Curriculum Delivery Models for Gifted Education
“Through TAMS, I’ve had the freedom to choose the university-level classes that interest me and to dictate my own schedule. The professors at the University of North Texas ignited my passion for mathematics and inspired me to extend my education and knowledge to future generations by becoming a mathematics professor.”

— Serena Delgadillo
TAMS student with a concentration in mathematics

tams.unt.edu
TEMPO is the official journal of the Texas Association for the Gifted & Talented. It is published three times a year. The subscription is a benefit for TAGT members.

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Poet, philosopher, and historian William Thompson (1978) stated in his book, *Darkness and Scattered Light*, “To take a step into the future, we need to shift our weight to the opposite foot…” (p. 1). Although Thompson wrote these words more than 30 years ago, they are perhaps more timely today than ever before.

In line with Thompson’s quote, I have heard numerous people allude to the idea that educators can no longer expect students to “fit” our schools. Instead, we must make sure that our schools “fit” the students we serve. As diversity in student populations increases, this notion becomes even more important to consider. We, as educators, can no longer open our filing cabinets and pull out the folder that contains the worksheets and activities that go with a topic unit that we have taught for years, run the worksheets off for the class, and expect students to be interested, engaged, and benefit from the experience. We must individualize and deliver the instruction in ways that help to ensure positive learning outcomes for every child.

Differentiated curriculum, individualized curriculum, customized curriculum—no matter what one calls it, the purpose is the same: to provide learning experiences for students that are commensurate with their abilities, that engage them in learning, that address their learning preferences, that challenge them, that prepare them to be successful contributors to society, and that help them to enjoy a life of fulfillment and purpose.

According to Sandra Kaplan (Center for Talent Development, 2006), differentiated curriculum is “a response to the cognitive, affective, social, and physical characteristics that distinguish what and how students learn. A classroom where learners are provided with equal opportunity to learn, but are not expected to learn the same curriculum in the same way at the same time is the context that exemplifies differentiation. Respect for individual differences among and between learners is a definition of differentiation” (p. 2).

Differentiating curriculum is not easy. It takes teachers understanding and knowing their students; it takes time and effort; it takes dedication. To differentiate curriculum, teachers must not only have thorough knowledge of the standards that must be taught, they must also understand how to deliver the content so that every child benefits from the learning experiences offered in the classroom.

This issue of *TEMPO* speaks to the need for “shifting our weight to the opposite foot” as we step into the future as educators, making every effort to ensure that children in our schools receive instruction designed to address their individual needs. In addition, the *TEMPO* Editorial Board is excited to introduce two new columns in this issue identified by board members as features that our readers will find interesting and helpful. Lacy Compton has taken the lead on a new column titled *Spotlight on Students* in which student work will be highlighted. We invite *TEMPO* readers to submit the work of gifted youngsters for possible publication and hope that you enjoy getting a glimpse of the outstanding contributions that gifted kids are making to our world.

Dr. Ann Batenburg will be providing helpful insights in her new column, *Gifted 101*. Although this column is designed for educators and parents new to gifted education, I think readers will quickly see that the information Dr. Batenburg shares is valuable to each of us. She will be addressing topics that she covers in her introduction to gifted education courses, providing an overview of timely topics.

Readers can also look forward to another column that will be featured in the upcoming summer issue of *TEMPO*. This column will provide helpful tips for teachers and will be authored by Raine Maggio and Dr. Joyce Miller. We hope that you enjoy and benefit from these new additions to *TEMPO*.

**REFERENCES**


When I was a child we had an electric popcorn popper. We would simply add a little oil and kernels of corn, affix the plastic domed lid, and then plug it in. Within a few minutes, the dome would be filled with perfectly popped corn! Occasionally, if my mom was feeling adventurous, we would place a sheet on the floor, put the popper in the middle, remove the lid, and let it go to work. Slowly, one kernel would pop, and then another and another until the floor was covered. It was great fun to eagerly anticipate where the next kernel would fly in this uncontrolled set-up.

Unfortunately, this describes the attitude that many organizations and individuals have toward planning. I often describe this reactionary approach as “popcorn” because it reminds me of the random popping of corn (with no lid) that I enjoyed so much as a child. Without a focused strategy, we often find ourselves chasing ideas and initiatives and reacting to unexpected or unintended surprises. In order to ensure success in anything we do, we must think and plan strategically.

TAGT volunteer leaders and staff are dedicated to operating the association with deliberate and intentional strategic direction. Over the last few years, we have added new programs and services, achieved advocacy successes, and increased membership and involvement. All of these efforts were guided by a specific TAGT strategic plan.

We are committed to providing you, our members, with the necessary resources to strategically accomplish your goals as a G/T educator, parent, or supporter of gifted issues. In fact, this issue of TEMPO specifically explores best practices related to curriculum design. Member resources such as the weekly e-news brief, Pulse, and the many face-to-face and online training opportunities provide you with thought-provoking, informative content. We are excited to announce the development of two new TAGT resources designed to help members effectively evaluate and improve G/T programs at the campus and district levels. This includes an evaluation template and an evaluation resource webpage (coming soon).

Recently, association leaders developed two initiatives that will guide TAGT to new levels of success. Efforts will focus on:

- evaluating and stabilizing a brand that establishes an awareness of our association and communicates our message effectively; and
- developing and implementing various strategies and resources that create relevant engagement for our members and supporters.

These initiatives will help our association to consider two important topics—*who are we and what is our message* and *how do we demonstrate extreme member focus?* It’s an exciting time to be a part of TAGT; the last few years have been marked by increased interest in the association and in G/T education in our state. I am certain that these efforts will provide solid direction for continued growth.

Clear and focused strategies are critically important for classrooms, programs, families, and especially organizations. Otherwise, we will find ourselves running a popcorn popper without the lid. Although that certainly provides great entertainment for children, it’s definitely not the most effective way to accomplish individual and organizational success. With well-planned, meaningful strategies, we will all be equipped to better serve the gifted community.
First, a little introduction: For nearly 7 years, I had the privilege of serving as the editor of a unique children’s literary magazine called Creative Kids, which features the best work by writers, artists, and other talented kids across the country. With hundreds of submissions coming in every couple of months, trust me, I saw work that would knock most adults’ socks off. So, when Krys Goree and the TEMPO editorial board (of which I am a part) discussed featuring student work at a recent meeting, I began brandishing my pen like Hermione Granger waving her arm in class. “Me, me! I know the perfect student for this!” I wanted to shout (don’t worry, I kept my enthusiasm in check).

And here she is: Isabella Taylor, a 13-year-old from Austin who not only has a lovely way with poetry, but has recently turned her phenomenal artwork (see her self-portrait from 2011) into her own fashion line that’s been featured on The Huffington Post, Justine magazine, and the TODAY show. Oh, and did I mention, she’s currently a college student?

Teachers and parents, I know I’m not alone in noticing the amazing work of young Texans. We really do have some of the best and the brightest right here at home! The TEMPO board wants to see the fantastic things your gifted students are doing, too! Please submit your students’ outstanding work (and get creative—artwork, poems, stories, essays, or personal narratives like Isabella’s are all welcome!) to me at lacy@cmptn.org. I’d love to help feature your students in a future issue of TEMPO!
“Do what you love to do.” That is how my adventure into art and fashion first began.

I began to paint at a very early age, and it was through my passion for painting and fashion that my current fashion line has become a business. Four years ago, I was exploring mixed media and wanted to learn how to sew, so I signed up for a sewing camp at the Austin School of Fashion Design. I fell in love with sewing and designing and quickly began sewing clothes for myself. Designing clothing was another creative outlet for me that was tied to my art sometimes consciously and other times very subconsciously. A few years ago, I translated one of my paintings “Winter Roses” into a couture dress that I patterned, designed, and sewed together. I took the movement of the painting and the floral design as well as the color palette and “made” it into a dress. (Editor’s Note: “Winter Roses” won a Gold Key in Fashion from the Scholastic Arts Awards in 2013.)

I have always said “if art had legs, it would be fashion,” and I really believe that holds true for me. I have been turning my paintings into fabric. I can see my paintings as tops or pants and sometimes I might be working with a fabric that influences my color palette for a painting. The relationship moves pretty fluidly back and forth. I have moved on from sewing clothes for myself to making clothing collections with the support of my Mom and Dad. I have been learning a great deal about what it takes to run a fashion line. There are many moving pieces that need to be orchestrated in order to make it happen from my initial design sketches to fabric selections, sample making, and production to the hanger. It has definitely taken a lot of “blood, sweat, and glitter” to get to where I am now but I absolutely love what I am doing!

Lacy Compton is a member of the TEMPO Editorial Board. She has been an editor and promotions coordinator at Prufrock Press since 2005 and an instructor with Johns Hopkins University’s Center for Talented Youth since 2009, where she teaches online literature courses to gifted fourth and fifth graders. Lacy holds a bachelor’s degree in journalism from Baylor University and a master’s degree in English from Texas State University.
Gifted Education at the Texas Academy of Mathematics and Science: A Model for STEM Talent Development

Todd Kettler, Ph.D., Micheal Sayler, Ph.D., & Russ Stukel
of the chief goals of gifted education is to develop the talents of students who demonstrate potential for outstanding achievement. Although there may be other goals associated with gifted education—such as self-actualization—from a policy and practice standpoint, developing advanced levels of talent in students is of chief importance (Jung, 2012; Subotnik, Olszewski-Kubilius, & Worrell, 2011). Developing potential into talent involves recognizing potential and intentionally providing environments in which potential can be nurtured into interest and achievement. High school gifted education is precariously positioned in the final third of the K–12 educational continuum. Thus, the role of high school gifted education differs somewhat from the role of primary, intermediate, and middle school gifted education. During the high school years, gifted students should be developing domain-specific talents and the psychosocial skills that are necessary for advanced levels of achievement.

Developing outstanding talent in the areas of science, technology, engineering, and mathematics (STEM) has been widely lauded as a national educational and economic imperative. The National Science Board (2010) argued that the long-term prosperity of the United States relies on developing the talents of motivated individuals to support scientific and technological innovation. Furthermore, after a 2-year study of advanced STEM education in the U.S., the National Science Board concluded that, “The U.S. education system too frequently fails to identify and develop our most talented and motivated students who will become the next generation of innovators” (p. 5). In the midst of the current call for increased emphasis on developing STEM talent, the number of the highest achieving high school students selecting STEM-related majors in college has actually declined (Lowell, Salzman, Bernstein, & Henderson, 2009). It seems reasonable to ask what type of educational initiatives are addressing the concerns associated with even our highest achieving high school students avoiding careers in the well-documented areas of need? More specifically, what type of gifted education program models address the imperative to develop STEM talent among our highest achieving high school students?

Gifted education previously aligned its emphasis with national STEM priorities subsequent to the launch of Sputnik and the National Defense Education Act (Jolly, 2009), and some advocate for a similar alignment to national educational priorities today (Kettler, 2013; Subotnik, Edminston, & Rayhack, 2007). The National Association for Gifted Children (NAGC, n.d.) has advocated for a renewed commitment to developing advanced mathematics and science talent in our K–12 schools so that U.S. high school graduates can compete with their international counterparts for admission to prestigious U.S. universities in STEM fields. Recent publications in the field of gifted education further suggest that developing STEM talent is building acceptance as one of the goals of gifted education at all levels (Gentry, Hu, Peters, & Rizza, 2008; Heilbronner, 2013; Heilbronner, 2011; Mann, Mann, Strutz, Duncan, & Yoon, 2011).

The Texas Academy of Mathematics and Science (TAMS) is a model of gifted STEM education. Gifted high school students with a career focus in one or more of the STEM disciplines spend their final 2 years of high school taking college courses in advanced mathematics and science at the University of North Texas. Through the graduating class of 2008, approximately 78% of TAMS graduates have pursued careers in STEM fields, and the percentage would be higher if STEM education fields were included (Jones, 2011). After completing terminal degrees, TAMS graduates have served as faculty members on some of the nation’s most prestigious universities including MIT, Stanford, and the University of Chicago. Although we cannot replicate TAMS in comprehensive high schools, the purpose of this inquiry is to extract some principles of high school gifted education from the TAMS model and suggest some implications that can inform educators of the gifted as they design and implement high school programs to develop the talents of gifted and advanced students, particularly in the STEM fields.

