Teaching gifted and talented students of any age can be an enormous challenge. Teachers are often unaware of the needs of their brightest students. The capabilities of gifted students often hide their needs. While instructional technology may be used as a tool to offer opportunities for enrichment, teachers need help in discovering ways in which the planned, purposeful use of technology can support implementation of differentiation. This casebook has examples of real classroom practice designed to augment the heterogeneous classroom. All students deserve to have extensions to their learning with appropriately current technologies and opportunities to explore those technologies. The activities and supporting research in this book will allow teachers to bring needed differentiation to their classes to address the needs of all students.

Teacher education courses on instructional technology have usually focused on either teacher usage or teacher constructed applications. Problem-based learning, inquiry learning, can be supported with technology-based instruction. In the past, P-12 teachers were encouraged to use technology with gifted students by using research skills or by providing students with online courses. This casebook not only addresses appropriate methods of using technology in the gifted and talented populations; it also gives a concrete means by which the technology could be implemented in P-20 classrooms and be used to provide differentiated instruction for all students.

This casebook best serves the needs of P-20 teachers. The target audiences for this casebook are P-12 classroom teachers, undergraduate and graduate curriculum/methods courses, and teachers of P-20 gifted and talented students. The book provides wonderful support for Science, Technology, Engineering, and Mathematics (STEM), instructional technology curriculum, and teacher training courses. A companion book provides essential questions about each case study/vignette, lessons learned, and additional resources. Several chapters also offer unique insight to gifted and talented instruction with arts and humanities. Classroom teachers need research-based instructional methods to enrich classroom curriculum. The collected cases provide research-supported ideas for implementation. Teacher education faculty can use the cases to support pre-service teachers as they learn to differentiate instruction for all learners.
The case studies in all six sections were written to provide practical examples of research-based instruction for gifted students. Using instructional technology in a variety of forms, the researchers examined everything from under-identification of gifted students to the diverse needs of the gifted. The case studies provide a framework for improving instruction for all gifted and talented students from elementary to college age. While most of the instructional strategies can easily be implemented into heterogeneous classrooms, the strategies provide ideal opportunities for gifted students to learn in unique and challenging ways. The emphasis of each of the case studies is on gifted and talented students. However, the instructional strategies are easily differentiated to provide challenging curriculum for all students.

The casebook is divided into six sections. Each section scrutinizes a different aspect of gifted education. The first section, “What is Giftedness?” explores the definition of giftedness and gifted education in the United States (USA). After developing an understanding of gifted and talented students, the second section of the book, “Science and the Gifted/Talented Student,” explores STEM concepts. STEM is an area that is receiving a great deal of attention, and it is an area where gifted students can grow through practical application of research. The third section of the book, “Arts and Humanities and the Gifted/Talented Student,” takes creative thought and instructional technology in a different direction. Creativity is one identification area that is hard to identify, and the case studies provide a research-based platform to promote opportunities to fuse innovative thinking and technology. After examining practices in STEM and the humanities, Section 4, “Voices from the School,” provides an insight into how gifted students interact with movie making technology. In Section 5, “Teacher Training,” the case studies focus on providing quality classroom instruction. Instructional strategies, creative lesson design, and the needs of gifted college students are researched. The final section, “Teacher Education,” examines the ways in which teachers should be supported through research-based training.

In the first section, “What is Giftedness?” Kimberely Fletcher Nettleton lays the foundation for all of the cases in “Defining the Undefinable: What Does it Mean to be Gifted?” by exploring the definitions of gifted and talented students and building an understanding of the diverse characteristics of gifted students. Gifted students learn at a faster rate and in more depth than most students, but enrichment does not always occur in the classroom. This chapter also discusses the twice-exceptional gifted child, the child who has a learning disability or other special need in addition to being gifted. The author discusses both intellectual and emotional traits of the gifted child.

In their chapter, “Historical Overview of Adult Gifted Education in the United States,” Judith Bazler, Letitia Graybill, and Meta Van Sickle share the historical underpinnings of gifted education in the United States. Gifted and talented students do not cease to be gifted when they enter higher education. The authors make a case
for continued education of gifted students at the university level, suggesting that professors should be more responsive to students’ educational needs. This chapter opens a new dimension in gifted instruction as the question of the ongoing need for enrichment for gifted adult learners has rarely been explored.

