

Challenges of Returning to the Post-Pandemic Classroom

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Imagine being a young, curious child sent home from school on a Friday in March, blissfully unaware that you would not be able to go back to school again for an entire year. Why can't you go back to school? What happened to your teacher? What about your friends? What happened to everything you left inside your desk? The images flashing on the TV news and the reporters' words confuse and concern you. You see that people in your community are very sick and dying. You can't visit your grandparents or cousins because everyone is home under quarantine orders. You see images of exhausted healthcare workers and hear your parents talking about losing their jobs. The world feels precarious, unsafe, scary, and confusing.

As we all know, this is the reality that our students have lived through during the unprecedented challenges and events of 2020 and 2021. Our students have experienced the uncertainties of the pandemic lockdown, social isolation, distance learning, hybrid learning, socially distanced classrooms, social injustice protests, political unrest, and financial stress. Gifted students can be especially vulnerable to the stress of this uncertainty. So how do we as educators help our gifted learners?

Before we answer this question, let's take a moment to explore the concept of traumatic stress and what it means to find

ways to help our students cope and heal from the trauma they have experienced. The National Child Traumatic Stress Network (NCTSN) (2003) explained, "From a psychological perspective, trauma occurs when a child experiences an intense event that threatens or causes harm to his or her emotional and physical well-being." This pandemic created varying degrees of stress for our students. Students experienced the fear of a virus they couldn't see; were suddenly taken out of the structure and routine of their school day; lost social connection with their peers; may have experienced parents losing jobs; and may have experienced a loved one sick with the virus. This uncertainty created stress that many children had a difficult time coping with. "Although many of us may experience reactions to stress from time to time, when a child is experiencing child traumatic stress, these reactions interfere with his or her daily life and ability to function and interact with others." (NCTSN, 2003)

For many gifted students, traumatic stress can be exacerbated by their ability to think and reason at a level much higher than their same-age peers. In addition, gifted children also often dive deep into topics that most children in their peer group

continued on page 14

FEATURE ARTICLES

Cover: An emotional return.

Page 6: Arguing for Math's sake.

Page 12: One student's remarkable journey.

Page 18: Out of this world interview.



Page 18



INSIDE THIS ISSUE

- From the Editor.....2
- Curriculum Café3
- Special Populations.....4
- Taking the Creative Leap.....10
- Social and Emotional Learning.....11
- Buried Under Books.....16
- Socially Scientific19



Communication and Collaboration

As I sat down to read the contents of this issue, I couldn't ignore two terms that jumped out at me in just about every piece, either directly stated or inherently present, communication and collaboration. The two C's. And it makes sense. The ways in which educators communicate throughout the school day are as varied as the students we teach. During engagement in class, we read aloud and lecture, offer encouragement through written and oral assessment, and engage in one-on-one discussions. We want the same for our students. We encourage them to not only speak to each other, respecting different points of view, but to speak to us, letting us know what they need and how they feel. An open line of communication, free of judgment, offers a setting and climate that is comfortable and safe. It is a skill, that once mastered, presents a lifetime of opportunity.

Collaboration with colleagues can happen during productive meetings or casual conversation, where clarification, supportive advice, curricular planning, and a focus on the strengths of the faculty are at the forefront. Educators must work together to create an environment where student engagement, learning, and success are the top priority. And again, we want the same for our students. We want them to work together to solve problems, with each student offering his or her talents to the larger group. We demonstrate that the process of problem solving often involves collaboration with others and that individual success is often dependent on how well members of a group communicate with each other. Open communication and effective collaboration lead to achievement. Let us look at the contents of the issue, where you are certain to find the two C's.

Tiphany Kane's *Challenges of Returning to the Post-Pandemic Classroom* opens the issue with an urgent plea for educators to establish and integrate social-emotional learning practices into classroom instruction. *Doc, I Want to Study the Pentagon Scandal*, by Willard White, takes us on a remarkable journey of identification and service for one student that made all the differ-

ence. *Making Things Write: Supporting Mathematically Promising Students*, by Tutita Casa, makes the case for providing students the opportunity to develop communication and reasoning skills, using mathematical arguments as the starting off point. Bobby Belden and Brad Brandvold finish up our features with an interview about the Near Space Program and its benefits in *Soaring High, Diving Deep*. In this last installment of *Curriculum Café*, Elissa Brown discusses four research-based ways to appropriately differentiate content. *Taking the Creative Leap* presents Dr. Mary Frasier's Traits, Aptitudes and Behaviors (TABs) identification instrument, designed to aid in creating talent development opportunities for students from diverse populations. *Socially Scientific* tells us that students need opportunities to experience science collaboratively, with communication at the forefront. *Buried Under Books* introduces the idea of altered books, where discarded volumes can be used to create art and deliver ideas in any content area. *Special Populations* is all about supporting students from culturally diverse backgrounds during catastrophic times, discussing the importance of instilling resilience. *Social and Emotional Learning* reminds us that in this unprecedented time, the social-emotional well-being of our talented students should be a top priority and the process of Videotherapy might offer a solution.

The two C's are skills that resonate throughout every discipline, over every subject area, and are not limited to the classroom. Success in education, and in life, begins with communication and is realized through collaboration. No one individual can do it alone. The earlier we can introduce these skills to our students, the better.

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Differentiating Curriculum for Gifted Learners

Curriculum for gifted learners requires adaptations from the typical grade level content to address their cognitive and affective characteristics. Curricular adaptations should occur regardless of the grouping model and the type of giftedness. A teacher who differentiates effectively is balancing differentiation across the dimensions of content, instruction, and product. Figure 1 (below) provides a differentiation features template for educators. The efficacy of curriculum models employed in gifted education rest on the defining aspects of these features (VanTassel-Baska & Brown, 2007). In the differentiation features framework, there are four research-based ways to differentiate content. Under each feature are aspects that define the feature further. The differentiation features framework can be used to ensure that curriculum content is sufficiently differentiated and responsive to the needs of gifted learners.

The feature of acceleration in terms of curriculum could be employed in a variety of ways. For example, using a pre-assessment to determine the level of previous acquired content (in order not to repeat) is one way to differentiate the content. Another accelerative approach is speeding up the process for learning, if students demonstrate a readiness for the content area, or teaching the unit of study in a shorter amount of time (e.g., covering a 6 week unit in 4 weeks), thus compacting it. For secondary gifted students, using above grade level content (e.g., Advanced Placement) or sophisticated primary source documents accelerates the content knowledge.

The feature of complexity is when teachers add layers of challenge to a task. It can involve adding more variables to study, such as when a student is creating a book report or a presentation and the teacher adds complexity (more variables to include) to the assignment. Another way to add complexity is to engage students in challenging tasks that require higher levels of Revised Blooms Taxonomy (Krathwohl, 2002) simultaneously; thus students are synthesizing, evaluating and creating within a task demand.

The feature of depth involves focusing on a particular task, topic, or concept that requires study to fully understand it at a “deeper” level resulting in product creation. If stu-

dents are asked to consider multiple perspectives about a historical event and then create a product including those perspectives, that’s adding depth. Framing a unit of study around a conceptual question, such as *Is war necessary?* adds depth to student understanding.

Creativity as a differentiation feature should always be a component of differentiating curriculum. It allows students to work within the bounds of a structure or a given set of criteria but, with open ended access, opportunities and pathways. Projects derived from subject areas should try to reflect real-world connection to careers associated with them (VanTassel-Baska & Baska, 2019).