DESCRIPTION OF THE TEXAS ACADEMY OF MATHEMATICS AND SCIENCE

The Texas Academy of Mathematics and Science is a publicly supported, residential early college entrance school at the University of North Texas (UNT) at Denton (Sayler, 2006). Created by the Texas legislature in 1987, TAMS is one of 16 state-supported residential university-based mathematics and science schools in the United States (Jones, 2011). TAMS enables talented students planning STEM careers to complete their last 2 years of high school, earn a high school diploma, and finish at least their first 2 years of college simultaneously. Participants enroll in university courses normally taken by college students who are majoring in advanced-level science, mathematics, engineering,
or medical tracks. Approximately 200 students enter the program each year. Entering students typically have completed their sophomore year in high school and enter TAMS in the fall of their 11th-grade year; although some students are ready and enter earlier. Students pay no tuition or book costs, but do pay the costs for room and board. They earn at least 57 credits in the four semesters of the program; however, some students graduate with as many as 70 credits. TAMS students must live on campus in a designated TAMS residence hall used exclusively for students in the TAMS program with its own specially trained residential, student life, and counseling staffs. Separate wings of the hall are used for men and for women. There are commons rooms, a computer lab, recreation areas, and TAMS staff offices in the hall.

Taking college courses while at TAMS gives students early access to real-world professional content in mathematics and science and allows many of the TAMS students to be involved in authentic research efforts. The deep knowledge of the fundamentals of biology, chemistry, physics, and mathematics received in their college courses, combined with high natural ability and enthusiasm for mathematics, science, medicine, and engineering, prepare TAMS students for participation in advanced-level scientific investigations at the UNT campus and other universities during the school year and during the summer between their 2 years in the program. As second-semester juniors, students may apply for $3,000 TAMS Summer Research Scholarships, which provide summer stipends for travel and living expenses. These scholarships are competitively awarded to approximately 60–65 of 200 rising seniors annually for mentor-guided summer research. Over the years, many TAMS students have won prestigious scholarly/research and achievement awards (see Table 1).

TAMS was the first university early entrance program at which the students take only college courses (Stanley, 1991). The exposure to accelerated content provides students an opportunity to advance toward STEM careers and prepares them to engage in authentic research as high school students. The academic load at TAMS is rigorous and demanding. To be admitted, students must demonstrate advanced achievement in mathematics and science, while also having the verbal skills to take college-level English courses as well as college-level social studies courses and electives. More than 3,200 students have completed TAMS since its first class entered in the fall of 1988. Most of the students have done very well academically, in their careers, and in their personal lives (Boazman & Sayler, 2011). Taking university classes, living with other highly gifted and motivated adolescents, and engaging in authentic research opportunities prepare TAMS graduates to enter prestigious programs in their content fields at top universities.

Authentic engagement in science and math is a key feature of the TAMS model. While enrolled in the 2 years of TAMS study, many students apply for and join faculty research teams. The real-world research activities in which they engage ranges from education to psychology, biology to engineering, computer science to chemistry. These research projects are done with faculty researchers at UNT, at regional medical centers, at private research centers, aboard a research vessel sailing near Antarctica, at the NASA Johnson Space Center, at the M.D. Anderson Cancer Center, at the University of Texas-Houston Health Science Center, at the Southwestern Medical Center, and at Moscow State University in Russia. Many times students voluntarily enter a laboratory their first semester to gain functional experience so when the student petitions the researcher in the spring, the researcher has seen a diligent student and one who has the requisite skill to conduct meaningful research. Students also continue in those labs after the summer experience to finish

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<th>Honor/Award</th>
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<tr>
<td>Goldwater Scholars</td>
<td>53</td>
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<td>Intel Science Talent Search</td>
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<td>Finalists</td>
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<td>Siemens Westinghouse</td>
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<td>National Winner</td>
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<td>Regional Finalists</td>
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<td>USA Today All-USA Academic Teams</td>
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<td>First Team</td>
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<td>Presidential Scholars</td>
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<td>Coca-Cola Scholars</td>
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<td>National Merit Scholars</td>
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<td>Finalists</td>
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<td>Semi-finalists</td>
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<td>Commended</td>
<td>93</td>
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<td>Hispanic</td>
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Table 1. Awards and Honors Received by TAMS Students (1988–2013)
projects, gather data, and publish results. A graduate of the 2012 TAMS class had six publications on her résumé by the time she graduated from TAMS.

WHAT CAN WE LEARN FROM THE TAMS MODEL?

The purpose of considering the TAMS model of high school gifted education was to attempt to extract some guiding principles that characterize successful gifted education focused on the national STEM imperative in the early 21st century. TAMS has been incredibly successful at developing gifted students who are prepared and interested in pursuing STEM careers at highly competitive universities. Arguably, no other high school in the United States has been more successful at developing STEM talent—the only high school or university with more Goldwater Scholars than TAMS is MIT (Jones, 2011). Four principles long supported by gifted education research are exemplified at TAMS: (1) acceleration is necessary for gifted high school students to master advanced content; (2) working with an advanced peer group supports talent development; (3) students develop STEM talent through authentic practice and research; and (4) academic contests may serve as motivators and indicators of advanced talent development.

Acceleration of Content Is Necessary

Acceleration has a long history of research support as a tool to facilitate gifted students’ mastery of advanced content knowledge. Acceleration can take many forms including grade skipping, content-specific acceleration, early access/entry to college courses (Southern & Jones, 2004), and classroom accelerative techniques such as tiered objectives (Kettler & Curls, 2003). TAMS explicitly accelerates content in mathematics and science. TAMS students complete two semesters each of university-level advanced sciences for science majors in biology, chemistry, and calculus-based physics plus associated labs. TAMS students are required to complete through at least Math 1720–Calculus II. Typically 70% of the incoming TAMS students begin the mathematics sequence in Math 1650–Pre-Calculus, transitioning to Math 1710–Calculus I the next semester and completing Math 1720–Calculus II in the third semester. Mathematics electives are taken in addition to the required courses and during the final semester. Diagnostic placement exams are administered to students and approximately 30% of the incoming classes test out of the required mathematics classes and start at a higher level of mathematics than the Pre-Calculus class. Students are allowed to register for additional electives after the first semester provided they maintain a cumulative grade point average of 3.0; Table 2 presents a list of required and elective mathematics courses completed by TAMS students in recent years.

Beyond the mathematics and science requirements, TAMS students also complete four semesters of English, two of history, and one semester of political science. Most high school mathematics options peak at high school calculus, but TAMS students will graduate high school with a minimum of two college courses beyond high school calculus. Additionally, they will complete at least six semesters of advanced college-level sciences beyond those they completed in their first 2 years of high school, all of which include advanced laboratory experiences.

According to the National Association for Gifted Children (2004), acceleration is a cornerstone for exemplary gifted programs. Acceleration is the chief mechanism through which gifted and advanced learners have opportunities to tackle advanced content in mathematics and science. Gifted education programs ought to include advanced content, and programs specifically concerned with developing talent in the STEM disciplines need to provide multiple opportunities for high school stu-

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<th>Table 2. Mathematics Course Options for TAMS Students</th>
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<td>Required Math 1650</td>
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Tempo reported satisfaction with the opportunity to work with similar ability peers while engaging in advanced content (Sayler, 1995, 2010).

Learn Through Authentic Practice

Students develop STEM talent and expertise through authentic practice and research. Situated learning theory (Lave & Wenger, 1991) suggests that learning involves legitimate peripheral participation in which learners participate in a community of practitioners within a field or domain. The students begin on the periphery but gradually move toward full participant in the sociocultural practice of the field or domain. In this participation, the students become part of the authentic processes and practices of a field acquiring the knowledge and skills of the domain in authentic situations. Movement from the periphery toward more authentic tasks requires the students to demonstrate willingness to learn as well as competencies in the domain of practice. Lave and Wenger described the initial participation on the periphery as mostly observational, but even though the students are not very involved, they learn by “both absorbing and being absorbed in the culture of practice” (p. 95).

Wenger (2006) described communities of practice as a group of people engaged in a process of collectively learning in a shared domain. Generally, these communities share an interest or a concern and learn how to perform the tasks better as they interact regularly.

There are three required elements: a domain, a community, and a practice. Although these can be applied across many settings, in the case of TAMS students, the domains are generally in the sciences, mathematics, and engineering fields. The communities are the research teams of professors, graduate students, research assistants, and undergraduate students (including TAMS students). The practices include the formal processes of conducting research at a large research university.

TAMS students are invited and encouraged to participate in research activities with the research faculty at the University of North Texas. When the TAMS students take part in the research activities, they enter a situated learning environment with legitimate peripheral participation.

TAMS students are exposed to research from the beginning of their entry to the TAMS program. During the summer orientation process before classes even begin, newly admitted students interact with second-year students who are currently involved in research. Within the TAMS Student Life program, a student club called the Research Organization exposes incoming students to current research, hosts presentations on research, and follows up with students expressing interest. Participation in research is emphasized before new TAMS students take their first class in August.

When the incoming students arrive, they have the opportunity to join the Research Organization and visit laboratories with second-year students who are currently researching at the University of North Texas and surrounding institutions. During the formal Academic seminar presentations in the fall, first-semester students are instructed on the scientific method and the application of the method as it is applied to all disciplines in academic research. Professors from several disciplines present during the seminar highlighting the work that transpires in the laboratories and the advances in the laboratories and the advances...
that occur due to those research ventures. In addition to research professor presentations, other faculty present on how specific research and opportunities are tied to prestigious awards on the domestic and international level. It is during this first fall semester that students are encouraged to begin thinking about which discipline and with what type of research they wish to engage.

In the spring semester of the TAMS students’ first year, an additional formal seminar is presented that outlines the professional steps to be taken by TAMS students in contacting researchers and attaining a position in specific laboratories. Students are responsible for contacting, establishing, and securing these research pairings. The Research Organization assists students in locating various types of research. One of the opportunities is with NASA in Houston, which typically allows three to four TAMS students to participate in research at the NASA Space Center. The TAMS program has budgeted a Summer Research Scholarship that covers the cost of tuition for these research opportunities. This allows the student selected for a TAMS Summer Research Scholarship to receive academic credit while conducting research.

Document Achievement Through Academic Contests

Academic contests serve as motivators and indicators of STEM talent development. Academic contests have traditionally been a part of gifted education (Ozturk & Debelak, 2008), and these competitions provide challenging and engaging learning opportunities for gifted students (Olszewski-Kubilius & Lee, 2004). Examples of academic contests include math leagues, science fairs, math and science Olympiads, engineering competitions, writing competitions, and problem-solving competitions such as Destination Imagination. Participation in academic competitions can help gifted students define their interests and develop increased self-awareness of personal strengths and career possibilities (Calvert & Cleveland, 2006). As participants in large national or international competitions, they get a chance to realistically evaluate their talents in relation to other gifted and talented individuals with similar interests. TAMS students have historically participated widely in academic competitions and their success in some of the most prestigious competitions is documented (see Table 1).

**IMPLICATIONS FOR HIGH SCHOOL GIFTED EDUCATION**

TAMS is a model program for developing the talents of gifted students in the STEM fields. For 25 years, students have entered and completed the TAMS program and most of them enter and complete the rigorous college and university program, and then participate and succeed in STEM-related fields. Despite the overwhelming evidence of success at TAMS, the academic itself and the principles of gifted education it exemplifies go largely unnoticed and underappreciated in the network of gifted education professionals and policy makers in Texas. In this inquiry we have announced four principles of gifted education that are critical to the success of the TAMS model; furthermore, we want to suggest some implications that the TAMS model might offer high school gifted education programs.

**Establish Clear Goals for Developing STEM Talent in the Gifted Program**

Clear and compelling goals ought to guide the development and implementation of gifted education programs and services (Kettler, 2013). We began with the suggestion that the chief goal of gifted education ought to be the recognition and development of outstanding talent and achievement. Furthermore, developing STEM talent is widely lauded as one of the most pressing educational imperatives of educational policy and reform in the U.S. today. Thus, it seems reasonable that gifted programs, specifically at the high school level, should adopt goals for recognizing and developing STEM talent. These goals should be compelling and measurable. They are compelling when they attract the attention and support of the local community and entire school system. Additionally, goals are measurable when they include student outcomes that can be observed, measured, and monitored over time. Table 3 includes samples of gifted STEM program goals that are compelling and measurable. These goals require a commitment to advanced learning opportunities for students participating in those programs, and students successfully mastering these outcomes will be exceptionally well prepared to enter postsecondary options in STEM fields.

**Support and Encourage Acceleration and Grouping for Talent Development**

Acceleration and grouping are research-supported practices long associated with successful gifted education programs. Acceleration and grouping are both recommended facets of gifted education programs by the National Association for Gifted Children, and the Texas State Plan for the Education of the Gifted/Talented calls for districts to support and facilitate acceleration options for students. Examination of the TAMS model reveals that gifted students at TAMS succeed in significantly accelerated content. They are graduated from high school with an estimated 60 credit hours of advanced college mathematics and science as well as foundational courses in English and social studies. To accomplish the types of compelling goals demonstrated in Table 3, acceleration of content and grouping for dedicated talent development are necessary.

