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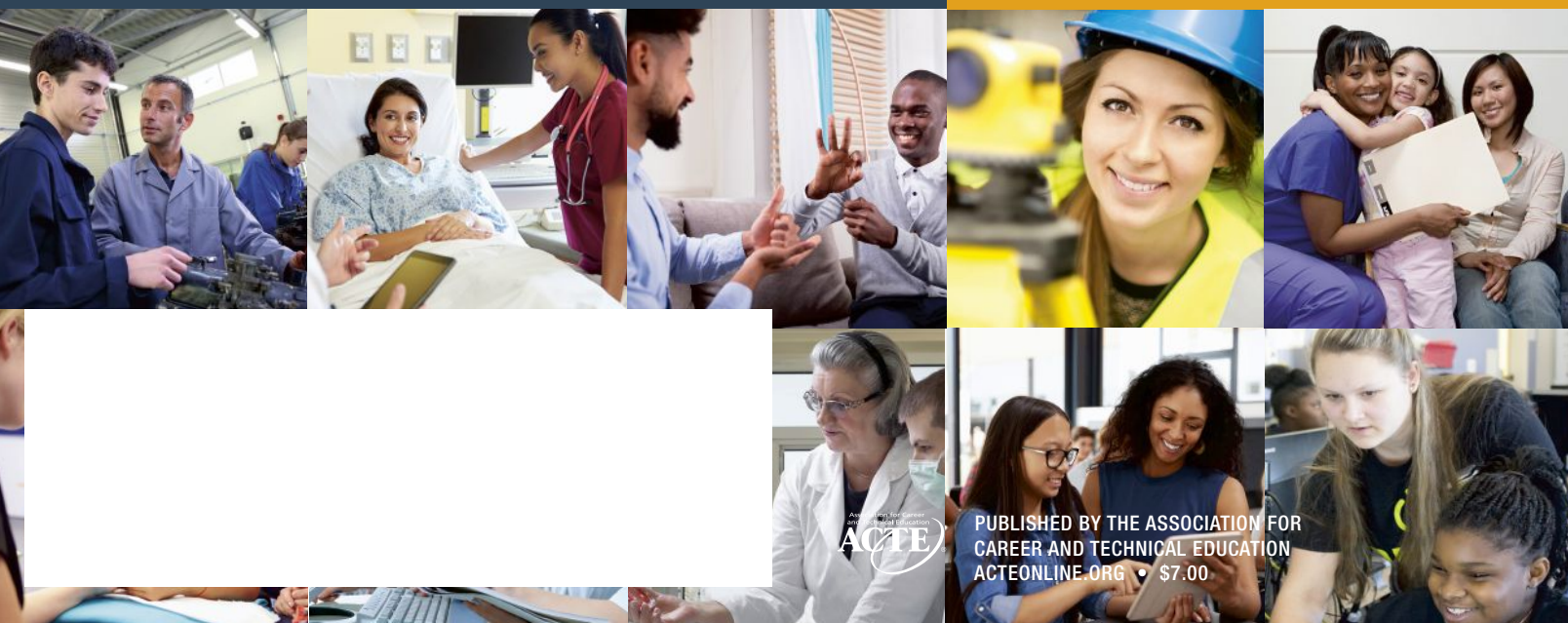

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(Source: Deloitte and Manufacturing Institute)

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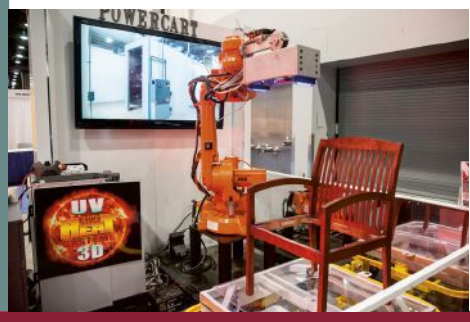

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Audrey Brewer,
Marketing Manager,
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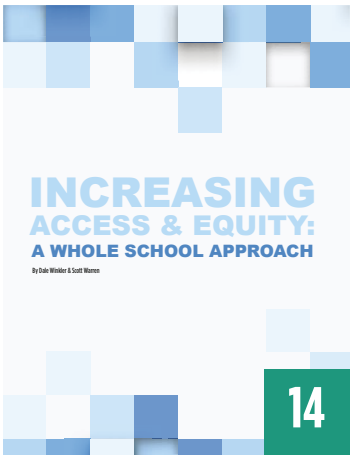

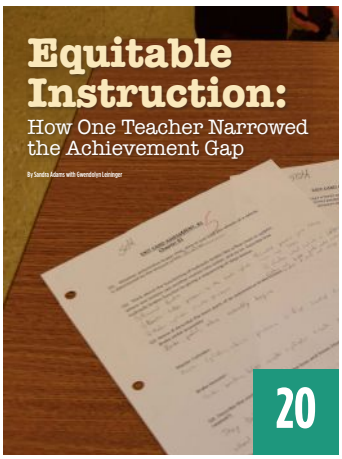

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ENSURING HISTORY DOES NOT REPEAT ITSELF

WELL-KNOWN 20TH CENTURY PHILOSOPHER GEORGE SANTAYANA IS PERHAPS BEST known for the phrase, "Those who do not remember the past are condemned to repeat it." This phrase could be applied to career and technical education (CTE) as we think about our own history and the challenges faced related to the issue of student "tracking," or when we consider how to meeting the needs of all students who enter our programs today.

While the vast majority of CTE educators have always been focused on teaching and supporting each and every student, regardless of who they are or where they come from, the system has not always worked well for everyone. In addition, there are those in our profession who need more information and education about why access and equity are important, and the related actions that may be required to ensure an equitable learning environment.

This issue is as important to our communities and businesses as it is to CTE and our students. In fact, there is a growing body of evidence that equates inclusive work environments with a company's competitiveness. CTE needs to reflect the same types of situations that our students will encounter when they enter the workforce.

Students were once separated by perceived ability, often "tracked" into CTE as opposed to more rigorous academic pathways that generally led to postsecondary education and higher earning potential in the workplace. This separation of students reflected racial, ethnic and societal divides at play in the U.S.

Thankfully, our history has evolved and most of today's education system rejects a "tracking" philosophy. With that said, even overt rejection does not guarantee that all programs are accessible and equitable. We must be intentional about addressing these issues if each and every student is to have similar CTE opportunities. This is especially important when considering traditionally underserved populations.

I'm excited about this issue of *Techniques*, which eatures articles on this important and timely topic. Read Catherine Imperatore's article (on page 10) for more information about element No. 6 in ACTE's Quality CTE Program of Study Framework, Access and Equity. How might you apply these concepts in your own courses? I encourage all readers to leverage the Quality CTE Program of Study self-evaluation instrument discussed on page 11, to help determine what, if any, actions can be taken to improve your program of study in this and other areas.

This edition will also feature information from SREB's work to help schools "adopt school improvement frameworks based in the belief that every student can master challenging academic and career pathway curricula, and in environments that encourage them to succeed."

If you are a classroom teacher, you may be especially interested in Sandra Adams' discussion of exercises to achieve equitable classroom management. Creating opportunities for visually impaired students, opening doors for financial access to postsecondary education, and engaging young women in STEM are all issues covered in this month's magazine.

Access and equity may not be easy topics to discuss but the conversation is important if we are going to ensure a level playing field, to prepare a competitive workforce. Most importantly, every student needs access and equity in order to realize their full potential as they prepare for their futures.

LeAnn Wilson
ACTE EXECUTIVE DIRECTOR

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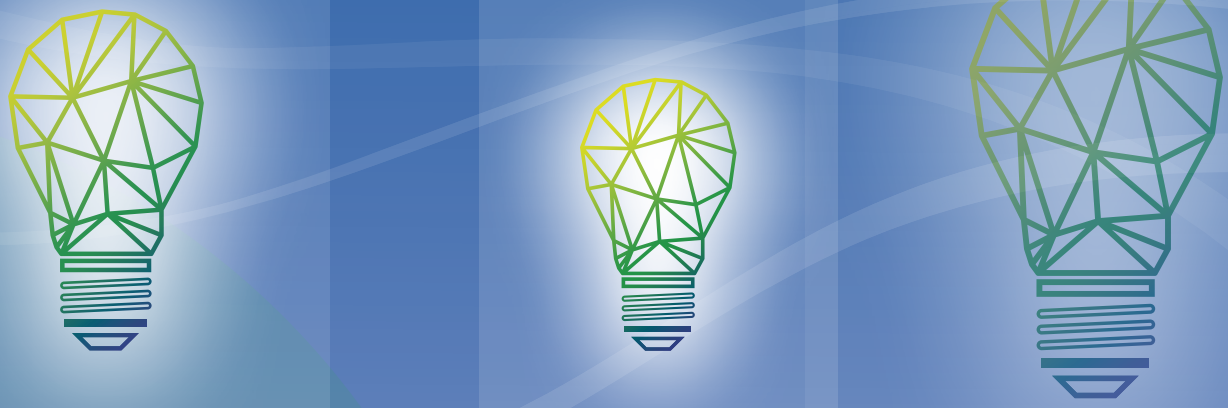

PERKINS V AND IDEA: IT'S ALL ABOUT ACCESS

By Helen E. Malone

WITH PERKINS V BECOMING PUBLIC LAW 115-224, STATES WILL HAVE AN INCREASED EMPHASIS ON serving special populations. How will states meet the needs of students identified as special populations? What does "access" mean? What does it look like in the classroom? What are some resources that will help? Special education teachers will prove to be a key resource moving forward with Perkins V.

When the Individuals with Disabilities Education Act (IDEA) was reauthorized in 2004, states were tasked with providing *all* students access to the general education curriculum. The objective was for students to meet developmental goals and challenging expectations that were established for all children. Students in special education classes should be provided the opportunity to learn the same curriculum as their non-disabled peers and make progress toward the standards. The degree of access, types of supports, accommodations and strategies all vary because they should be individualized to the student.

Access and Standards

University of Kentucky researchers developed the Stepwise Process to help special education teachers provide access to the general education standards. This same process can be used by career and technical education (CTE) teachers.

1. Identify the standard(s) the instruction will address.

What is the state standard?	What are the elements or indicators in the standard?	What is the intent of the standard?

2. Define the outcome(s) of instruction from the instructional unit.

What are the desired outcomes for all students? What will the classroom-based assessment look like?	What outcomes will be prioritized for instruction and monitoring for the students with disabilities?	What supports would be necessary for the student to access the instruction?

3. Identify the instructional activities.

What are the instructional activities planned for all students?	How can the student with disabilities participate in the activities?	What supports would help the student access the instruction?

4. Target specific objectives from the IEP.

Which of the instructional activities provide opportunities to work on the goals and objectives?	What IEP objectives can be addressed within the instructional activities?	What other IEP objectives could be addressed within the instructional activities?

Step one: Determine the standard(s) that will be included in the instructional unit. What is the essence of the standard? What is the enduring understanding? Why is that standard important? Next, a teacher should identify the outcome of the instruction. What is the outcome for a general education student? What is the outcome for a special education student? It may be the same.

Third, a teacher designs the instructional activities. This is where a teacher can plan for engagement, develop supports or differentiation that may be needed, and identify activities that allow for meaningful participation. A student's individualized education plan (IEP) will contain information on accommodations and supports already developed to benefit that student; use this resource and consult with the student's special education teacher. The special education teacher can identify or link IEP goals to instruction.

For example, if a student has a goal to increase content vocabulary, the special education teacher can collaborate with the CTE teacher to pre-teach the vocabulary needed for the specific unit.

The goal is not only access but *meaningful* participation, which should move the student toward learning. If a special education student takes a nutrition class, the student should do more than hold the utensil or scoop with a measuring cup. Meaningful engagement might involve identification of a whisk from an array of utensils or of which measuring cup is the ½ cup. That moves the student closer to the content standard and supports independent living skills.

Instructional Activities

When identifying activities, there are some things to consider. Burdge et al (2001) identified five common instructional activities and possible barriers for different learning characteristics. The first and second instructional methods are research and culminating projects. Both activities require students to be able to read and synthesize information. Research is primarily in print and information is not always distinct or clear, so a student must differentiate the necessary details from the nonessential information.