Uses for the differentiation framework are many. Educators can use it to analyze lesson plans and current approaches to determine target areas to differentiate. It can be used as a planning framework, when planning out a unit of study to ensure that aspects of it are differentiated appropriately for gifted learners. It can be used as a communication device with parents and administrators and finally it can be used overall as a strategic way to differentiate “up” content standards. **THP**

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Figure 1. Differentiation Features

| Features | Acceleration | Complexity | Depth | Creativity |
|-------------------------|--|---|---|--|
| Defining aspects | <ul style="list-style-type: none"> ✓ Fewer tasks assigned to master standard ✓ Assessed earlier or prior to teaching ✓ Clustered by higher order thinking skills ✓ Advanced resources employed ✓ Sophisticated content used | <ul style="list-style-type: none"> ✓ Used multiple higher level skills ✓ Added more variables to study ✓ Required multiple resources | <ul style="list-style-type: none"> ✓ Studied a concept in multiple applications ✓ Conducted original research ✓ Developed a product ✓ Cross-disciplinary applications made ✓ Reasoning made explicit | <ul style="list-style-type: none"> ✓ Designed/constructed a model based on principles or criteria ✓ Provided alternatives for tasks, products, & assessments ✓ Emphasized oral & written communication to real world audience |

Anxiety and the Social Emotional Needs of Minoritized Gifted Students

With the start of the 2021-2022 academic year and increasing COVID-19 cases including the Delta variant, school officials had to prioritize the physical health and safety of students to meet the physiological and emotional toll the past several months have placed on students, families, local communities, and our nation. Racially, culturally, ethnically, and linguistically different (RCELD) students have historically had quantitatively different experiences in gifted programs based on issues of underrepresentation, misconceptions about their potential and performance, and factors steeped in deficit thinking (Floyd, 2021; Trotman Scott & Moss-Bouldin, 2014), and therefore, require additional attention. Educators must keep all students at the heart of every decision they make, including circumstances affecting the mental and social/emotional state of each student. In this article, we discuss ways educators and school leaders can better support RCELD students during catastrophic times and how resilience plays a part in improving the social-emotional needs of gifted students from culturally diverse backgrounds.

The “New Normal”

Readjusting to life following the past several months will be difficult for students from diverse backgrounds. From digital access issues and wi-fi/internet lapses, to having absent parents who serve as essential workers, or experiencing parents’ loss of employment, it is safe to say the “new normal” is far from normal. What has become normal for most are extreme social distance practices, mask wearing, and virtually hosted lessons, family reunions, and birthday parties. Students and their families have been forced to learn a new way of performing the most basic functions from a distance. This distant existence has challenged many highly sensitive gifted students’ abilities to remain calm and confident during their interactions with others during an unprecedented global health crisis, while also forcing them to manage their emotions without their traditional coping mechanisms.

School leaders must encourage teachers to redefine the new normal for their diverse gifted students by first listening to, then amplifying, their students’ voices so they feel empowered to face new challenges. Lynch and Lemaire (2020) suggested that educators make time for conversations with students about how they feel during the isolation and restrictions borne out of the COVID-19 pandemic. Educators must guide gifted students in restoring their health, strength, and feelings of well-being when they are struggling on their own to do so. Topics such as mask wearing, quarantine, lack of academic support, loss of family members and basic needs,

and general fears caused by the novel coronavirus are all topics that gifted students need support navigating.

The Role of Family Pre- and Post-Pandemic

Prior to the COVID-19 pandemic, students and families functioned in myriad ways, but were accustomed to traveling, outdoor play, swimming, reunions, parties, and other gatherings without strict social distancing restrictions. Unfortunately, the pandemic put a halt to these activities. Students experienced significant loss of family, friends, and physical access to the world outside of their households. Further, the pandemic caused frustration and created havoc for gifted students, especially from culturally diverse backgrounds with limited access to technology, creative outlets, and who were already challenged with a lack of resources and enrichment in their communities (Floyd, 2021).

Where possible, educators should provide outlets for RCELD gifted students by including family and community members in school activities. Providing “family engagement” classroom time for students to host virtual meetings with physically distant parent-approved relatives, who are existing members of the student’s support circle, is such an outlet. This activity helps minimize the stress students feel when navigating the post-pandemic era. Communicating regularly with parents and guardians and assisting them with at-home resources are all great ways culturally responsive gifted educators keep a family and community connected with school (Roberson, 2021). Additionally, having regular chats with parents, especially to discuss what is going well, rather than making contact only when there are concerns, helps teachers ease the burden families and students face as they transition to regular routines at home and school.

The Teacher’s Role

Teachers have become essential workers for students by connecting with them on a more emotional level simply because of the circumstances they co-shared in their respective learning spaces during the pandemic. Students leaned on these newly framed relationships, trusting in new ways while forming bonds to survive the school year together. As this year progresses, teachers and school leaders must not refrain from embracing and revisiting their essential roles. The connections will have a lasting impact on students’ abilities to face challenges and respond with courage and tenacity despite what they have experienced over the past several months.

Collaboration with the School Counseling Division

A vital source of support is the district’s counseling de-

partment. Students benefit from available services to maintain strong and healthy relationships with peers, family members, and educators. District leaders must ensure that members of the counseling department participate in culturally relevant (Ladson-Billings, 2014) professional learning experiences to guarantee the services provided are appropriate and adequate for the diverse students receiving them. Area agencies can assist with providing students with resources, services, and strategies for confronting anxiety or fear. School leaders must get to know the individual needs of each student and work diligently to provide them in concert with parents and caregivers.

While this has been an extremely challenging period for everyone, the post-pandemic period will not prevent our return to a healthy or happy way of life. However, we must all do our part to provide RCELD gifted students with the tools and support to successfully do so. **THP**

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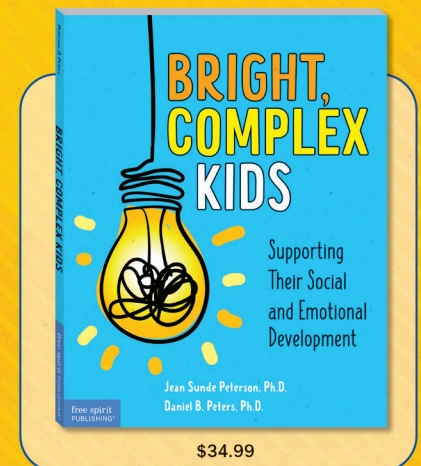
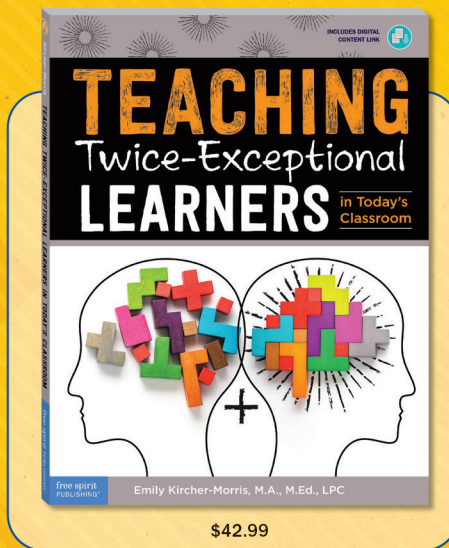
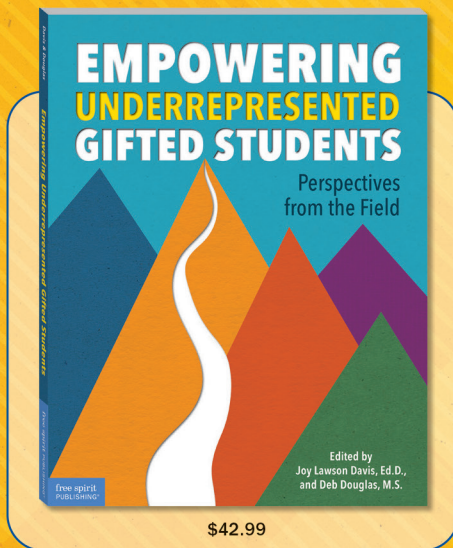
Write for THP

Do you have practical classroom applications of current research, theory, and best practices in the field of gifted education? Are you proud of the innovative way you address the needs of gifted students in your school or classroom? Have you created a successful lesson or unit plan that aligns with the revised NAGC Pre-K-Grade 12 Gifted Programming Standards? If so, we want to hear from you! Send manuscripts to: Jeff Danielian, Editor, THP at jdanielian@nagc.org.