Technology has afforded more opportunity for accelerated options...
than any time previously. When we cannot take the student to the curriculum, we can use technology to bring the curriculum to the student. For instance, most high schools do not offer courses beyond calculus; however, online learning opportunities and university partnerships are widely available to provide these options for students. Opening the doors to accelerative options requires schools to establish policies and guidelines that not only allow acceleration but also facilitate it for students wanting to develop advanced levels of talent and achievement. This may require consideration of GPA policies, summer learning opportunities, and the creation of digital learning labs to support taking advanced college courses at the high school campus.

Support Academic Competitions and Authentic Research

Athletic talent is developed on the practice fields and gyms, but it is demonstrated and evaluated in competition. Similarly, talented writers compete in writing competitions, and artists enter their works in annual competitions. Musical talent must eventually be displayed in public performances, many of which are subject to review and evaluation. Studies of talent development typically reveal that talents are evaluated and sharpened through participation in rigorous competition; yet, an examination of school budgets would probably reveal that commitments to fund competitions in arts and athletics far surpasses commitments to fund competitions in core academic arenas such as mathematics, science, and engineering.

Schools that establish goals to develop STEM talent should commit necessary resources to support students in STEM academic competitions. Human resources may include faculty time either during the typical school day, or paying appropriate stipends for extracurricular work. Fiscal resources also include funding entry fees, preparatory materials, travel expenses to competition venues, and laboratory facilities commensurate with the rigorous requirements of national competitions. Creating a climate that supports and encourages students in academic competitions is equally as important as providing appropriate resources. Faculty sponsors and coaches should be inviting students into their programs regularly, and the school should find ways to recognize and honor those students who compete. Schools may provide elective courses that are dedicated to preparation for advanced academic competitions and ensure that GPA policies do not deter top-tier students from participation. TAMS has built a climate that fosters and supports students competing in the most prestigious competitions in the nation for science, mathematics, and engineering, and participation in these events motivates and inspires students toward dedicated study. All of those competitions are open to students at any high school and the human and fiscal resources are far from inhibitive.

Additionally, high schools committed to developing STEM talent should find ways to engage students in authentic research activities. Perhaps there is no better example of taking authentic research seriously than the Dr. Robert Pavlica Authentic Science Research Program at Byram Hills High School in Armonk, NY (see www.byramhills.org). Pavlica started the authentic research program at Byram Hills in the early 1990s in response to some of the advanced science students’ request that they spend less time preparing for AP exams and more time actually doing science (Robinson, 2004). Students

Table 3. Compelling STEM Goals for High School Gifted Programs

<table>
<thead>
<tr>
<th>Area</th>
<th>Sample Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>Students participating in the gifted education program for mathematics will complete a minimum of one course beyond calculus. Students participating in the gifted education program for mathematics will compete and succeed in advanced mathematics problem-solving competitions. Students participating in the gifted education program for mathematics will earn scores at or above 700 on the mathematics SAT.</td>
</tr>
<tr>
<td>Science</td>
<td>Students participating in the gifted education program for science will compete and succeed in state, national, and international science competitions. Students participating in the gifted education program for science will complete extended research studies as evidenced by professional quality scientific research reports published by the science department.</td>
</tr>
<tr>
<td>Technology and Engineering</td>
<td>Students participating in the gifted education program for engineering will compete and succeed in state, national, and international engineering competitions.</td>
</tr>
</tbody>
</table>

in the science research program complete a spiraled curriculum of scientific research skills from the sophomore year through the senior year culminating in some of the nation’s most prestigious student research projects. Byram Hills students have often led the nation in the number of semi-finalists and finalists for the annual Intel Science Talent Research Competition (Robinson, 2004), and in 2012 a student from Byram Hills was one of four students in the U.S. to win the national Neuroscience Research Prize award at the 65th annual meeting of the American Academy of Neurology. Other than its national reputation as one of the most outstanding science high schools in the United States, Byram Hills is a typical, relatively small, public high school of fewer than 1,000 students in upstate New York. However, Byram Hills is an excellent example of how a typical comprehensive high school can make a commitment to supporting authentic student research and achieve outstanding results in developing STEM talent. Authentic research experience is one facet of developing STEM talent. TAMS students participate in these experiences, and other high schools have also modeled how to make a commitment to providing science research opportunities in traditional settings.

Remove the Learning Ceiling

The final implication offered from this inquiry of the model of STEM education found at TAMS is to remove the learning ceiling. Each year, TAMS enrolls approximately 200 students in its junior class, but there are hundreds of otherwise similarly qualified students who could have applied for admission but chose not to (Fleming, Scharff, & Henderson, 1999; Jones, Fleming, Henderson, & Henderson, 2002). Those similarly qualified students traverse the 11th- and 12th-grade curriculum of typical comprehensive high school across the state year after year while their TAMS counterparts engage in advanced college coursework, authentic research, and participate in elite levels of STEM competitions. From an achievement and talent development perspective, the students are arguably equal after the 10th-grade year; however, the data suggest that TAMS students have achieved far more in their mastery of mathematics and science by high school graduation. Given the relative equality of the students at the beginning of high school, the differences in achievement are mostly related to variance in the learning opportunities available to the students.

Learning ceilings for gifted students involve content or experience limitations that may be attributed to the perceived limitations of a typical public high school. Additionally, learning ceilings may be attributed to prevalent attitudes and dispositions that result in gifted students receiving limited focus and priority in the era of competency testing accountability.

To turn this tide, high school gifted education models are encouraged to think differently about the desired outcomes for gifted students interested in STEM-related areas. How might we bring the opportunities to the students in situations where for good reasons, the students were not able to move to the opportunity? In what ways might technology be utilized to bring accelerated content to students who are willing to complete eight high school science courses rather than the typical four? How might other graduation requirements be streamlined to allow more room in the typical high school schedule for additional mathematics and science content as well as authentic research experiences? How might the school develop a gifted mathematics pipeline that generates enough demand for additional courses beyond AP Calculus? In what ways might a high school partner with a college or university to award dual credit for these advanced mathematics and science courses taught by advanced mathematicians and scientists? Every time a school laments that it cannot provide the advanced courses for its brightest students, the community’s response ought to be to try harder because the students deserve it. Learning ceilings are constructs of limitation that can be overcome with innovative thinking driven by the desire to support advanced talent development. Perhaps, such thinking is the hallmark of high school gifted education programs.

Authentic research experience is one facet of developing STEM talent.

CONCLUSION

High school gifted education ought to have as its chief goal the development of outstanding talent among those students demonstrating potential, interest, and motivation to succeed in various domains. Specifically, one of the national educational imperatives is the development of talented students in the STEM disciplines to support a pipeline of outstanding thinkers and innovators. The Texas Academy of Mathematics and Science has been answering this call for gifted STEM education for more than 20 years, and it has illuminated a number of pedagogies of talent development to inform gifted education in Texas and beyond.

As the field of gifted education takes stock of its conceptions of giftedness, rethinking models for appropriately educating gifted students must employ the very innovation that we hope to develop in our gifted young people. Rethinking high school gifted education is a good place to start. Too often high schools have resigned themselves to claim that they do not really have gifted programs or that


Continued on page 42
What Is Depth and Complexity?

Marcy Voss
The need for curriculum and instruction to be modified for gifted students in depth, complexity, and pacing is not a new concept. The Texas State Plan for the Education of Gifted and Talented Students (Texas Education Agency, 1996, 2009) informs districts of this need. The lingering question is how it is best accomplished.

Though Evelyn Hiatt, then Associate Senior Director for the Division of Advanced Academic Services at the Texas Education Agency, referenced Dr. Sandra Kaplan’s work in answering “What Do We Mean by Depth, Complexity, and Pacing?” in her TEMPO article in 1998, use of Kaplan’s Model of Depth and Complexity has not received widespread attention in Texas until the last few years. Perhaps this is because our new state assessment standards also address the need for depth and rigor. Another reason that Kaplan’s model has not received widespread attention may be because that written information on the Kaplan Model of Depth and Complexity is difficult to find. There is no book that gives a complete outline of this model. As a result, educators are left to gather their own information and resources from a multitude of sources to make sense of and use the model.

The purpose of this article is, therefore, to bring together information I have gathered from workshops given by Dr. Sandra Kaplan since 1995, conversations with experts/trainers who have a thorough understanding of Kaplan’s model, and the many Internet sources that present information on this model. By doing so, I hope to present a comprehensive, yet concise overview and explanation in one location to facilitate understanding and ease of its use.

HISTORY

The first publication where the concept of depth and complexity was discussed and a definition given, Differentiating the Core Curriculum and Instruction to Provide Advanced Learning Opportunities, was a position paper copublished in 1994 by the California Department of Education and the California Association for the Gifted. Sandra Kaplan, President of the California Association for the Gifted at the time, was credited as the principal contributor of the ideas in the work.

In 1995, Sandra Kaplan and Bette Gould cowrote and published The Flip Book: A Quick and Easy Method for Developing Differentiated Learning Experiences. This was the first book for educators and the general public on the topic of differentiating the core curriculum with the dimensions of depth and complexity.

In 1996, Dr. Kaplan, in her role as Clinical Professor at the Rossier School of Education, University of Southern California, initiated a project with the California Department of Education and the California Association for the Gifted to improve educational practices for gifted and talented children. This project, Curriculum T.W.O., was funded by a Javits grant from the U.S. Department of Education’s Office of Educational Research (Callahan & Hertberg-Davis, 2012).

During the Curriculum T.W.O. project, the 11 elements of depth and complexity came to be represented by icons developed by Sheila Madsen. These elements/icons were used as tools to differentiate curriculum in order to help students utilize a more sophisticated thought process and develop a deeper, more complex understanding of content. The use of this body of knowledge resulted in Kaplan’s Model of Depth and Complexity.


PURPOSE

While one of the advantages of Kaplan’s model for educators in Texas is that it helps teachers meet the state requirement for developing a quality curriculum for gifted students, it has many other benefits as well. Depth and complexity increases the sophistication of content and fosters in students the skills necessary to think critically, analytically, and creatively (Dodds, n.d.). It allows teachers to teach toward the highest levels of knowing (“Kaplan’s Depth & Complexity and Content Imperatives,” n.d.). It helps students focus on elements that one needs to master a subject, thus increasing rigor...
and engagement in learning activities (Byrd, n.d.). In addition, it provides structure and support for helping students take a deeper and more complex look at any topic and inspires higher order thinking skills and productivity from students (Vallone, n.d.).

VALIDITY

Although very little research has been conducted on this model, two dissertation studies address its validity. Joanna Lauer (2010) found that the concepts of depth and complexity were applicable for and relevant to academic experts and their disciplinary work and were an appropriate and authentic means to facilitate content knowledge in the study of disciplines for gifted students. Kimberly Dodds (2010) found that use of the depth and complexity prompts positively affected both gifted and nongifted students’ understanding across the disciplines (though gifted student understanding was greater than nongifted student understanding) and that both gifted and nongifted students perceived the prompts to be helpful, interesting, and challenging.

DEFINITION

As the name implies, Kaplan’s Model of Depth and Complexity is comprised of two dimensions: depth and complexity. Depth, as defined in Kaplan’s work with the Texas Education Agency’s Mentor School Network Carnegie Project in 1998, is exploration within a discipline that can be obtained by: (1) analyzing from the concrete to the abstract, familiar to the unfamiliar, and known to unknown; (2) exploring the discipline by going past facts and concepts into generalizations, principles, theories, and laws; and (3) investigating the layers of experience within a discipline through details, patterns, trends, unanswered questions, and ethical considerations (Martin & Morrow, 1996).

If symbolized, depth could be represented by a vortex or vertical line with an arrow on the bottom to indicate “digging down” into deeper and deeper levels of understanding. To me, it represents the opposite of how I learned history as a student: memorizing dates, places, and names. This type of surface-level learning is easily forgotten. By contrast, in-depth learning helps students acquire new knowledge and understandings as they discover the “big ideas” of the content. Because this helps students to organize and construct meaning, the knowledge is remembered.

Complexity, as defined in the Carnegie Project, is seeing relationships in, between, and across disciplines (Martin & Morrow, 1996). This can be achieved by: (1) extending the content through the study of themes, problems, and issues; (2) discovering relationships between and among ideas within the topic, discipline, and disciplines; (3) examining relationships over time; and (4) investigating relationships from multiple points of view.

Complexity could be symbolized by overlapping shapes or by a horizontal line with arrows at either end to represent making connections between topics or disciplines. Complexity helps students develop scholarly insights into the connections across time, people, and disciplines. It helps students relate to and apply concepts and ideas at a more sophisticated level, bridge diverse subjects, and find more effective solutions.
tions from considering multiple points of view.