A student may not be able to take "whole to part" or know what to focus on when planning for the activity. If a student must research careers related to coding, they may not know how to break down the task or apply time management skills. Of course, both instructional activities are extremely challenging for a student who struggles with reading and writing. A student who has poor attention or one who is impulsive may not be able to attend to the task at hand. If a student has a speech impairment, they may not feel confident or comfortable presenting to the class.

Another area identified is lecture and notetaking. For a student who has a limited attention span or who has difficulty identifying the important information, lecture and taking notes can be challenging. Lecture can occur at a fast pace and may not identify the major ideas. Notetaking requires the ability to listen and watch, then write down the vital information, which can be difficult if a student has a physical or cognitive disability. Guided notetaking is a strategy for students who may struggle with taking notes. The teacher uses a PowerPoint presentation or an instructional guide and omits key vocabulary and concepts. The student is then responsible for following along while writing in the pertinent information. This ensures the student has the correct information to study.

Fourth includes practice activities and homework. A student who uses an assistive technology device may not have the device at home and cannot complete the work. If a parent does not know Braille or American Sign Language, the student may not have the support at home.

Last, cooperative learning groups can impact students who have inconsistent communication skills. When working in groups, there are quick exchanges of thoughts, ideas and opinions. A student who uses a communication device may not have the right information programmed in the system; another student may not have the vocabulary to participate. In addition, a student with immature social skills related to a disability may struggle in cooperative learning groups. If a peer disagrees with the student's input, the student may not know how to handle rejection in an appropriate manner.

Through differentiation of content, process and product, a student can successfully overcome many barriers for full participation. Technology has leveled the playing field for students with disabilities. There are countless free resources that allow for all students to have meaningful engagement with the content. Below are several websites that can be helpful when providing access or providing meaningful engagement.

Providing curriculum access to all will better equip students to be college- and/or career-ready. While IDEA and Perkins V require us to provide curriculum access, it is best practice for all our students. Investing in our greatest capital, human capital, will reap far superior benefits for our future and for theirs! ■

Helen E. Malone is the department head for CTAE and transition at the Atlanta Area School for the Deaf. She has taught students with multiple and severe disabilities, worked in depth with curriculum and instruction, and has held multiple leadership roles. She holds degrees from Erskine College, Georgia State University and Central Michigan University. Email her at hmalone@doe.k12.ga.us.

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ACCESS AND EQUITY

By Catherine Imperatore

HIGH-QUALITY CAREER AND TECHNICAL EDUCATION (CTE) PROGRAMS DEMONSTRATE COMMITMENT to the success of students from different backgrounds and with varying needs. For this reason, Access and Equity is one of ACTE's 12 elements of high-quality CTE within the *Quality CTE Program of Study Framework*.

The Access and Equity element of ACTE's quality framework includes seven criteria that describe program of study promotion; student recruitment; and inclusive strategies that support access and equity for various student populations, including by gender, race and ethnicity, and special population status (such as individuals with disabilities, individuals from economically disadvantaged families and English learners). The criteria listed below are from the 2018 version of the ACTE *Quality CTE Program of Study Framework*.

Criteria for Access and Equity in High-quality CTE Programs

a. The program of study is promoted to all potential participants and their parents/guardians (as appropriate), in a manner that is free from bias, inclusive and nondiscriminatory.

b. Students are actively recruited from populations that have been traditionally under-represented, including by gender, race and ethnicity, and/or special population status.

c. Career guidance is offered to all potential and current program of study participants in a manner that is free from bias, inclusive and nondiscriminatory.

High-quality programs of study promote the program and recruit students in ways that are inclusive and intentional. Promotional materials, such as brochures, posters, websites and social media, and presentations delivered at schools and community events, should feature a variety of students from different demographic groups and special populations. Messaging should be carefully crafted to ensure that it avoids explicit or implicit biases and communicates that a variety of students can be successful in the program of study.

In addition, if data shows that students from certain populations have been under-represented in a program of study, administrators and teachers can actively reach out to these populations to inform them about the program and how it can help them achieve their goals. Community organizations and student groups that represent particular populations can help you make these connections.

Career development professionals across the program of study can also help with promotion and recruitment, and are responsible for delivering unbiased career guidance that informs

all students of their options within CTE. Additional criteria about the delivery of high-quality career guidance are addressed under the Student Career Development element of the ACTE framework.

d. Facilities, equipment, technology and materials are provided in a way that ensures all students have the opportunity to achieve success in the program of study, including by meeting Title IX, Americans with Disabilities Act and other accessibility requirements.

e. Curriculum, instruction, materials and assessments are free from bias, inclusive and nondiscriminatory, and offered in a way that ensures all students have the opportunity to achieve success in the program of study, including through accommodations, as appropriate.

The content of the program of study must be delivered in a way that enables students from various populations to succeed in the program whenever possible. This includes ensuring that facilities and equipment not only meet legal accessibility requirements, but also are welcoming and inclusive for students with different needs and varying abilities. Curriculum, instruction, assessments and learning materials must be reviewed for explicit and implicit bias, and appropriate accommodations made available. For instance, programs of study that have integrated industry certification exams into their curricula should consult with the certification provider to determine what accommodations are available and appropriate.

Beyond these requirements, teachers should also strive to differentiate instruction for various learning styles. This concept is not addressed in the Access and Equity element of the ACTE *Quality CTE Program of Study Framework*, but rather in the Engaging Instruction element.

f. Supportive services, such as tutoring and transportation assistance, are provided to ensure all students have the opportunity to achieve success in the program of study, as appropriate.

g. Appropriate actions are taken to eliminate barriers to extended learning experiences, such as work-based learning, CTSO participation and articulated credit, for all students, including special populations.

High-quality programs of study work to ensure access to work-based learning, career and technical student organization (CTSO) activities, and opportunities to earn articulated credit. For example, program staff can provide extra preparation and support to students with disabilities as well as their employers, to ensure work-based learning experiences are productive. In addition, programs of study should also consider providing logistical support and services such as tutoring, child care and transportation to ensure that students are able to focus on their coursework. This is particularly relevant for programs of study that support low-income youth and adults.

Community and business partners can often help with funding for these activities. A criterion addressing partner financial support for programs and students is included under the Business and Community Partnerships element. A related criterion in the Facilities, Equipment, Technology and Materials element calls on programs of study to maximize student access to facilities and equipment through partnerships and flexible delivery methods — a concept with particular relevance to rural and resource-limited programs.

Success Strategy: Inclusive Equipment and Materials

Assessing a program of study's commitment to access and equity can mean taking a new perspective. Roseburg High School participated in the National Alliance for Partnerships in Equity Education Foundation's Program Improvement Process for Equity (PIPE) training in 2015, with support from the Oregon Department of Education. By conducting an equity environmental scan and student surveys, program staff learned that young women were not participating in manufacturing courses, in part because protective gear was too large for them to wear comfortably and safely. Armed with this information, Roseburg invested in smaller helmets, gloves and jackets; developed a survey course to expose freshmen to each of the school's CTE programs, including welding; highlighted female welding students in community events; and invested, with funding from the Douglas Education Service District, in educator professional development on equity. By the following semester, female enrollment in welding had increased by more than 800 percent.

Tools to Promote Quality

To ensure all students have access to high-quality programs of study, and opportunities to succeed within those programs, practitioners can turn to ACTE's High-quality CTE Tools online library. Resources within the Access and Equity section address messaging to promote CTE; equity gap analysis and program improvement; overcoming barriers to work-based learning and CTSO activities for students from special populations; and specific, inclusive strategies for rural students, students with disabilities, economically disadvantaged students, low-skilled adults, English language learners and nontraditional program participants.

Practitioners can also use the *Quality CTE Program of Study Framework Self-evaluation Instrument* to assess a single program or multiple programs across a district or institution, in relation to ACTE's 12 elements of high-quality CTE. The rubric can be completed on paper or online, where users can receive automatically calculated scores, save and print their results, and be connected to the online library for areas identified as needing improvement. ■

Catherine Imperatore is research manager for ACTE. Email her at cimperatore@acteonline.org.

EXPLORE MORE

Quality CTE Program of Study Framework and Self-evaluation Instrument: **www.acteonline.org/high-quality-CTE**

High-quality CTE Tools Online Library: **www.acteonline.org/high-quality-CTE**

LEADING FOR EQUITY

By Ricardo Romanillos

LAST FALL A NEW ERA OF CAREER AND TECHNICAL EDUCATION (CTE) WAS USHERED IN WITH THE signing of the *Strengthening Career and Technical Education for the 21st Century Act* (Perkins V). While this important, bipartisan legislation ensures continued funding for CTE in secondary and postsecondary institutions, its lasting impression will be its commitment to equity.

Within Perkins V state and local leaders will find new equity provisions that expand and forefront the need to address issues of underrepresentation for diverse student groups in CTE programs. No longer solely a focus on gender, equity has been expanded to include the needs of culturally and linguistically diverse students, homeless students, and the children of active duty military personnel, among others. Through a local needs assessment process, local education agencies will engage varied stakeholders to identify and take action on pressing community-centered issues posing barriers for students.

While the specificity of these new provisions is critical to bringing equity to our schools, the breadth of opportunity (or lack of specificity) in other areas of the law signals a time of innovation for CTE policy. The space to be creative is at the heart of Assistant Secretary Scott Stump's message. He has asked leaders to seize this moment to be bold in bringing a new lens to state and local plans, and to resist the natural tendency to start with the assumptions and structures of previous plans.

This transition time, where states and then organizations will codify new language, presents a unique opportunity for leaders to place equity at the center of their work, and institutionalize access and opportunity. Now is the time to begin leading for equity in CTE.

Access and Opportunity

A focus on equity is a focus on making the myriad opportunities available through a CTE program, certificate or degree *actually* accessible to underrepresented students. A professional engagement doesn't pass without someone making mention of the many jobs going unfilled due to shortages in the labor market. Whether it's advanced manufacturing, nursing or welding, the stories are numerous and carry similar hallmarks. A recent report by The Manufacturing Institute and Deloitte indicates that more than half of skilled manufacturing positions remain open and are likely to go unfilled over the next 10 years (Giffi et al., 2018).

The difficulties of employers large and small is one aspect of the national economy that signals how employment and economic outcomes are influenced by demographics. While the national unemployment rate is a low 3.7 percent, black workers (5.9 percent) and workers with disabilities (7.7 percent) experience higher rates (BLS, 2018). Specific groups (e.g., black, Hispanic, Native American, women) also remain consistently underrepresented within many in-demand careers (Figure 1). In order to meet employers' labor needs, our job as educators must be to build new systems and transform our school culture so that students are pulled through career pathways and directly connected to opportunity.

Leading for Equity

To grasp and make use of the autonomy in Perkins V, a reframed mode of leadership is needed. From the National Alliance for Partnerships in Equity (NAPE), Leading for Equity addresses this with a simple and powerful idea — it is leadership with a primary focus on equity of access, opportunity and outcomes.