The first chapter in Section 2, “Science and the Gifted/Talented Student,” is Edward Shaw, Jr., and Rebecca Giles’s case study, “Using Technology to Teach Gifted Students Science in a Heterogeneous Classroom.” The researchers examined the connections between motivation, instructional technology, and gifted students. This chapter summarizes development and delivery of instruction, students’ performance and perceptions, and professional implications of an elementary science lesson utilizing interactive whiteboard technology to convey science content and elicit participation. The importance of teacher educators’ modeling procedures with interactive whiteboards is emphasized. The authors suggest that using interactive whiteboards in teacher training programs for the purpose of demonstrating differentiated instruction will better prepare future teachers for the diverse learners who will fill their classrooms.

In “Integrating Educational Robotics to Enhance Learning for Gifted and Talented Students,” Amy Eguchi presents the theoretical background behind ideal Robotics in Education (RIE) approaches. The study of robotics is an effective blend of STEM skills. Eguchi argues that through robotic programs the potential of able students to display giftedness is maximized. Eguchi introduces valuable tips to ensure effective student learning when teaching with robotics and researches the effectiveness inherent in robotic programs.

Emily Bodenlos and Lesia Lennex discuss using the iPad applications (apps), VoiceThread and Pangea Safari, to improve concept attainment in a fourth grade science classroom. Detailed lesson plans and alternative app summaries are provided in “VoiceThread and iPad Apps Supporting Biological Change Concept.” As students studied biological change using the apps, Bodenlos and Lennex analyzed how students and teachers use technology to create a learning environment that was both challenging and appealing for gifted and talented students.

Integrating technology into Environmental Education is the case study topic in Kimberely Fletcher Nettleton’s chapter, “To Boldly Go: Instructional Technology and Environmental Science.” Nettleton examines how using technology in an outdoor classroom experience created a learning environment that enhanced collaboration skills. The fifth and sixth grade students explored science through an integrated survival/environmental theme that spanned the school year. In addition to learning critical thinking skills, the gifted students were supported in the development of skills in leadership and creativity.

Mohammed Nazir Amir explores STEM and creativity in the case study “Showcasing the Creative Talents in Science of the Academically Less-Inclined Students.”
through a Values-Driven Toy Storytelling Project” and demonstrates how a class of 14-year-old students was able to represent their knowledge of science through the use of toys. Students in the project worked in groups to present short fairytale stories to younger children (3-6 years of age) as part of their Community Involvement Program (CIP). Students designed, fabricated, and animated toys in addition to preparing electronic media to support their creation. The juxtaposition of creativity and STEM provides a segue into the third section of the book.

Jeanne Petsch examines how art education and technology can be used effectively in “Creating Our World: An Art Program for Alternative School Students.” This is the first case study in Section 3, “Arts and Humanities and the Gifted/Talented Student.” Pre-service art teachers worked with middle and high school students in an alternative school. The case study explores how building relationships with troubled students and art experiences led to the discovery of unidentified gifted students.

In “From Student to Author: Engaging Gifted Learners in the National Novel Writing Month Young Writers Program,” Nancye Blair Black writes about the National Novel Writing Month Young Writers Program (NaNoWriMo YWP). In this program, fourth and fifth grade students developed and composed a long narrative story. Through use of a three-phase program implementation, NaNoWriMo YWP resources and online community, dynamic technology tools, and extended blocks of uninterrupted writing time, these students engaged in advanced writing instruction and practices in order to meet or surpass a personal narrative writing goals. This chapter outlines the program’s alignment with best practices in gifted education, educational goals/objectives, the specific strategies and practices used in implementing the program, the outcomes to student learning, and recommendations for educators who plan to participate in the program with their gifted and talented students.

Students who are gifted in the visual and performing art not only create through art and writing, but with music, too. Chris Deason, in “Culturally Relevant Applications of Digital Audio Workstations in the Heterogeneous GT Classroom,” brings music into the gifted and talented classroom. The chapter discusses his work from 2005-2012 with Digital Audio Workstations (DAWs). Special emphasis is placed on the elements of hip-hop culture (i.e., rapping, graffiti art, beat making, and break dancing) combined with DAWs to impact learning motivation and learner achievement in the heterogeneous gifted and talented classroom.

Section 4, “Voices from the School,” examines how two classroom teachers encouraged students to make movies. The teachers wrote short vignettes to explain how they used movies for different purposes and discovered the creative energy of their students. Cletus Turner, a middle school teacher, discusses how filmmaking was integrated into his sixth grade social studies classroom. His vignette, “iMovies and Gifted Grouping,” shares what he learned about cluster grouping and student synergy. Using small-group collaboration to create movies, Turner experimented with group composition and analyzed the results.
Kristen Waller, an elementary school gifted and talented teacher, shares her first-person account of what happened when her principal challenged the gifted students to make a motivational video for high-stakes testing. In “Motivational Video for State Testing,” Waller provides an inexpensive road map for using smart phones and computers to create a learning experience that supports students gifted in creative thought, visual and performing arts, and/or leadership. The final project was used to energize the school as it prepared for end-of-year testing.