**ELEMENTS**

Depth is comprised of eight elements. Although not in an exact hierarchy, the order does represent moving from simple to difficult and concrete to abstract (Kaplan & Gould, 1998). Presenting content in this way allows a teacher to scaffold questions or activities by starting the lesson with elements at the beginning of the list, which are more tangible and less in-depth, and working through to elements at the end of the list, which are more conceptual and achieve greater depth of learning. Teachers can also manipulate the flow of thought toward greater depth and more enduring understandings by giving students two or three elements to use in addressing the question that was posed.

Complexity is comprised of three elements that are not arranged in a hierarchy. Greater complexity is achieved by increasing the amount of information being compared or related. For example, when studying the solar system, one might compare it to body systems to facilitate an understanding of relationships within the discipline. To achieve greater complexity and understanding, the solar system might also be compared to the U.S. government (system of government) and the elements of a novel (system of writing). Or, rather than simply studying the BP oil spill as it relates to damaged marine life (a marine biologist), one might also view the situation from that of a worker injured in the explosion or people living on the Louisiana coastline who earn a living through fishing and tourism.

Each element of depth is associated with an icon. The Depth and Complexity Icons are perhaps the most widely used aspect of the framework; however, it is important to recognize that the icons are only one piece of the larger Depth and Complexity Framework that also includes the use of varied levels of thinking skills, content imperatives, universal concepts and generalizations, and disciplinarian thinking.

Each element of depth is associated with an icon. The Depth and Complexity Icons are perhaps the most widely used aspect of the framework; however, it is important to recognize that the icons are only one piece of the larger Depth and Complexity Framework that also includes the use of varied levels of thinking skills, content imperatives, universal concepts and generalizations, and disciplinarian thinking.

USE

Kaplan’s Model of Depth and Complexity can be used successfully at all grade levels, K–12, and with all content areas. In her YouTube video, Kaplan suggests educators take four steps to introduce the prompts and scaffold student learning with the ultimate goal of independent student use. Teachers first introduce the element and corresponding icon by giving a definition. The second step is to relate the element/icon to student previous knowledge and experience. Next, the teacher helps the students apply the element/icon to new knowledge and information. The last step is to help students integrate the element/icon to the real world and current events. Once students become familiar with the elements/icons through this process, they can begin to work with multiple elements/icons to achieve even greater levels of depth and complexity of understanding. I have found the following websites to be helpful when using this model:

- [http://pdsupport.cmswiki.wikispaces.net/Depth+%26+Complexity](http://pdsupport.cmswiki.wikispaces.net/Depth+%26+Complexity) — This wiki provides a variety of resources for understanding depth and complexity, including charts, videos, and teacher/student examples.
- [www.byrdseed.com](http://www.byrdseed.com) — Complete a search for “depth and complexity” on this website created by Ian Byrd to find additional information, curriculum examples, and websites related to depth and complexity.
- [www.daretodifferentiate.wikispaces.com/file/view/DepthComplexity.pdf](http://www.daretodifferentiate.wikispaces.com/file/view/DepthComplexity.pdf) — This website contains a chart of the elements/icons with key questions, associated thinking skills, and resources.
- [www.giftedcalifornia.org/depth_complexity.php](http://www.giftedcalifornia.org/depth_complexity.php) — This website provides links to a number of printable resources, including the icons in Spanish, as well as PowerPoint slides from presentations on depth and complexity.
- [www.giftedcalifornia.org/dicons/icon.presentation_k-5_lolson.ppt](http://www.giftedcalifornia.org/dicons/icon.presentation_k-5_lolson.ppt) — This is a PowerPoint presentation
Table 1. Depth & Complexity Icon Chart

<table>
<thead>
<tr>
<th>Depth</th>
<th>Icon</th>
<th>Key Questions</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language of the Discipline</td>
<td></td>
<td>What vocabulary terms are specific to the content or discipline?</td>
<td>Tools Terms Jargon Slang Abbreviations</td>
</tr>
<tr>
<td>Details</td>
<td></td>
<td>What are the defining features or characteristics? Find examples and evidence to support opinions and ideas.</td>
<td>Parts Factors Attributes Variables Distinguishing Traits</td>
</tr>
<tr>
<td>Patterns</td>
<td></td>
<td>What elements reoccur? What is the sequence or order of events? Make predictions based on past events.</td>
<td>Predictability Repetition</td>
</tr>
<tr>
<td>Unanswered Questions</td>
<td></td>
<td>What information is unclear, missing, or unavailable? What evidence do you need? What has not yet been proven?</td>
<td>Missing Parts Incomplete Ideas Discrepancies Unresolved issues Ambiguity</td>
</tr>
<tr>
<td>Rules</td>
<td></td>
<td>What structure underlies this subject? What guidelines or regulations affect it? What hierarchy or ordering principle is at work?</td>
<td>Structure Order Reasons Organization Explanation Classification “Because…”</td>
</tr>
<tr>
<td>Trends</td>
<td></td>
<td>Note factors (Social, Economic, Political, Geographic) that cause events to occur. Identify patterns of change over time.</td>
<td>Influence Forces Direction Course of Action Compare, Contrast and Forecast</td>
</tr>
<tr>
<td>Ethics</td>
<td></td>
<td>What moral principles are involved in this subject? What controversies exist? What arguments could emerge from a study of this topic?</td>
<td>Values Morals Pro and Con Bias Discrimination</td>
</tr>
<tr>
<td>Big Ideas</td>
<td></td>
<td>What theory or general statement applies to these ideas? How do these ideas relate to broad concepts such as change, systems, chaos vs. order, etc? What is the main idea?</td>
<td>Draw conclusions based on evidence Make generalizations Summarize Theory Principle Main Idea</td>
</tr>
<tr>
<td>Across the Disciplines</td>
<td></td>
<td>Relate the area of study to other subjects within, between, and across disciplines.</td>
<td>Connect Associate Integrate Lend Ideas Cross-Curricular study</td>
</tr>
<tr>
<td>Changes over Time</td>
<td></td>
<td>How are elements related in terms of the past, present, and future? How and why do things change? What doesn’t change?</td>
<td>Connecting points in time Examining a time period Compare and Contrast</td>
</tr>
<tr>
<td>Different Perspectives</td>
<td></td>
<td>How would others see the situation differently?</td>
<td>Different roles and knowledge Opposing viewpoints</td>
</tr>
</tbody>
</table>

Note: Based upon the work of Sandra Kaplan. Reprinted with permission of J Taylor Education.
CONCLUSION

Twenty-five years ago, when I taught in a G/T pull-out program, I was told that I should make my curriculum more in depth and complex for my students. However, I was never instructed how to accomplish this. Sandra Kaplan was one of the first to design a concrete way for teachers (and students) to manipulate curriculum and instruction to make it in depth and complex. Now, as a district coordinator, I still find the Kaplan Model of Depth and Complexity best in helping teachers avoid “more of the same” or “arty-craftsy” projects for students. Once teachers are comfortable with the model, they are excited to redefine lessons and activities using the icons. More importantly, students are excited to respond to this type of instruction. What a testament to quality curriculum and instruction!

REFERENCES


Marcy Voss is the Special Programs Coordinator at Boerne ISD. She received her master’s in educational psychology with a specialization in gifted education from Texas A&M University in 1983. She currently serves on the Commissioner’s Gifted and Talented Advisory Council and is a member of the Texas Association for the Gifted and Talented. She is also the parent of three gifted children. Marcy may be contacted at marcy.voss@boerne-isd.net.
A mother (who was also a special education teacher) was concerned about her kindergarten son. He rarely spoke with his family and even less in his classroom. Observations at home raised red flags according to all the mother’s training. Midway through the school year, the mother met with the school counselor and explained that she was concerned that her son may qualify for special education services, but that she couldn’t quite put her finger on what the issues might be. The counselor promised to meet with the little boy and his teacher and get back to her. When the two met again, the counselor smiled and told the mother that not only was there not a thing to be worried about, but that the teacher and counselor were recommending her son for the gifted and talented program. I was that mother and my son is now 11 years old, still struggling in areas of social and coping skills due to overlooking a possible disability that was camouflaged by giftedness. My son’s instruction was not differentiated to meet the needs of a twice-exceptional student, only to that of a gifted child. Due in great part to this personal experience, I have chosen to study twice-exceptional learners in light of curriculum differentiation.
The twice-exceptional learner is an individual who is “simultaneously gifted and has a diagnosed disability” (Assouline & Whiteman, 2011, p. 380). Trail (2011) suggested some typical characteristics of the twice-exceptional learner may include superior vocabulary, insightfulness to complex issues, advanced-level content, creativity, high energy, preference for real-world and open-ended assignments, inconsistent academic performance, deficits in cognitive processing, lack of organizational skills, and an inability to prioritize and plan efficiently. As one can see, these characteristics may seem to contradict each other, which is one of the dilemmas faced by educators as they plan instruction. Despite good intentions, schools today often view the identification of gifted and disability as mutually exclusive. Twice-exceptional learners can take on myriad characteristics, which makes it difficult to identify one specific curriculum model that is more successful than another. There are gifted students with physical disabilities, sensory disabilities, emotional disorders, Attention-Deficit/Hyperactivity Disorder, autism spectrum disorder, and learning disabilities. Teachers’ lack of exposure to exceptionalities and training about this population creates a hole in the instruction of the everyday classroom. When a student is twice-exceptional, instruction should be differentiated as such. There are specific challenges related to students in this area and if left unaddressed, children are at risk of not achieving to their potential.

Twice-exceptional learners are one of the most underidentified populations in our schools today (Bianco & Leech, 2010; Ruban, 2005). McCallum et al. (2013) proposed that this is due to lack of efficient identification processes. They quoted the National Joint Committee on Learning Disabilities (NJCLD) as estimating that the prevalence rate may be as high as 20% of the population, with only 5% receiving services (NJCLD, 2011). The identification of a student as twice-exceptional requires an awareness of the relationship between the two areas of exceptionality by the teacher. This group is often difficult to identify due to the masking of one exceptionality by another. It is important that educators are able to view a student’s ability, characteristics, and performance through the lenses of both gifted and special needs. Baum (1989) identified three typical categories into which these students may fall as they are recognized as twice-exceptional. These are described in Table 1.

One of the major pitfalls in the lack of identification of the twice-exceptional population is the inadequate instruction they are receiving in the classroom (Ralabate, 2006). When discussing curriculum and instruction, the curriculum is the “what” is being taught and the instruction is the “how” it is being taught. This article will suggest a curriculum delivery model that, when implemented correctly, can be effective for students who are both gifted and have a disability.

### Table 1. Categories of Twice-Exceptional Students

<table>
<thead>
<tr>
<th>Giftedness Masks Disability</th>
<th>Disability Masks Giftedness</th>
<th>Giftedness &amp; the Disability Not Readily Apparent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formally identified as gifted but not having an identified disability</td>
<td>Formally identified as having a disability but not gifted</td>
<td>Not formally identified as gifted or disabled</td>
</tr>
</tbody>
</table>

### WHAT DO TWICE-EXCEPTIONAL LEARNERS LOOK LIKE AND WHERE ARE THEY?

Curriculum is an instruction plan providing content for a specific group of learners while curriculum models are utilized as tools to assist in designing curriculum in a more systematic way (Ornstein & Hunkins, 2013). When curriculum is delivered in the classroom, various strategies should be utilized to differentiate instruction for the students. Different types of delivery models typically fall under whole group, small group, or one-on-one instruction with varying components attributed to the model.

Most educators would agree that learners should experience curriculum that allows them to perform to their maximum potential (Jordan, Schwartz, & McGhie-Richmond, 2009). Research has shown that the effectiveness of current curriculum models, specifically those for students with exceptionalities in the inclusive classroom, is deficient (Blecker & Boakes, 2010; McLeskey & Waldron, 2011; Thomas et al., 2012). In the Digest of Education Statistics, 2011, Snyder & Dillow (2012) reported that in the fall of 2009, 95% of students with exceptionalities were being served in the regular school environment. With inclusive classrooms becoming the national norm (Snyder & Dillow, 2012), it is probable that most educators will experience being responsible for providing appropriately challenging learning experiences for twice-exceptional students, whether in the special education or the general education classroom. This raises two very important questions: (1) What are the characteristics of an effective curriculum model for serving twice-exceptional students? and (2) How do we implement such a model?

### WHAT IS A CURRICULUM DELIVERY MODEL?

Beginning with Bloom’s Taxonomy, curriculum models have driven instruction toward a more con-
sistent overall model (Krathwohl, 2002). Unfortunately, all children who are twice-exceptional rarely benefit from one specific model and therein lies the problem. Willard-Holt, Weber, Morrison, and Horgan (2013) maintained that few teachers practice effective strategies for the twice-exceptional learner. Assuming that whatever model teachers are using for the general education population is sufficient for the twice-exceptional learner is a grave mistake.