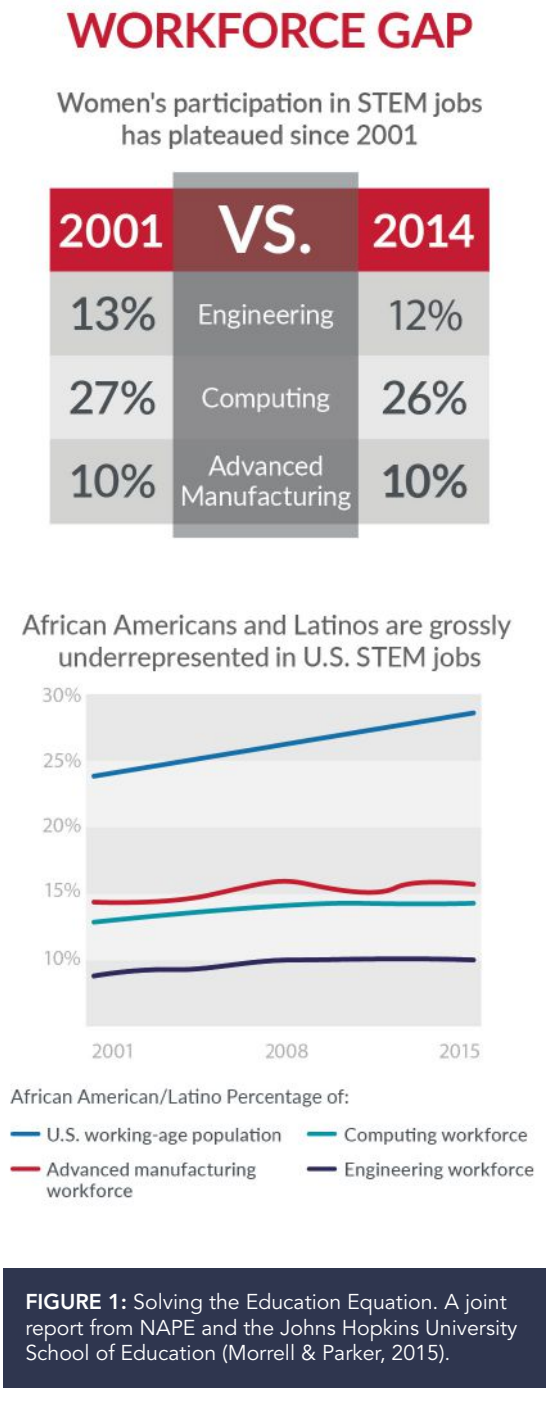

FIGURE 1: Solving the Education Equation. A joint report from NAPE and the Johns Hopkins University School of Education (Morrell & Parker, 2015).

> "This transition time, where states and then organizations will codify new language, presents a unique opportunity for leaders to place equity at the center of their work, and institutionalize access and opportunity. Now is the time to begin leading for equity in CTE."

Theories and models have covered a wide spectrum of ideas, detailing litanies of attitudes, behaviors and knowledge that administrators should employ. Leadership for learning is one such model that has garnered a great deal of focus in schools. It cuts through previous debates and uses quantitative data to distill the actions related to improved academic outcomes (Hallinger, 2010). Yet, the persistent achievement and employment gaps in the U.S. stand as ever-present reminders that these leadership models are lacking.

Chief among the deficiencies of business-style leadership models is an absent focus on the ways in which bias around race, class and ability have been worked into the policies and structures of schools. In taking a neutral stance to structural inequities we allow them to remain unseen and unchallenged, undoing high-minded policies seeking to improve outcomes. Leading for equity counters this trend. Remedying equity gaps in CTE requires action that will 1) uncover and undo old systems where possible, and 2) empower educators, students and families through equitable policies that redistribute assets to confront entrenched power dynamics (Figure 2).

Taking Action

Acting to counter old inequities can be a daunting task, naturally leaving us to consider where to begin. Research shows that our actions as leaders within schools are not equally impactful (Hallinger, 2010). Drawing from this same research and from the fields of social justice and education, NAPE has developed a Leading for Equity framework of action. Three broad levers are available to direct our leadership work.

a) **Policies and procedures:** Written rules and regulations can replicate our internal implicit biases. Evaluating new and existing policy with the aid of representatives from underserved communities is one key to catching and eliminating biased language. Are current policies in your organization inadvertently disadvantaging groups of students?

b) **Instructional supervision:** Teachers and faculty are the most influential part of any school. Professional learning can aid in reducing teacher prejudice, increasing expectations and changing pedagogy to be culturally responsive. How are teachers being empowered and supported with professional development to create a culturally responsive learning environment?

c) **Community:** The internal climate of a school and the external stakeholders engaged are both important areas of focus. Using cultural brokers to bridge the gap between schools and communities can bring oft-unheard voices to inform our programs. Which key community groups are missing in current outreach efforts, and what community organizations could bridge the gap?

Overarching across these three levers is a leader's vision of equity. A leader's vision and "values define both the ends toward which [they] aspire as well as desirable means by which they will work to achieve them" (Hallinger, 2010, p. 128). Our ideals are evident in our everyday actions, our formal and informal communications, and within our rules and regulations. A vision of equity that plainly acknowledges that CTE systems must change to suit students and families is immediately felt across a program or institution.

As we venture into this next iteration of CTE, it is paramount for leaders to speak to the varied realities of the students and communities we serve. The Leading for Equity framework guides our work and empowers us to utilize the freedom available in Perkins V to remedy persistent deficiencies. NAPE's work with CTE leaders and teachers has consistently illustrated that thoughtful and purposeful action can and will improve outcomes for diverse student groups. ■

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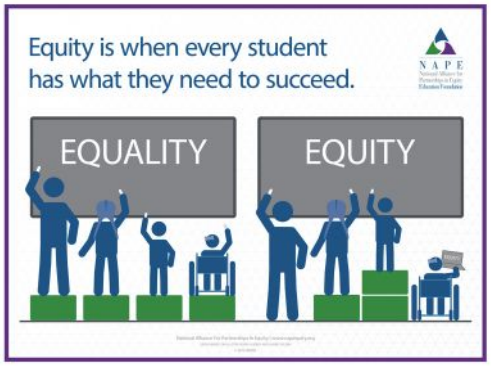

FIGURE 2: Equity versus equality. Available on the NAPE website.

INCREASING ACCESS & EQUITY: A WHOLE SCHOOL APPROACH

By Dale Winkler & Scott Warren

Despite a pervasive national rhetoric around college and career readiness, just eight percent of high school graduates complete a full college- and career-preparatory curriculum, and nearly half of all graduates complete neither a college- nor a career-preparatory curriculum, according to the Education Trust (Bromberg & Theokas, 2016). The numbers are worse in schools serving high percentages of minorities and schools in geographically isolated or economically disadvantaged communities.

Many youth also graduate without basic workplace knowledge and skills. Leading employers report struggling to find qualified workers with the broad mix of skills described by the Business Roundtable — industry-specific technical skills; all-purpose skills in science, technology, engineering and math (STEM); and essential employability skills like the ability to communicate well, read technical materials, work in teams and solve complex problems.

We believe that career pathway programs that blend quality career and technical education (CTE) and college-preparatory academics offer a way to increase readiness, postsecondary attainment, career advancement and economic stability for youth of all genders, races, socioeconomic backgrounds and ability levels.

States are using career pathways as an essential element of college and career readiness initiatives that satisfy the requirements of the Every Student Succeeds Act (ESSA) and Perkins V.

Adopt Improvement Frameworks

The Southern Regional Education Board (SREB) has a long history of helping K–12 schools and technology centers in racially, economically and geographically diverse communities adopt school improvement frameworks that are based on the belief that students can master challenging academic and career pathway curricula when taught in environments that encourage them to succeed.

SREB's Making Schools Work frameworks are also grounded in research showing that high-quality CTE keeps students engaged and achieving at higher levels,

Bold Goals for Student Achievement

In the **middle grades**, 90 percent of students should enter high school able to read and understand grade-level texts and prepared to take Algebra I.

In **high schools and technology centers**, 90 percent of students should earn enough credits as first-time ninth-graders to enter the 10th grade, 95 percent should graduate on time, 80 percent should graduate college- and career-ready, and 60 percent should earn a credential or degree of value by age 25.

prevents dropout, promotes successful transitions to postsecondary education and the workplace, and offers special benefits to minorities, young men, and students from low-income families (Kemple & Willner, 2008; Stone, 2017).

Our approach began in 1987 with the High Schools That Work framework, which we expanded to address the unique needs of middle grades schools and technology centers with Making Middle Grades Work and Technology Centers That Work. Now encompassing all of K–12, Making Schools Work engages educators and leaders in identifying problems of practice that prevent at-risk students from achieving, implementing research-based solutions to those problems, and learning within a collaborative network.

Schools that adopt these frameworks implement key practices that expand access to rigorous curricula, help academic and CTE teachers integrate their instruction, improve the quality of instruction in all classrooms, provide students with personalized supports, and help leaders foster a culture of continuous improvement.

Network schools report experiencing fewer absences and disciplinary incidents as well as increased attendance, graduation rates and achievement. They can also set and achieve Making Schools Work's bold goals (sidebar).

Increase Access to Career Pathways

In December 2013, SREB convened national CTE experts and state leaders to determine actions to address growing gaps in workforce preparation and credential attainment. The result was *Credentials for All* (Bottoms & Sundell, 2015), a report that gave states, districts and schools a set of actions for increasing access to pathways that:

- Are driven by labor market demand
- Are comprised of a college-ready academic core and a challenging sequence of technical courses
- Align three stages of learning — secondary, postsecondary and workplace
- Offer guidance systems that connect career exploration with ongoing advisement
- Allow students to accelerate their learning and earn advanced credentials and college credits
- Lead to postsecondary credentials and degrees and high-skill, high-wage, high-demand careers

We responded to this report by intensifying the focus of our frameworks on helping districts and schools develop or expand career pathway programs, align pathways with labor market demand, and conduct curriculum and instruction reviews and pathway reviews that now help districts meet the access and equity requirements of Perkins V.

We also partner with districts and schools to design pathways that attract underrepresented and nontraditional students.

One such collaborative effort is Kentucky's new nursing pathway. In October 2015, SREB convened state leaders around the goal of building pathways from high school to careers in high-growth industries. At the meeting, Kentucky leaders committed to developing a seamless, secondary-to-postsecondary pathway in nursing, one of the state's most in-demand fields (Sundell & Shaughnessy, 2017).

Kentucky's nursing pathway is delivered alongside a college-ready academic core. SREB recommends that the core include four years of college-preparatory English, three years of lab-based science, three years of social studies, and four years of college-prep math that is tailored to students' career interests. For example, students pursuing credentials and careers in STEM fields like nursing or health care would take Algebra II and

Advanced Career Pathways

- Aerospace Engineering
- Automated Materials Joining Technology
- Clean Energy Technology
- Energy and Power
- Global Logistics & Supply Chain Management
- Health Informatics
- Informatics
- Innovations in Science and Technology
- Integrated Production Technology
- Oil and Gas

higher math. Students pursuing credentials and careers in non-STEM fields might take Algebra I, geometry and two career-related math courses.

Introduce Students to Careers

In 2009, SREB published a commission report that challenged states, districts and schools to expand access to curricula that blend college-ready academics with hands-on learning and introduce students — especially at-risk and nontraditional students — to career options (Bottoms, Spence & Young, 2009).

Later that year, SREB began partnering with state leaders, employers, postsecondary educators and master teachers to design 10 Advanced Career (AC) curricula that prepare high school students for industry and postsecondary credentials and degrees and exciting careers (sidebar). Each four-course pathway was purpose-built to attract underrepresented and nontraditional students and spark their interest in STEM careers through project-based assignments. As an out-of-the-box curriculum, AC can also help rural and urban schools and districts address access and equity.

Schools have found that AC helps students find a purpose for learning because its multiweek projects challenge them to apply their knowledge and skills to solve complex, real-world problems. Postsecondary and workplace learning opportunities — key elements of ESSA and Perkins V — are baked into AC's curricula and projects.

Perkins V also calls on state and local education agencies to provide career exploratory experiences as early as fifth grade. Early learning experiences are key to introducing students to STEM degrees and careers. In a 2011 survey of students and parents commissioned by Microsoft, nearly four in five STEM college students said they decided to study STEM in high school or earlier; one in five decided in the middle grades or earlier (Harris Interactive, 2011).

In response to this need, SREB developed a project-based middle grades STEM curriculum that introduces students to the principles of scientific inquiry and the engineering design process. As a "pre-AC" curriculum, middle grades STEM projects were designed to appeal to nontraditional students and students whose exposure to a broad range of STEM career opportunities may be limited.

To further address the cultural, geographic and economic limitations diverse students face, Making Schools Work frameworks also encourage schools to offer career aptitude surveys along with interest inventories to help students make the connection between their talents and career possibilities.

Focus on Quality Instruction

High-quality instruction is essential to school and student success. Schools implementing SREB's improvement frameworks use project-based learning to infuse CTE with high-level math, science, language arts and problem-solving skills that prepare students for the modern workplace and continued learning.

The frameworks also provide tools and practices that enhance the quality of instruction and help students connect what they learn in the classroom with their career and college goals.

