this video takes a look back to what the conditions were like before IDEA, and how its passage has changed the educational landscape for students with disabilities today.

http://www.youtube.com/watch?v=DUn6luZQaXE

- To assist states, localities, educational service agencies, and federal agencies to provide for the education of all students with disabilities

To assess and ensure the effectiveness of efforts to educate students with disabilities [34 C.F.R. 300.1; 20 U.S.C. 1400(d)].

Understanding IDEIA Citations

Throughout this textbook, you will see citations for IDEIA. If you wanted to read IDEIA, you could find it in one of two places, the U.S. Code (U.S.C.) and the Code of Federal Regulations (C.F.R.):

As you watch the video titled "United States Code," take the time to learn how the U.S. Code categorizes federal statutes by subject under specific Titles.
https://www.youtube.com/watch?v=UnHA2G1eaGE

1. U.S. Code (U.S.C.): The U.S. Code (U.S.C.) has 50 subject classifications called "Titles." For example, Title 17 is Copyright; Title 26 is the Internal Revenue Code; Title 42 is about Public Health and Welfare. Title 20 represents the laws in Education. When you see "20 U.S.C.," you know it's an education law.

   In each Title, laws are indexed and assigned Section Numbers. IDEIA is cited as 20 U.S.C. 1400–1482. So, any time you see 20 U.S.C. with index numbers that follow that are between 1400 and 1482, you know it's a special education law (IDEIA). For example, the definition of Special Education in the U.S. Code is 20 U.S.C. 1401(29).
2. Code of Federal Regulations (C.F.R.): You can also find IDEIA in the Code of Federal Regulations (C.F.R.). Volume 34 of the C.F.R. is the section on Education. Part 300 is the information on IDEIA. The special education regulations are published in Volume 34, Part 300 of the Code of Federal Regulations. The legal citation is 34 C.F.R. 300. For example, the definition of Special Education in the C.F.R. can be found in 34 C.F.R. 300.39(b)(3).

Classifications Under IDEIA

As you watch the video titled "Code of Federal Regulations (2014)," focus on how the C.F.R. works and its purposes for classification of federal regulations.
https://www.youtube.com/watch?v=A9ED5ZWyvf8

IDEIA lists separate categories of disabilities under which children may be eligible for special education and related services. Children are eligible to receive special education services and supports if they meet the **eligibility** requirements for at least one **disability** listed in IDEIA and it is determined that they are in need of special education services (Giuliani, 2012).

The definitions of the 13 classifications of disabilities under IDEIA are listed below:

Autism: A developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age 3 that adversely affects a child's educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences. The term does not apply if a child's educational performance is adversely affected because the child has an emotional disturbance.

Deaf–Blindness: Concomitant hearing and visual impairments, the combination of which causes such severe communication and other developmental and educational problems that they cannot be accommodated in special education programs solely for children with deafness or children with blindness.

Developmental Delay: For children ages 3 through 9, a state and local education agency (LEA) may choose to include as an eligible "child with a disability" a child who is experiencing developmental delays in one or more of the following areas:

- physical development
- cognitive development
- communication development
- social or emotional development
- adaptive development

It must also be determined that, because of the developmental delays, the child needs special education and related services. Developmental delays are defined by the state and must be measured by appropriate diagnostic instruments and procedures.

Emotional Disturbance: A condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a child's educational performance:

- An inability to learn that cannot be explained by intellectual, sensory, or health factors
- An inability to build or maintain satisfactory interpersonal relationships with peers and teachers
- Inappropriate types of behaviors or feelings under normal circumstances
- A general pervasive mood of unhappiness or depression
- A tendency to develop physical symptoms or fears associated with personal or school problems

The term includes schizophrenia. The term does not apply to children who are socially maladjusted, unless it is determined that they have an emotional disturbance.

Hearing Impairment: An impairment in hearing, whether permanent or fluctuating, that adversely affects a child's performance but that is not included under the definition of deafness in this section. (**Deafness:** A hearing impairment so severe that the child is impaired in processing linguistic information through hearing, with or without amplification, that adversely affects a child's educational performance.)

Intellectual Disability: Significantly subaverage general intellectual functioning, existing concurrently with deficits in adaptive behavior and manifested during the developmental period, that adversely affects a child's performance.

Multiple Disabilities: Concomitant impairments (such as intellectual disability–orthopedic impairment) the combination of which causes such severe educational problems that the problems cannot be accommodated in special education programs solely for one of the impairments. The term does not include deaf–blindness.

Orthopedic Impairment: A severe orthopedic impairment that adversely affects a child's educational performance. The term includes impairments caused by congenital anomaly (e.g., clubfoot, absence of some member), impairments caused by disease (e.g., poliomyelitis, bone tuberculosis), and impairments from other causes (e.g., cerebral palsy, amputations, and fractures or burns that cause contractures).

Other Health Impairment: Having limited strength, vitality, or alertness due to chronic or acute health problems, such as a heart condition, tuberculosis, rheumatic fever, nephritis, asthma, sickle cell anemia, hemophilia, epilepsy, lead poisoning, leukemia, or diabetes, that adversely affects a child's educational performance.

Specific Learning Disability: A disorder in one or more of the basic psychological processes involved in understanding or using language, spoken or written, which may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. The term includes conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia; it does not include a learning problem that is primarily the result of visual, hearing, or motor disabilities; of intellectual disabilities; of emotional disturbance; or of environmental, cultural, or economic disadvantage. Under IDEA 2004, when determining whether a child has a specific disability, a local education agency shall not be required to take into consideration whether a child has a severe discrepancy between achievement and intellectual ability.

Speech or Language Impairment: A communication disorder, such as stuttering, impaired articulation, a language impairment, or a voice impairment that adversely affects a child's educational performance.

Traumatic Brain Injury: An acquired injury to the brain caused by an external physical force, resulting in total or partial functional disability or psychosocial impairment

or both, and that adversely affects a child's educational performance. The term applies to open or closed head injuries resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgment; problem solving; sensory, perceptual, and motor abilities; psychosocial behavior; physical functions; information processing; and speech. The term does not apply to brain injuries that are congenital or degenerative or to brain injuries induced by birth trauma.

Visual Impairment: An impairment in vision that, even with correction, adversely affects a child's educational performance. The term includes both partial and total sight blindness.

Prevalence of Children Receiving Special Education Services Under IDEIA

According to the U.S. Department of Education's latest data on **prevalence** of students in special education, more than 6 million U.S. children between 6 and 21 years of age receive special education services (U.S. Department of Education, 2014). Broken down by classification (in alphabetical order):

• Autism	7.0%
• Deaf-Blindness	0.1%
• Developmental Delay	6.0%
• Emotional Disturbance	6.0%
• Hearing Impairments	1.0%
• Learning Disabilities	36.0%
• Intellectual Disabilities	7.0%
• Multiple Disabilities	2.0%
• Orthopedic Impairments	1.0%
• Other Health Impairments	12%
• Speech & Language Impairments	21%
• Traumatic Brain Injury	0.4%
• Visual Impairment	0.4%

Today, the number of children served under IDEIA represent approximately 13.0 percent of all children in school.

OVERVIEW OF THE ASSESSMENT PROCESS

The process of identifying, evaluating, determining eligibility, and educational placement of children in special education is a step-by-step process. IDEIA mandates that certain procedural steps occur to ensure that students with disabilities are afforded the right to a free appropriate public education, as well as have substantive and procedural due process rights. All of these steps will be addressed in much more detail in the upcoming chapters.

Step 1. Identification of Children

As you watch the video titled "Eligibility for Special Education," focus on the rights of parents in the special education process and how children go through the process being special education eligible.
https://www.youtube.com/watch?v=XncgzTGEzZY

Generally, the two ways in which children are identified as possibly needing special education and related services are: *Child Find* (which operates in each state) and by referral of a parent or school personnel.

CHILD FIND. IDEIA mandates that all states identify, locate, and evaluate all children with disabilities in the state who need special education and related services. To do so, states conduct what are known as Child Find activities. When a child is identified by Child Find as possibly having a disability and as needing special education, parents may be asked for permission to evaluate their child. Parents can also call the Child Find office and ask that their child be evaluated.

REFERRAL OR REQUEST FOR EVALUATION. A school professional may ask that a child be evaluated to see if he or she has a disability. Parents may also contact the child's teacher or other school professional to ask that their child be evaluated. Parental consent is needed before a child may be evaluated. Under the federal IDEIA regulations, evaluation needs to be completed within 60 days after the parent gives consent. However, if a State's IDEIA regulations give a different timeline for completion of the evaluation, the State's timeline is applied.

Step 2. Full and Individual Evaluation of the Child by a Multidisciplinary Team

A comprehensive evaluation done by a multidisciplinary team is an essential early step in the special education process for a child. It's intended to answer these questions:

- Does the child have a disability that requires the provision of special education and related services?
- What are the child's specific educational needs?
- What special education services and related services, then, are appropriate for addressing those needs?

By law, the initial evaluation of the child must be "full and individual"—which is to say, focused on that child and that child alone. The evaluation must assess the child in all areas related to the child's suspected disability.

The evaluation results will be used to decide the child's eligibility for special education and related services and to make decisions about an appropriate educational program for the child.

If the parents disagree with the evaluation, they have the right to take their child for an **Independent Educational Evaluation (IEE)** and can ask that the school system pay for this IEE (see Appendix A).

Step 3. Determination of Eligibility for Special Education

Once the comprehensive assessment of the child is completed, an **Eligibility committee** meeting is formed (in some states referred to as the **Committee on Special Education** or (**CSE**), where professionals and the parents look at the child's evaluation results. Together, a determination is made as to whether the child meets the criteria for a "child with a disability," as defined by IDEIA. If the parents do not agree with the eligibility decision, they may ask for a hearing to challenge the decision.

If the child is found to be a child with a disability (as defined by IDEIA), he or she is eligible for special education and related services.

As you watch the video titled "Special Education Process," think about all of the steps involved in the special education process. What steps did you know of already? Which ones were new to you?

https://www.youtube.com/watch?v=I9R0Rd6Zzg8

Step 4. Scheduling an IEP Meeting

A team of school professionals and the parents must meet to write an individualized education program (IEP) for the child within 30 calendar days after a child is determined eligible. The school system schedules and conducts the IEP meeting. School staff must:

- Contact the participants, including the parents
- Notify parents early enough to make sure they have an opportunity to attend
- Schedule the meeting at a time and place agreeable to parents and the school
- Tell the parents the purpose, time, and location of the meeting
- Tell the parents who will be attending
- Tell the parents that they may invite people with knowledge or special expertise about the child to the meeting

Step 5. Holding the IEP Meeting and Then Writing the IEP

The IEP team gathers to talk about the child's needs and write the student's **Individualized Education Program (IEP)**. Parents and the student (when appropriate) are full participating

members of the team. If the child's placement (meaning, where the child will receive his or her special education and related services) is decided by a different group, the parents must be part of that group as well.