Twice-exceptional learners have been said to have different characteristics that are oftentimes unique from the non-exceptional learner. Some possible challenging characteristics may include discrepancies between verbal and written ability, difficulty relating to peers, inappropriate social interactions, difficulty memorizing isolated facts, anxiety, depression, poor motivation, shyness, behavior problems, and organizational deficiencies (Trail, 2011). However, focusing on other unique characteristics such as high creativity, ability to work well with abstract concepts, high capacity for problem solving, commitment to the task, and analytical prowess could balance out the strengths and weaknesses. Willard-Holt, et al. (2013) suggested that the best way of meeting the needs of these students is by “highlighting and encouraging students’ abilities while supporting their coexisting exceptionalities” (p. 247). Research shows that focusing on the students’ abilities rather than their deficiencies promises to create a successful learning environment where the twice-exceptional (2E) learner will thrive (Assouline & Whiteman, 2011; Coleman, 2005; Kalbflesch, 2013; Nicpon, Allmon, Sieck, & Stinson, 2011; Trail, 2011; Weinfeld, Barnes-Robinson, Jeweler, & Shevitz, 2002). Finding a curriculum model that incorporates this attention to strengths as well as supports the multitude of accommodations and modifications that can be applied to instruction of students that are twice-exceptional can be difficult.

LEARNER-CENTRED EDUCATION MODEL

A learner-centered education (LCE) model could efficiently address the more complex differentiation necessary for success of 2E learners. In 1997, McCombs and Whisler defined LCE as:

The perspective that couples a focus on individual learners (their heredity, experiences, perspectives, backgrounds, talents, interests, capacities, and needs) with a focus on learning (the best available knowledge about learning and how it occurs and about teaching practices that are most effective in promoting the highest levels of motivation, learning, and achievement for all learners). This dual focus, then, informs and drives educational decision-making. (p. 9)

When implementing this type of education, learners are recognized as having distinct differences, including learning styles, stages of development, ability, emotional states of mind, and other characteristics that have been noted as especially common in the twice-exceptional student. The learner-centered philosophy has been supported by multiple learning theories and can be traced as far back as the Chinese and Greek philosophers Confucius and Socrates (Ozmon & Craver, 2008). John Dewey, also a famous philosopher as well as psychologist and educator, believed that each child’s education should begin with understanding his or her capacities, interests, and talents in order to facilitate success (Simpson, Jackson, & Aycock, 2005). A curriculum model that focuses on the student rather than only the content is sure to prove more effective for the twice-exceptional learner.

In 2007, Jeffrey Cornelius-White published a meta-analysis of the literature about the learner-centered teacher-student relationship. He pointed out that this type of model “includes more of a focus on student variables and learning processes as critical to positive student outcomes” (p. 113). His study resulted in “above average” links between learner-centered teacher variables and positive student outcomes, specifically critical thinking, math achievement, drop-out prevention, self-esteem, verbal achieve-

IT IS IMPORTANT THAT EDUCATORS ARE ABLE TO VIEW A STUDENT’S ABILITY, CHARACTERISTICS, AND PERFORMANCE THROUGH THE LENSES OF BOTH GIFTED AND SPECIAL NEEDS.

LCE Model Infrastructure

As research has shown, teachers have a remarkable opportunity to influence their students’ future that can be dependent on how they interact with them (Jong, Tatwijk, Verloop, Veldman, & Wubbels, 2012). Learner-centered teachers have the ability to develop the 2E learner’s talents by planning educational experiences based on questions such as “Who do we serve?” “How should specific curriculum be constructed?” and “What learning services are required to ensure their success?” This attention to who we are teaching will lead to what we are teaching and more importantly how we should teach it.

Putting the focus on the learner allows for an organization of the classroom that can include development of strengths, self-direction, collaboration between peers, self-reflection,
strength-orientated accommodations, enrichment activities, adult modeling, and most importantly, a nurturing environment where individual differences are respected (Weinfeld et al., 2002). To implement a learner-centered model for the 2E student, specific objectives must be met: (1) know your student, (2) plan strength-based instruction, (3) allow the student to take responsibility for his or her learning, (4) continuously assess, and most importantly, (5) maintain an environment free of fear.

Know Your Student

The first strategy I suggest for this type of model takes into consideration specifically who you are serving. In order for teachers to recognize who their twice-exceptional learners are, they need to have some inclination of what to look for. Simply sharing the possible characteristics identified above with the staff could create a higher awareness for those students who may be twice-exceptional, whether officially acknowledged or not. There are several resources online for both educators and parents that outline characteristics, suggested strategies, and more regarding the twice-exceptional learner. Some resources are:

Wright’s Law
http://www.wrightslaw.com/info/2e.index.htm

Council for Exceptional Children (CEC)
http://www.cec.sped.org/

Coordinated Campaign for Learning Disabilities (CCLD)
http://www.aboutld.org/

Learning Disabilities Online
http://www.ldonline.org/

Learning Disabilities Association of America (LDA)
http://www.ldanatl.org/

Plan Strength-Based Instruction

Once the first component has been successfully completed, you should have a good profile of your 2E learner. This is where you will create a curriculum more unique to your learner. Some common deficiencies of the 2E learner can be addressed by counteracting with their strengths. For example, if you have a student that is both ADHD and gifted, you could use advanced organizers that the student creates himself. This not only helps with strengthening focus, but allows the student to take ownership of learning through the ability to be creative. Another example could include a student with dyslexia who is gifted. Students with dyslexia struggle to read, often reading well below grade level. It is a mistake to assume that we can motivate these students to read by staying with books at their level. Usually, the level books they are reading are not in alignment with their cognitive level. Trail (2011) suggested using computers or alternate ways for these students to access literature that is higher level and addresses topics that they may be interested in.

Some strategies that Tomlinson (2000) suggested to support strength-based instruction include:

- Be aware of who your student is.
- Offer activities that focus on the strengths of each student.
- Allow for open-ended responses to establish content knowledge.
- Create tasks that fit the student profile and learning style.
- Provide multi-sensory instruction.
- Utilize guided discovery.
- Afford more choices for the students.
- Offer real-life and hands-on assignments.
- Vary content, process, and product.

Allow the Student to Take Responsibility

The learner-centered approach empowers students to take responsibility of their own education. Expecting students to take control of their learning is not a new concept. Research over the last decade supports the idea that this is an effective strategy to use when helping students succeed (Gonzales & Nelson, 2005). Weinfeld et al. (2006) suggested that once a student is “provided with tools, strategies, and skills for learning” (p. 92) he will be able to become a partner in making decisions about his education.

Several of the same strategies Tomlinson (2000) suggested for strength-based learning can be applied to helping learners become self-directed. Below are some additional things to keep in mind to promote self-directed learning:

- Talk less and allow students to talk more.
- Arrange the classroom in a collaboration-friendly lay out.
- Model learner behaviors such as “self-talk,” open-mindedness, higher level thinking, and reflection.
- Teach students to set goals.
- Allow for reflection after activities.
- Promote student led activities.

Continuously Assess

Coleman (2005) discussed the importance of “dynamic assessment” with students who are twice-exceptional. She suggested that this kind of assessment allows teachers to “check
in” with their students throughout the year. She noted that assessment can answer questions about “what they know,” “what they do not know,” and “where they have misconceptions.” She proposes that practicing ongoing dynamic assessment will allow more time for effective instruction.

Assessment of the twice-exceptional learner can take many different forms, from written tests to observing the child brainstorming about the topic at hand (Winebrenner, 2003). However, no matter what form is practiced, process monitoring can be an effective tool to modify measurable goals or even specific assignments with which the student may be struggling. A variety of assessments help to provide specific information about the 2E learner that could have been initially overlooked. In addition, the educator should use a variety of instructional techniques and tools that will be sure to capture the uniqueness of the 2E learner. For example, the student may create a podcast instead of standing in front of the classroom to do an oral report or may make a model using a scientific concept rather than writing a report to show mastery of an objective. The key to determining what kind of assessment to use goes back again to knowing your students and constantly observing them in the classroom.

Maintain an Environment Free of Fear

Underachievement of the 2E learner is often derived from an environment that doesn’t match the student (Siegle & McCoach, 2005). Creating a school climate that is “safe” and encourages risk taking can be challenging, especially with this population. For example, many twice-exceptional learners are known to have high anxiety concerning failure. They will often refuse to complete an assignment rather than attempting with the possibility of failing (Trail, 2011). This unwillingness to take risks, especially in regard to academics, is a common characteristic in this population.

There are several ways to create an inviting environment for the 2E learner. Some suggestions are (Clifford, 1990; Trail, 2011; Weinfeld et al., 2006):

- Model risk taking and failure.
- Share success stories of those who were also twice-exceptional and/or had some sort of disability, but overcame it.
- Create an environment in which risk-taking is rewarded by encouraging and rewarding students for attempting difficult tasks.
- Decrease the discomfort or pain of failure.
- Recognize the social and emotional needs of students.
- Teach students strategies to cope with stress and frustration.
- Assign a mentor to students.

**SUMMARY**

Baum, Cooper, and Neu (2001) stated that while it may be challenging to educate the 2E learner, success may be accomplished by “providing these students with a curriculum that both accommodates their gifts and talents and simultaneously allows the students to compensate for problematic weaknesses” (p. 477). The benefits and rewards of successfully educating a student who is twice-exceptional are numerous. When examining the positive impact that some of the most famous contributors to our society have had in light of the notion that they were very likely twice-exceptional, one can easily see the important implications of an effective education for this population. People such as Albert Einstein, Steven Spielberg, Winston Churchill, and Pablo Picasso all struggled with learning (Nowak, 2001); however, as 2E blogger Carolyn K. says it, these learners are just “exceptional squared” (Kottmeyer, 2013)!

*My son is now 11 years old and in 5th grade. His teachers adore him because he makes straight As and is quiet; however, he is going to a therapist every other week to deal with the social deficiencies he experiences as a symptom of what I have only hypothesized to be mild Asperger’s syndrome. He is oftentimes sad and thinks everyone hates him. He doesn’t understand figurative language, has no desire to play sports, and needs no interaction with peers to be happy. He is extremely literal and cannot comprehend “off the cuff” remarks or sarcasm. I know my son will be fine, but I believe that the struggles we are facing are something that should have been dealt with in the primary grades. Just like any exceptionality, twice-exceptional students have specific needs and will attain more success with instruction differentiated to address their abilities.*

**REFERENCES**


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What is intelligence?

We are starting something new in TEMPO: a column that focuses on those who are beginners to gifted education. In this column, I hope to touch on several basic issues: familiar ideas, new research, and potential changes taking place in the gifted community. I plan to draw on the topics that I teach in an introduction to gifted education course. If you have specific questions, I would welcome them. Please send questions to me at abatenburg@smu.edu.

The first topic I cover in my course is the definition of giftedness. Historically, how we define giftedness has been the key to identification and services. Whether you like Renzulli’s Three-Ring Conception of Giftedness, Gagné’s Differentiated Model of Giftedness and Talent, Sternberg’s focus on wisdom, or Dabrowski’s Overexcitabilities, we all rely on a particular definition in order to identify our students. In Texas, the State Plan for the Gifted includes our state definition, which states, “gifted and talented students’ means a child or youth who performs at or shows the potential for performing at a remarkably high level of accomplishment when compared to others of the same age, experience, or environment and who: (1) exhibits high performance capability in an intellectual, creative, or artistic area; (2) possesses an unusual capacity for leadership; or (3) excels in a specific academic field.”

There are many overlapping, yet sometimes contradictory, definitions, and each provides us some guidance as we identify our students. (I will return to the usefulness of these various definitions in the next column.) In this first issue, however, I would like to discuss something that lies beneath these definitions: what we believe about intelligence. It all starts with the book Mindset: The New Psychology of Success by Carol Dweck. This book can change fundamentally how you think about praise, what habits you encourage in your children, and how you foster self-esteem and greater self-efficacy. It will make you think twice about the things you say around your children if you are a parent or a teacher. (After I read it as a fifth-grade teacher, I found myself tongue-tied for several weeks! The ways in which I was praising my students needed an overhaul, and I didn’t know what to say at first.) This book will make you think about the messages you send to yourself every minute of every day. It provides direction for reaching perfectionists and gifted children, particularly those who put in little effort. It describes findings from neuroscience and psychology in ways that will help you encourage students of all ages to see their intelligence as something they can improve and develop with effort.