Literacy is an essential workplace skill. Our powerful literacy practices advance students' reading, writing, speaking and listening skills and content achievement. Literacy-based assignments in every class require students to read grade-level or higher texts and demonstrate their understanding in writing and discussions.

Effective schools create an organizational structure and schedules that give

> "'Struggling students don't learn more by us teaching them less.' I learned that as principal of Decatur High School. With SREB support, we opened access to high-level courses, removed 'basic' options, and brought equitable experiences to students of all backgrounds and achievement levels. Raising the floor and removing the ceiling transformed our school."
>
> –Lauri Johnson, division director, SREB

Six Elements of Professional Development

1. Build the capacity of teacher-leaders with professional development and job-embedded coaching.
2. Develop local certified literacy and math trainers who can provide coaching support within schools and across the district or region.
3. Conduct classroom observations and provide feedback that helps teachers shift their practices.
4. Work toward schoolwide and districtwide implementation by developing lead teachers and local trainers.
5. Work with principals to conduct classroom observations that focus on powerful literacy and math practices.
6. Adopt rubrics and tools that give teachers and leaders a common vision for best instructional practice.

teams of academic and CTE teachers time to co-plan instruction, design standards-driven assignments and assessments, and model and share effective instructional strategies.

To support these shifts, SREB developed a six-element approach to professional development (sidebar) that changes professional learning from an event to a process.

SREB's improvement frameworks also help schools expand access to job shadows, internships, co-ops, school-based enterprises and service learning. Schools plan a range of developmentally appropriate work-based learning experiences in partnership with employers. Experiential learning is especially valuable for low-income students who may lack the social capital to learn about careers.

Support Students

As changes in curriculum and instructional practices occur, SREB's school improvement frameworks help schools adopt a systematic approach to identifying and supporting each student's unique needs. Evidence suggests that literacy and math courses like SREB's can increase students' academic achievement and prepare them for college-level coursework.

In spring 2016, SREB worked with Arkansas and Mississippi to offer students the opportunity to retake the ACT exam after completing SREB's college-preparatory Literacy Ready and Math Ready courses.

Over 50 percent of students who took Literacy Ready increased their overall ACT score by an average of two or more points and their English and science scores by an average of three or more points (Bottoms & Squires, 2017). SREB found that 40 percent of Literacy Ready students who fell within three points of a cutoff score in ACT's English, reading or science exams met the state readiness benchmark and could avoid remediation in college.

About 60 percent of students who took Math Ready increased their overall ACT score by an average of two or more points and their math and science scores by two or more points in math and three or more points in science. More than 35 percent of Math Ready students who fell within three points of a cutoff score in ACT math or science met the state readiness benchmark and could avoid remediation in college.

Increase Access & Equity for All

In urban, suburban and rural settings, SREB's school improvement frameworks provide a structure that empowers schools to make the changes needed to expand or improve access to high-quality programs and ensure that all students — regardless of their gender, race, socioeconomic background, ability level or location — discover a purpose for learning and life.

With support, middle grades schools, high schools, technology centers, postsecondary partners and workforce leaders can create career pathway programs that expand opportunities for all.

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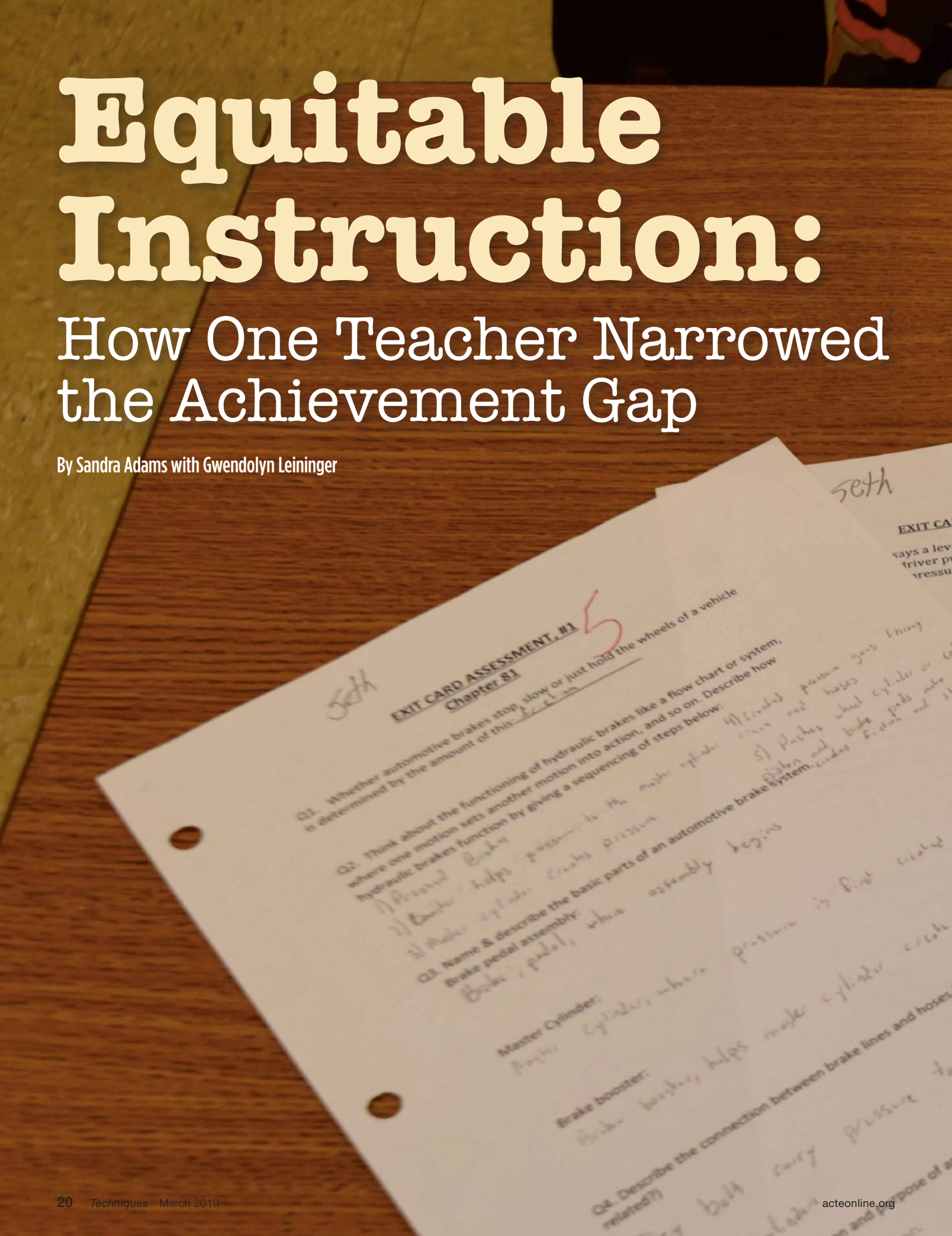
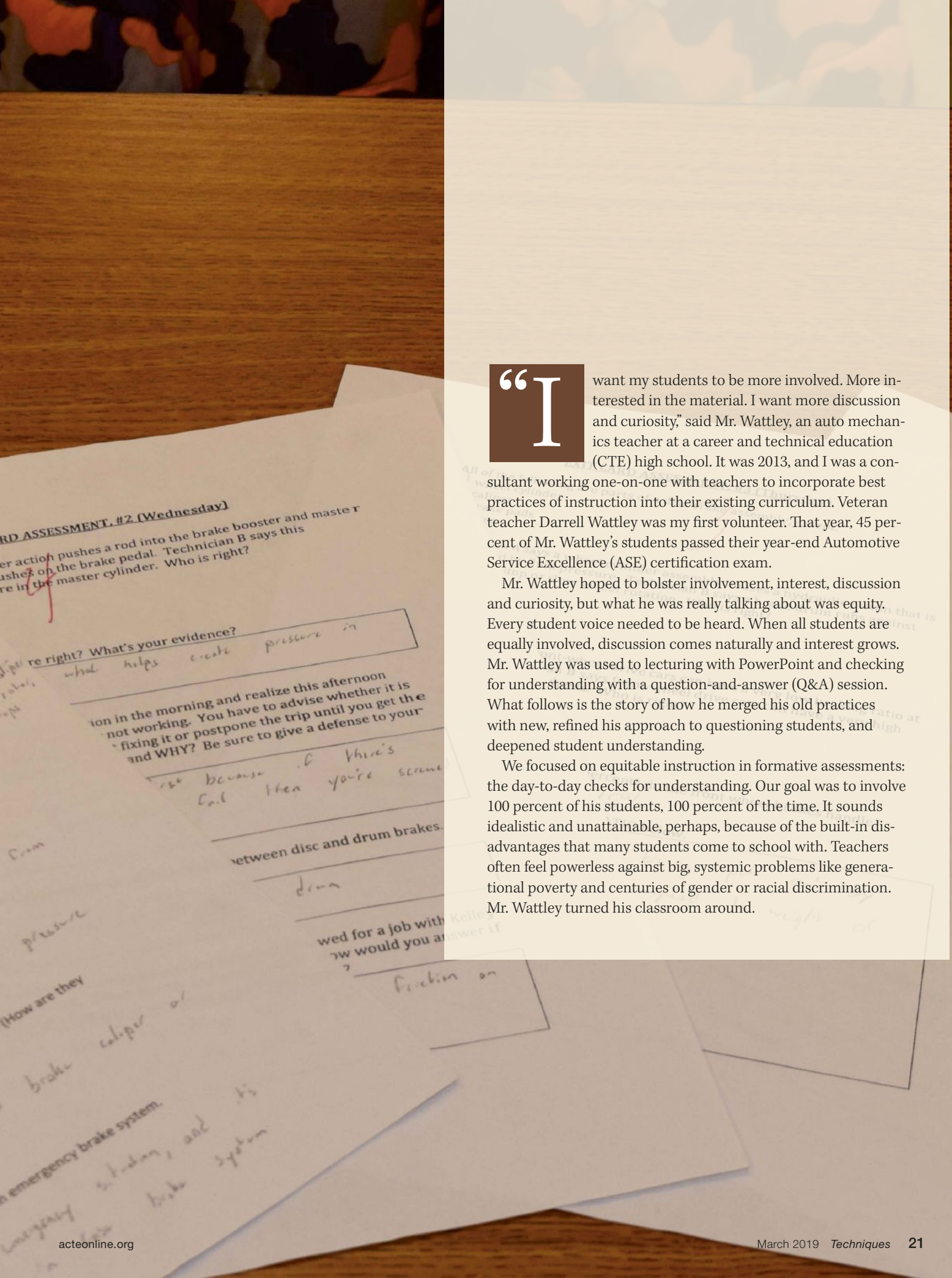
Equitable Instruction:

How One Teacher Narrowed the Achievement Gap

By Sandra Adams with Gwendolyn Leininger





"I want my students to be more involved. More interested in the material. I want more discussion and curiosity," said Mr. Wattley, an auto mechanics teacher at a career and technical education (CTE) high school. It was 2013, and I was a consultant working one-on-one with teachers to incorporate best practices of instruction into their existing curriculum. Veteran teacher Darrell Wattley was my first volunteer. That year, 45 percent of Mr. Wattley's students passed their year-end Automotive Service Excellence (ASE) certification exam.

Mr. Wattley hoped to bolster involvement, interest, discussion and curiosity, but what he was really talking about was equity. Every student voice needed to be heard. When all students are equally involved, discussion comes naturally and interest grows. Mr. Wattley was used to lecturing with PowerPoint and checking for understanding with a question-and-answer (Q&A) session. What follows is the story of how he merged his old practices with new, refined his approach to questioning students, and deepened student understanding.

We focused on equitable instruction in formative assessments: the day-to-day checks for understanding. Our goal was to involve 100 percent of his students, 100 percent of the time. It sounds idealistic and unattainable, perhaps, because of the built-in disadvantages that many students come to school with. Teachers often feel powerless against big, systemic problems like generational poverty and centuries of gender or racial discrimination. Mr. Wattley turned his classroom around.