Before the school system may provide special education and related services to the child for the first time, the parents must give consent. The child begins to receive services as soon as possible after the IEP is written and this consent is given.

If the parents do not agree with the IEP and placement, they may discuss their concerns with other members of the IEP team and try to work out an agreement. If they still disagree, parents can ask for mediation, or the school may offer mediation. Parents may file a state complaint with the state education agency or a due process complaint, which is the first step in requesting a due process hearing, at which time mediation must be available.

Step 6. Providing Special Education and Related Services to the Student

As you watch the video titled "What is an IEP?," listen to Laura Kaloi, Public Policy Director at the National Center for Learning Disabilities, explain the ins and outs of Individualized Education Programs (IEPs), including who develops them and how to put together a good one.

https://www.youtube.com/watch?v=q2XlAWcMAUk

The school makes sure that the child's IEP is carried out as it was written. Parents are given a copy of the IEP. Each of the child's teachers and service providers has access to the IEP and knows his or her specific responsibilities for carrying out the IEP. This includes the accommodations, modifications, and supports that must be provided to the child, in keeping with the IEP.

Step 7. Progress Monitoring

The child's progress toward the annual goals is measured, as stated in the IEP. His or her parents are regularly informed of their child's progress and whether that progress is enough for the child to achieve the goals by the end of the year. These progress reports must be given to parents at least as often as parents are informed of their nondisabled children's progress.

Step 8. IEP Is Reviewed

As you watch the video titled "IDEA Basics: Triennial Evaluations," understand the importance of evaluation in special education and the legal mandate that all children in special education get reevaluated every 3 years. This is known as the triennial review. Do you agree with triennial reviews? If yes, why? If not, how often do you believe children with disabilities should be evaluated?

https://www.youtube.com/watch?v=Ces1vZbwcjM

The child's IEP is reviewed by the IEP team at least once a year, or more often if the parents or school ask for a review. This is known as the **annual review**. If necessary, the IEP is revised. Parents, as team members, must be invited to participate in these meetings. Parents can make suggestions for changes, can agree or disagree with the IEP, and agree or disagree with the placement.

If parents do not agree with the IEP and placement, they may discuss their concerns with other members of the IEP team and try to work out an agreement. There are several options, including additional testing, an independent evaluation or asking for mediation or a due process hearing. They may also file a complaint with the state education agency.

Step 9. Child Is Reevaluated

At least every 3 years the child must be reevaluated. This evaluation is often referred to as a **triennial review**. Its purpose is to find out if the child continues to be a child with a disability, as defined by IDEIA, and to determine the child's educational needs. However, the child must be reevaluated more often if conditions warrant or if the child's parent or teacher asks for a new evaluation.

CONCLUSION

Assessment is a complex process that needs to be conducted by a multidisciplinary team of trained professionals and involves both formal and informal methods of collecting information about the student. Although the team may choose to administer a series of tests to the student, by law assessment must involve much more than standardized tests. Interviews of

all key participants in the student's education and observations of student behaviors in the classroom or in other sites should be included as well. To develop a comprehensive picture of the student and to develop practical intervention strategies to address that student's special needs, the team must ask questions and use assessment techniques that will help them determine the factors that are facilitating—and interfering with—the child's learning.

It is also important that assessment be an ongoing process. As you will see as you read through this book, the process begins even before the student is referred for formal evaluation; his or her teacher or parent may have noticed that some aspect of the student's performance or behavior is below expectations and, so, requests an official assessment. After eligibility has been established and the IEP developed for the student, assessment should continue, through teacher-made tests, through ongoing behavioral assessment, or through other methods. This allows teachers and parents to monitor the student's progress toward the goals and objectives stated in his or her IEP. Thus, assessment should not end when the eligibility decision is made or the IEP is developed; it has continuing value in contributing to the daily, weekly, and monthly instructional decision making that accompanies the provision of special education and related services.

A thorough and comprehensive assessment can greatly enhance a child's educational experience. The assessment process has many steps and needs to be appropriately done. Furthermore, no one individual makes all of the decisions for a child's classification; it is done by a multidisciplinary team. As future special educators, it is your professional responsibility to understand the laws, steps, and various assessment measures and procedures used in the special education process so that when you enter the school systems, you can have a significant and positive impact on all those with whom you are involved in special education.

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2 Methods of Assessment and Testing Considerations

KEY TERMS

Authentic/naturalistic/performance-based assessment
Basal
Ceiling
Content-referenced tests
Criterion
Criterion-referenced tests (CRTs)
Curriculum-based assessment (CBA)
Curriculum-based measurement (CBM)
Dynamic assessment
Ecological assessment
Formal assessments
Informal reading inventory (IRI)
Informal assessments
Learning styles assessment
Limitations of testing
Norm group
Norm-referenced tests (NRT)
Outcome-based assessment
Portfolio
Portfolio assessment
Showcase portfolio
Standardization
Standardized tests
Standards-referenced tests
Task analysis
Teacher portfolio or record keeping
The Mental Measurements Yearbook (MMY)
Working portfolio

CHAPTER OBJECTIVES

The focus of this chapter is to discuss various formal versus informal methods of assessment. After reading this chapter, you should understand the following:

- Norm-referenced tests
- Intended purposes of norm-referenced tests
- Standardization
- Concerns with standardized testing
- Criterion-referenced tests
- Standards-referenced tests
- Ecological assessment
- Curriculum-based assessment (CBA)
- Curriculum-based measurement (CBM)
- Dynamic assessment
- Portfolio assessment
- Authentic/naturalistic/performance-based assessment
- Task analysis
- Outcome-based assessment
- Learning styles assessment
- Selecting an appropriate instrument
- Selection of test content
- Test interpretation
- Limitations of testing

ASSESSMENT AND TESTING CONSIDERATIONS

The ways that children and adolescents can be evaluated for special education vary from individual to individual. The assessment method needs to be determined on a case-by-case basis. However, to obtain the most valid and accurate picture of a student's strengths and weaknesses, a comprehensive measure of assessment involves using both formal and informal methods of assessment.

Formal and informal are not technical psychometric terms; therefore, there are no uniformly accepted definitions. **Formal assessments** assume a single set of expectations for all students and come with prescribed criteria for scoring and interpretation. Formal assessments are formal ways of finding out how much a student has learnt or improved during the instructional period. These include exams, diagnostic tests, achievement tests, screening and intelligence tests, and so on. All formal assessments have standardized methods of administering the tests. The data are mathematically computed and summarized. Scores such as percentiles, stanines, or standard scores are mostly commonly given from this type of assessment (see Chapter 4).

As you watch the video titled "Formal Assessments," take the time to get a good understanding of what formal assessments are, the importance of formal assessments, and issues pertaining to what the strengths and limitations are of formal assessments.

https://www.youtube.com/watch?v=0YprPyI1XhQ

Informal assessments can judge and evaluate students' performance and skill levels without making use of standardized tests and scoring patterns. There are no standardized tools to measure or evaluate the performances in these assessment tools. The best examples of informal assessments are projects, experiments, and presentations given by students in classrooms and other platforms. Unlike standardized tests, they are not intended to provide a comparison to a broader group beyond the students in the local project or to predict future performance. Informal assessments are not data driven but rather content and performance driven. For example, running records are informal assessments because they indicate how well a student is reading a specific book. Scores such as 10 correct out of 15, percent of words read correctly, and most rubric scores are given from this type of assessment (Weaver, 2015a).

This is not to say that informal assessment is casual or lacking in rigor. Informal assessment requires a clear understanding of the levels of ability the students bring with them. Only then may assessment activities be selected that students can attempt reasonably. Informal assessment seeks to identify the strengths and needs of individual students without regard to grade or age norms.

FORMAL ASSESSMENTS

Norm-Referenced Tests

Norm-referenced tests allow us to compare a student's skills to others in his age group. Norm-referenced tests are developed by creating the test items and then administering the test to a group of students that will be used as the basis of comparison (Logsdon, 2014b). Scores on norm-referenced tests (NRT) are not interpreted according to an absolute standard or criterion (e.g., 16 out of 20 correct) but rather according to how the student's performance compares with that of a particular group of individuals. For this comparison to be meaningful, a valid comparison group—called a **norm group**—must be defined. A norm group is a large number of children who are representative of all the children in that age group. Such a group can be obtained by selecting a group of children who have the characteristics of children across the United States—that is, a certain percentage must be from each gender, from various ethnic backgrounds (e.g., Caucasian, African American, American Indian, Asian, Hispanic), from each geographic area (e.g., Southeast, Midwest), and from each socioeconomic class.

By having all types of children take the test, the test publisher can provide information about how various types of children perform on the test. (This information—the types of students comprising the norm group and how each type performed on the test—is generally given in the manuals that accompany the test.)

Thus, before making assumptions about a child's abilities based on test results, it is important to know something about the group to which the child is being compared —particularly whether the student is being compared to children who are similar in ethnicity, socioeconomic status, and so on. The more unlike the child the norm group is, the less valuable the results of testing will generally be. This is an area in which standardized testing has fallen under considerable criticism. Often, test administrators do not use the norm-group information appropriately, or there may not be children in the norm group similar to the child being tested. Furthermore, many tests were originally developed some time ago, and the norm groups reported in the test manual are not similar at all to the children being tested today.

Norm-referenced tests include basal and ceiling levels, which are used to prevent the examiner from having to administer all of the items with each test. A **basal** is the "starting point." It represents the level of mastery of a task below which the student would correctly answer all items on a test. All of the items prior to the basal are not given to the student. These items are considered already correct. For example, on an IQ test, the examiner may start with question 24 because of the age of the child. That is the basal. Here, the student starts with credit given for the first 23 questions.

Once the basal is determined, the examiner will administer all items until the student reaches a ceiling. The **ceiling** is the point at which the student has reached the predetermined number of errors, and therefore, testing is stopped because it is assumed that the student will continue to get the answers wrong. The ceiling is the "ending point." It represents the level of mastery of a task above which the student would incorrectly answer all future items on a test. For example, if on a spelling test a child got numbers 25 to 34 wrong, and the ceiling is 10 incorrect in a row, this means that the examiner would stop administering spelling words to the child because the ceiling has been obtained.