Debra Sprague and Beverly Shaklee’s case study, “Differentiating through Technology for Gifted Students,” is the first case study in Section 5, “Teacher Training.” Sprague and Shaklee investigate how pre-service teachers use technology when working with gifted students in the classroom. Pre-service teachers worked with classroom teachers to differentiate instruction for gifted students. Sprague and Shaklee emphasize the versatility of technology and the many ways in which it can support enrichment.

Jennifer G. Beasley and Marcia B. Imbeau also investigate differentiation and instructional technology in their case study, “Differentiation 2.0: Using the Tools of Technology to Meet the Needs of all Learners.” As they studied the ways in which teachers supported students’ interactions with technology, they identified areas in which teachers needed more training. Additional development of skills in differentiation, technology use and integration, and classroom management were recommended.

Shigeru Ikuta, Diane Morton, Mikiko Kasai, Fumio Nemoto, Masaki Ohtaka, and Mieko Horiguchi present a unique method of communication for gifted and talented special needs students in “School Activities with New Dot Code Handling Multimedia.” Dot codes printed on paper and linked with multimedia such as voices, sounds, movies, Web pages, html files, and PowerPoint files are used as an effective teaching modification. More than one audio file may be linked with a single dot code, and other multimedia files can be further linked to the same dot code in addition to the audios. Their research illuminates the many ways the dot codes may be adapted in educational settings.

Judith Bazler, Letitia Graybill, and Meta Van Sickle investigated underserved gifted college students in “Designing Instruction for Gifted Future Science Teachers.” Bazler, Graybill, and Van Sickle explored the ways in which teacher education preparation programs address the needs of gifted student in science education courses. Identifying and serving the gifted teacher education candidate is challenging. This chapter studies the challenges of differentiated teaching and planning for gifted college students.

The final section of the book, “Teacher Education,” begins with Jeong Won Choi, SangJin An, and YoungJun Lee’s, “A Case Study of Distance Education for Informatics Gifted Students.” Choi, An, and Lee analyzed cases in which curriculum programming was informed via e-learning. With the goal of improving computational thinking and problem-solving ability, the class received algorithm and program-
ming education. The class experienced the design and implementation process of a programming project titled “Interactive Movie Production through Scratch Programming” through the creation of a learning group. The learners received gifted education via e-learning systems, such as video lecturing, video conferencing, and smart phones. The study provides new considerations for applications of technology and gifted education.

In “Gifted Education and One Case Solution through E-Learning in Japan,” Masahiro Nagai and Noriyuki Matsunami examine the effectiveness of e-learning as it relates to equal access education. Nagai and Matsunami provide an understanding of gifted education in Japan, reform movements in education, and the lack of acceleration opportunities for gifted students. Many Japanese students are enrolled in private, after school programs called juku. This is a privately funded extracurricular activity. This chapter describes the use of e-learning as an alternative to traditional juku.

“The Role of Technology in Providing Effective Gifted Education Services in Clustered Classrooms,” by Geri Collins, Jeffrey Hall, and Bridget Taylor, provides needed research-based strategies for gifted students. Collins, Hall, and Taylor studied the need for facilitating clustered classrooms and the incorporation of instructional technology across several content areas. From games to science to mathematics, Collins, Hall, and Taylor suggested the use of technology as a foundational element in providing appropriate instruction to gifted students. The researchers provide sample lesson plans as a guide for practicing educators.

In the last chapter, Jana Willis, Douglas J. Steel, and Vanessa Dodo Seriki describe using instructional technology to motivate fourth grade gifted and talented students in a heterogeneous classroom. Their chapter, “Instructional Technology and the Nature of the Gifted and Talented,” describes the flexible approach necessary to maintain an appropriately challenging classroom. Their research examines how gifted students interact with each other. A rich technological environment stimulates student learning. Willis, Steel, and Seriki suggest the need for educators to be more aware of the diversity that exists between gifted students.

This casebook clearly serves the needs of P-20 gifted and talented teachers. P-12 classroom cases present research-based strategies for implementation of differentiation for gifted and talented students. Cases with teacher education courses present needed information for building robust differentiation curriculum. Much has been written about gifted and talented populations, but few have given voice to the actual students and their needs. This casebook is a resource rich with experienced teachers presenting classroom cases, both in P-12 and teacher education, which supports teachers in truly teaching to our nation’s gifted and talented students.

Lesia Lennex  
Morehead State University, USA

Kimberely Fletcher Nettleton  
Morehead State University, USA