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Making Things 'Write:' Supporting Mathematically Promising Students

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“I just know...because it's right.” Zan's response to our attempt to get him to further explain his thinking in writing (see Figure 1) caught us off guard since he had scored five grade levels above his peers on a standardized test. Although he could readily provide answers, we knew that he was missing a critical aspect of mathematics: communicating his reasoning (Common Core State Standards Initiative [CCSSI], 2010; National Council

of Teachers of Mathematics [NCTM], 2000). In fact, NCTM's *Providing Opportunities for Students with Exceptional Mathematical Promise* Position Statement (2016) noted, “Students with exceptional mathematical promise include those who...are particularly good at explaining complex concepts to others or demonstrate in other ways that they understand mathematical material deeply” (p. 1).

This experience and similar ones with the other excelling students in our second- and third-grade classes made us consider how we could help them advance their abilities to communicate their mathematical reasoning. It so happens that recent work being done in elementary mathematical writing emphasizes writing for the purpose of reasoning and communicating mathematically (Casa et al., 2016). Writing therefore was a way we felt we could provide services for students, like Zan, who were underachieving in this area.

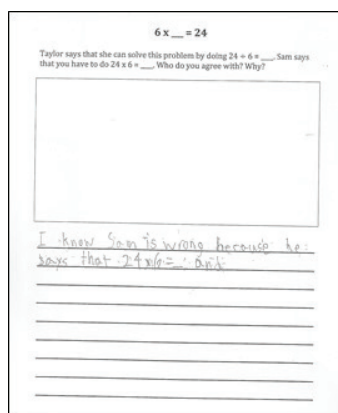
Planning to Teach Argumentative Writing

We decided specifically to target argumentation, one of the four types of mathematical writing identified by the

Elementary Mathematical Writing Task Force (Casa et al., 2016) because of its direct connection to the Common Core's mathematical practices. Specifically, Mathematical Practice 3 states, “Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is” (CCSSI, 2016, p. 7). The core elements of an argument include a claim and evidence to support that position. An example of a written mathematical argument is when a student writes the claim, “I disagree that there are enough goodie bags,” and backs it by stating, “There are three blue ones and two reds. I know two and two is four, plus one is five. There are six kids, so there's not enough.”

Following NCTM's position that “each and every student has mathematical promise” (2016, p. 1), we were committed to providing all our students with the opportunity to develop their abilities to communicate their reasoning through mathematical arguments. We also hoped their writing would more accurately show us whether there were gaps in their understanding to push their thinking further

Figure 1. Zan found his numerical answer in two minutes, but then spent 30 minutes putting nothing else on the page, even when prompted



and, at the same time, provide them with the opportunity to showcase a unique way of thinking about any given topic. We therefore sought to differentiate our supports as suggested by NAGC's Pre-K-Grade 12 Gifted Programming Standards (2019) Learning and Development and Curriculum & Instruction strands. To do this, we identified excelling, average, and struggling students based on their scores on mathematics district assessments and unit tests. We further tweaked these three groups based on our observations of their performance and participation in discussions during class.

This work with our second and third graders took place across two months. Prior to responding to each of six writing tasks, students discussed the prompt. They became accustomed to solving the problem first, then deciding whom they agreed with and why. We specifically prompted our students to write mathematical arguments by asking them to choose one of two solutions we provided from fictional students and defend their argument by explaining their choice, as recommended by Firmender, Casa, and Colonnese (in press). It took students about 30 minutes to complete each task, which included time to talk and write.

Lessons Learned from Our Students

Despite our designation of the three student groups, we attended to the needs of our excelling students with an aim to have the strategies that helped them serve other groups. Nonetheless, students are more successful in learning when they are taught in ways that meet the needs of their individual readiness levels. We decided to differentiate our instruction and identify strategies that could help us best serve our students.

Figure 2. The student-friendly language in this rubric made it possible for students to self- and peer-assess each other's writing.

| | Things you need to work on | Things you almost have | Things you do very well |
|--------------------|---|--|---|
| Vocabulary | I didn't find any math vocabulary. | I saw some vocabulary words, but some are missing. | I see a lot of math vocabulary used correctly. |
| Clarity | I have a hard time understanding the writing. | I can understand what the author is trying to say, but the writing isn't clear. | I completely understand the author's response. |
| Explanation | I don't understand how the author got their answer. | I am starting to understand how the author got their answer, but I still have questions. | I fully understand how the author got their answer and I have no questions. |

We therefore had all our students work on the same task with different levels of support. Additionally, we designed a student-friendly rubric (Figure 2) that outlined expectations. We used the rubric to assess our students' work and provide them with feedback. They also used it to evaluate their own writing and that of their peers.

Over time, we found that different groups of students benefited from word banks, sentence starters, manipulatives, and hints. We initially thought that our excelling students would be able to write their ideas clearly enough to build an argument that would demonstrate their reasoning, and therefore did not provide them with any scaffolds. It turned out that they needed more support in attending to precision (CCSSI, 2010), and a word bank allowed them to further their abilities to write strong arguments. This scaffold turned out to be beneficial for our average group. Although they often figured out the correct answers, they initially were lost about what to write when it came time to construct their argument. We therefore also provided them with sentence starters. Lastly, our students who were struggling, not surprisingly, needed help with the mathematics and writing. Thus, in addition to using the word bank and sentence starters, we initially made manipulatives available to them, and then hint cards.

Strategies That Supported Our Students' Argumentative Writing

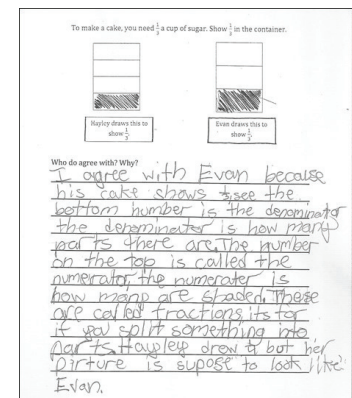
We recognize that the strategies we implemented across groups might be applicable to other teachers whose students are excelling at different levels with regards to their command of mathematics and ability to communicate

their arguments in writing. Therefore, we present the strategies we used in more detail. Our goal was to ensure all our second- and third graders could reach their highest potential in writing mathematical arguments, and we hope these insights support other teachers' work in this area.

1. Using Word Banks to Improve Accuracy

Our goal for utilizing the word bank was to help our students hone in on the ideas they could address to help readers understand the argument. While many students had command of the mathematics content, utilizing precise mathematical language pushed them to describe more accurately what they knew clearly and efficiently. We provided students terms written on large index cards that had student-friendly definitions on the back. Students engaged with the cards, yet students who knew the definitions already did not need to flip them over. We changed the word banks to correspond to the content, such as including "numerator" and "whole" for a prompt about fractions. Eli's response in Figure 3 shows how he incorporated relevant fraction terms and their definitions to convince others why his claim was correct.

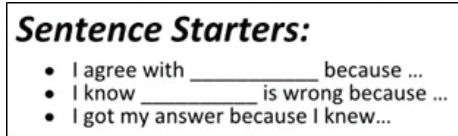
Figure 3. Eli used the fraction related vocabulary words and their definitions to explain to the reader why Evan was right.