Intended Purposes of Norm-Referenced Tests

When you see scores in the paper that report a school's scores as a percentage—"the ABC school ranked at the 37th percentile"—or when you see your child's score reported that way—"Coryn scored at the 23rd percentile"—the test is usually a norm-referenced test. Norm-referenced tests are designed to "rank order" test takers—that is, to compare students' scores. A commercial norm-referenced test does not compare all the students who take the test in a given year. Instead, test makers select a sample from the target student population (say, ninth graders). The test is "normed" on this sample, which is supposed to fairly represent the entire target population (all ninth graders in the nation). Students' scores are then reported in relation to the scores of this norming group. To make comparing easier, test makers create exams in which the results end up looking at least somewhat like a bell-shaped curve (the normal curve; see Chapter 3). Test makers make the test so that most students will score near the middle, and only a few will score low (the left side of the curve) or high (the right side of the curve).

An important reason for using norm-referenced tests is to classify students. NRTs are designed to highlight achievement differences between and among students to produce a dependable rank order of students across a continuum of achievement from high achievers to low achievers. School systems might want to classify students in this way so that they can be properly placed in remedial or gifted programs. These types of tests are also used to help teachers select students for different ability level reading or mathematics instructional groups.

Tests are normed using a national sample of students. Because norming a test is such an elaborate and expensive process, the norms are typically used by test publishers for 7 years. All students who take the test during that 7-year period have their scores compared to the original norm group.

Standardization

All norm-referenced tests include standardized procedures. Standardized Tests are those tests with carefully designed procedure, questions, and administration. Often in achievement tests, the tests measure the performance of large numbers of individuals to collect

information about individual children or adults, or to assess the success of schoolwide educational programs. **Standardization** refers to structuring test materials, administration procedures, scoring methods, and techniques for interpreting results. **Standardized tests** have detailed procedures for administration, timing, scoring, and interpretation procedures that must be followed precisely to obtain valid and reliable results. When developing standardized tests, the test creators administer the test to large groups of children (subjects) across age groups. They evaluate individual items, they will also compare scores across age groups, across geographic areas, sometimes even across racial or socioeconomic groups. This information is used to create the norms that will be used to evaluate individual students' performance on the same items (Webster, 2015b).

Concerns with Standardized Testing

Criticisms of standardized tests seem to have grown in proportion to the frequency with which, and the purposes for which, they are used (Pierangelo & Giuliani, 2012). Districts now administer such tests at every grade level, define success or failure of programs in terms of test scores, and even link teacher and administrator salaries and job security to student performance on standardized tests.

Three areas of criticism in regard to standardized tests are content, item format, and item bias. Standardized tests are designed to provide the best match possible to the perceived "typical" curriculum at a specific grade level. However, for programs such as a bilingual education that are built on objectives unique to the needs of their students, many of the items on a standardized test may not measure the objectives or content of that program. Thus a standardized test may have low-content validity (see Chapter 7) for specific bilingual education programs. In such a situation, the test might not be sensitive to actual student progress. Consequently, the program, as measured by this test, would appear to be ineffective.

Standardized achievement tests generally rely heavily on multiple-choice items. This item format allows for greater content coverage as well as objective and efficient scoring. However, the response required by the format is recognition of the correct answer. This type of response does not necessarily match the type of responses students regularly make in the classroom, for example, the production or synthesis of information. If students are not used to responding within the structure imposed by the item format, their test performance may suffer. On the other hand, students may recognize the correct form when it is presented as a discrete item in a test format, but fail to use that form correctly in communication contexts. In this case, a standardized test may make the student appear more proficient than performance would suggest.

Further, some tests have been criticized for including items that are biased against certain kinds of students (e.g., ethnic minority, limited English proficient, rural, inner-city). The basis for this criticism is that the items reflect the language, culture, and/or learning style of the middle-class majority.

Thus, there are strong arguments in favor of educators considering the use of alternative forms of assessment to supplement standardized test information. These alternate assessments should be timely, not time-consuming, truly representative of the curriculum, and tangibly meaningful to the teacher and student. Techniques of informal assessment have the potential to meet these criteria as well as programmatic requirements for formative and summative evaluations. Validity and reliability are not exclusive properties of formal, norm-referenced tests. Informal techniques are valid if they measure the skills and knowledge imparted by the project; they are reliable if they measure consistently and accurately.

Research suggests that there are many positive and negative aspects to standardized testing (Columbia University, 2013; Forsyth, 2014; Meader, 2015b).

Positive Aspects of Standardized Testing

- **Gives teachers guidance.** This helps them determine *what* to teach students and *when* to teach it. The net result is less-wasted instructional time and a simplified way of timeline management.

- **Allows students' progress to be tracked over the years.** When students take the same type of test yearly (adjusted for grade level), it is easy to see if a student is improving, losing ground academically, or staying about the same.
- **Provide an accurate comparison across groups.** (For example, this makes it easy to see how boys are performing as compared to girls in a particular school or district.) Over the years, great improvements have been made with regards to test bias, which has led to more accurate assessments and comparisons.
- **Holds teachers and schools accountable.** Probably the greatest benefit of standardized testing is that teachers and schools are responsible for teaching students what they are required to know for these standardized tests.
- **Allows students located in various schools, districts, and even states to be compared.** Without standardized testing, this comparison would not be possible. Public school students in the state of Texas are all required to take the same state standardized tests. This means that a student in Amarillo can be compared to a student in Dallas. Being able to accurately compare data is invaluable and is a major reason that the Common Core State Standards have been adopted. These will allow for a more accurate comparison between states.
- **Typically it is accompanied by a set of established standards or instructional framework, which provides teachers with guidance for what and when something needs to be taught.** Without this structure, a third grade teacher and a sixth grade teacher could be teaching the same content. Having this guidance also keeps students who move from one school district to another from being behind or ahead their new school.
- **Is objective in nature.** Classroom grades given by a teacher are at the very least minimally subjective in nature. Standardized tests are often scored by computers or at the very least scored by people who do not directly know the student. They are also developed by experts and each question undergoes an intense process to remove bias.
- **Provides accurate comparisons between subgroups.** These subgroups can include data on ethnicity, socioeconomic status, special needs, and so on. This provides schools with data to develop programs and services directed at improving scores in these sub-groups.

Negative Aspects of Standardized Testing

- **Many teachers are (unjustly) accused of teaching to the test.** Most do not do this, but some feel so much pressure for their students to achieve a specific score that they *do* end up teaching to the test, *whether they want to or not*. This can make school drudgery for students and steal teachers' enjoyment of teaching. This practice can hinder a student's overall learning potential. With the stakes getting higher and higher for teachers, this practice will only continue to increase.
- **Some school systems are under great pressure to raise their scores so they have resorted to decreasing (and sometimes doing away with) time spent in recess.** This can have negative impact on children's social, emotional, and academic well-being.
- **Standardized tests can place a huge amount of stress on students and teachers alike.** This can lead to negative health consequences as well as feelings of negativity directed at school and learning in general.
- **Standardized tests have the potential for test bias.** As much as test creators try to do away with testing bias, it may be impossible to rid tests of it altogether.
- **Standardized testing only evaluates the individual performance of the student instead of the overall growth of that student over the course of the year.** Adequate Yearly Progress (AYP) only focuses on whether a student is proficient at the time of testing. This does a disservice to both the teacher who worked hard to help their students grow and the student who worked extremely hard over the course of the year and improved tremendously, but failed to score proficient.

As you watch the video titled "Standardized Testing," focus on the pros and cons about standardized testing. What is your position on standardized testing? As a future special education professional, what, if any concerns do you have with standardized testing?

https://www.youtube.com/watch?v=r-FhGeVobNw

- **Standardized testing can create a lot of stress on both educators and students.** Excellent teachers quit the profession every day because of how much stress is on them to prepare students to perform on standardized tests.
- **Standardized testing can be wrongfully used as fuel for those with political agendas.** This is a sad reality far too often across all levels of the political realm.

INFORMAL ASSESSMENT

Criterion-Referenced Tests

Many educators and members of the public fail to grasp the distinctions between criterion-referenced and norm-referenced testing. It is common to hear the two types of testing referred to as if they serve the same purposes or shared the same characteristics. Much confusion can be eliminated if the basic differences are understood. Whereas norm-referenced tests ascertain the rank of students, **criterion-referenced tests (CRTs)** report how well students are doing relative to a predetermined performance level on a specified set of educational goals or outcomes included in the school, district, or state curriculum. Educators use criterion-referenced tests to determine what specific concepts a child has learned (Logsdon, 2014a).

Educators or policy makers may use a CRT to see how well students have learned the knowledge and skills they are expected to have mastered. This information may be used as one piece of information to determine how well the student is learning the desired curriculum and how well the school is teaching that curriculum.

CRTs are scored according to a standard, or **criterion**, that the teacher, school, or test publisher decides represents an acceptable level of mastery. An example of a criterion-referenced test might be a teacher-made spelling test containing 20 words to be spelled. The teacher has defined an "acceptable level of mastery" as 16 correct (or 80%). These tests, sometimes called **content-referenced tests**, are concerned with the mastery of specific, defined skills; the student's performance on the test indicates whether he or she has mastered those skills. Examples of criterion-referenced questions would be as follows:

- Does Kelly correctly read the word *dinosaur?*
- Does Juanna do fifth-grade math computation problems with 85 percent accuracy?
- Did Yvette get 90 percent of the questions correct on the social studies exam?

Ultimately, criterion-referenced testing, unlike norm-referenced testing, uses an objective standard or achievement level. A student is required to demonstrate ability at a particular level by performing tasks at that degree of difficulty. Scores on criterion-referenced tests indicate what individuals *can* do—not how they have scored in relation to the scores of particular groups of persons, as in norm-referenced tests (Valpar International Corportation, 2015)

An **informal reading inventory (IRI)** is an example of a criterion-referenced test. IRIs generally consist of two main sections: word recognition and passage reading. According to Bigge and Stump (1999),

> the interpretation of an IRI is based on criteria or levels of performance, and identifies three reading levels: independent, instructional, and frustration. The independent reading level is the level at which a student reads fluently and for pleasure (word recognition of 96% to 99% correct paired with correct comprehension of 75% to 90%). The instructional reading level is the level at which the student can experience success with assistance (word recognition of 92% to 95% correct paired with correct comprehension of 60% to 75%). The frustration level is the level at which the reading process breaks down for the student (word recognition of 90% to 92% or less paired with correct comprehension of 60% to 75% or less), as demonstrated by depressed comprehension and difficulties with word recognition (p. 197).