The basic premise of Mindset is that everyone falls into one of two categories: a fixed mindset or a growth mindset. Fixed mindseters believe in natural ability, that you are born
IMPROVES—EVEN GENIUSES. THE WAYS EVERYBODY LEARNS AND MISTAKES, AND TAKING RISKS ARE PRACTICE, LEARNING FROM MISTAKES, AND TAKING RISKS ARE THE WAYS EVERYBODY LEARNS AND IMPROVES—EVEN GENIUSES.

On the other hand, growth mindsetters believe that you can always change your basic ability, whether it is intelligence or talent or anything imaginable. Practice, learning from mistakes, and taking risks are the ways everybody learns and improves—even geniuses. Challenges and feedback (especially constructive criticism) are always welcome, as that is how growth mindsetters view the way to gain the greatest development of skills. This view leads to better interpersonal relationships, a greater sense of being in control of one’s life, and a love of learning. Hard work and dedication are the keys to success in any venture. Success and failure are things that happen in life and do not determine the growth mindsetters’ essential views of themselves: “I have failed, rather than I am a failure.”

The key to which mindset you develop as a child has to do with the level of challenge you receive in school and how you are praised for your performance. Dweck says that we have given excessive praise for tasks that are too easy for children. Gifted children are particularly at risk for this type of situation. Gifted children are often underchallenged in schools. Yet, we say to them, “How smart you are!” when they finish an assignment quickly and with 100% accuracy. This leads them to think that “smart” means “quick and easy and perfect.” When they finally do run into a challenge, they believe they are not smart anymore. Effort, in their eyes, means they are stupid.

I spoke to one of my undergraduate students the other day. She was grade skipped from kindergarten to first grade when she entered school, but was tested at the sixth grade level in math at that time. As a sophomore in college, she is still looking for challenge, even though she started what would seem to be a very difficult engineering program last year. It’s still not challenging enough for her. She has added education to her list of majors, because she doesn’t want other kids to go through what she went through—missed opportunities.

There are a whole host of other personality characteristics that go with mindset, and Dweck has chapters about how both types of mindsets manifest in sports, business, and personal relationships. Fixed mindset people achieve great success, but their examples also paint a picture of a very stressful existence that may lead to short-lived success. Growth mindset people, on the other hand, achieve similar successes, live in a world in which mistakes are welcome, and may sustain their success over the long term in a more healthy way.

Two great examples of the mindsets used throughout the book are drawn from John McEnroe and Michael Jordan. McEnroe, a tennis star from the time he was very young, used to throw incredible temper tantrums if anything went wrong in a match. If he lost, then he blamed the official, his training, the sun, and even one time, his shoes. The losses were never his fault. He once lost a match to his brother, then wished his brother would lose the tournament so that he himself wouldn’t look so bad. To McEnroe, winning was a confirmation of his talent and, therefore, of his self-worth as a human being. He couldn’t lose for reasons internal to himself; it psychically cost him too much.

Jordan, on the other hand, was legendary for his hard work. After every game, after every practice, he shot 100 consecutive free throws before he went home. If he missed the game-winning shot at the end of a game, then he would practice that shot continually until he felt like he got it right. He took a huge risk in trying baseball at one point in his career; he wasn’t any good, but he learned a lot about himself. He was always trying to improve himself on the court and worked harder than anyone else on his team.

At SMU—in the classroom rather than on the court—I require my undergraduates in educational psychology to read Mindset. Many of these young adults are blown away by the ideas presented in the book. One example gives me great hope that mindsets can be changed, and can be changed with just a little awareness. I spoke with one stu-
What the Research Says About

CURRICULUM DELIVERY MODELS

Susan K. Johnsen, Ph.D.,
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Curriculum for gifted and talented students emphasizes advanced content, depth, complexity through abstract concepts, direct study of higher order thinking processes, interdisciplinary themes, and student research that culminates in products for real audiences (Davis, Rimm, & Siegle, 2011). Curriculum needs to be responsive to gifted learners and address their differences through the overlapping dimensions of concepts, issues, and themes: process-product; and advanced content (VanTassel-Baska, 2003). These definitions describe important characteristics that are often associated with exemplary curriculum models in gifted education. Educators need to understand not only these curricular characteristics but also know which curriculum models are effective with gifted and talented learners. They need to apply theoretically- and research-based models of curriculum to ensure specific student outcomes (NAGC, 2010).

To assist educators in selecting research-based models, this review included articles that had been published since 2004 in Gifted Child Today, Gifted Child Quarterly, Journal for the Education of the Gifted, Journal of Advanced Academics, and Roeper Review that focused on the implementation and/or the effects of curricula specifically designed for gifted and talented students. We also included articles that examined the effects of distance learning and Advanced Placement courses since these types of curriculum delivery are frequently used in gifted education. We did not include articles that focused primarily on instructional strategies or activities. Using these criteria, we found 23 articles. Participants in the studies ranged from kindergarten through college-bound seniors with the majority of articles focused on elementary students. Almost half of these studies (48%) involved samples from schools in urban areas and/or students from low socioeconomic backgrounds. One study described a culturally-responsive curriculum (Jones & Hébert, 2012), two were reviews of different curriculum models (Hockett, 2009; VanTassel-Baska & Brown, 2007), four used qualitative methods (Briggs, Reis, & Sullivan, 2008; Hallett & Venegas, 2011; Hertzog, 2005; Kylburg, Hertberg-Davis, & Callahan, 2007), nine used quantitative approaches (Gavin, Casa, Adelson, Carroll, & Sheffield, 2009; Gavin, Casa, Firmender, & Carroll, 2013; Kitano & Lewis, 2007; Little, Feng, VanTassel-Baska, Rogers, & Avery, 2007; Newman, 2005; Pierce, Cassady, Adams, Speirs Neumeister, Dixon, & Cross, 2011; VanTassel-Baska, Bracken, Feng, & Brown, 2009; VanTassel-Baska et al., 2008; Wallace, 2009), and seven used both qualitative and quantitative methods (Azano et al., 2011; Feng, VanTassel-Baska, Quek, Bai, & O’Neill, 2005; Olszewski-Kubilius & Lee, 2004; Peterson & Lorimer, 2011, 2012; Reis & Boeve, 2009; Swanson, 2006). Eight of these studies were also longitudinal occurring over a period of 3–6 years (Feng et al., 2005; Gavin et al., 2009; Little et al., 2007; Peterson & Lorimer, 2011; Pierce et al., 2011; Swanson, 2006; VanTassel-Baska et al., 2008).

The qualities and effects of these specific curriculum delivery models were examined in the studies: Advanced Placement (Kylburg et al., 2007; Olszewski-Kubilius & Lee, 2004; Wallace, 2009); Challenge Leading to Engagement, Achievement, and Results Model (CLEAR; Azano et al., 2011), Ford-Harris Model (Jones & Hébert, 2012); Integrated Curriculum Model (Feng et al., 2005; Hockett, 2009; Little et al., 2007; Swanson, 2006; VanTassel-Baska et al., 2008; VanTassel-Baska et al., 2009); International Baccalaureate (Kylburg et al., 2007); Kaplan’s curriculum framework (Briggs et al., 2008); Multiple Menu Model (Hockett, 2009); Parallel Curriculum Model (Hockett, 2009); Purdue Model (Briggs et al., 2008); Project M² (Gavin et al., 2013); Project M³ (Gavin et al., 2009); Schoolwide Enrichment Model (Briggs et al., 2008); and Talents Unlimited (Newman, 2005). Other studies examined the effects of affective curriculum (Peterson & Lorimer, 2011, 2012), alternative math units (Pierce et al., 2011), reading enrichment and seminars (Kitano & Lewis, 2007; Reis & Boeve, 2009), a writing course (Hallett & Venegas, 2011), and a curriculum designed around projects (Hertzog, 2005).

Twelve of the studies examined achievement gains using different curriculum models with all showing the model’s effectiveness with one or more groups. In several studies the curriculum model was successful with both general education and gifted students. For example, the treatment group who used the Integrated Curriculum Model made significant gains in language arts, science, and social studies when compared to all students who did not use the model (Feng et al., 2005; Little et al., 2007; Swanson, 2006). Significant student improvements included these areas: literary analysis, persuasive writing, grammar, and scientific research skills (Feng et al., 2005); deeper comprehension of measurement and geometry concepts (Gavin et al., 2013); critical thinking, conceptual reasoning, and content learning in social studies (Little et al., 2007); the completion of creative products (Newman, 2005); reading fluency (Reis & Boeve, 2009); and critical
thinking and reading comprehension (VanTassel-Baska et al., 2009).

Some of the models focused on students from poverty and attempted to improve their performance in gifted programs (Briggs et al., 2008; Kitano & Lewis, 2007; Kylburg et al., 2007; Reis & Boeve, 2009) and the likelihood that they might be identified for gifted education services (Briggs et al., 2008; Hertzog, 2005; Swanson, 2006). Hallett and Venegas (2011) noticed that even though more AP courses were being offered in low-income urban high schools, they found that the students’ sense of their own preparation and their performance on AP exams did not indicate quality or preparation for college. On the other hand, when Talent Search students took AP courses with teachers proficient in their respective subject areas in a by-mail or an online format, the majority made 5s and 4s on their AP exams (Olszewski-Kubilius & Lee, 2004).

Attitudes of both teachers and students were examined in the studies as well. Changes in students’ attitudes were noted when they were involved in more challenging curriculum, with students becoming more confident (Reis & Boe, 2009) and interested in course subjects (Wallace, 2009). Teachers’ attitudes and practices were also affected by the implementation of the curriculum models. For example, teachers’ perspectives were altered toward the students and the total classroom environment in Project Approach (Hertzog, 2005). Their comfort and confidence with group work and in discussing social and emotional development improved in delivering an affective curriculum (Peterson & Lorimer, 2012), they noticed the importance of high expectations and a challenging curriculum for improving student achievement (Swanson, 2006), and they enhanced their instructional practices when implementing the Integrated Curriculum Model (VanTassel-Baska et al., 2008).

Researchers often commented on the difficulty of treatment fidelity (i.e., the teachers implementing the protocol model of the curriculum). Azano et al. (2011) found that the teachers’ experiences and beliefs impacted their implementation of the curriculum with teachers changing the curricular model if they believed the concept or skill was easy or too difficult for the students. Similarly, Pierce et al. (2011) reported that teacher intentionality was a significant factor that contributed to the success of the curricular intervention. From several studies, it appeared that a longer time period was helpful in not only implementing the protocol model but also in yielding better increases in achievement and support for the model (Feng et al., 2005; Peterson & Lorimer, 2011). In addition, veteran teachers were more likely to show a consistent and high level of instructional practices when implementing the curriculum model (VanTassel-Baska et al., 2008).

Finally, two reviews provided criteria for evaluating different curriculum models. Hockett (2009) identified these characteristics as indicative of a high-quality curriculum for both general and gifted educators: authentic to the discipline; focused on real problems, processes, and products; personally relevant; integrated; meaningful outcomes; flexible to account for individual differences; and challenging. She found three models in gifted education that met these criteria: the Integrated Curriculum Model, the Multiple Menu Model, and the Parallel Curriculum Model. VanTassel-Baska and Brown (2007) reviewed nine curriculum models and found six that were effective with gifted learners. These six met the majority of the following 12 criteria: research evidence to support use (student learning impact), application to actual curriculum (products in use), quality of curriculum products based on the model, teacher receptivity, teacher training component for use of the model, ease of implementation, evidence of application of model in practice, sustainability, systemic (operational in respect to elements, input, output, interactions, and boundaries), alignment or relationship to national standards, relationship to school-based core curricula, and comprehensiveness.

In reviewing these articles, the good news for gifted and general educators is that we do have curriculum models in gifted education that appear to be effective in raising the achievement not only for gifted students but also for all students. We encourage you to contact the authors for more information regarding the models in this article.

REFERENCES
A sequential mixed-methods design was used in this study in conjunction with the What Works in Gifted Education (WWIGE) study. The Challenge Leading to Engagement, Achievement, and Results (CLEAR) curriculum model was developed. The researchers started with a qualitative component to understand the beliefs and experiences of the participants and whether their adherence to and delivery of the research-based curriculum was impacted. Then, the researchers added a quantitative component to determine the degree to which fidelity of implementation exhibited by the teacher was associated with student assessment outcomes. Fidelity of implementation was described as the degree to which the implementation of the curriculum in the classroom adhered to the protocol model of curriculum and instruction. In this study, interview and observation data were gathered for 55 teachers. Additional quantitative analysis was performed on a subset of 26 teachers, 14 of whom were categorized as low fidelity and 12 as high fidelity. The results of the study indicated that the experiences and beliefs held by the teachers impacted their instructional practices despite all having quality curriculum available. For example, if the teacher expected any struggle with a specific skill or concept in the unit, she would slow the pace of instruction. On the other hand, if the teacher expected that the students would perform well on the skill or concept she would be more apt to follow best practices. Fidelity of instruction and the level of adherence to the facilitators for implementing the curriculum were related to student outcomes.