2. Using Sentence Starters to Bridge Between Student Solutions and Their Writing

We needed to help some students connect their solutions with their written arguments. We therefore provided them

Figure 4. Students received a copy of these sentences starters with their prompts.



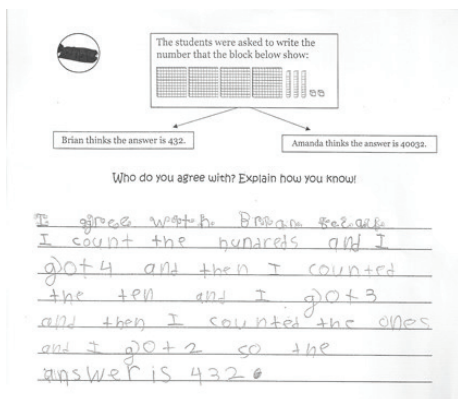
with sentence starters (Figure 4) to help them initially realize that instead of listing the steps they took to solve the problem, the structure of a written argument includes a claim and evidence supporting that claim.

Figure 5 shows how although Stephanie wrote a relatively long piece, she only wrote out her computational steps and did not attend to the misconception introduced in the prompt. In contrast, Lily (Figure 6) adapted the “I knew ___ was wrong because...” sentence starter to structure her argument in a way that provided important details about how she chose which claim to agree with and why the other one provided was invalid.

3. Using Manipulatives to Solve the Problem

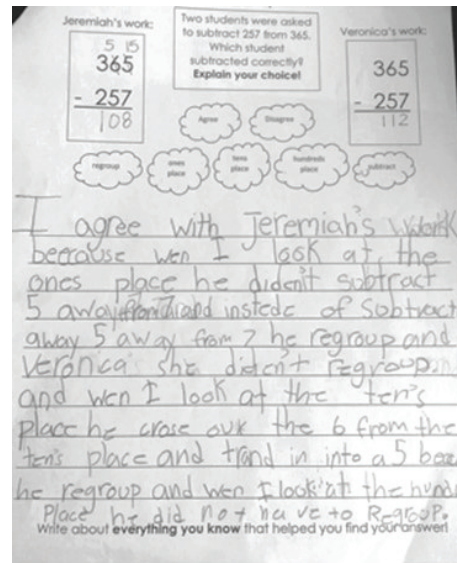
We recognized that having command of the mathematics was necessary for students to write a compelling argument. Therefore, one way we tried to support our students was to provide them with the option of using manipulatives like base-ten blocks (for regrouping) and square tiles (for area) to help them determine a solution prior to writing their arguments. Although students who chose to use the manipulatives eventually settled on a valid answer,

Figure 5. Stephanie simply listed her steps rather than defending an argument.



they ran out of time to construct their argument. While utilizing manipulatives was a strategy that was beneficial for some of our students, we wished to have our whole group focused on one task at the same time. We therefore considered another alternative that still would give them the foundation they needed to figure out the mathematics and time to write their arguments.

Figure 6. Lily gives important details about how she chose which claim to agree with and why Veronica was wrong.



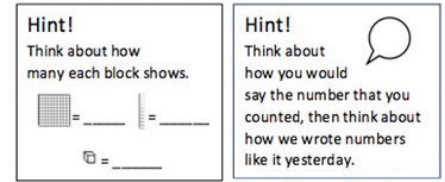
4. Using Hint Cards as a Reference of Content

Eventually, we designed hint cards to give our students a jumpstart on thinking about the argument presented in the prompts. These cards served to remind students about key ideas we had discussed in class to allow them to apply it to the specific problem they were given, such as the one in Figure 7 that we used with a prompt focused on place value. We passed out a hint card with the prompts, to allow them to choose whether they would like to use it. Students initially resist using it and instead asked us for help. We suggested they check the hint card. Over time, students learned to be more independent about using the cards when they needed it while thinking on their own whenever possible.

Final Thoughts

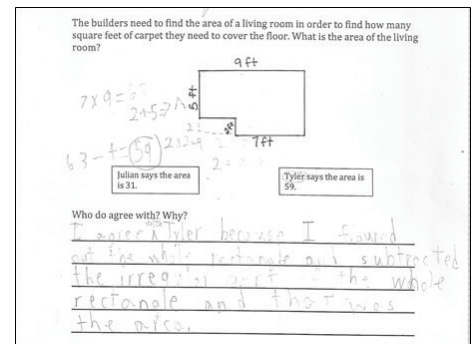
Although our students had differing

Figure 7. These are hint cards that students were given for a prompt about place value.



needs, our work taught us that all students, including our excelling ones, may need some level of support to start the process of mathematical writing. Focusing on writing mathematical arguments required our students to go beyond the answer and communicate their reasoning. We envisioned all our students as having mathematical promise and providing them with scaffolds to allow them to delve more deeply into the content through writing seemingly empowered them. Even for excelling students, like Zan, just one support may make a drastic difference in their writing. While Zan was stumped about what to record when we began asking our students to write mathematical arguments, in the

Figure 8. While every other student decomposed the shape into two rectangles to find the area, Zan's creative approach showcased a strategy he used that was more sophisticated.



end, he realized he had the voice to convey a solution path that was advanced among his classmates (see Figure 8). Opening the possibility for our students to communicate their unique reasoning through mathematical writing is something we plan to continue to provide all our students. **THP**

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Using the TABs Scale to Encourage Creativity

Dr. Mary Frasier's Traits, Aptitudes and Behaviors (TABs) is a versatile and flexible instrument for designing talent development opportunities for students from diverse populations. The TABs instrument represents the basic characteristics of giftedness that can be recognized within and across a variety of economic, cultural and linguistic groups. Such was the case in our recent work with a school focused on equitable programming for all students where teachers in the upper elementary were interested in building a creative problem solving (CPS) program as enrichment for students. The teachers wanted to identify students who would be able to contribute to the program in several different ways. We (the university partners) shared with them that in good CPS environments, you want to be able to spot students that have strong writing, communication, leadership, and idea generation skills. Together, we designed a creative environment and observational structure where students could work on a creative task under the direction of graduate students, while teachers functioned as careful observers noting their students' strengths using the TABs scale. Such observations allowed teachers to view their students in dynamic ways while using the TABs form to guide their observations and thus highlighting students who demonstrated motivation, interest, problem solving ability, and creativity.

In addition to collecting TABs data on each student, the team of teachers and graduate students reviewed writing samples and discussed students who showed potential to benefit from the program through demonstrated behaviors. One interesting part of the discussion focused on a student that graduate students had identified as a really great idea generator. Yet teachers seemed to focus on the fact that this student had difficulty completing their classwork, staying focused on tasks, and collaborating with others. They were able to recognize the students' potential but were hesitant to include the student in the CPS work because of some of the behaviors aforementioned. Through the discussion, however, the university-school partnership team realized that sometimes traits, aptitudes and behaviors may not come in positive manifestations, but can still be indicators of promise for high ability programming. Students who are creative can sometimes seem out of step, be seen as different by their peers, be nonconformists and focus on unusual or dark content. Part of the conversation around the students was this idea that sometimes creative behaviors can manifest in what some might consider negative ways. This was a light bulb moment for the teachers who were able to see creative behaviors in new and different ways. In the end, the team de-

cidated that it was in the best interest of the student to include him in the CPS work. Although he experienced challenges in the program, being able to creatively contribute to the overall work of the group served as a great benefit to him and helped him develop his sense of self. Using the TABs, the team learned to look at the "above ground" manifestations of talent, but that those manifestations might not always be what their school culture expects or wants.