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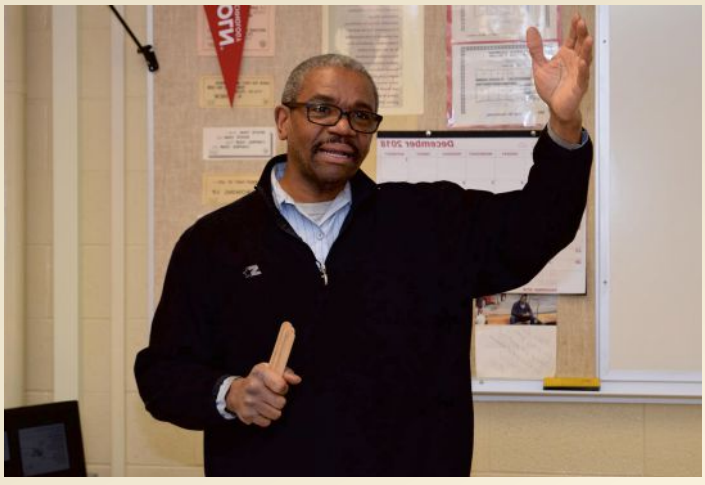
He expected growth.

The first place to cultivate equity is your mind. Students won't grow if you aren't willing to grow yourself. Darrell Wattley volunteered to work with me. He chose not to internalize his teaching methods and took no offense at the suggestion of change. He took a closer look at a question-and-answer lecture style that had seemed to work for him for years, and embraced the challenge of improving it.

Examine your own attitudes and classroom activities. No one consciously discriminates against students; but unless you actively communicate an expectation of growth from every student, some students may still receive negative messages. For instruction to be truly equitable, educators must first examine their own expectations for their students.

Recall the well-known Oak School experiment, in which teachers were told that certain randomly chosen students had "high potential for intellectual growth." After one academic year, the students who had been singled out for success showed significantly greater improvement than their classmates and were rated more highly by their teachers (Rosenthal & Jacobson, 1966). Over 50 years later many teachers still fall into the trap of low expectations, to the detriment of students. The belief that all students can grow is the first essential step toward equity in the classroom. Check your mindset, and label all of your students as "high potential for intellectual growth." Your instruction cannot be equitable otherwise.



He examined data.

Despite his willingness to grow himself and his students, Mr. Wattley had yet to realize the extent of the problem. He knew he wanted more student involvement, but he didn't realize quite how lacking in equity his class discussions actually were. He needed some data.

I sat in on his classes and took a simple tally of how many times each student participated during a 20-minute observation. Only four of 12 students spoke productively in the classroom. I have performed this simple tally exercise with several teachers, and the results shock them every time. Almost always, a handful of students speaks up while the majority remain silent, and their test scores usually show it. Lack of verbal participation contributes to the achievement gap.

He facilitated productive talk.

It is true that each student has an equal opportunity to raise their hand, but if we truly believe that all students can grow, we must do more to involve those who tend not to participate — to turn equal opportunity into real equity. Mr. Wattley understood the difference and made small changes to his existing teaching style to make equity possible.

Above I mentioned that few of Mr. Wattley's students "spoke productively." Productive talk is talk that promotes learning. It's a teacher-structured conversation, where students construct meaning for themselves through talk. Students listen, explain, question, challenge each other's ideas, and revise their own opinions based on input from others. Students learn through speaking productively, so, to increase learning by all students, all students must engage in productive talk.

30-second Talk-about

When he noticed students' attention waning during lectures, Mr. Wattley encouraged productive talk with a simple exercise in which partners took turns speaking and listening to each other on an assigned topic for 30 seconds each without stopping. It took just a few minutes and required minimal preparation and no supplies. It was, quite simply, having students talk to each other. But, by giving that talk time a catchy name and a deliberate design, it can be a useful strategy for building classroom equity. Getting students out of their seats woke them up, physically increasing blood flow and catering to kinesthetic learning styles. The 30-second

Talk-about exercise pushes every student to take ownership of their learning, organize it in their minds, and explain it to a peer in a relaxed environment.

Think-pair-share

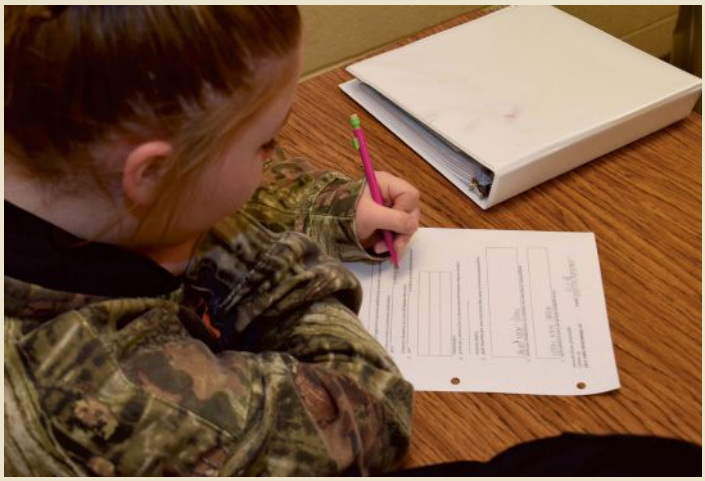
He also began using think-pair-share, another equity-boosting strategy. As Mr. Wattley's automotive students were learning about suspension systems, he directed them to brainstorm, individually, everything they knew about systems in general for three minutes without stopping. Next, he gave them six minutes to partner up and compare lists, working together to compile a definitive list of traits that all systems have in common. After that, Mr. Wattley called on pairs to share what they had come up with, fostering a whole-group discussion until they reached a consensus. Finally, he began his own prepared lecture on suspension systems, pointing out elements that the students had shared from their lists.

The teacher took on the role of facilitator, continuously moving through the room, listening and ensuring everyone stayed on topic. Even after the student-talk portion of the exercises, Mr. Wattley used what he had learned from listening to his students to increase the effectiveness of his lecture. He called on students to share what their partner or group had discussed, drawing them even further into productive talk. With a better understanding of his students' prior knowledge, he could pace his ensuing lecture appropriately; the students themselves had given him — in their own words — key points to emphasize and explain.

Through these exercises, he drew every student into productive talk. That's equity! Although Mr. Wattley was listening and encouraging students, he did not need to hear individually from every student. Equity in productive talk is not about the instructor hearing every word; it is about providing the opportunity for every student to speak productively — and thus, to think deeply.

He focused on the thought process.

Deep thought from every student became a goal of productive talk, but Mr. Wattley also wanted to increase his students' interest and participation even when they were not talking. With his traditional question-and-answer style, the only students required to engage mentally were those who would raise their hands to speak. The remaining two-thirds of the class were permitted to check out. He realized he didn't need to call on every student every time — the mere possibility of being called on would encourage continued mental participation from every student.



He took a cue from writer Dylan William and wrote each student's name on a Popsicle stick and put the sticks in a jar. Each time he asked a question, he drew a stick from the jar and called on that student; the Popsicle stick went back in the jar and could be picked again. No student was ever off the hook. Mr. Wattley's Popsicle stick jar ensures equity in group discussions and ensures that all students participate mentally (William, 2011).

Recently, I observed Mr. Wattley's class, during which he used the Popsicle stick trick. And every student participated verbally — multiple times — because they were all participating mentally throughout. He received productive, useful feedback from 100 percent of his class.

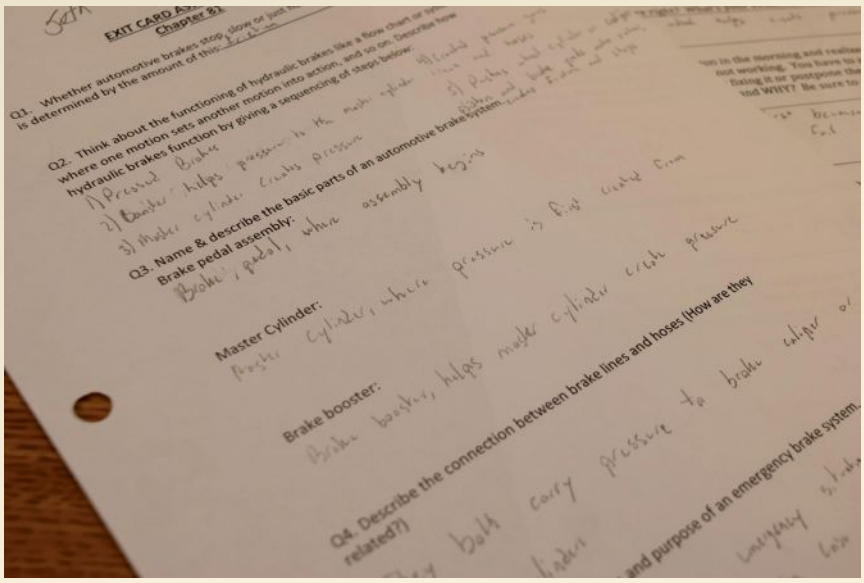
He continued to tweak his Q&A sessions by incorporating individual dry erase boards. As students wrote their answers and held up their boards, Mr. Wattley waited until everyone had written something before calling on anyone. At most, this took a few extra seconds per question, but the effect was profound. When you pose a question to a group of students, the goal is often perceived as one correct answer, so the teacher can move on. But to achieve equity in the classroom, the goal must, instead, be to get everyone thinking toward the answer.

Previously, only the most-engaged students had consistently gotten the opportunity to think through questions to their conclusions; now all students got to keep their thinking opportunities, and they began to understand that thinking and learning, rather than finding a correct answer, is the real goal. The quickest students still get the feeling of competency, but not at the expense of anyone else's thinking time. In every class there is a student who will reach the answer faster than another. Equity-minded teachers must find ways to give every student a chance to think through tough questions.

Equitable Instruction:

How One Teacher Narrowed the Achievement Gap

> "Students subconsciously ask themselves four key questions about any learning material: How do I feel? Am I interested? Is this important? Can I do this? (Marzano & Pickering, 2010). Fostering student engagement requires lessons structured in such a way that all students answer "yes" to these questions."



Where Equity Meets Rigor

Increasing equity did not diminish rigor or keep eager learners from being challenged. In fact, the effect of equity was quite the opposite — it allowed Mr. Wattley to discover new ways to add rigor. Seeing his students' improvement gave him confidence to tackle what he saw as his biggest obstacle to rigor: the study guide.

Students used class notes and the textbook to complete a study guide worksheet for each unit, which they would then use to study for the test. It was busywork, and it didn't require deep thinking. He graded the worksheets just to make students accountable to complete them, yet they amounted to meaningless, inflated grades. He had kept the worksheets every year because they gave his students a cohesive, concise resource for studying, but he knew they were not adding much value during class time. Students subconsciously ask themselves four key questions about any learning material: How do I feel? Am I interested? Is this important? Can I do this? (Marzano & Pickering, 2010). Fostering student engagement requires lessons structured in such a way that all students answer "yes" to these questions. Yet Mr. Wattley's study guide worksheets were getting a resounding "no" from most of his students.

The answer was exit cards. Rather than spending long periods of instructional time on the worksheet, he broke it into chunks, and each day students spent the last few minutes of class answering questions that corresponded to what they had learned that day. Each student had to think through the key points of the day's lesson to answer the questions — turning the rote "open textbook" worksheet into meaningful thinking work. In addition to reinforcing each day's lesson, the cards allowed Mr. Wattley to check for understanding, and he could spend the beginning of the next class filling in the gaps in their understanding, with plenty of time to strengthen their weak points before the test. The students kept their exit cards, compiling them eventually into an effective study guide at the end of each unit.

All of the changes Mr. Wattley made were small, but perfecting small elements of his teaching style snowballed over three years into what can only be described as a turnaround. His own willingness to grow gave everyone an opportunity to think and speak productively. The effect of increased equity was great. In 2013, 45 percent of Mr. Wattley's students passed their automotive certification exam. By the end of 2015, 77 percent passed, and those numbers have held strong: with 74 percent passing in the spring of 2016 and 82 percent in the spring of 2017.