As you watch the video titled "Introduction to Norm Referenced Tests & Criterion Referenced Tests," be able to explain the differences between both tests. Why are they both important to use in special education assessment?

https://www.youtube.com/watch?v=nb1C8MVe2WM

Standards-Referenced Tests

A recent variation of the criterion-referenced test is the **standards-referenced test**, or standards-based assessment. Many states and districts have adopted content standards (or "curriculum frameworks") that describe what students should know and be able to do in different subjects at various grade levels. They also have performance standards that define how much of the content standards students should know to reach the "basic," "proficient," or "advanced" level in the subject area. Tests are then based on the standards, and the results are reported in terms of these "levels," which, of course, represent human judgment. In some states, performance standards have been steadily increased, so that students continually have to know more to meet the same level.

Educators often disagree about the quality of a given set of standards. Standards are supposed to cover the important knowledge and skills students should learn—they define the "big picture." State standards should be well written and reasonable. Some state standards have been criticized for including too much, for being too vague, for being ridiculously difficult, for undermining higher-quality local curriculum and instruction, and for taking sides in educational and political controversies. If the standards are flawed or limited, tests based on them also will be. In any event, standards enforced by state tests will have—and are meant to have—a strong impact on local curriculum and instruction.

Ecological Assessment

Ecological assessment involves directly observing and assessing a child in the many environments in which he or she routinely operates. The purpose of conducting such an assessment is to probe how the different environments influence the student and his or her school performance. Critical questions to ask in an ecological assessment include the following:

- In which environments does the student manifest difficulties?
- Are there instances in which he or she appears to function appropriately?
- What is expected of the student academically and behaviorally in each type of environment?
- What differences exist in the environments in which the student manifests the greatest and the least difficulty?
- What implications do these differences have for instructional planning?

In an ecological assessment, the child is observed and assessed in different environments to see how he or she functions in these different places. Sometimes students do well in some school environments but have difficulty, in performance and/or behavior, in others. For example, the child may be very well-behaved during art class but acts out inappropriately during math, or he may be calm during classroom time but becomes agitated in the cafeteria. Often adjusting the environment is the most effective way of making modifications that benefit the student. Maybe he or she misbehaves when the environment is too noisy or stimulating, or maybe the expectations of the staff are different in one environment to another. Having this kind of information can be very important in making decisions for placement and in accommodating the student's needs (EduQna.com, 2012). The components of an ecological assessment clearly reveal that it involves numerous aspects of the student's life to get a detailed picture of his or her situation.

Curriculum-Based Assessment

Direct assessment of academic skills is one alternative that has recently gained in popularity. Although a number of direct assessment models exist, they are similar in that they all suggest that assessment needs to be tied directly to instructional curriculum. **Curriculum-based assessment (CBA)**is assessment based on the curriculum that a child is mastering. It may be the curriculum materials for the grade level the child is in, or it may be adapted to the student's ability or IEP goals. For example, fourth grade children

are mastering long division, but children with disabilities in the same classroom may be mastering single digit divisors into two or three (Webster, 2015c).

Curriculum-based assessments provide a direct assessment of a child's skills upon entry into a curriculum; guide development of individual goals, interventions, and accommodations; and allow for continual monitoring of developmental progress (McLean, Wolery, & Bailey, 2004). Curriculum-based assessments should be conducted as an ongoing process of gathering information regarding children's strengths, interests, and emerging abilities related to important skills across all content and developmental areas for the purpose of planning instruction. "Assessment cannot and should not represent a single point in time and ongoing decisions should be continuously made based on data when programming for young children" (Grisham Brown, Hemmeter, & Pretti-Frontczak, 2005, p. 87).

CBA is useful because it:

- Can monitor the child's progress frequently
- Can be closely aligned to performance standards
- Can be sensitive to cultural and linguistic diversity
- Links curriculum and instruction
- Helps the teacher determine what to teach
- Can be administered frequently
- Is sensitive to short-term academic gains
- Assists in the evaluation of student progress and program evaluation
- Can be reliable and valid (Technical Assistance & Training System Communities of Practice, 2009)

Whereas standardized commercial achievement tests measure broad curriculum areas and/or skills, curriculum-based assessment (CBA) measures specific skills that are presently being taught in the classroom, usually basic skills. Several approaches to CBA have been developed (Hall & Mengel, 2002). Four common characteristics exist across these models:

- The measurement procedures assess students directly using the materials in which they are being instructed. This involves sampling items from the curriculum.
- Administration of each measure is generally brief in duration (typically 1–5 minutes).
- The design is structured such that frequent and repeated measurement is possible and measures are sensitive to change.
- Data are usually displayed graphically to allow monitoring of student performance.

"Tests" of performance in this case come directly from the curriculum. For example, a child may be asked to read from his or her reading book for one minute. Information about the accuracy and the speed of reading can then be obtained and compared with other students in the class, building, or district. CBA is quick and offers specific information about how a student may differ from his or her peers. Because the assessment is tied to curriculum content, it allows the teacher to match instruction to a student's current abilities and pinpoints areas in which curriculum adaptations or modifications are needed.

CBA also offers information about the accuracy and efficiency (speed) of performance. The latter is often overlooked when assessing a child's performance, but is an important piece of information when designing intervention strategies. CBA is also useful in evaluating short-term academic progress (Wright, 2007).

Curriculum-Based Measurement

Curriculum-based measurement (CBM) is an assessment method that involves timing tasks and then charting performance. CBM is most concerned with fluency. This means that we are looking at the rate at which a student is able to perform a given task. After assessing the speed at which the student performs the task, we then chart performance over time so that we can clearly see on a graph the student's progress (or decline) from the initial performance to the goal point. An example of curriculum-based measurement would be to examine the number of words correctly read from a book in 5 minutes and then continually chart the student's progress over the course of the school year with the goal being set at a predetermined number (e.g., 150 words).

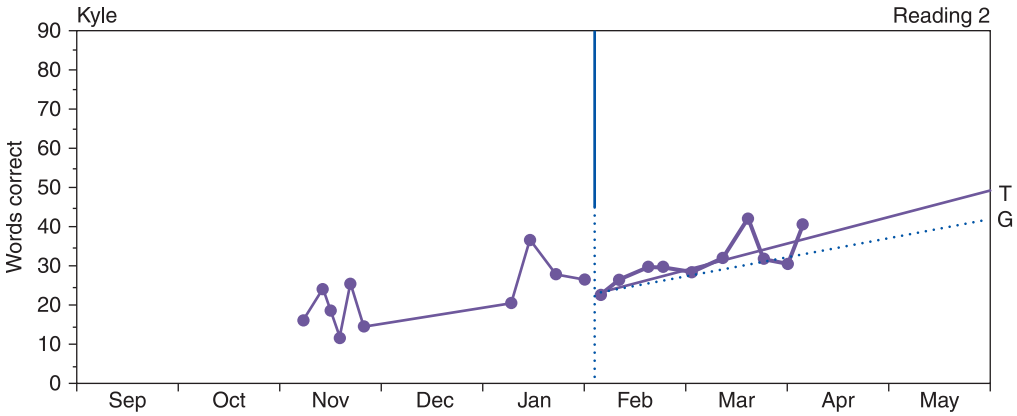

FIGURE 2.1 Example of Curriculum-Based Measurement (CBM) graph for reading.

How Does CBM Work?

According to McLane (2011), when CBM is used, each child is tested briefly each week. The tests generally last from 1 to 5 minutes. The teacher counts the number of correct and incorrect responses made in the time allotted to find the child's score. For example, in reading, the child may be asked to read aloud for 1 minute. Each child's scores are recorded on a graph and compared to the expected performance on the content for that year. The graph allows the teacher, and you, to see quickly how the child's performance compares to expectations. (Figure 2.1 is an example of what a CBM graph looks like.)

After the scores are entered on the graphs, the teacher decides whether to continue instruction in the same way, or to change it. A change is called for if the child's rate of learning progress is lower than is needed to meet the goal for the year.

The teacher can change instruction in any of several ways. For example, he or she might increase instructional time, change a teaching technique or way of presenting the material, or change a grouping arrangement (e.g., individual instruction instead of small-group instruction). After the change, parents—and the teacher—can see from the weekly scores on the graph whether the change is helping their child. If it is not, then the teacher can try another change in instruction, and its success will be tracked through the weekly measurements.

As you watch the video titled "Reading Curriculum-Based Measurement," examine the importance of curriculum-based measurement (CBM) and how CBM is important for data-based decision making.

https://www.youtube.com/watch?v=YElGmzHUcF8

Dynamic Assessment

Dynamic assessment refers to several different but similar approaches to evaluating student learning. One of the chief characteristics of dynamic assessment is the inclusion of a dialogue or interaction between the examiner and the student. The interaction allows the examiner to draw conclusions about the student's thinking processes (i.e., why he or she answers a question in a particular way) and his or her response to a learning situation (i.e., whether, with prompting, feedback, or modeling, the student can produce a correct response and what specific means of instruction produce and maintain positive change in the student's cognitive functioning).

Dynamic assessment may be framed as a constructivist approach to assessment. That is, the goal is to determine what students do, can do, and can do with help, and to devote less time and attention to comparing student performance to set standards or to norm-group performance in an attempt to identify deficiencies. In dynamic assessment,

> the assessment is focused on student learning and performance over time, and comparisons are made between a student's current and past performance. Additionally, dynamic assessment is concerned with learning what a student is able to do when provided supports in the form of prompts, cues, or physical supports, some of which naturally exist in the environment (Bigge & Stump, 1999, p. 182).

As you watch the video titled "Dynamic Assessment of Receptive and Expressive Language," follow a demonstration of dynamic assessment of receptive and expressive language. Focus on what dynamic assessment is, its importance, and how to use it with children with special needs.

https://www.youtube.com/watch?v=EiPnlLnFDBo

Typically, dynamic assessment involves a test–train–retest approach. The examiner begins by testing the student's ability to perform a task or solve a problem without help. Then, a similar task or problem is given to the student, and the examiner models how the task or problem is solved or gives the student cues to assist his or her performance. In Feuerstein's (1979) model of dynamic assessment, the examiner is encouraged to interact constantly with the student, an interaction that is called *mediation*, which is felt to maximize the probability that the student will solve the problem.

Dynamic assessment is a promising addition to current evaluation techniques. Because it incorporates a teaching component into the assessment process, this type of assessment may be particularly useful with students from minority backgrounds who may not have been exposed to the types of problems or tasks found on standardized tests. The interactional aspect of dynamic assessment can also contribute substantially to developing an understanding of the student's thinking process and problem-solving approaches and skills. Certainly, having detailed information about how a student approaches performing a task and how he or she responds to various instructional techniques can be highly relevant to instructional planning.