Another important lesson from this work highlights the difficulty in observing creativity (or other key indicators in the TABs instrument) of students if we do not first make space for that creativity to be practiced. Creative behaviors do not happen in a vacuum. Teachers have to consistently provide opportunities for students to practice creative thinking skills, develop products that utilize creative thinking and be introduced to creative ways of achieving their end goal, whether it is a classroom task or a summative assessment of learning. Below are two ways that we have seen creative strategies used in classrooms that also provide space and opportunity for creative behaviors to develop. What interesting ways can you use creative strategies?

1 When holding a discussion in your classroom, make sure to develop thoughtful prompts ahead of time that ask students to innovate or generate new ideas. For example, in an engineering class that centers on a particular set of skills for a build, pose the following question: Is there something that you can observe in nature that might aid you in developing your build? Or in Language Arts, when discussing a particular character from the novel study, juxtapose their attributes to another character from a different novel previously studied. In what ways is Atticus Finch from *To Kill a Mockingbird* similar to or different from Bryan Stevenson of *Just Mercy*?

2 When asking students to perform research or build background on a particular area of content, allow them to utilize a variety of items, including primary and secondary resources, as well as accessible technology sources. If students are investigating the impact of the 1960's on their particular area of the United States, have them invite community members who were alive at that time to be a classroom speaker or to interview them in person or through Zoom. Likewise, you might have students who are studying probability and statistics in math. Task them with finding fun game resources like Shodor's Rabbits and Wolves or Advanced Monty Hall, and have them create their own ways of interpreting the data in addition to the specific analysis tools you provide. **THP**

Videotherapy in the Age of Online Learning

Many gifted students are experiencing heightened stress and anxiety related to academic pressures from the Covid-19 pandemic, as many families are facing concerns over health, employment, and the uncertainty of K-12 schooling. Across the country, districts are experimenting with hybrid schedules, as children alternate between online and in-person learning. While many educators have also experienced feelings of concern to some degree, new research from the CDC and others has shown increased rates of depression and anxiety in youth during the pandemic. In this unprecedented time, the social-emotional well-being of our talented students should be a top priority, as the emotional challenges faced by some (underachievement, perfectionism and engagement) may be exacerbated by the pandemic.

The Benefits of Videotherapy

Videotherapy is a strategy that uses film to help foster developmental and counseling needs enabling students to identify with the characters. This can be empowering for gifted students who may be struggling in some manner (Dole & McMahon 2005, Milne & Reis 2000, Hebert & Sergent 2005). While all adolescents face challenging periods of growth and transition, students with gifts and talents may feel these same challenges more intensely, experiencing asynchronous development, heightened sensitivities, or issues of multipotentiality (Hebert & Sergent 2005). In film, students can engage in meaningful discourse with their peers and teachers, problem-solve during major developmental moments, and be empowered to consider important decisions in their own lives.

While videotherapy is a useful strategy at any point throughout development, it is particularly important in this new age of online learning. There is less time for students to meet with teachers individually, less group and partner work, and less access to support staff. While society often views gifted students as being self-sufficient, the reality is that many academically talented students also have learning disabilities, are learning English as their second language, do not have access to rigorous texts at home, or may be underachieving for varying reasons. Additionally, at a time where students are completing their work on electronic devices, secondary students may receive a flood of reading assignments from their teachers. These assignments can be monotonous for students, and some teachers have reported that this shift to online learning has made them feel less competent, as they cannot assign as many creative tasks. Using film during this uncertain time can help

to provide students with learning experiences that are engaging, exploratory, and unique.

Recommendations for Videotherapy for Secondary Teachers

Videotherapy has many benefits but must be structured in a thoughtful manner. Educators interested in teaching through film need to guide their students carefully, as many students can get carried away by the entertainment value of the film and lose sight of the objectives. First, teachers must consider the rating of the film, view it in its entirety, and follow district protocols for teaching with videos in class. As with any well-structured lesson, teachers must have clear objectives for their students, and practitioners suggest three stages in videotherapy: identification, catharsis, and insight.

The *identification* stage enables students to connect with the characters and their problems, followed by the *catharsis* stage that occurs when students feel emotionally connected to the character, and then *insight*, when students problem solve and identify real-life solutions.

Depending on certain factors, such as the age of students in class, the length of the film, and the film content, videos can be shown in their entirety or in clips (Milne & Reis, 2000). When students view films at home during remote learning, the movie or movie clips must be free and easily accessible. Additionally, if the film is not intended to be viewed in its entirety, time stamps must be clearly communicated. In order to help scaffold students through their viewing, it is useful to have pre-viewing, viewing, and post-viewing activities that are different depending one's objectives. Pre-viewing activities include reflection foreshadowing the themes of the film and a synopsis of the plot and characters. If viewing occurs during class, a time for reflection should be provided for identification, catharsis, and insight. Teachers can also consider providing specific stopping points for students to reflect and draw conclusions. After viewing, opportunities should be given for students to engage in the insight stage, where they can problem-solve and make meaningful connections to their own life.

Teachers can assign a follow-up project or assignment to enable students to create divergent questions that could be discussed in a virtual class discussion or complete a brief writing entry that challenges students to draw on themes from the film to make personal connections. This stage can be differentiated and should keep in mind students' needs and interests. The following films (or parts

continued on page 17

“Doc, I Want to Study the Pentagon Scandal”: What I Learned from a Gifted Student

Willard L. White

Florida Atlantic University

Willard L. White, Ph.D. served as a teacher and administrator in the Birmingham, MI Public Schools and later coordinated the gifted education program in the Palm Beach County, FL Schools. His doctoral research at the University of Connecticut involved a follow-up study of the Speyer School Program for highly gifted students in New York City, documented in America's First Gifted Program: Hollingworth and the Speyer School Experiment (Royal Fireworks Press, 2014).

After a thirty-year career as a teacher and administrator in one of Michigan's top school districts, I expected to have a number of former students who are enjoying successful careers and receiving recognition for their achievements. There is one student, Rahul Kohli, who is enjoying a career in medicine, and for several reasons, ranks as the top student of my career. He is the subject of this story.

As a middle school administrator, I received a phone call from an elementary principal describing a fourth-grade math prodigy in his school who was ready for high school math. The principal reported that he did not know what to do with this student.

Rahul was definitely an advanced learner in need of acceleration in mathematics, his strongest subject. His teacher and school principal were unaware of the eighteen types of acceleration outlined by Colangelo in *A Nation Deceived*, including subject and grade-level advancement which were most appropriate for this student. I brought this to their attention and arrangements were made (after checking with the student's parents, the middle school principal, and the math teacher) for Rahul to come to the middle school for eighth grade math in the first hour in the morning, returning to the elemen-

tary school as a fifth-grade student for the remainder of the day. There were skeptics who believed he would not fit in with eighth grade students as well as concerns about his social growth. These criticisms were put to rest as his test scores ranked the highest in the class and he had no trouble with social adjustment but rather was looked upon as a hero in the school.

The following year when he entered middle school as a sixth-grade student there was not a math class appropriate for his ability. Arrangements were made for his mother to drive him to the high school for a first hour math class returning him to the middle school for the remainder of the day. He arrived at the middle school twenty minutes before the next class period. The principal and I made the decision for him to report to my office each morning rather than interrupt a class each day. I made it clear that he would not be wasting that time each week and he should decide on a research project. At that point Rahul showed me a folder of articles he had collected from *Time*, *Newsweek*, and *U.S. News and World Report* and said, “Doc, I want to investigate the Pentagon Scandal”. I asked him to identify the scandal. He explained that there are hundreds of employees at the Pentagon who are on their phones all day ordering sup-

plies and they give the contracts to their friends back in their home state and no one ever investigates this. As an example, he added the entire country read about the six-hundred-dollar toilet seats the Pentagon ordered. It was obvious this student had read extensively about one function of the Pentagon and was concerned about what he thought was wrong. He was even more concerned there was not an ongoing investigation.