The ASE certification exam has not changed, nor have the socioeconomics of Mr. Wattley's classes. What has changed is the teaching. It took patience and perseverance to see the effects of greater equity reflected in their scores. Many systemic inequalities remain in our larger American culture, but by increasing equity in his own instruction Mr. Wattley has leveled the playing field for a large percentage of his students, who now have the authentic knowledge and certification necessary to enter the skilled workforce. ■

Sandra Adams is a teacher and instructional coach with the Career Academy, Fort Wayne Community Schools. She co-wrote the ACTE-supported book *But I'm NOT a Reading Teacher!: Literacy Strategies for Career and Technical Educators* with Gwendolyn Leininger. Email her at sandra.adams@fwcs.k12.in.us.

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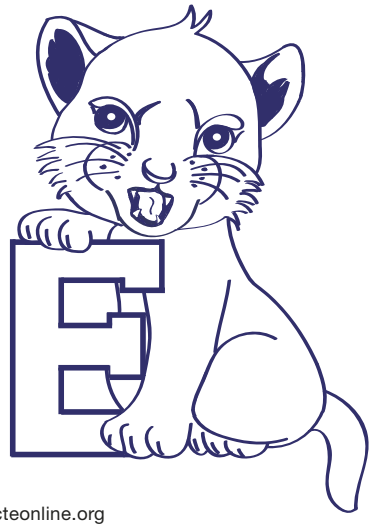
CTE Brings Storytelling to Life

By Patrick M. Cain

There are few things more memorable to a child than having a story brought to life. From an early age we can all remember that special someone who read to us and did so much more, drawing us into the story and making us feel as if we were there with the characters. Deborah Owens, special education teacher at WeeCats Preschool, is a gifted storyteller.

No matter how much inflection she used, nor how descriptive she would make the story, Owens knew she would not be able to bring stories to life for her visually impaired students in the same way she could for her non-visually impaired students. That is, until now!

In collaboration with career and technical education (CTE) programs within Enterprise City Schools, Owens is working toward a goal to bring children's books to life for all of her students in a therapeutic sensory library. Together, CTE instructors Josh King, engineering; Brad White, arts, A/V technology and communication; Buddy Skinner, construction framing and electrical; and Jerad Dyess, agriscience, lead their students in projects to design, manufacture and install various pieces of the library. What began as a dream for Owens will become reality, while CTE students see their knowledge and skills come to life through this yearlong work-based learning project.



The Back Story

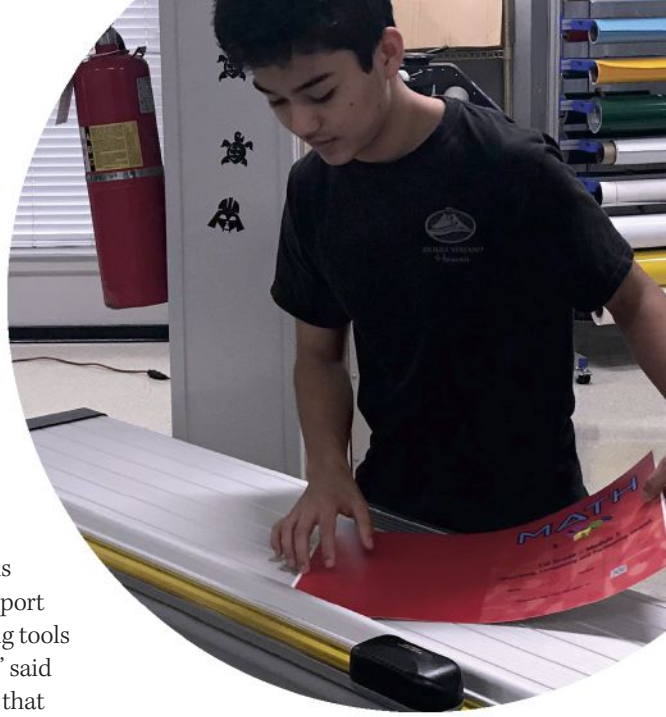
Joylee Cain, special education director for Enterprise City Schools and chief executive officer of WeeCat Industries, along with Owens, has successfully embedded the Alabama Developmental Standards for Preschool Children (2013) into their daily curriculum for three- and four-year-old special education and general education students using simulated workplace and live work philosophies. In *Techniques* in March 2018, Cain was quoted, "We are educating the workforce of the future. It is essential to consider the voice of business and industry in planning for instructional delivery in the preschool setting when the window to learning is optimal. The early acquisition of workplace skills can change a child's trajectory in life." The article goes on to discuss specifics about planning, development and implementation.

The Vision

Steve Jobs was renowned for his famous quote, "One more thing..." No matter how great his newest product, Jobs continually pushed his company and its developers to find new and innovative ways to make. Cain and Owens do this, too, to ensure that their students receive the best education possible.

A Brief History of Enterprise, Alabama

To provide a little context: In 1915, our way of life in the City of Enterprise (n.d.) was threatened by the invasion of the Mexican boll weevil. This small insect wreaked havoc on our crops; approximately 60 percent of the cotton production that year was destroyed. As family farms faced bankruptcy and a spiraling economy, farmers turned to peanuts. In two years, Coffee County, Alabama, produced and harvested more peanuts than any other county in the nation. As a show of appreciation for the lessons learned, Enterprise erected the world's only monument to an agricultural pest, the boll weevil, in 1919. Inscribed at the bottom of the monument, text reads, "In profound appreciation of the boll weevil and what it has done as the herald of prosperity, this monument was erected by the citizens of Enterprise, Coffee County, Alabama."



Their newest, "One more thing…" is a therapeutic sensory library — also referred to as Cotton's Cove after WeeCat Industries' beloved mascot Cotton, a baby wildcat. Their library will be unlike any in our area. Cotton's Cove will be designed to reflect the diverse landscape of the piney woods and oaks of the past to the vast agricultural community of today. Cain and Owens envision a library that brings storytelling to life for their visually impaired students in an environment that pays tribute to the history of our great city through sight, smell, hearing, taste and touch.

Engineering

"In the beginning, I thought we could make our own tactile books but quickly realized we needed some help," Owens explained. "After speaking with others in our district, it was determined that this could be a great project for our engineering students."

Josh King's "Introduction to Engineering Design" course focuses on the design process and its application. His students apply engineering standards through the use of Autodesk Inventor (**Editor's note:** the same 3D modeling software used by ACTE's 2018 Student Trophy Design Contest winners) to develop solutions for real-life problems.

Using the knowledge and skills learned in King's classroom, engineering students will design and manufacture tactile books for Cotton's Cove. Tactile books are a must to foster age-appropriate developmental literacy skills for visually impaired students; they provide value-added supports for literacy instruction, and are used to develop concepts and hone sensory efficiency skills.

Engineering students will sketch the tactile page on paper with rough dimensions and discuss key literacy words for creation. Next, the students design the tactile page in Autodesk Inventor before then converting the design to an STL file, adding that file to the 3D printer and orienting the object for a successful 3D print using MakerBot and Stratasys Mojo 3D Printers.

"Originally, our engineering program was going to work with Owens and WeeCats Preschool as tech support for an idea they had to print learning tools for their visually impaired students," said King. "It's become much more than that and I am so happy we are able to design and create these books for their students."

"It takes a lot of time to design and print a tactile book," said Christopher LaVoy, a sophomore engineering student at Enterprise High School. "It's a great idea though, and I think the preschool students will really benefit from us doing it." Enterprising engineering students like LaVoy have designed and printed many tactile puzzles and books in 2018–19, including *Goodnight Moon, The Snowy Day, If You Give a Mouse a Cookie,* and *Pete the Cat and His Four Groovy Buttons.*

Arts, A/V Technology & Communication

Students enrolled in Brad White's digital design course will apply their knowledge and skills to address a variety of components for Cotton's Cove. Within Adobe Illustrator — and while learning layout and design techniques, type styles, desktop publishing, processing mechanical production files and other various computer operations — students will create a realistic, nature-themed scene for the therapeutic sensory library to reflect our city's rich agricultural history.

The digitally designed nature scenes include a large southern live oak tree. In addition, the students will design custom-made light covers to mimic both the daytime sky, with fluffy clouds, and a night sky, with stars. The day and nighttime scenes will also include a sun and moon, to be illuminated by students in the CTE electrical program.

When asked about this project and the ways in which he approached its undertaking with his students, White stated, "I believe the most important thing we do for students is build relationships with them. Because we can approach the subject in real-world terms, the work has meaning for students and it's not just for show. The students are learning to think for themselves and problem-solve instead of immediately raising their hand and asking questions."

Construction Framing & Electrical

Students enrolled in our Construction Framing course will apply their knowledge of framing principles: from lumber selection and material estimation, to floor systems, wall and stair

> When asked about this project and the ways in which he approached its undertaking with his students, White stated, "I believe the most important thing we do for students is build relationships with them. Because we can approach the subject in real-world terms, the work has meaning."

construction, and everything in between. In one corner of the library, students will design and build a custom reading nook framed out with wooden beams that appear embedded inside the trunk of a large southern live oak that replicates so many found in our area. On either side of the reading nook, along the walls, students will design and build pie-shaped seating areas, which will then be covered in material like grass to simulate the look and feel of a field, under a tree — the perfect spot to sit and read a book.

In addition, pine tree replicas will frame out the large window in the library; each tree in the therapeutic sensory library is designed to have the look and, most importantly, the feel of actual tree bark. The limbs of the trees will extend into the library and along the ceiling, adorned with pine needles in varying sizes to bring to mind the history of our piney wood landscape. At the bottom of each trunk, students will design and build custom bookshelves to accommodate the oversized books for our visually impaired students. Not only will these bookshelves accommodate larger books, but they will also be mobile so teachers can easily move the books to various areas of the library as needed. This will be especially useful for our students who have mobility issues that might make it difficult to travel from one side of the library to the other.

Students enrolled in Buddy Skinner's electrical course will see classroom concepts come to life as they work in the library to assist in the installation of electrical systems. His students will install wiring and other electrical components, including switches and light fixtures, based on a blueprint and meeting the National Electrical Code and state and local codes. Skinner, a tradesman with more than 40 years' experience, is a licensed home builder, master plumber and electrician.

"It is so important for these students to learn these skills not only to benefit themselves, but to replenish a struggling workforce," said Skinner.

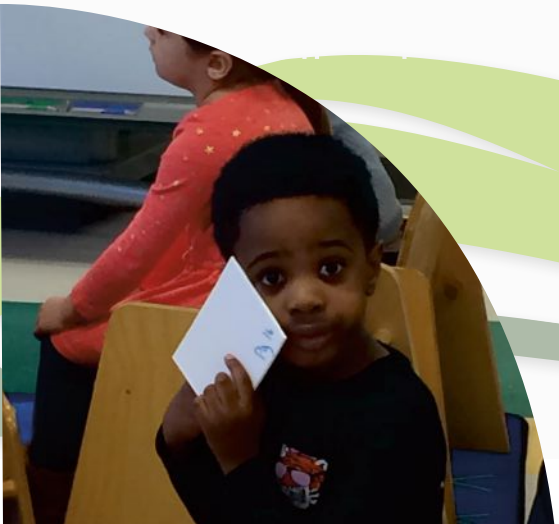
Agriscience

New to the Enterprise City Schools agriscience program is a computer numerical control (CNC) router. Agriscience students now have the opportunity for exposure to and experience with designing and manufacturing custom products using a CNC router with precision and automation. For some students, they will be able to transfer some knowledge of computer-aided design (CAD) and skills learned in their engineering course, while for others, this will be the first time they are exposed to this amazing type of technology.

To pay homage to our iconic boll weevil monument, agriscience students will utilize a CAD program and the CNC machine to design and manufacture their own 3D version of the monument, which will depict the WeeCat Industries mascot, Cotton, holding up his friend and sidekick, Peanut, the boll weevil. The model monument will include a small water feature, designed and built by Enterprise students, just like the one at the base of our boll weevil monument, standing proudly in the middle of Main Street.

Jerad Dyess, agriscience teacher, found his calling from an early age, while a student at Enterprise High School. "This piece of equipment is just one example of the many opportunities our students have in Enterprise to learn, and just as important, to give back to our great community," he said.