Portfolio Assessment

Perhaps the most important type of assessment for the classroom teacher is the **portfolio assessment**. A **portfolio** is collection of works that are associated with standards students are required to learn. This collection of work is often gathered over a long period of time to reflect what you have been taught as well as what you have learned. Each piece in the portfolio is required to be an authentic reflection of what students have learned and is meant to reflect a student's current knowledge or skills. A portfolio can include written reflection, artistic pieces, photographs, and a variety of other media all reflecting the concepts you have been learning (Meader, 2015a).

As you watch the video titled "Assessment Portfolios," focus on what assessment portfolios are, their importance, and how to use them with children with special needs.
https://www.youtube.com/watch?v=Yz7JkF5Hips

Batzle (1992; cited in Bigge & Stump, 1999) identifies three general types of portfolios:

- **Working portfolio:** Teacher, student, and parents all contribute to the portfolio. Both works in progress and final product pieces are included.
- **Showcase portfolio:** The portfolio houses only the student's best work and generally does not include works in progress. The student manages the portfolio and decides what to place in it.
- **Teacher portfolio (record keeping):** The portfolio houses student test papers and work samples maintained by the teacher. It contains work not selected by the student for inclusion in the showcase portfolio.

Portfolios are essentially different from other forms of assessment in that they make it possible to document the unfolding process of teaching and learning over time. They are a dynamic ongoing assessment that aids in stimulating thinking and promoting student independence. The use of portfolio-based assessment allows students to reflect, evaluate, and set future learning goals by thoughtfully selecting samples from different areas to be included. Implementation of such authentic assessments allows parents, teacher, administrators, students, and other stakeholders to be provided with directly observable products and understandable evidence concerning student performance (Thomas, 2005)

Authentic Assessment

Another technique that is becoming increasingly popular with classroom teachers to assess classroom performance is **authentic assessment**. Authentic assessment is a form of assessment in which students are asked to perform real-world tasks that demonstrate meaningful application of essential knowledge and skills. An authentic assessment usually includes a task for students to perform and a rubric by which their performance on the task will be evaluated. For example, when an individual is being assessed in the area of artistic ability, typically he or she presents artwork and is evaluated according to

various criteria; it is not simply the person's knowledge of art, materials, artists, or history. Authentic assessment is sometimes referred to as **naturalistic-based assessment** or **performance-based assessment**. The terms can be used interchangeably.

According to Powers and Gamble (2009), "authentic assessment comprises a variety of assessment techniques that share the following characteristics:

1. direct measurement of skills that relate to long-term educational outcomes such as success in the workplace;
2. tasks that require extensive engagement and complex performance; and
3. an analysis of the processes used to produce the response.

Authentic assessment is often defined by what it is not: Its antonyms include: norm-referenced standardized tests; fixed-choice multiple-choice or true/false tests; fill-in-the-blank tests. Synonyms include: performance assessment, portfolios, and projects" (p. 1).

As you watch the video titled "Keeping Assessment Relevant and 'Authentic,' " think about the idea that mistakes become learning opportunities, as you will see in Ben Mook's 7th grade Algebra class. To assess his students, Mook challenges them to solve real-life problems and emphasizes their thought processes over getting the right answers.

https://www.youtube.com/watch?v=HfwGqH9w-64

Task Analysis

Task analysis is very detailed; it involves breaking down a particular task into the basic sequential steps, component parts, or skills necessary to accomplish the task. As the adage goes, you have to walk before you can run. It is easy to forget that some tasks need to be broken down into chunks because after a time they become like second nature to us. We often expect students to be able to figure out the steps involved in completing a task. But with a special needs population, where you might have children with processing disorders or difficulty with organization, it's necessary to take the time to express the different parts of a task until the student has mastered each one (Grove, 2012).

Task analysis is the process of breaking a skill down into smaller, more manageable components. Once a task analysis is complete, it can be used to teach learners with disabilities a skill that is too challenging to teach all at once. Taking this approach to assessment offers the teacher several advantages. For one, the process identifies what is necessary for accomplishing a particular task. It also tells the teacher whether the student can do the task, which part or skill causes the student to falter, and the order in which skills must be taught to help the student learn to perform the task (Szidon & Franzone, 2009).

Task analysis is an approach to assessment that goes far beyond the need to make an eligibility or program placement decision regarding a student. It can become an integral part of classroom planning and instructional decision making.

As you watch the video titled "Task Analysis," watch how task analysis involves a very specific step-by-step approach. Even when setting a table, each step must be followed. How does this video apply to a classroom of children with special needs? What are examples of when task analysis could be used in a special education classroom?

https://www.youtube.com/watch?v=Hxp33AFda-k

Outcome-Based Assessment

Outcome-based assessment has been developed, at least in part, to respond to concerns that education, to be meaningful, must be directly related to what educators and parents want the child to have gained in the end. Outcome-based assessment involves considering, teaching, and evaluating the skills that are important in real-life situations. Learning such skills will result in the student becoming an effective adult. Assessment, from this point of view, starts by identifying what outcomes are desired for the student (e.g., being able to use public transportation). In steps similar to what is used with task analysis, the team then determines what competencies are necessary for the outcomes to take place (e.g., the steps or subskills the student needs to have mastered in order to achieve the outcome desired) and identifies which subskills the student has mastered and which he or she still needs to learn. The instruction that is needed can then be pinpointed and undertaken (Pierangelo & Giuliani, 2012).

Learning Styles Assessment

Learning styles theory suggests that students may learn and problem solve in different ways, and that some ways are more natural for them than others. When they are taught or asked to perform in ways that deviate from their natural style, they are thought to learn or perform less well. Some of the common elements that may be included in **learning styles assessment**

would be the way material is typically presented (visually, auditorily, tactilely) in the classroom, the environmental conditions of the classroom (hot, cold, noisy, light, dark), the child's personality characteristics, the expectations for success that the child and others hold, the response the child receives while engaging in the learning process (e.g., praise or criticism), and the type of thinking the child generally utilizes in solving problems (e.g., trial and error, analyzing). Identifying the factors that positively impact the child's learning may be very valuable in developing effective intervention strategies.

TESTING CONSIDERATIONS

There are many testing considerations that need to be understood when doing the assessment of a child for a suspected disability. This next section will address these testing considerations and explain the importance of each.

Selecting an Appropriate Instrument

Choosing an appropriate test for a given student requires investigation. It is extremely important that those responsible for test selection do not use only what is available to or what has "always been used" by the school district or school. The child's test results will certainly influence eligibility decisions, instructional decisions, and placement decisions, all of which have enormous consequences for the child. If the child is assessed with an instrument that is not appropriate for him or her, the data gathered are likely to be inaccurate and misleading, which in turn results in faulty decisions regarding that child's educational program. This is one of the reasons that many educators object vehemently to standardized testing as a means of making decisions about a student's strengths and weaknesses.

Therefore, selecting instruments with care is vital, as is the need to combine any information gathered through testing with information gathered through other approaches. Given the number of standardized tests available today, how do professionals in special education select an appropriate instrument for a given student? Here are some suggestions:

- Consider the student's skill areas to be assessed, and identify a range of tests that measure those skill areas. A variety of books can help evaluators identify what tests are available.
- Investigate how suitable each test identified is for the student to be assessed, and select those that are most appropriate: A particularly valuable resource for evaluating tests is **The Mental Measurements Yearbook (MMY)**. The MMY includes timely, consumer-oriented test reviews, providing evaluative information to promote and encourage informed test selection. Typical MMY test entries include descriptive information, one or two professional reviews, and reviewer references. To be reviewed in the MMY a test must be commercially available, be published in the English language, and be new, revised, or widely used since it last appeared in the MMY series. Beginning in The Fourteenth Mental Measurements Yearbook, tests also must provide sufficient documentation supporting their technical quality to meet criteria for review (Buros Center for Testing, 2015).
- According to the publisher or expert reviewers, what, specifically, is the test supposed to measure? Is its focus directly relevant to the skill area(s) to be assessed? Will student results on the test address the educational questions being asked? (In other words, will the test provide the type of educational information that is needed?) If not, the test is not appropriate for that student and should not be used.
- Is the test valid and reliable? These are two critical issues in assessment (see Chapter 7). Validity refers to the degree to which the test measures what it claims to measure. For example, if a test claims to measure anxiety, a person's scores should be higher under a stressful situation than under a non-stressful situation. Reliability refers to the degree to which a child's results on the test are the same or similar over

repeated testing. If a test is not reliable or if its reliability is uncertain—it does not yield similar results when the student takes the test again—then it should not be used. Test publishers make available specimen sets that will typically report the reliability and validity of the test.

- Is the content/skill area being assessed by the test appropriate for the student, given his or her age and grade? If not, there is no reason to use the test.
- If the test is norm-referenced, does the norm group resemble the student? This point was mentioned earlier and is important for interpreting results.
- Is the test intended to evaluate students, to diagnose the specific nature of a student's disability or academic difficulty, to inform instructional decisions, or to be used for research purposes? Many tests will indicate that a student has a disability or specific problem academically, but results will not be useful for instructional planning purposes. Additional testing may then be needed in order to understand fully what type of instruction is necessary for the student.
- Is the test administered in a group or individually? By law, group tests are not appropriate when assessing a child for the presence of a disability or to determine his or her eligibility for special education.
- Does the examiner need specialized training in order to administer the test, record student responses, score the test, or interpret results? In most, if not all, cases, the answer to this question is yes. If the school has no one trained to administer or interpret the specific test, then it should not be used unless the school arranges for the student to be assessed by a qualified evaluator outside of the school system.
- Will the student's suspected disability impact his or her taking the test? For example, many tests are timed tests, which means that students are given a certain amount of time to complete items. If a student has weak hand strength or dexterity, his or her performance on a timed test that requires holding a pencil or writing will be negatively affected by the disability. Using a timed test would be appropriate only for determining how speed affects performance. To determine the student's actual knowledge of a certain area, an untimed test would be more appropriate. It may also be possible to make accommodations for the student (e.g., removing time restrictions from a timed test). If an accommodation is made, however, results must be interpreted with caution. Standardized tests are designed to be administered in an unvarying manner; when accommodations are made, standardization is broken, and the norms reported for the test no longer apply.
- How similar to actual classroom tasks are the tasks the child is asked to complete on the test? For example, measuring spelling ability by asking a child to recognize a misspelled word may be very different from how spelling is usually measured in a class situation (reproducing words from memory). If test tasks differ significantly from classroom tasks, information gathered by the test may do little to predict classroom ability or provide information useful for instruction.