Several days passed as I gave more thought about how I could assist Rahul by giving direction for his research. It finally occurred to me there must be an office of public information at the Pentagon and perhaps I could arrange for Rahul to conduct a telephone interview with a Pentagon official. The following day when Rahul came to my office, I asked if he would like to call the Pentagon. His eyes and the smile on his face gave me a clue that a call just might be a key possibility. Then I told Rahul to compile a list of questions about what he would like to learn. Of course, I had to identify some ground rules before the calls were made. He could not call his concern a scandal for obvious reasons. I explained that his questions would compose an Interview Guide. The following day I reviewed his questions and called Alexandria, VA for the area

code and a phone number for the Pentagon. The man that answered said, "Code number please". I replied that I do not have a code number and I am an educator from Michigan who has a gifted student who would like to know more about how the Pentagon functions. I asked if there is a Public Affairs department, and he said each branch of the military has such a department. I asked Rahul which he would like to address first, and he said the Marines. I gave Rahul the phone and he began talking and recording his notes. Before the call, I told Rahul to be sure and get the name and title of the person with whom he was speaking and the exact address as he would want to write a thank you letter on school letterhead.

During the next several weeks Rahul talked with the Public Information Department of each branch of the military carefully recording his notes. Meanwhile, boxes of information began arriving at the school addressed to him. The material included booklets, brochures, and information sheets, some of which were more technical than an educator or student might understand. The office secretary was amused as the boxes continued to arrive for the better part of the semester. Rahul carefully included examples of this information along with his extensive notes of each phone conversation. His research of The Pentagon Scandal was on display in the school library and later in the local public library.

Near the end of his seventh grade year, Rahul took the SAT with high school juniors and seniors and scored high enough to be awarded a summer scholarship at Ohio State University. At the end of the summer, I received an official transcript from Ohio State showing Rahul had completed the university course, *Number Theory and Discrete Math* finishing first in a class of seventeen students. He is the only student I have known who had a university transcript before entering eighth grade. With transcript in hand, I went to the math teacher's office and asked if she had taken this course in college. She replied that she waited until her senior year as it was considered one of the

most challenging courses in the math sequence. I then showed her Rahul's transcript and watched her mouth drop as she was initially skeptical of such a young student taking eighth grade math.

During eighth grade, Rahul came to my office one morning and asked, "Doc, do you know a guy named Stanley?" He then handed me two handwritten letters from Dr. Julian Stanley, Father of Talent Searches and Professor at Johns Hopkins University, advising him about his further education. Because of Rahul's SAT score, he was on a National Registry of advanced math students. Dr. Stanley advised him not to discount Ann Arbor in his quest for college. He added the University of Michigan is equally as good as or better than some of the Ivy League Schools, especially in mathematics.

Rahul skipped ninth grade and was admitted to Detroit Country Day School on a full scholarship. At that time, Detroit Country Day, a private school, was the only school in the area that offered the International Baccalaureate (IB) Program. After completing high school in three years, he entered the University of Michigan

on a full scholarship. His education then led him to Harvard University.

On Christmas Eve, 2003, Rahul and his parents came to our home in Florida to invite me to attend his graduation from Harvard the following summer. Of course, I was honored to receive his invitation and attended. Rahul received a Ph.D. in Pharmacology in the morning and guests were given tickets for lunch and taken by bus to the Harvard Medical School graduation where he received an M.D. Degree in the afternoon. In addition to Rahul's parents several of his relatives attended including his grandfather who traveled from India.

Epilogue

Rahul's first position after medical school was at Johns Hopkins University Medical School and he is now Assistant Professor of Medicine and Biochemistry & Biophysics at the University of Pennsylvania Medical School. He is married to Meena Bewtra, a graduate of the Yale University Medical School. Meena is an Assistant Professor of Medicine and Epidemiology at The Perelman School of Medicine, University of Pennsylvania. **THP**

What I Learned from This Student

- There is not a ceiling on learning for some students.
- Student's intrinsic motivation is an important factor in their academic success.
- Highly gifted students often have unusual interests and a special feeling for what is right.
- Parental support is a plus in a student's success.
- Schools must offer flexibility in meeting the needs of highly gifted students.
- Grouping students by chronological age does not benefit highly gifted students.
- Educators should know the benefits of subject and grade acceleration for students who are ready and motivated.
- Advanced learners are not convenient for scheduling and do not fit into the K-5, 6-8, 9-12 design of most public schools.

challenges of returning to the post-pandemic classroom

continued from page 1

do not actively explore. However, their young age prevents them from fully understanding how to handle the information they are taking in emotionally. Delisle and Galbraith (2015) noted,

Gifted children can be extraordinarily sensitive. They often feel things more intensely than other kids their age. They tend to develop empathy earlier than other children do. They often have a social conscience—an intense awareness of the world’s problems. They worry about the world, the environment, wars and conflicts, hunger and homelessness. Their emotions are raw and deep, yet close to the surface. (p.9)

Let’s look again at the young child you were asked to imagine yourself being at the beginning of this article. This child is based on a real fourth-grader in a Southern California public school. She is passionate about current events, enjoys watching the evening news with her parents, asks many questions about the pandemic, health care workers, people getting sick, social injustice, and the protests that swept the nation. However, emotionally she could not wrap her mind around the scary images of the health-care workers battling the virus and protests about social injustice that she continued to see. This caused her great distress and affected her sleep and eating patterns. She had difficulty falling asleep at night, often needing reassurance. During distance learning, she would often interrupt class because she just needed to ask about what she saw on the news and could not focus on the lesson until her concerns were discussed.

As this example shows, many of our gifted learners are especially vulnerable to the traumatic stress of current events because they experience heightened awareness and inability to respond to that awareness emotionally. Therefore, it is crucial as teachers of gifted children to establish and integrate social-emotional

learning practices into our academic instruction as we return to the classroom. A layer of social-emotional learning (SEL) is Trauma-Informed SEL. Trauma-Informed SEL takes into account the knowledge that students experiencing trauma will often feel helpless, vulnerable, and out of control. (Transforming Education, 2020).

According to Transforming Education (2020) there are five ways you can integrate Trauma-Informed SEL into your academic day to help your gifted students feel safe, connected, and with a sense of control.

1. Create predictable routines and rituals to create a sense of safety and belonging in the classroom.

Start your day with activities that welcome students into the classroom and help students feel included. These activities, routines, and rituals help create a sense of belonging and develop a connection to the other students in class.

For example, a teacher that greets students at the door with the choice of a high-five, fist pump, or hug allows students the opportunity to feel welcomed in the way the student needs and wants to be included. These welcoming routines can be adjusted for socially distanced practices and still make students feel welcomed.

Help transitions in the classroom day by creating routines and rituals that ease the adjustment into a new activity. Students feel a sense of safety when they can prepare for what comes next. For example, a teacher who uses a rainstick to give a two-minute warning for transitioning from writing to recess will help students organize themselves and relieve the stress of abruptly stopping one activity and moving into another.

2. Build strong and supportive relationships with students to foster a sense of safety.

All members of the school community can help to create this strong and supportive environment for students. For example, the principal greets students as they get off the bus by name. The custodian greets students in the

halls and asks how they are doing. The school secretary smiles and helps students when they come to the office. All teachers work together and consider the students as “our” students.