The concepts, designs and products in the therapeutic sensory library are based, historically and contextually, on our home in southeastern Alabama, and they are designed to be aesthetically pleasing. But more importantly, they provide Cain and Owens the ability to expose their three- and four-year-old special education and general education students to books and reading in a way unlike ever before. No matter a child's exceptionality or what challenges they may face, WeeCat Industries brings storytelling to life through the help of career and technical education.



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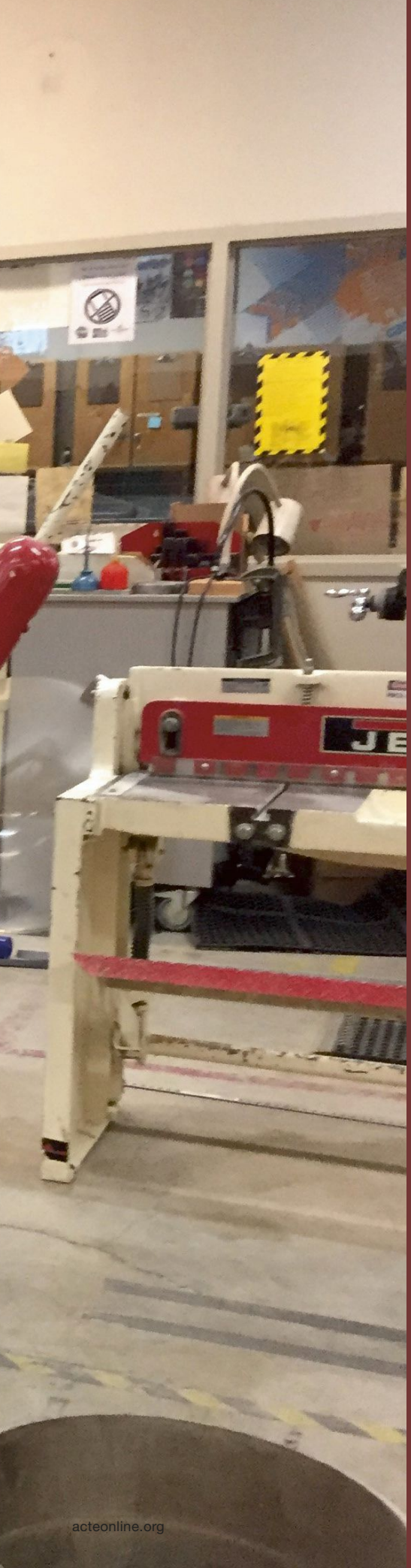

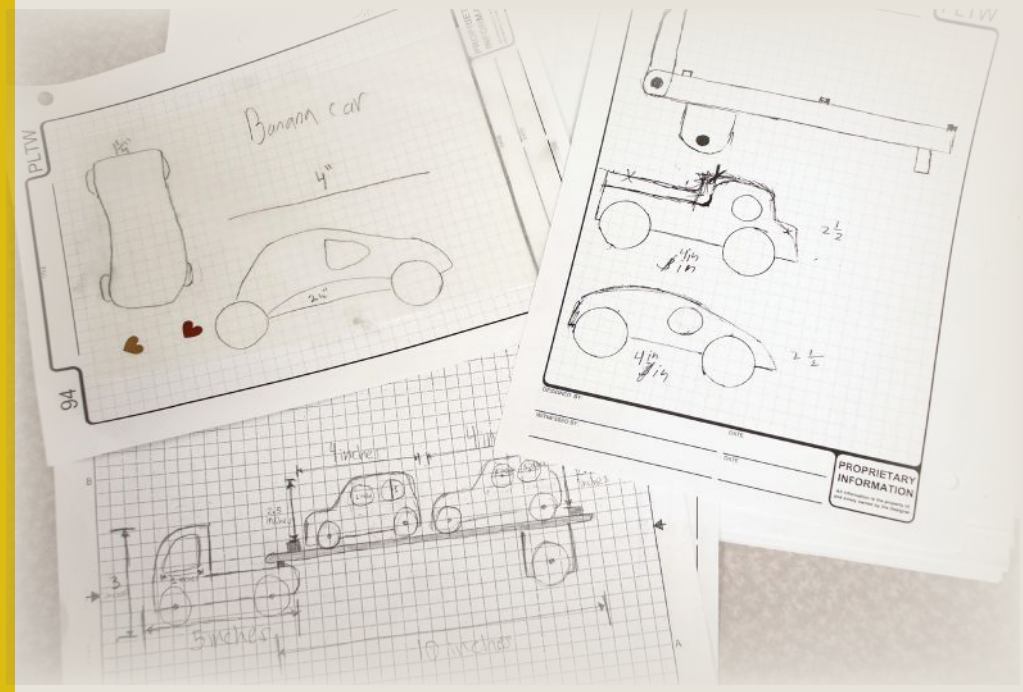

COLLABORATION & COMMUNITY ENHANCE MANUFACTURING EDUCATION

By Toni Wise

On the final day of school last June, a yellow bus pulled up at the YWCA of Clark County in Vancouver, Washington, carrying a group of students from Heritage High School, their teacher, and 20 wooden toy trucks. Career and technical education (CTE) students in Susan Mangin's Imagine It, Design It, Make It (IDM) class built the simple toy trucks and wrapped up the year with a gesture of giving: The trucks were destined for a shelter, to be enjoyed by children impacted by domestic violence.

COLLABORATION & COMMUNITY ENHANCE MANUFACTURING EDUCATION

"This year, we tried something new, starting with the name," said Mangin. "Formerly Manufacturing 1 and 2, we wanted to generate more interest by calling it Imagine It, Design It, Make It." The class was rebooted to encompass the entire manufacturing process, from beginning to end, while students work in groups toward a common goal.

Building Blocks

Before tackling the toy truck project, in the first semester (IDM-1), students worked in cooperation with a first-grade class at one of the district's elementary schools to design and build chicken brooders for eggs the first-graders had been incubating.

The first-grade students, as part of a unit about what animals need to survive in the world, created mock-ups of brooders from paper and cardboard. Then, they worked with Mangin's class to arrive at the most effective design. The IDM students created the final drawing and, after purchasing the needed lumber according to agreed-upon specs, brought the raw materials and tools to the first-grade classroom where the little ones were given patient lessons in building, drilling and driving nails. After successfully hammering her first nail, one little girl said, "This is the best day EVER!" It was evident the older students enjoyed it, too.

"IDM teaches problem-solving and organizational skills," said Mangin. "Students have to communicate with each other and work together to create products. Everyone had to participate to get the project done on time."

Junior Justin Franklin signed up for the class out of an interest in design. "The first semester was a tutorial for second semester," he said. "The class taught me to both think for myself to solve problems, and to participate in a team setting."

Hands-on Learning

From the start of second semester, the IDM-2 students were even more deeply immersed in the manufacturing process. Their assignment: to work as teams and create a quantity of wooden toys. "Unlike typical wood shop projects that students complete individually, which often never progress from the prototype phase, the assignment involved collaborative planning and cooperation, culminating in an assembly line build," said Mangin.

Initially, the project seemed daunting to some. "I wasn't sure we were going to be able to pull it off," said sophomore Sierra Van De

Grift. "There were students in the class who didn't seem very interested, at first, and then everybody found their groove."

The students began by brainstorming to design the toys. They each designed their own cars and, as a class, decided which types of cars to build that would then ride on the flatbed of a predesigned semitruck.

Based on an image of a model found online, the truck was drawn in Rhinoceros, a 3D computer-aided design (CAD) modeling software. Each student drew their own car in AutoDesk Inventor. Then the class voted on which two cars they wanted to build. The design files were translated into AutoCAD software and saved as .DXF files. They printed cardboard patterns for the truck and cars out of the laser printer, and used the patterns to draw the shapes onto wood.

"They had to figure out the process of how to build the product and how to organize the manufacturing steps," said Mangin. "This included doing quality checks at each juncture."

The students created a material list and budget, developed the steps for manufacturing the parts, and designed a system for assembly.

Mangin began by rotating students through each stage, but soon observed them gravitating toward the areas where they felt the most competent. "Some really felt comfortable working the machines. Others preferred to work on the organization and process, making sure everything was running smoothly and being completed. They were all invested and working as a team." At the end of nine weeks, they had built 40 flatbed trucks, each carrying two cars.

Hard Work Rewards

Each student wanted to take a truck and two cars home. They enjoyed making the finishing touches with the laser engraver, personalizing the bottom of the flatbed with their name and the date, and often the name of a sibling to whom they wanted to give the truck. The students agreed the remaining 20 toys should be donated to a place where children would play with them. They contacted the YWCA of Clark County and found a home for the trucks with the SafeChoice domestic violence program.

On the day of delivery at the YWCA in June 2018, Kacee Cohen, SafeChoice assistant director, and Alix Prior, shelter manager, accepted the toys and spoke with the students about the SafeChoice program,

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> "Her classes are project-based, because she believes the best way to learn is by doing. "The students work in teams for a lot of activities, and are encouraged to help and teach one another. I try to create a collaborative environment that sparks creativity and the sense of safety to try new things."

which offers safety and resources to survivors of intimate partner violence and their families in Vancouver and Clark County. They talked about how the toys would benefit kids who often arrive at the shelter, having left home in a hurry, without toys or other belongings to comfort them. The students were treated to a pizza-and-cake lunch to thank them for their efforts.

A primary goal of career and technical education is to equip students with real-world skills they can apply to any career endeavor. "I learned a lot about organization," said Van De Grift, who emerged as the class leader in quality control. "I also learned how to communicate with people from different backgrounds and skill levels to move the job forward."

Mangin believes three key elements combined to innovate her manufacturing class, and could be implemented for similar success in other CTE classes:

1. Start with a large class project with a finished product goal.
2. Have the students break down the project into organized, step-by-step procedures.
3. Have the students figure out the materials lists and costs.

"This is the first time we have ever done this process. It was a great learning experience for both my students and me. I hope we will do this every year," said Mangin.

Mangin has taught for 16 years and worked in the field of architecture for 15 years. She is a registered architect in Washington state. She combines her knowledge of architecture with her knowledge of education to teach architecture, engineering and manufacturing classes at the high school level. Her classes are project-based, because she believes the best way to learn is by doing. "The students learn many skills and concepts by designing and building projects. They work in teams for a lot of activities, and are encouraged to help and teach one another. I try to create a collaborative environment that sparks creativity and the sense of safety to try new things," said Mangin. ■

Toni Wise is the business outreach coordinator for career and technical education programs in the Evergreen School District, located in Vancouver, Washington. She has a background in communications, marketing, graphic design and photography, acquired and utilized over 25 years of work in local government and nonprofit sectors. Email her at toni.wise@evergreenps.org.

Addressing a Local Need

Southwest Washington is home to a vast number of manufacturing employers with a common challenge: the lack of access to a qualified talent pool. This spurred the Evergreen Public Schools CTE leadership to develop an advanced manufacturing program in 2016, in collaboration with a local semiconductor manufacturer, S.E.H. America, and Clark Community College. Students who have completed advanced manufacturing coursework in the high schools may be hired at S.E.H. America while simultaneously participating in a tuition program that funds a two-year degree in Mechatronics at Clark.

"Manufacturing firms in southwest Washington have provided over 300 internships to students in our district," said Evergreen Public Schools Career & Technical Education Director Susan Dixon. "The opportunity to explore the manufacturing industry while receiving mentorship from professionals and gaining real-world skills helps students further define their career goals. Many high-paying jobs within the manufacturing sector do not require a four-year degree."

TECHNOLOchicas & the Future:

Girls in STEM and Technology

By Snehal Bhakta

We have all heard it. We have read about it, and it's likely you've witnessed it in your career and technical education (CTE) classrooms. There is a gender disparity in education and the current workforce. Women are underrepresented in many of the growing science, technology, engineering and math (STEM) career fields.

By 2022, the U.S. Department of Labor (2018) expects there to be 1.1 million computing-related job openings, making it one of the fastest-growing sectors of the economy. Many of these jobs may go unfilled and the reason is, at least in part, because women occupy only 25 percent of this workforce (or less depending on the category) and the numbers are even lower when you look at minority women, especially Latinas (Bradberry, Fernandez, & Thompson, 2016) As the Hispanic population and number of computing and STEM-related jobs, both, grow at a tremendously fast rate, this is reason for concern.