Selection of Test Content

Test content is an important factor when choosing between a norm-referenced test (NRT) and a criterion-referenced test (CRT). The content of an NRT test is selected according to how well it ranks students from high achievers to low. The content of a CRT test is determined by how well it matches the learning outcomes deemed most important. Although no test can measure everything of importance, the content selected for the CRT is selected on the basis of its significance in the curriculum, whereas that of the NRT is chosen by how well it discriminates among students.

Any national, state, or district test communicates to the public the skills that students should have acquired as well as the levels of student performance that are considered satisfactory. Therefore, education officials at any level should carefully consider content of the test which is selected or developed. Because of the importance placed on high scores, the content of a standardized test can be very influential in the development of a school's curriculum and standards of excellence.

Test Interpretation

As mentioned earlier, a student's performance on an NRT is interpreted in relation to the performance of a large group of similar students who took the test when it was first normed. For example, if a student receives a percentile rank score on the total test of 34, this means that he or she performed as well or better than 34 percent of the students in the norm group. This type of information can be useful for deciding whether or not a student needs remedial assistance or is a candidate for a gifted program. However, the score gives little information about what the student actually knows or can do. The validity of the score in these decision processes depends on whether or not the content of the NRT matches the knowledge and skills expected of the students in that particular school system.

Limitations of Testing

Even when all of these considerations have been observed, there are those who question the usefulness of traditional testing in making good educational decisions for children. Many educators concerned with the **limitations of testing** see traditional tests as offering little in the way of information useful for understanding the abilities and special needs of an individual child.

Another concern about the overuse of testing in assessment is its lack of usefulness in designing interventions. Historically, it has seemed as if tests have not been interpreted in ways that allow for many specific strategies to be developed. Although scores help to define the areas in which a student may be performing below his or her peers, they may offer little to determine particular instruction or curricular changes that may benefit the child.

Traditional tests often seem to overlap very little with the curriculum being taught. This suggests that scores may not reflect what the child really knows in terms of what is taught in the actual classroom. Other concerns include overfamiliarity with a test that is repeated regularly, inability to apply test findings in any practical way (i.e., generating specific recommendations based on test results), and difficulty in using such measures to monitor short-term achievement gains.

The sometimes circular journey from the referral to the outcome of the assessment process is frustrating. The teacher or parent requests help because the student is having problems, and the assessment results in information that more or less states, "The student is having problems."

It may be, however, that it is not that the tests themselves offer little relevant information but, rather, that the evaluators may fail to interpret them in useful ways. If we ask questions only related to eligibility (e.g., does this child meet the criteria as an individual with mental disabilities?) or about global ability (e.g., what is this child's intellectual potential?), then those are the questions that will be answered. Yet such information is not enough if the goal is to develop an effective and appropriate educational program for the student.

CONCLUSION

Various methods of assessment are available to use when evaluating a student for a possible disability. Both formal and informal measures of assessment are necessary to get the most complete picture of a student's abilities. Ultimately, it becomes necessary for you to understand all the different measures. Selecting instruments with care is vital, as is the need to combine any information gathered through testing with information gathered through other approaches. Given the number of standardized tests available today, it is your professional responsibility to be sure that you understand the various methods of assessments and the purpose of their use.

3 Basic Statistical Concepts

KEY TERMS

Bimodal distribution
Correlation
Correlation coefficient
Descriptive statistics
Frequency distribution
Interval scale of measurement
Mean
Measures of central tendency
Median
Mode
Multimodal distribution
Negative correlation
Negatively skewed distribution
Nominal scale of measurement
Normal curve
Normal distribution
Ordinal scale of measurement
Positive correlation
Positively skewed distribution
Range
Ratio scale of measurement
Skewed distribution
Standard deviation
Variance
Zero correlation

CHAPTER OBJECTIVES

Statistics! This one 10-letter word tends to instil more fear and anxiety in undergraduate and graduate students than any other word we know. We have learned from our experience as college professors that when we say we are going to cover statistics in our assessment courses, responses from students will be as follows:

- Can we take this course pass/fail?
- What is the latest date to drop the course?
- I hate math—I always get confused!
- Do we really have to know this? If so, how come?

The fact is, whether you are an avid fan of statistics or generally do not enjoy it, you absolutely have to know statistics when you are doing special education assessment. Statistics play a vital role in the understanding of disability awareness. Although there are numerous reasons to know statistics, of primary importance to special educators is that without a proper understanding of it, you cannot interpret test results.

When large sets of data are being presented, it is important that they be organized in a fashion that makes some sense to the reader. In special education, this is done through methods known as **descriptive statistics**. Descriptive statistics summarize and describe data. In this chapter, we discuss basic descriptive statistics used every day in special education. After reading this chapter, you should be able to understand (and in some cases be able to calculate) the following:

- Scales of measurement
- Measures of central tendency (mean, median, and mode)
- Frequency distribution
- Range
- Variance

- Standard deviation
- Normal curve
- Skewed distributions
- Correlations

SCALES OF MEASUREMENT

The way data can be expressed in assessment often depends on the type of score one receives. In descriptive statistics, there are four scales of measurement that can be used to explain data: nominal, ordinal, interval, and ratio.

As you watch the video titled "Scales of Measurement: Nominal, Ordinal, Interval and Ratio scales explained," take the time to understand the importance of scales of measurement, why it is used and its importance for assessment in special education. Be able to explain the purpose of using these types of measurements to parents and use it practically as a special education professional.

https://www.youtube.com/watch?v=rL38g06DbSc

Nominal

In a **nominal scale of measurement**, the data are "categorical." It assigns observations into various independent categories and then counting the frequency of occurrence within each of the categories creates a nominal scale. It refers to quality more than quantity. A nominal level of measurement is simply a matter of distinguishing by name, for example, 1 = Freshmen, 2 = Sophomore, 3 = Junior, and 4 = Senior. Even though we are using the numbers 1, 2, 3, and 4, they do not denote quantity. This is referred to as nose-counting data. It is a scale in which scores represent names that are weighted equally—for example, observing how many males versus females there are in a school (1 = male; 2 = female).

With nominal data, the concept of quantity cannot be expressed for any individual unit of data. For example, the numbers on football jerseys are examples of nominal data. A person who wears number 20 is not two times better than the person who wears number 10. Examples of nominal data include telephone numbers, social security numbers, and species of birds.

Ordinal

An **ordinal scale of measurement** involves the rank order system. It is a scale in which scores indicate only relative amounts or rank order. When we discuss horse races and say first place, second place, and third place, we are using ordinal data. Although ordinal scales tell us rank, they do not tell us the distance between each subject. For example, even though we know which horse finished first, second, and third, we do not know by how much the first-place horse beat the second-place horse. In schools, class rank is a classic example of ordinal data.

Interval

An **interval scale of measurement** is one in which equal differences in scores represent equal differences in amount of the property measured, but with an arbitrary zero point. For example:

- Fahrenheit temperature: A temperature of 40 degrees is not twice as hot as 20 degrees. Also, zero degrees does not mean no temperature; it is an arbitrary zero point.
- IQ scores: A student with an IQ of 100 is not twice as smart as someone with an IQ of 50.

Ratio

A **ratio scale of measurement** has all the properties of an interval scale with the additional property of zero indicating a total absence of the quality being measured. A score of zero means zero. For example:

- Distance: The distance 15 feet is three times more than 5 feet.
- Duration: The duration 20 minutes is twice as long as 10 minutes.
- Weight: A 300-pound man is six times heavier than a 50-pound boy.
- On a math test in which a child gets four wrong and another gets eight wrong, the child who missed eight questions got twice as many wrong as the other child.

MEASURES OF CENTRAL TENDENCY

Most students have learned the **measures of central tendency** many times in their academic lives. So, for many of you, this may be a review. There are three ways to describe central tendency in a set of scores. These are mean, median, and mode.

As you watch the video "Central Tendency - Mean Median Mode Range," take the time to understand the importance of these statistical concepts, why they are used and their importance for assessment in special education. Be able to explain the purpose of using the mean, median and mode to parents and use it practically as a special education professional.

https://www.youtube.com/watch?v=81zcjULlh58

Mean

The **mean** is the mathematical average of the distribution of scores. Statistically, the mean is represented by the symbol *M*. The way to calculate the mean score is simply to add up the scores in the distribution and divide by the number of units. For example, suppose the following scores were obtained in a distribution: 8, 10, 8, 14, and 40. Calculate the mean score.

CALCULATION OF THE MEAN

- Add up the scores (this is also referred to as summating or summation): 8 + 10 + 8 + 14 + 40 = 80.
- Count the number of units in the distribution. Here, there are five of them (8, 10, 8, 14, and 40 = 5 numbers in total).
- Take the total score in Step 1 and divide by the number of units calculated in Step 2: 80/5 = 16.

The mean is 16 (or you can write it as $M = 16$).

Important Point: *The mean is greatly affected by extreme scores.* For example, suppose four students take an exam and receive scores of 90, 95, 100, and 7 percent. The mean of the distribution is 73 percent. Notice though that three students did extremely well, but the one student who got a 7 percent took the mean from an A average to a C average.

Median

Another way to measure central tendency is to order the scores relative to where they fall in a distribution. The **median** is the middle score in a distribution. It is the point at which half the scores fall above and half the scores fall below. In the distribution 8, 10, 8, 14, and 40, what is the median?

CALCULATION OF THE MEDIAN

- Rank order the data from least to greatest. What you do is simply list the scores from the smallest number to the largest: 8, 8, 10, 14, 40.
- Now cross off the low score (8), then the high score (40). Repeat this step until there is only one number left. In our example you would next cross off the 8, then the 14. This leaves 10 as the middle number. The median is 10.
- Now, suppose the distribution of scores had an even number of units. For example: 8, 10, 12, 8, 14, and 40. Calculate the median. In this example, first rank order the data: 8, 8, 10, 12, 14, 40. After crossing out the high and low numbers, you are left with 10 and 12.
- To find the median, simply take the average of the two numbers left. This would make 11 the median score: (10 + 12 = 22/2 = 11).

Important Point: *The median is less affected by extreme scores than is the mean.* For example, suppose four students take an exam and receive scores of 90, 95, 100, and 7 percent. Although the mean of the distribution is 73 percent, the median is 92.5 percent, a much better indication of how the four students did overall.

Mode

The **mode** is the most frequently occurring score in a distribution. For example: In the distribution 8, 10, 8, 14, and 40, what is the mode? The answer is 8. The number 8 occurs twice, whereas all other numbers occur only once.