In the classroom, the teacher can hold a weekly meeting where all the students sit in a circle and discuss important SEL topics. For example, the circle discussion might be, “How does it feel to be back at school?” or “How do disagreements on the playground make you feel? What do you think is the best way to handle disagreements before we come back to the classroom?” During this circle, all students are able to share in a safe place. This allows students to feel heard and seen. It also builds a sense of community and connection.

3. Empower student agency and autonomy to build student success and provide a sense of control.

Students want to feel seen, heard, and empowered. By welcoming student feedback and/or self-reflection after a lesson, we make students realize they are an important part of the classroom learning process, as well as being in charge of their own learning. For example, a teacher can take a moment after a lesson to ask students what went well and what they would like to see changed or improved for next time. The teacher can choose a focus such as: How did the use of technology help you to process the information? How did our interactive structure help the project? What do we need to work on as a group to help our collaborative process? What learning goal will you set for yourself? How did your understanding of the topic change?

Give students a choice in how to access information and show learning outcomes. Some children enjoy accessing information in a digital format, and others love books. Some children are musically gifted and would thrive being able to write a song to show their learning. Another child may be gifted in visual arts, while the next student is gifted in performing arts, and another may love to write. Giving students a choice em-

powers students and helps them feel a sense of accomplishment and a sense of control.

4. Help students develop self-regulation skills to manage stress and develop self-control.

We can guide students in becoming aware of self-regulation strategies that can help them cope with stress and adversity. We can teach students to manage their emotions, behavior, and body movement when faced with a difficult situation. A student who can self-regulate is a student who builds resilience and self-confidence. For example, we

“It is crucial as teachers of gifted children to establish and integrate social-emotional learning practices into our academic instruction as we return to the classroom.”

can model calm breathing and relaxation exercises; positive self-talk; and the value of self-expression through art, music, dance, writing, etc.

Modeling how you handle frustration and stress is a powerful way for students to learn self-regulation.

For example, the teacher can say, “Students, right now I am feeling sad and disappointed because our assembly got canceled. I was really looking forward to that assembly. I think it would help me feel better if I close my eyes and take a deep breath. It is ok for me to feel disappointed, and I also know that I can still have a good day because I’m here with you.”

5. Provide opportunities to explore individual and community identities to develop self-awareness and connection.

Build in the opportunity for students to strengthen and explore their own identities and explore the perspectives of others. For example, when participating in a literature study, students can

make connections with the characters on a cultural level to explore similarities and differences.

Gifted students often feel injustice deeply. Acknowledging students’ feelings around complex topics such as race, politics, and other current events is vital. We can foster students’ community connection and sense of agency by encouraging civic engagement with local political entities and participation in local community traditions.

Let’s go back to our fourth-grade student that has been experiencing trauma around social injustice. Her teacher realized that this student is feeling helpless, vulnerable, and out of control. Utilizing trauma-informed practices to help this student feel more in control, the teacher encouraged her and her classmates to write to a local government representative to ask the representative

to take action on social injustice. The teacher also created an independent study activity where students studied people who made a difference on the social injustice topic of their choice. This fourth-grader was given the choice of how to disseminate her information to the class. The student enjoys creating movies on her iPad, so she created a short informative film about people making a difference. The teacher also incorporated mindfulness and stress management strategies into her academic day to help students cope with the stress of the constantly changing schedule with distance learning, hybrid learning, and coming back to a socially distanced classroom.

Creating an environment of compassion, security, safety, belonging, and connectedness can help students begin to heal from the trauma experienced by these unprecedented times. The bonus of creating this environment is that we as educators can also develop and model our social-emotional learning skills and use self-care practices that

enable us also to heal the traumas we have also experienced. **THP**

For More information on Trauma-Informed SEL

- CASEL: SEL Roadmap <https://casel.org/reopening-with-sel/>
- CASEL: SEL Framework <https://casel.org/wp-content/uploads/2020/12/CASEL-SEL-Framework-11.2020.pdf>
- Transforming Education: Trauma-Informed Social Emotional Learning Toolkit <https://transformingeducation.org/resources/trauma-informed-sel-toolkit/>
- National Center for Safe and Supportive Learning Environments: Building Trauma Sensitive Schools <https://safesupportivelearning.ed.gov/building-trauma-sensitive-schools>

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Altered Books as Objects of Art, Creativity, and Comprehension

We have such a limited amount of time with our students and it can be difficult to achieve all the goals set with and for our students no matter how we focus on student need. As an educator, whose focus is on English Language Arts, I am consistently looking for ways to deliver more effective instruction that integrates reading, writing, listening, and speaking while requiring students to think and create.

Years ago I was introduced to the idea of altered books, where books are used as a medium to create art but also deliver ideas. To see some examples, type “altered books” into an internet search engine and click on images. You will immediately see many different types of altered books, in a wide range of forms where the book is the object and the object has been transformed.

Altered books are a great teaching tool, not only in art class but also in English Language Arts or a content course such as Science or Social Studies. For example, students may take outdated nonfiction books that have been discarded from public, school, or classroom libraries and they might update and revise them. Since students are so often told not to write in books, they are often excited to be told that they can manipulate and alter the book in any way. This revision may focus on the accuracy of the material, (as there may be new information), the presentation of the material, the appeal of the material, the ways in which content relates to the subject, and more.

In creating an altered book, students acquire and/or implement many skills. They will read and analyze the original text and/or illustrations, photographs, charts/tables, and other elements of the book. After they read and evaluate the book to identify how it might be updated, revised, and made more appealing, they will need to research the topic, both in print and on the Internet, then they will need to make decisions about what to change and how to give the book an appealing and inviting revision that adds and/or reinforces accuracy.

A Partial Outline for Creating Altered Books (Not a Definitive One)

- Gather outdated and/or books on topics of interest and/or related to the curriculum
 - Science books
 - Animal and animal habitat books work particularly well
 - History books
 - This is a great opportunity to bring in a wide variety of perspectives and part of history that may have not been addressed in history books of the past
- Add perspectives, contributions of people, and events related to BIPOC (Black Indigenous People of Color) and LGBTQIA+ communities.
- Survey books
 - These are expository books that provide an introduction to the different elements of a topic such as the Eyewitness books published by Dorling Kindersley. For each topic, there is one two-page spread about a part of that topic.
- Magazine articles
 - Old magazines such as *National Geographic*, *Ranger Rick*, *Click*, *Ask*, *Faces*, *Muse* (and other magazines published by the Cricket Group-<https://shop.cricketmedia.com/>) would work well.
- Explain to students the goals and objectives and ask them to choose a book that they would like to alter. You may want to provide students with a way to preview the books and/or rate their choices. You may also want to create a model altered book or show them ideas from the Internet. One key to success is to consistently say that there is more than one way to alter and/or update a book.
- Have students read and analyze the book for:
 - Accuracy: Is the information up to date? Does it reflect facts? Bias?
 - Appeal: Would someone want to read the book? Would they find the information interesting?
- Provide students with time to research the topic, reminding them to keep track of their sources as they will need to add their sources to the altered book (as back matter, on the end pages, etc.)
- There are so many ways that students might alter a book including but not limited to:
 - Revising text
 - Adding text
 - Adding new images
 - Revising images
 - Adding word bubbles to illustrations and/or photographs
 - Creating sidebars
 - Revising and/or writing caption for the images
 - Presenting information in another form
 - Adding tables and charts
 - Creating infographics
 - Adding a resource list for more information

- o Adding references
- Creative supplies that may be useful include glue sticks, colored pencils, permanent and non-permanent markers, scissors, old magazines and newspapers, colored paper, double-sided tape, washi tape, rubber stamps, inkpads, internet and a printer.