In this qualitative study, the authors examined methods to increase the participation of culturally, linguistically, and ethnically diverse (CLED) students in gifted education programs. Twenty-five programs were selected and evaluated based on predetermined criteria including written correspondence, informational questionnaires, program documentation, and interviews. Of the 25 programs, 7 were chosen for site visits to investigate the methods used to increase CLED student participation. These seven programs were selected for program design, region of the country, uniqueness of the program, and an increase in CLED student participation. Data sources included questionnaires, document reviews, interviews, observations, program reports, curriculum descriptions, and program handbooks. Based on the data, the researchers developed five axial categories to analyze programs identified as meeting the needs of gifted and potentially gifted CLED students: identification procedures, student preparation prior to identification, curriculum, parent-home connection, and program evaluation. The curriculum changes were broken down into three subcategories: (a) implementation of a continuum of services, (b) adoption of a specific curricular framework, and (c) directly addressing the needs of CLED students. The researchers reported that curricular frameworks were used to guide instruction; specific curriculum models were used such as the Schoolwide Enrichment Model, the Purdue Model, or a differentiation model using Kaplan’s interdisciplinary themes based on depth and complexity; and curriculum methods were adapted to meet the needs of CLED students. These adaptations included helping students make connections between the curriculum, specific program opportunities, and students’ language and culture. Results indicated that these gifted programs increased the participation of CLED students but that the factors were multifaceted and included recognition of the problem, an increased awareness of cultural impact on student academic performance, and the establishment of program supports to help program directors and teachers make changes, which included the curriculum.


The purpose of this mixed-methods longitudinal study was to evaluate the effects of the William and Mary language arts and science curriculum, designed around the Integrated Curriculum Model (ICM), in a northeastern suburban school district. The authors sought to answer two main research questions: (a) To what extent is there evidence of gifted students’ growth as a result of the use of ICM-based curriculum? (b) To what extent is this curriculum meeting the needs of identified students as perceived by relevant stakeholders? The sample consisted of 973 students in grades
Most of the students had been exposed to the William and Mary language arts and science units prior to the start of this study. The language arts units that had been used were *Journeys and Destinations*, *Literary Reflections*, and *Autobiographies*. The previously used science units were *What a Find*, *Electricity City*, and *Acid, Acid Everywhere*. The researchers used performance-based assessments, such as The Diet Cola Test, to evaluate student learning. Other instruments included student surveys, which measured student perceptions and perceived cognitive and affective growth. Additionally, there were 732 students, 110 educators, and 367 parents who comprised the stakeholder groups and returned surveys regarding their views about the curriculum. These surveys collected information regarding staff development, personnel qualifications, communication concerns, curriculum implementation, and curriculum satisfaction. Along with the surveys, focus groups were created to gain more information about the stakeholders’ views of the curriculum. The data were analyzed using both qualitative and quantitative strategies. The findings suggested that student learning had been enhanced by the curriculum, both at the time of the curriculum delivery and over the full 6-year period. Student growth was determined to be statistically significant in literary analysis, persuasive writing, grammar, and scientific research skills. The effect size ranged from .52 to 1.38, and the overall academic growth increased in all of the assessed domains. The results also suggested that repeated usage of the William and Mary units yielded an increase in achievement in the areas of literary analysis, persuasive writing, grammar, and scientific research skills. The challenging nature of the curriculum, the organization, the scope and sequence, and the opportunities for peer communication were cited as the most beneficial across stakeholder groups. The authors proposed that their study be used as a model for school districts in monitoring student progress over time.

### Teachers should hold all learners to high expectations and develop their critical thinking to become socially active members of the society.


This quasi-experimental design study focused on determining the efficacy of Project M3 units by looking at the gain in students’ mathematical achievement. Project M3 consists of 12 units addressing important mathematical ideas from one of the NCTM content strands and are designed primarily for students in grades 3, 4 and 5. The study included third- and fourth-grade students in 11 schools from Connecticut and Kentucky. All student participants were identified as gifted following the NCTM definition. Experimental Group 1 included 193 gifted students who were identified the first year and Experimental Group 2 included 177 gifted students who were identified the second year. The comparison group included 211 gifted students. All teacher participants attended a 2-week professional development summer institute. They learned about the philosophy, teaching strategies, and content of the units. Students were assessed using the Concepts and Estimation Test of the Iowa Tests of Basic Skills (ITBS) and on open-response questions. Results of the study showed positive gain in student mathematical achievement. Students in the experimental group showed significant gains on the standardized test as well as the open-response questions. The authors suggest that concept-based curriculum units such as the Project M3 contribute to better mathematical achievement.


This study reported achievement results for first-grade students at 12 different sites using curriculum from the Project M3. Project M3 involved creating and testing challenging measurement and geometry units for K–2 students. The two research questions examined the increases in mathematics achievement after exposure to Project M3 units and differences between students exposed to Project M3 units and those not exposed to the curriculum. Mathematics achievement was measured by the Iowa Tests of Basic Skills (ITBS) mathematics subtest and an open-response assessment. There were 186 students in the intervention group and 174 students in the comparison group. No significant differences were found on the ITBS between the two groups; however, significant differences were discovered on the open-response assessment favoring the experimental group. Thus, the researchers concluded that students from the experimental group performed as well as their peers on the traditional method of assessment but showed deeper comprehension of measurement and geometry concepts.
The authors were interested in the connection between increased access and academic quality of Advanced Placement courses in low-income urban high schools. Participants included 48 college-bound students who participated in a summer writing program that prepared them for selective and highly-selective colleges and universities. All of the students met federal requirements for the Free/Reduced Lunch Program and more than 60% were female. The authors conducted a semi-structured 30-minute interview with each student as well as informal observations during the 5-week summer bridge program. The constant comparative method enabled data to be collected and analyzed simultaneously. They found that although more opportunities to take AP courses exist than in previous years, students' sense of their own preparation and their performance on AP exams did not indicate quality or preparation for college.


This qualitative case study examined the implementation of the Project Approach in a K–5 school where approximately 90% of the students received free or reduced lunch. The Project Approach includes inquiry-based activities such as brainstorming, webbing, field studies, and class discussions. Out of a staff of 15 teachers, one music and two kindergarten teachers gave the researcher permission to observe and document the implementation of the Project Approach. Data were collected from interviews with teachers and administrators, observations of students, field notes from whole-staff meetings, project-based learning meetings and workshops, and other public forums where the initiatives were discussed. The instructional changes altered the teachers’ perspectives of their students (e.g., greater engagement, enthusiasm, understanding of concepts) and their total classroom environment (e.g., climate in school, classroom literacy environments). Implementation barriers included time and compatibility.


This review synthesis provided guidelines from general and gifted education regarding high-quality curriculum, evaluated three gifted education curriculum models using these guidelines, and offered suggestions for how general education and gifted education can create curricular conditions conducive to educating highly able learners. The author suggested that general educators and gifted educators view these characteristics as indicative of high-quality curriculum: authentic to the discipline; focused on real problems, processes, and products; personally relevant; integrated; meaningful outcomes; flexible to account for individual differences; and challenging. She reported that three models in gifted education—the Integrated Curriculum Model, the Multiple Menu Model, and the Parallel Curriculum Model—would be able to contribute to general education curriculum design and address the needs of highly able learners with most of the effectiveness research conducted with the Integrated Curriculum Model. The author concluded that general educators need to be explicit about what challenge is and what it looks like in the curriculum, emphasize teacher content knowledge/training in the discipline as requisite to teaching all students, and distinguish standards from the curriculum. Gifted educators need to provide clarity about which attributes of high-quality curriculum are specific only to highly able learners, promote research-based approaches, and demonstrate the effectiveness of curricular units for use with a variety of gifted learners and all learners.


In this article, the authors started with a scenario representing the importance of focusing on the strengths and talents of gifted students through culturally responsive classrooms. They then described the need to create classroom environments in which teaching methods are sensitive to students’ needs and diversity. Teachers should hold all learners to high expectations and develop their critical thinking to become socially active members of society. To meet the needs of diverse gifted students, Ford and Harris developed a curriculum model. The authors explained how the model offers teachers a framework for delivering culturally responsive curriculum. This model can be used to develop understanding in social science education to provide students with an enriched intellectually challenging experience of the U.S. history. To engage diverse gifted students in the immigration experience of the U.S., the authors identified and discussed seven different teaching strategies: photojournalism, ethnographic research or infusing of multicultural literature and poetry, service learning, role playing, examining primary documents, and discussion. Finally, they related these instructional strategies to the traits, characteristics, and needs of gifted students.

Kitano, M. K., & Lewis, R. B. (2007). Examining the relationships...
between reading achievement and tutoring duration and content for gifted culturally and linguistically diverse students from low-income backgrounds. *Journal for the Education of the Gifted, 30*, 295–325.

This study investigated the effects of a tutoring intervention incorporating literature-supported features on the reading achievement of gifted students from low-income backgrounds. The program focused on gifted children from very low-income families in grades 4–5. Gifted students who were on free or reduced-price lunch were identified using the Raven Progressive Matrices, scoring between the 99.6th and 99.8th percentile. A total of 57 children (34 males and 23 females, 12 of whom were English learners) were enrolled in the reading seminars, which consisted of teaching six basic comprehension strategies (making connections, questioning, visualizing and imagining, inferring, determining importance, synthesizing) within increasingly levels of complexity. Students received an average of 65 hours of tutoring during the academic year, of which 43 were focused on decoding and reading comprehension. Results indicated that the participating students showed significant gains over one academic year in reading on both the state standardized test and on a classroom fluency measure.


This qualitative study investigated ways in which teacher and administrator behavior and the school environment contributed to the successes or frustrations of minority students in AP and IB courses. Three urban high schools located in high-poverty areas from two Mid-Atlantic states were selected. Researchers visited each school at least twice during the course of an academic year. During each visit, the researchers observed participating teachers’ classrooms, interviewed 43 participating teachers, 4 counselors, 43 teachers, and 75 students. Interactions among superintendent, central office, building administrator, and teacher-student classroom levels dynamically influenced one another and the classroom environment. Inhibitors to involvement in AP or IB included major assignments due at the same time, inappropriate level of curricular challenge, and variation in culturally-sensitive teaching and lack of support for learners deficient in cultural capital. “Two key factors seemed to be integral to creating environments that nurture the growth of academic talent among students of diverse backgrounds: (a) a pervasive and consistent belief that these students could succeed, which resulted in instructional and group support; and (b) scaffolding to support and challenge able students (e.g., extracurricular help, lunchtime discussion forms, subsidized college visits). Teachers found ways to flexibly tailor their support and expectations to individual student needs in terms of product and performance expectations and the kind of help that was provided” (p. 173).


The purpose of this 3-year quasi-experimental study was to explore the effects of a social studies curriculum...
The affective curriculum was designed to improve critical thinking skills and creative productivity within the classroom. With this purpose in mind, the researchers selected 147 students in grades 3–6 to participate in Type II enrichment programs in their schools. Type II programs teach higher level thinking skills and procedural knowledge. Sites in Alabama were selected according to socioeconomic status, curriculum, and staff education opportunities. Both the treatment group and the control group, consisting of 59 students and 45 students respectively, were required to complete 27 products during the study. Five teachers, who were trained in the TU model, taught 10 sets of TU lessons that focused on interest finding, record keeping, identifying a problem, researching, developing a real-world product, presenting, and evaluating. Teachers assigned to the control groups also encouraged students to develop sophisticated products using the Schoolwide Enrichment Model (SEM), an alternative model of promoting creative productivity. Using a chi-square analysis, the researchers compared the completion rates of the treatment and control groups.

Analysis of Variance (ANOVA) and the Student Product Assessment Form (SPAF) determined the variance and quality of the products. To accumulate qualitative data, the researchers used open-ended questionnaires, which were analyzed by tallying predetermined responses and categorizing common themes. Results indicate that the Talents Unlimited lessons had a positive effect in reducing the number of students who did not complete their creative products. While all of the students in the experimental group finished their Type III products, 21% of students in the control group did not. Ninety percent of the treatment students responded positively to being able to identify an interest area to study, 93% of them reported improvement in focusing on a topic, and 90% reported they were better at identifying a problem related to their chosen topic. Mean scores for the quality of experimental students products were significantly higher than the products from the students in the control group.