What is the mode in the following distribution: 8, 10, 8, 10, 14, and 40? Here, the scores 8 and 10 occur twice; therefore, we have two modes: 8 and 10. When you have two modes in a distribution, it is referred to as a **bimodal distribution**. If you have three or more modes in your distribution, it is referred to as a **multimodal distribution**. For example, what is the mode of this distribution: 8, 10, 8, 10, 14, 14, and 40? Because 8, 10, and 14 are the most frequently occurring numbers (three of them), it is a multimodal distribution.

FREQUENCY DISTRIBUTION

To see data more clearly (and often the way to find the mode) in a distribution, it can be extremely helpful to set up a frequency distribution. A **frequency distribution** expresses how often a score occurs in a set of data. For example, suppose you had the following distribution of 11 students' scores on a spelling test:

Student Name	Spelling Test Score (%)
Ted	100
Carmen	85
Ralph	75
Juana	98
Celest	98
Mohammed	100
Joaquinne	95
Amy	80
Carol	85
Tony	85
Jesus	100

A frequency distribution sets up a much easier way to look at the data. To set up a frequency distribution, simply make three columns: Column 1—Test Score, Column 2—Tally, Column 3—Frequency. Under each column fill in the appropriate information. Table 3.1 shows what the frequency distribution would look like for the above 11 students' spelling test scores.

Table 3.1 Frequency Distribution for Spelling Test Scores

Test Score (%)	Tally	Frequency
75	I	1
80	I	1
85	III	3
95	I	1
98	II	2
100	III	3

Important Point: *When setting up a frequency distribution, always rank order the data from the smallest to the largest number or the largest to the smallest.* In Table 3.1, 75 is the smallest and 100 is the largest. Also, notice that when setting up a frequency distribution it is very easy to calculate the mode(s) simply by inspection. (The scores that most frequently occur are 85 and 100—seen by the 3s in the frequency column.)

As you watch the video titled "Statistics - How to make a frequency distribution," take the time to understand the importance of frequency distributions, why they are used and its importance for assessment in special education. Be able to explain the purpose of using frequency distributions and use them practically as a special education professional.

https://www.youtube.com/watch?v=amLYLq73RvE

RANGE

The **range** of a distribution is the difference between the high score and the low score in the distribution (range = high score − low score). For example, if we have a distribution of 8, 10, 8, 14, and 40, what is the range?

CALCULATION OF THE RANGE

1. Find the high score and the low score in the distribution: 40 and 8.
2. Subtract the low score from the high score: 40 − 8 = 32.
3. The range is 32.

Important Point: The range is very simple to determine, yet there is a serious problem with just giving the range of scores. Think about it: The range tells you nothing about the scores in between the high and low scores. And, if there is *one extreme score, it can greatly affect the range.* Suppose the distribution was 8, 9, 8, 9, 8, and 1,000. The range would be 992 (1,000 − 8 = 992). Yet, only one score is even close to 992, the 1,000.

As you watch the video titled "Statistics-Find the range," take the time to understand the importance of this statistical concept, why the range is used and its importance for assessment in special education. Be able to explain the purpose of using this statistical concept to parents and use it practically as a special education professional.

https://www.youtube.com/watch?v=estOLtAfUQ8

Variance

When looking at scores within a distribution, it is often very helpful to know how the scores are spread out. In order to get a better idea of the spread of scores within a distribution, it is necessary to calculate the variance. The **variance** is a statistical concept that tells you the spread of scores within a distribution. The variance is an extremely important concept to understand because it is necessary in the calculation of the standard deviation and the analysis of data in the normal curve. (These two areas, discussed later in this chapter, are critical to understand as special educators.)

To explain the importance of variance, let's look at the following two distributions of scores on a 50-question spelling test (each score represents the number of words correctly spelled):

Scores for 5 students in Group A: 28, 29, 30, 31, 32

Scores for 5 students in Group B: 0, 20, 30, 40, 50

Calculate the mean for Groups A and B

Mean of Group A = 30

Mean of Group B = 30

The mean of both groups is 30. Now, if you knew nothing about these two groups other than their mean scores, you might think they looked similar. However, the spread of scores in Group A (28 to 32) is much smaller than in Group B (10 to 50). Statistically, we say that the variance of Group B is greater than the variance in group A. The general rule is the greater the spread, the greater the variance. The fact that two different sets of scores have the same mean but different variances means that one has a larger range or spread of scores than the other.

Statistical variance gives a measure of how the data distributes itself about the mean. Unlike the range that only looks at the two extreme scores, the variance looks at all of the scores and then determines their distribution.

As you watch the video titled "Dancing statistics: explaining the statistical concept of variance through dance," follow the statistical concept of variance through dance. After watching the video and reading the chapter, take the time to understand the importance of this statistical concept, why the variance is used and its importance for assessment in special education. Be able to explain the purpose of using this statistical concept to parents and use it practically as a special education professional.

https://www.youtube.com/watch?v=pGfwj4GrUlA

STANDARD DEVIATION

In almost all cases, we determine the variance to calculate the **standard deviation**. *The standard deviation is the spread of scores around the mean.* It is an extremely important statistical concept to understand when doing assessment in special education (see normal curve explanation).

As you watch the video titled "What is the standard deviation?," take the time to understand the importance of this statistical concept, why the standard deviation is used and its importance for assessment in special education. Be able to explain the purpose of using this statistical concept to parents and use it practically as a special education professional.

https://www.youtube.com/watch?v=t8kDuV1Alt4

As you watch the video titled "Normal Distribution - Explained Simply (part 1)," take the time to understand the importance of the normal distribution, why it is used and its importance for assessment in special education. Be able to explain the purpose of using this statistical concept to parents and use it practically as a special education professional. This is Part 1 of a 2 part video.

https://www.youtube.com/watch?v=xgQhefFOXrM

As you watch the video titled "Normal Distribution - Explained Simply (part 2)," take the time to understand the importance of the normal distribution, why it is used and its importance for assessment in special education. Be able to explain the purpose of using this statistical concept to parents and use it practically as a special education professional. This is Part 2 of a 2 part video.

https://www.youtube.com/watch?v=iiRiOlkLa6A

Important Point: *The standard deviation is calculated by taking the square root of the variance*. The steps for calculating standard deviation are the exact same steps for calculating the variance except that there is one extra step. After finding the variance, take the square root. This is the standard deviation.

NORMAL CURVE

A **normal distribution** is an arrangement of a data set in which most values cluster in the middle of the range and the rest taper off symmetrically toward either extreme. A graphical representation of a normal distribution is sometimes called a **normal curve** (or bell curve because of its flared shape).

The normal curve tells us many important facts about test scores and the population. The beauty of the normal curve is that it never changes. As students, this is great for you because once you memorize it, it will never change on you (and, yes, you do have to memorize it at some point in your academic or professional career). Figure 3.1 shows how the normal curve is always represented.

Now, how does this help you? Well, let's take an example that you will come across numerous times in special education: IQ. The mean IQ score on many IQ tests is 100 and the standard deviation is 15. (The most popular IQ test is the Wechsler Scales of Intelligence; see Chapter 10.) Now, according to the normal curve, IQ on the Wechsler Scales is distributed as in Figure 3.2.

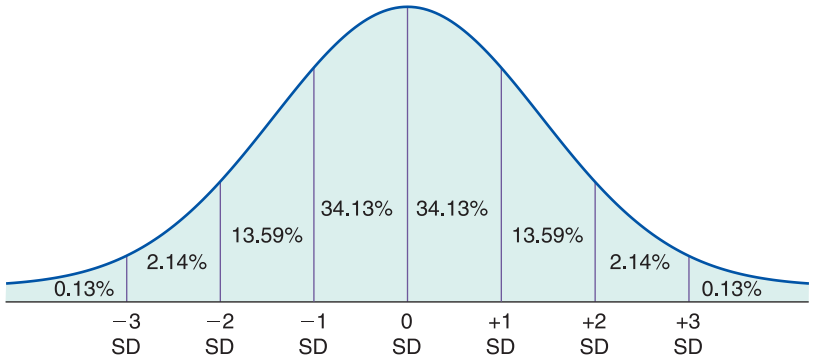

FIGURE 3.1 Diagram of the Normal Curve.

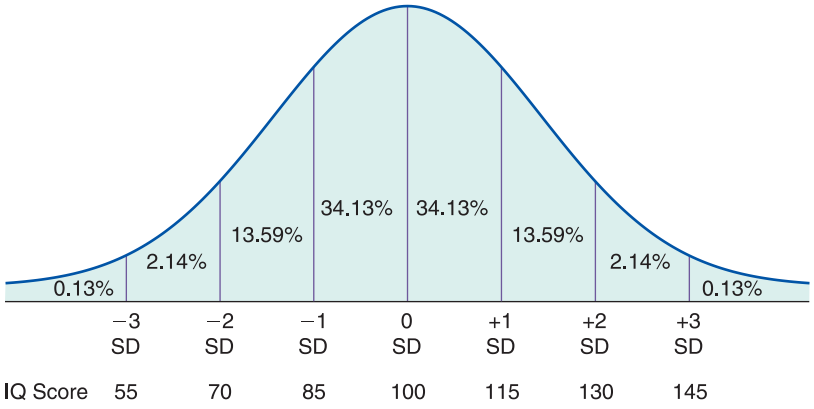

FIGURE 3.2 Diagram of the Normal Curve for the WISC-V with a Mean of 100 and a Standard Deviation of 15.

Given this information, there is so much we can say. First, notice that approximately 68 percent of the entire population has an IQ between 85 and 115 (−1 SD to +1 SD: 34% + 34% = 68%). Also, 13.5 percent of the population has an IQ between 115 and 130. Furthermore, about 95 percent of all the scores are found within 2 SD above and below the mean. (Look between the lines on the curve between −2 SD and + 2 SD. The percent of scores are 13.5% + 34% + 34% + 13.5%, which totals 95%.)

Do you know what the requirements are for most gifted programs regarding minimum IQ scores (that have a mean of 100 and SD of 15)? By looking at the normal curve, you may have figured it out—the minimum is normally an IQ of 130 for entrance. Why? Gifted programs will take only students who are 2 SD or more above the mean. In a sense, they want only those whose IQs are better than 97.5 percent of the population.

How about intellectual disabilities (formerly referred to as mental retardation)? On the Wechsler Scales, the classification of intellectual disability is determined if a child receives an IQ score below 70. Why 70? This score was not just randomly chosen. What we are saying is that in order to be mentally retarded, a student is usually 2 or more SD below the mean. In a sense, the child's IQ is only as high as 2.5 percent (or even lower) of the normal population (or, in other words, 97.5 percent or more of the population has a higher IQ than this child).