While this column focuses on one example of how to create an altered book with expository text, there are unlimited possibilities for how to use a similar approach to creating altered books with fiction where students illustrate a theme on the pages of the book, or create characters that pop up and speak central themes, illustrate a scene in the pages, and more. Note that this artistic approach is not meant to destroy books that are in good shape but to repurpose them.

Sources for books include library discard piles, library book sales, paperbacks that are losing their pages, extra copies of older books that may not have the same appeal that they had when they were published, and books that are being weeded from personal, public or school libraries.

If you and your students create altered books and want to share them on social media, please share them with the NAGC audience-tag @NAGC and use the hashtags #alteredbooks #ELA #Comprehension #Creativity. **THP**

social and emotional learning

continued from page 11

of films) are excellent for use with gifted secondary students: *Good Will Hunting*, *Hidden Figures*, *Finding Forrester*, *Spellbound*, *Akeelah and the Bee*, and *Mean Girls*. This diverse list offers opportunities for students to connect with main characters of color, talented boys and girls, and interests ranging from math to spelling. **THP**

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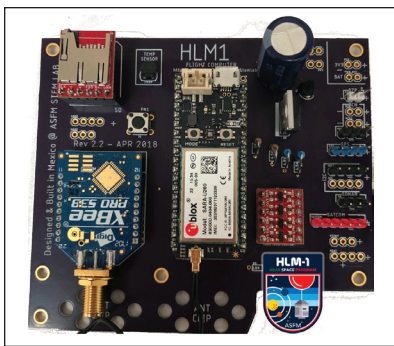


Funding for full-time students is available, including tuition and a generous stipend.

Brad Brandvold is a high school physics teacher at the American School Foundation of Monterrey (ASFM), a private international school in Monterrey, Mexico. Bobby Belden is a student in the Three Summers Program in Giftedness, Creativity, and Talent Development at the University of Connecticut and is the Gifted and Talented Program Coordinator at ASFM Middle School. In this interview, Mr. Belden and Mr. Brandvold discuss the Near Space Program that Mr. Brandvold has developed at ASFM.

Bobby: Can give some details about what students studied and created in the Near Space Program?

Brad: The Near Space Program students were divided into three teams, the environmental team, the electronics team, and the physics team. Their task was to launch a weather balloon into the upper atmosphere and to collect atmospheric data with its custom-built data capsule.



Custom designed and built 'Eagle-HLM1' Flight Computer 2018.

AP Physics 2 students, and the Physics team was comprised of AP Physics C students. All the students had been in one of my classes previously thus I was able to consider their strengths, weaknesses, and collaboration skills.

Bobby: What has been the biggest highlight of the Near Space Program?

Brad: Launching the capsule and then recovering it was the highlight event of the Near Space Program-Physics Team. Building the hardware, programming the software, and developing the Near Space Program App so everyone at ASFM could track the capsule were the highlights for the Near Space Program-Electronics Team. The highlight for the Environmental team was the gathering and analysis of the environmental data collected. If you want to pin it down to one event, it was when my students pulled the memory cards

from the onboard cameras and put the image of the curvature of the Earth with its fleetingly thin atmospheric line and the blackness of space up on the television.

Bobby: Is this a project that requires an abundance of resources, or is it something that could be done anywhere?

Brad: The wonderful thing about developing a data collection capsule for a Near Space Program is how flexible a project like this can be. Any school with as little as a hundred dollars and a group of motivated students, could construct a capsule, parachute and a simple circuit with a few sensors and send it into the Troposphere. For several months we were using a small styrofoam cooler left over from a restaurant order and only when we saw how far we were projecting our capsule would soar, did we develop an in-house capsule design.



Actual photo taken from the "Eagle-HLM1" Near Space Program capsule at approximately 41 kilometers in altitude.

We want to encourage all learners to reach for the sky and to have out-of-this-world learning experiences. A near-space program helps students build a multitude of skills through project-based learning. It's possible for students to take a trip to the upper atmosphere with readily available materials and a little bit of ingenuity. We hope that this article inspires more educators to have their students look skyward and expand their horizons through an exploration of near-space. **THP**



Centered Mr. Brad Brandvold and third from the left Francisco Lobo Morales with 12 of the 15 members of the ASFM-Near Space Program 2018 holding the 'Eagle-HLM1 Data Capsule.)

Communicating about Science Beyond the Classroom

Communication, collaboration, creativity, and critical thinking are what many consider to be the 21st century skills students need to possess to be successful in tomorrow's world filled with jobs not yet identified. In STEM classes, communication is often limited to using scientific concepts to build explanations and apply them to new situations. However, productively communicating in a scientific community is often left out of the classroom. Students need opportunities to do science collaboratively so that they are required to communicate ideas with peers, interpret data together, and share in the process of communicating the data to a larger community beyond the classroom.

For students to effectively communicate to an audience beyond the classroom, they must have practice. Before schools and classrooms around the world were disrupted due to COVID-19, teachers collaborated with each other to support student communication skill growth: students visited younger grades and presented lessons to these younger students on scientific concepts, students presented at math and/or science nights for the community, science and engineering fairs showcased students' learning and ingenuity, etc. Communicating about scientific learning was diverse and inclusive. However, these examples of students communicating their scientific knowledge often left out the true definition of communication; it is both giving and receiving.

As classrooms move back to a traditional learning environment, let's reimagine how science is communicated. Include more giving and receiving of information. Students need to receive feedback based on their presentation from the listener and engage in a conversation about the topic of investigation. Peer-to-peer feedback after an investigation is one example of this strategy.

Let's reimagine the paper towel absorbency test. It is a popular inquiry investigation that reminds students of basic measurement, data collection, and analysis skills. Instead of all students testing the absorbency rate of different paper towel brands, students design their own tests choosing the independent and dependent variables (i.e., absorbency rate, absorbency amount, strength when wet, perforation tear rate, 1-ply versus 2-ply, different paper towels, cost, etc.). After the various tests, students present their findings through video using online platforms such as FlipGrid, YouTube, or VoiceThread. Video offers students the opportunity to communicate their findings to, and receive feedback from, a wider community (e.g., other classes or schools). By allowing students to create videos and then upload them to an online platform, rather than recording live, students

can add content-specific vocabulary in text that appears on screen while they are communicating their findings.

Conversations are a cyclical communication process; we speak, listen, and respond. It is through the cyclical communication process that students actually learn how to effectively communicate. Moreover, cyclical communication has been shown an effective strategy to help English language learners improve their communication skills in the English language. One strategy to incorporate cyclical communication is to create a critical thinking opportunity. After students upload their findings' videos to the online platform, require students to review their peers' videos and ask them questions based on their data. Students then respond to their peers' questions and an online conversation about data findings is born. To take the conversation outside of the classroom, share the videos with other classes, with parents, or even the local grocery store manager. Allow this outside community to respond to their findings.

Effective communication skills require a command of the language, which some students may need extra support. Using online platforms that offer closed captioning for both English and Spanish can support English language learners in understanding their peers' questions. Additionally, this strategy will give all students sufficient time to gather their thoughts and create a response before responding to their peers' questions. When considering how to support English language learners communicate their inquiry investigations, consider not only opportunities to share and listen but also support strategies to make communication possible. Creating videos that include content-specific vocabulary as visuals can help reinforce meanings of science terms that have dual meanings (e.g., organ, space, plant, etc.). Allowing students to read from scripts when recording their findings from an investigation can help increase confidence in their speech skills.

The importance of communicating well in science is that both the communicators' and listeners' perspectives are represented and valued. Creating opportunities for conversations about content in the classroom is just part of the solution; inquiry investigations and data analysis should be included. To teach students to be better communicators, they need to learn to be a part of the conversation. **THP**

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