This program, LearningLinks, provided honors-level and Advanced Placement courses through distance learning to 186 gifted students in grades 6–12. All of the students were identified through the Talent Search process. The authors investigated how the students used the program, the receptivity of school districts of the program’s scores, and its effects on the students’ subsequent performance on AP exams. Teachers proficient in their respective subject areas provided courses in either a by-mail or an online format. Survey results indicated that the students were satisfied with the quality of communications with the instructors but were dissatisfied with the lack of face-to-face interactions. About half of the students received high school credit for the course while 20% said that their schools would not give them credit despite their requests. About one third of the students who received credit had their grades factored into their GPAs. The majority of the students made 5s and 4s on the AP exams. One major problem for half of the students was that no further courses were available in the same subject matter at their home schools.


This 5-year longitudinal study explored small-group affective curriculum and the responses from the gifted students. The affective curriculum was designed...
to aid in the development of the students’ social/emotional growth. The curriculum included approximately 100 topics over the five-year period and included discussions on feelings, stereotypes, stress, values, change, ethical and moral issues, kindness, bullying, and resilience. The focus in this study was on perspectives from the students (see Peterson & Lorimer, 2012 in this article for teacher-facilitators’ perspectives). There were approximately 260 fifth- through eighth-grade gifted students that participated in the study. The response to the weekly small-group discussions on social and emotional development changed over time. Initially the students showed resistance to the discussions but became more receptive over time. The results highlight the fact that the perceived effectiveness of the program may not be a quick process but rather occur slowly over time. Students in grade 5 were most receptive to the affective curriculum. Students in grades 5 and 6 noted that the curriculum had an overall positive effect on the school. Of additional importance was explaining the purpose of the program to the students, providing adequate training for those facilitating the groups, finding time for the meetings that would not eliminate choice activities for students, and choosing appropriate discussion topics.


In this mixed-methods longitudinal study, the researchers examined the implementation of a small-group affective curriculum. Five main questions explored the comfort and confidence of the teachers over time, the perceptions of student skill development, and the perceived impact of the group program. The focus in this study was on perspectives from the teacher-facilitators (see Peterson & Lorimer, 2011, in this article for student perspectives). The gifted students were comprised of 150–155 fifth through eighth graders in a private, nonsectarian, coeducational school for gifted children. Over the course of the 5-year study, teacher-facilitators’ perceptions of the need for an affective curriculum positively changed. Additionally, the perceived impact on the school and the teacher-facilitators’ comfort and confidence with group work and in discussing social and emotional development were positively impacted. Some of the positive changes were only experienced after the first full year of implementation. Implementation strategies and logistical challenges may help those who are looking to use an affective curriculum with gifted students. Facilitator comments within the qualitative component of the study may offer direction for program coordinators and others that may be a part of the program implementation.


This study examined the effects of three math replacement units on third-grade students’ math achievement. The curriculum focused on algebra and geometry. Participants were students assigned to third-grade cluster teachers’ classrooms in a large urban district. The authors found that curriculum, grouping practices, and teacher intentionality were all significant factors that contributed to the success of the curricular intervention. All students who were in classrooms that implemented the curriculum experienced gains. The authors concluded that teachers can promote academic gains over time for gifted and comparison students when the curriculum is designed to support learning at varied ability levels.

The authors found that curriculum, grouping practices, and teacher intentionality were all significant factors that contributed to the success of the curricular intervention.


In this mixed-methods study, the researchers collected quantitative and qualitative data to determine how gifted students in an urban elementary school responded to an after-school enrichment reading program. The goal of the 6-week project was to encourage multicultural, gifted students to read material that was at their instructional level with the help of trained teachers. Based on the Schoolwide Enrichment Model—Reading Framework (SEM-R), the lessons included three categories of effective reading instruction: (a) exposure to areas of interest, (b) training and methods instruction, and (c) opportunities to pursue areas of interest. The researchers selected five gifted students with a talent in reading to participate in the SEM-R after-school program. Over the course of three implementation phases, the students
participated in structured read-alouds, silent reading of high interest books, discussion groups, and self-choice activities. Each phase was created to help students develop automaticity in reading through differentiated reading strategies. The Elementary Reading Attitude Survey (ERAS), oral reading fluency assessments, the Scales for Rating the Behavioral Characteristics of Superior Students—Reading (SRBCSS-R), the Reading Interest-a-Lyzer questions, and case study methods were used to gather qualitative and quantitative data. The results show that students made significant gains in reading fluency and were increasingly more confident in reading books at their instructional levels. Based on their findings, the researchers composed a list of strategies that encouraged the students to read challenging books. Allowing students to pursue topics of interest was perhaps the most discussed strategy, followed by promoting book ownership.


This article describes Project Breakthrough, a demonstration project designed to challenge assumptions and attitudes of teachers in high-poverty, high-minority schools. Project staff worked for 3 years with three South Carolina elementary schools training teachers in the use of The College of William and Mary language arts and science curriculum units with all of their students. This mixed-methods study examined achievement scores, observations, teacher logs, questionnaires, and interviews. Results indicated an increase in students identified as gifted (i.e., four additional students were identified as gifted), student achievement increased in two schools that consistently gathered and reported test data, and many teachers demonstrated attitudinal shifts with some seeking national certification. Teachers increased their understanding of how to provide a rigorous curriculum for their classes and noticed how challenge, rigor, high standards, and expectations are critical to improved student achievement.


To measure gains in reading comprehension and critical thinking in Title I schools, the researchers conducted a longitudinal study of William and Mary language arts units over a 3-year period. Using six different school districts, 2,771 students in grades 3–5 participated in the study. Represented districts included urban, rural, and exurban. An average of 74 teachers per year were also included in the sample, with 38 teachers implementing treatment and 36 providing control classrooms. Treatment and control classrooms were created in all but one of the 11 sites. Four pretest instruments (the CogAT, the UNIT, the ITBS, and the TCT) were administered to the entire student sample prior to unit implementation. At the end of the intervention period, the ITBS Reading Comprehension subtest and the TCT were used to evaluate reading gains. Students in the treatment group completed measures of literary analysis and persuasive writing pre- and post-intervention. To monitor treatment fidelity and teacher practices, the researchers used the Classroom Observation Scale—Revised (COS–R). After pretesting, teachers of treatment groups systematically taught 24 William and Mary language arts lessons, designed for high-ability learners, over the course of 6–8 weeks. Teachers of control groups continued to use the district-selected curriculum, which in most cases was the Reading First Program. The results indicated that both the treatment and control groups made statistically significant gains in critical thinking. Although the differences between the two groups were not overwhelming, the scores favored the treatment group.


This article reviewed nine program/curriculum models in the field of gifted education. All nine models are K–12 applicable, transferable, and usable in all content areas; applicable across schools and grouping settings; incorporate differentiated features for gifted/talented learners; and serve as framework for curriculum design and development. Each of the models was discussed according to 15 criteria focusing on the effectiveness of students learning, teachers’ use, and relation to the context. The article considered Stanley’s Model of Talent Identification and Development and Renzulli’s Schoolwide Enrichment Triad Model since these two models have strong longevity research evidence. Based on the analysis of the nine models, six showed evidence of effectiveness with gifted learners: The Purdue Three-Stage Enrichment Model for Elementary Gifted Learners, Renzulli’s Schoolwide Enrichment Triad Model, Schlichter’s Models for Talents Unlimited Inc., Stanley’s
Model of Talent Identification and Development, Sternberg’s Triarchic Componential Model, and VanTassel-Baska’s Integrated Curriculum Model. The analysis of the models also highlighted the importance of grouping gifted students instructionally by subject area for advanced curriculum work. All models focused on inquiry as the central strategy and noted the importance of using student-centered learning opportunities. The remainder of the article discussed the structures supporting and impeding the implementation of differentiated curriculum for gifted students in a variety of settings. Strong professional development programs and fiscal support for curriculum were identified among the supporting factors. The article concluded with a description of three districts effectively implementing the Integrated Curriculum Model.


This quantitative study examined Title I heterogeneous classroom teachers’ instructional behavior change over a period of 3 years. Participants were 71 teachers from grades 3, 4, and 5 who implemented a research-based curriculum unit, the Integrated Curriculum Model. The experimental group had 34 teachers who attended regular professional development activities. Teacher attrition occurred at the end of each year due to high turnover rate in Title 1 schools. For the experimental group, teachers who participated the whole 3 years were considered veteran teachers, and non-veteran teachers participated 1 or 2 years. Teachers’ instructional practice and student engagement were assessed using the Classroom Observation Scale–Revised (COS–R) and the Student Observation Scale. The results of the study showed that teachers in the experimental group obtained higher ratings than comparison teacher on all behavioral categories of the scale (i.e., curriculum planning and delivery, accommodation for individual differences, problem-solving strategies, research strategies, creative thinking strategies, and critical thinking strategies). In addition, among teachers in the experimental group, veteran teachers demonstrated higher improvement of instructional behavior than non-veteran teachers. By the third year, veteran teachers showed a consistent and high level of instructional practices. The authors of the study highlighted the importance of monitoring and professional development especially over multiple consecutive years.


In this study, the author studied the effectiveness of distance learning for gifted students. Participants were 690 students ages 5 to 17 who were enrolled in the Johns Hopkins University Center for Talented Youth distance education program and who submitted online course evaluation forms. The students had all taken one of 54 different courses in math, writing, science, language arts, computer science, and Advanced Placement. The courses were all led by instructors who interacted with the students using e-mail, interactive whiteboard, online discussion forums and virtual classrooms, and telephone. Using descriptive statistics, the authors reported that the majority of the students enrolled because they hoped to use the course as a prerequisite for other CTY courses, hoped to get credit/placement, or had no specific plans. The majority of the students also were very or somewhat interested in the subject before taking the course, felt that the course was just about the right length, and was demanding but appropriate for them. Overall, three fourths of the students enjoyed the course and were satisfied with the academic experience. The majority of the students also reported that they were more interested in the subject after they took the course. The authors concluded that distance education can be an effective approach to accelerate or enrich the academic opportunities available to gifted students in grades K–12. They felt that more research was needed to explore individual differences and identify students who possess the level of readiness to thrive in a distance learning environment in terms of their capacities for time management, technological literacy, writing skills, and even keyboard skills.

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emotional adjustment of adolescent girls enrolled in a residential acceleration program.” Gifted Child Quarterly, 35, 67–70.


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Micheal Sayler, Ph.D., has worked in gifted education for the past 30 years and is currently the Senior Associate Dean in the College of Education at the University of North Texas. Dr. Sayler studies the components of what it takes for life-long thriving for gifted. He also specializes in successful parenting of gifted children and youth, early college entrance and other forms of acceleration and grouping, program planning and evaluation, identifying students, grouping arrangements, and measurement and research.

Russ Stukel is currently the Director of Student Life with the Texas Academy of Mathematics and Science (TAMS) at the University of North Texas. He has over 20 years of service working with this population of students and over 30 years of experience working in residence life on a university campus. Russ specializes in developing successful residential programs for specialized schools. He has served as a national consultant with multiple residential schools that also serve the talented and gifted student population.

**GIFTED 101: WHAT IS INTELLIGENCE?**

Continued from page 30

Student recently who was greatly affected by reading the book. It was week 3 of classes, and she was a bit behind; she had missed one quiz. She told me that normally she would have dropped the class at that point, thinking there was no way to catch up, and she would fail the class. This fixed mindsetter made a different decision this time. She had missed one quiz, and participating in two class discussions about it, this student made a different decision.

It’s not easy to change your mindset. I am a former gifted kid who experienced a lot of great enrichment activities in school but never much challenge. I am a recovering perfectionist, a fixed mindsetter, and though I read this book more than 10 years ago, I still struggle. The fixed mindset remains my default setting. However, I am better able to argue with that mindset now, better able to give myself the kind of encouragement and praise that reflects a growth mindset, and better able to set realistic goals for improvement. Reading this book made me a better teacher for my students and a more centered individual. I highly recommend it.

Ann Batenburg, Ph.D., serves as a clinical assistant professor in the Simmons School of Education and Human Development. Dr. Batenburg earned her doctorate in teaching and learning with a focus in gifted education from the University of Iowa in 2011. She also holds two master’s degrees: one in special education from Northern Illinois University in DeKalb, IL, and one in teacher leadership from North Park College in Chicago. She teaches a variety of undergraduate and graduate teacher education courses with a focus on gifted education. Dr. Batenburg has several years of elementary teaching experience in the Chicago area. She taught fifth grade for 9 years and students with special needs for 5 years. At the college level, she has taught undergraduate and graduate courses at the University of Iowa, Cornell College, University of North Carolina at Charlotte, and Salem College. Her passion is working with children who are gifted and talented, as they are often the children who are left without services in our schools. Her research interests center on examining factors that contribute to talent development, other issues in the education of the gifted, and constructivist philosophy and teaching methods.
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Please keep in mind the following when submitting manuscripts:
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