Skewed Distributions

As you may have noticed, the normal curve is *symmetrical.* This means that the left side of the bell is exactly the same shape as the right side. However, the normal curve may not always occur when you have only a small number of test scores in your distribution. When the population of a sample is not large, there may be a tendency for the scores to be *skewed.* A **skewed distribution** is one in which the majority of scores fall at either the high end or the low end rather than the middle of a distribution. A skewed distribution is uneven and asymmetric in nature. Unlike a standard normal distribution, which resembles a bell curve in shape, skewed distributions are shifted to one side, possessing a longer tail on one side relative to the other side.

A distribution can be either positively skewed or negatively skewed (see Figure 3.3). In a **positively skewed distribution**, more of the scores fall below the mean. In a **negatively skewed distribution**, more of the scores fall above the mean.

As you watch the video titled "Statistics - Reading the shape of a distribution," take the time to understand the importance of the normal distribution, why it is used and its importance for assessment in special education. Be able to explain the purpose of using this statistical concept to parents and use it practically as a special education professional.

https://www.youtube.com/watch?v=be6H0gcCYD0

Correlations

Correlations tell us the relationship between two variables (Berk, 2013). There are three types of correlations: positive, negative, and zero (see Figure 3.4).

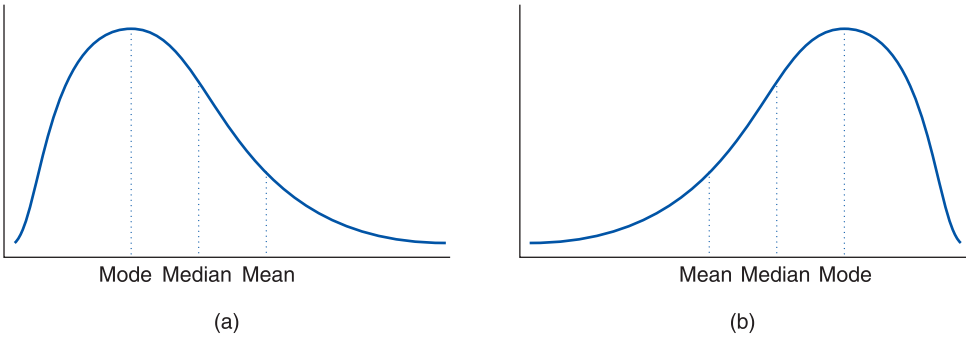

FIGURE 3.3 (a) Positively Skewed Distribution and (b) Negatively Skewed Distribution

As you watch the video titled "What is a correlation?," take the time to understand the importance of correlations, the difference among the types of correlations, why they are used and their importance for assessment in special education. Be able to explain the purpose of using correlations to parents and use them practically as a special education professional.

https://www.youtube.com/watch?v=Ypgo4qUBt5o

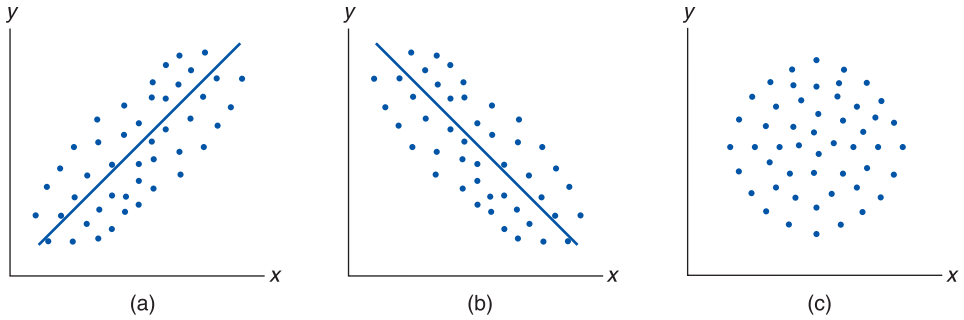

FIGURE 3.4 (a) Positive Correlation, (b) Negative Correlation, and (c) Zero Correlation.

1. **Positive correlation:** Variables are said to be positively correlated when a high score on one is accompanied by a high score on the other (direct relationship). Conversely, low scores on one variable are associated with low scores on the other. Examples include:
   - IQ and academic achievement—as IQ increases, academic achievement increases.
   - Education and income—as education increases, income tends to increase.
2. **Negative correlation:** Variables are said to be negatively correlated when a high score on one is accompanied by a low score on the other (an inverse relationship). Conversely, low scores on one variable are associated with high scores on the other. Examples include:
   - Teacher stress and job satisfaction—as job stress increases, job satisfaction decreases.
   - Student anxiety and student performance—in general, as anxiety increases, student performance decreases.
3. **Zero correlation:** Here, there is *no relationship between the variables*. Examples include:
   - Foot size and grades on exams—as foot size increases, nothing changes with respect to grades. They are not related whatsoever.
   - Weight and intelligence test scores—as weight increases, nothing changes with respect to IQ. They are not related whatsoever.

When describing the relationship between any two variables, you determine the **correlation coefficient** (see Table 3.2). Statistically, this is represented by the letter *r*. Now, the general rules for correlations are as follows (Tabachnick & Fidell, 2012; Berk, 2013):

As you watch the video titled "The Correlation Coefficient," take the time to understand the importance of correlation coefficients, how and why they are used and the importance of the correlation coefficient for assessment in special education. Be able to explain the purpose of using a correlation coefficient to parents and use it practically as a special education professional.

https://www.youtube.com/watch?v=VBrzoxgbStk

Table 3.2 Interpreting Correlation Coefficients

Correlation Coefficient	Statistical Interpretation
0.00	*No relationship between the variables.* The two variables **never** occur together.
0.01–0.25	*Weak relationship.* The two variables **rarely** occur together.
0.26–0.50	*Moderate relationship.* The two variables occur together **sometimes**.
0.51–0.75	*Strong relationship.* The two variables occur together **often**.
0.76–0.99	*Very strong relationship.* The two variables occur together **very often**.
1.00	*Perfect relationship*. The two variables **always** occur together.

Correlations range from +1.00 to −1.00.

The closer you get to +1.00 or −1.00, the stronger the relationship.

The closer you get to Zero, the weaker the relationship.

0.0 is the weakest correlation—no relationship between the variables.

For example, a correlation coefficient of −0.95 tells you that there is a negative correlation (– sign) and that there is a strong relationship (because 0.95 is close to 1.0). Finally, and perhaps the most important point with correlations, is this: *Correlations do not indicate cause and effect.* Just because two things are related to each other does not mean that one causes the other to occur. For example, there is a strong positive correlation between depression and anxiety (as depression goes up, so does anxiety). But does the depression cause anxiety, or is the anxiety causing the depression? The fact is, you do not know. Therefore, when determining or reading about correlations, never lose sight of the fact that they indicate only relationships, never cause and effect.

CONCLUSION

Descriptive statistics play a very important role in the assessment process. The fact is, without statistics there would be no way to collect truly objective data to be interpreted. Statistics give us the opportunity to compare children to the norms in many different ways. Understanding statistics is a vital part of being an effective special educator.

Numerous results will be presented to you on a daily basis. Without the proper understanding or interpretation of data, you will not be able to critically evaluate and properly diagnose a child with a disability. Therefore, being able to look at data and make sense of it are fundamental professional responsibilities of special educators.

PRACTICE PROBLEMS

1. Given the following set of IQ scores from students, calculate the mean:

Student Name	IQ Score
Billy	100
Juan	110
Carmela	75
Fred	120
Yvonne	95
Amy	80
Carmen	85

2. Given the following IQ scores, calculate the median:

Student Name	IQ Score
Ravi	100
Jesus	110
Carmela	75
Fred	120
Yvonne	95
Amy	80
Chenel	85

3. Given the following IQ scores, calculate the median:

Student Name	IQ Score
Ralph	100
Marguarita	110
Mike	75
Fred	120
Juanna	95
Amy	80
Carol	85
Ricky	85

4. Given the following spelling test scores, calculate the mode:

Student Name	Score
Edwin	100
Marguarita	85
Tom	75
Fredrika	100
Juan	95
Amy	80
Caroline	85
Ravi	85

5. Given the following spelling test scores, calculate the mode:

Student Name	Score
Ed	100
Joe	85
Miguel	75
Jean	100
Joan	95
Jose	80
Carol	85
Tony	85
Cory	100

6. For the following set of numbers, (a) create a frequency distribution and (b) calculate the mode: 20, 50, 45, 50, 25, 40, 20, 55, 20, 60, 33, 45, 33, 20.

7. For the following distribution, calculate the range: 20, 50, 45, 50, 25, 40, 20, 55, 20, 60, 33, 45, 33, 20.

8. For the following 10-point Reading Quiz scores, find the measures of central tendency, find the range, and draw a frequency distribution:

Student Name	Score
Caitlyn	10
Erin	8
Tom	7
Kate	6
Lynn	9
Miguel	9
Jen	5
Carol	6
Tony	9
Mohammed	10

9. For the following correlations, list them in order from strongest correlation to weakest correlation.

a. −0.67
b. +0.53
c. −0.91
d. +0.03
e. −0.47

Answers to Practice Problems

1. **M = 95.** To solve this problem, first summate the IQ scores. This total is 665. Now count the number of IQ scores. There are 7 of them. Now take 665/7, and you get 95 as the mean IQ score.

2. **95.** Rank order the data from lowest score to highest score: 75, 80, 85, 95, 100, 110, 120. Now, cross off the low and high scores (75 and 120). Do it again (80 and 110). Do it again (85 and 100). You are left with 95 as the median.

3. **90.** Rank order the data from lowest score to highest score: 75, 80, 85, 85, 95, 100, 110, 120. Now, cross off the low and high scores (75 and 120). Do it again (80 and 110). Do it again (85 and 100). You are now left with 85 and 95. Take the average and you get 90 as the median.

4. **85.** The test score of 85 occurs three times, **the most in the distribution.**

5. **85 and 100.** The test scores of 85 and 100 each occur three times, the most in the distribution.

6. (a). **Test**

Score	Tally	Frequency
20	||||	4
25	|	1
33	||	2
40	|	1
45	||	2
50	||	2
55	|	1
60	|	1

(b). **The mode is 20.**

7. **The range is 40.** The range is calculated by taking the high score (60) and subtracting the low score (20), which equals 40.

8. Reading

Quiz Score	Tally	Frequency
5	|	1
6	||	2
7	|	1
8	|	1
9	|||	3
10	||	2

The mode is 9. The mean is 7.9. The median is 8.5. The range is 5.

9. **strongest to weakest: c, a, b, e, d.**