TECHNOLOchicas & the Future:

Girls in STEM and Technology

For the United States to remain a global influencer and economic power we must be able to innovate. And in order to do so we need and must leverage our diverse population; together with all of our differences we are a stronger, more innovative workforce.

When I was enrolled as a student at Kansas State University more than 20 years ago, pursuing a bachelor of science in computer engineering and secondary education, I can only recall two or four female students and the rest were male. A couple of years ago, when I asked a recent engineering graduate how many female students he could recall, I was surprised to hear his response: five to seven female students. It is unfortunate how, over the past two decades, we've seen only small amounts of change as the workforce gaps continue to grow.

Making Connections

In an effort to narrow the workforce gap as it relates to women in STEM and technology fields, I have had the opportunity to lead efforts in Las Vegas, Nevada's Clark County School District (CCSD), funded by a Perkins nontraditional grant, to provide more awareness, encouragement and opportunities to female students in middle and high schools. This work isn't only professional for me, because I also have a personal connection: namely, a 12-year-old daughter in middle school.

First as a sales engineer and eventually as a business and technology consultant, I have often been charged to look at business or technology systems and provide recommendations on how to improve them and make them more efficient. In many of these technology-focused workspaces, I saw firsthand how there was very little diversity and even less gender parity. As my daughter grows up, I want to make sure, for her and any female student in any school district, that there is a place for her to succeed in any career, no matter what she wants to do.

Narrowing the Gap

Now, enough about me, back to the work we have started in CCSD. In the first year we focused strictly on eighth-grade girls to provide more awareness and opportunities to learn about programs in all of our high schools. STEM career fields were identified based on the In-Demand Occupations report by the Governor's OWINN, Nevada's GOED, and Nevada's DETR departments, and connected to CTE pathways in those high schools that were visited by the middle school girls.

“Together with all of our differences we are a stronger, more innovative workforce.”

Overall, the four events held in the 2015–16 school year were successful based on feedback from the girls that attended and everyone involved. However, CCSD is a majority minority school district and many of these events included young women that were already interested or taking similar classes in middle school. So we asked ourselves, “How do we get the right audience?” And a better question, “How do we know they are the right audience?”

One thing became apparent after the first year: We couldn’t make the impact we needed to, not based on the current level of funding and resources, nor could we do it by ourselves without other organizations involved.

Not only did we need to provide these experiences, we also needed to provide encouragement and recognition opportunities. In 2017, CCSD hosted the first Aspirations in Computing Awards, by the National Center for Women and Information Technology (NCWIT). NCWIT’s (n.d.) Aspirations awards program provides young women with “ongoing engagement, visibility, and encouragement for their computing and STEM-related interests and achievements from high school through college and into the workforce.” It honors young women in high school and college and encourages them to pursue their passions by providing a number of support systems and access to resources like the Aspire IT program.

The Aspire IT program uses a near-peer model where program leaders teach younger girls fundamentals in programming and computational thinking in fun, creative environments that are supported by program partners from the NCWIT community. The relationship between program leaders and their program partners fosters mentoring with technical professionals, increases young women’s confidence in their computing abilities, and develops valuable leadership skills.

Hannah, a two-time Aspirations award winner, received the Aspire IT grant in 2018. Not only was Hannah a fantastic example of a future female innovator in action — and she is an innovator, trust me — but her winning also opened my eyes to see just how important it is to recruit and celebrate young women in events like these, where they normally may not have access to these tech resources.

Hannah’s Aspire IT program spanned three months of Saturday workshops that ranged three to five hours. That’s a commitment for anyone attending: Give up at least three hours on a Saturday afternoon for three months. I feel extremely happy to report that her program had over 95 percent attendance, meaning all the girls showed up and were excited to be there. Whenever anyone asks me whether the interest is there from girls, the answer is always, *“Heck Yeah!”*

She recruited young women from all types of backgrounds; however, the smallest demographic area was still young Latinas. We recognized this trend from our first years’ events and experiences. I began to understand, this wasn’t just a program, local or state issue... It was a national issue that needed to be addressed. Then, around this time, I heard about another fantastic program from NCWIT called TECHNOLOchicas.

Technología

TECHNOLOchicas is a national initiative of the National Center for Women & Information Technology and Televisa Foundation

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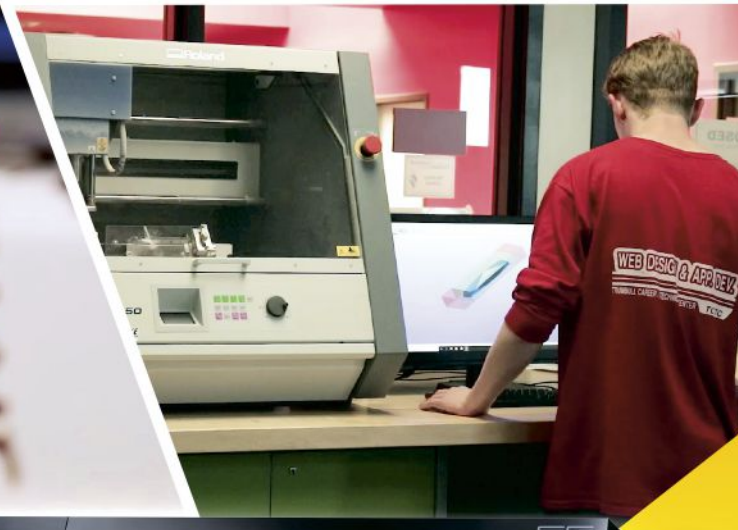

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designed to raise awareness among young Latinas and their families about opportunities and careers in technology. A light bulb moment: We hadn't yet engaged their families. Something as simple as gaining buy-in from their parents would be the success factor in engaging young Latinas.

In November 2016, Catherine Cortez Masto became the first Latina elected to the U.S. Senate. Things began falling into place for us to really engage the young Latina community in southern Nevada. In August 2017, in conjunction with Senator Cortez Masto's office, NCWIT's TECHNOLOchicas, and Televisa Foundation, we kicked off the TECHNOLOchicas campaign at Monaco Middle School in Las Vegas, Nevada.

We invited parents and encouraged them to bring not only their daughters but also the entire family to the event. There was food, the school's mariachi band, and several school officials in attendance along with four TECHNOLOchicas ambassadors that answered questions from the audience in English and Spanish.

Despite the intention and attraction, our event came and went without much fanfare or media coverage, as has been the case with many of our events across Clark County School District — until I had an opportunity to speak at the Southern Nevada Latino Summit.

I spoke on this earlier in the article: You can't go on this or any journey in education alone. I share what we are trying to do to get input and feedback from others, because you never know when an opportunity may arise. It was through conversations with Hildanies Colón, equity and diversity education coordinator for CCSD, that I was connected with the planning committee for the Latino Network of Southern Nevada 2018 Annual Summit.

I was excited and fortunate to share a short presentation and explain the work we have done to get more young girls interested in STEM and technology careers, and I looked forward to gaining a few leads to aid the TECHNOLOchicas project we had started.

After my presentation and pausing for questions, I went over my alloted time. Nearly the entire audience wanted to ask, "How can we help?" Inside I cried at the outpouring of support. Eventually we will be able to reach every single young woman, including Latinas, in southern Nevada — to make her aware of, expose her to, and encourage her to look at careers in STEM, because women will be and *must* be an integral part in creating the future of technology. ■

Snehal Bhakta is employed within the career and technical education department of Clark County School District (CCSD), the fifth largest school district in the country, with a focus on business and marketing, information and media technology, and ensuring Nevada's future workforce is prepared for success. Bhakta leads the #GirlsinTech and #GirlsinSTEM initiatives within CCSD. Email him at bhakts@nv.ccsd.net.

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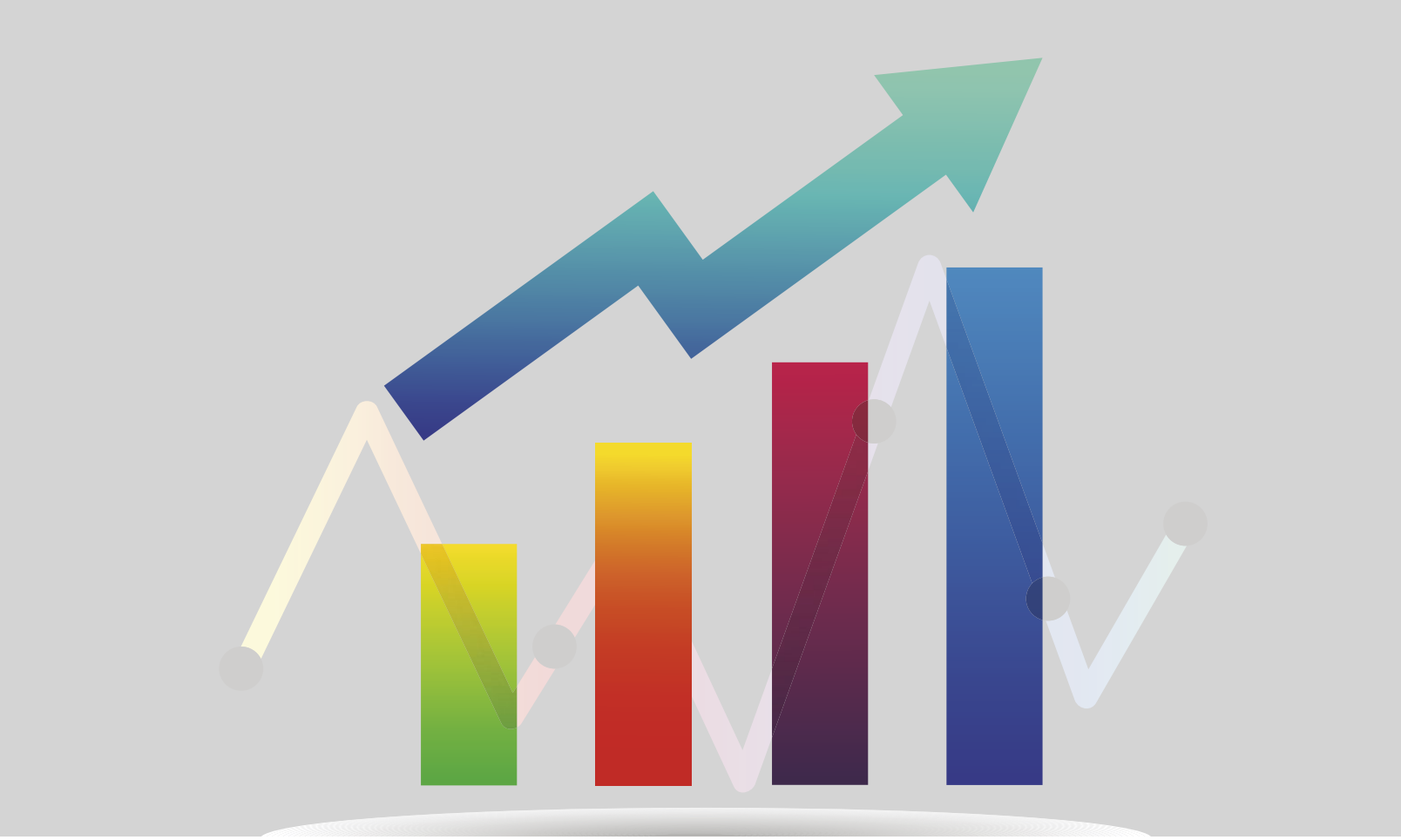

ADVANCING ACCESS & EQUITY IN THE MISSISSIPPI DELTA

By Sheriece Robinson

THE PURVIEW OF CAREER AND TECHNICAL EDUCATION (CTE) CONTINUES TO EVOLVE IN response to the many and varied challenges faced by our nation. Community colleges, too, are constantly evolving to meet the needs of their students, faculty, staff and community. Community colleges are valuable, and they must continue to enhance their services and programs to educate students for a global market.

With the changing landscape of higher education, community colleges face challenges that include but are not limited to funding, demographic trends and student expectations. Although some institutions face budget cuts, programs and services must be provided to meet the needs of the students. A common problem faced by community colleges in Mississippi, particularly in rural Mississippi, is student retention and college completion (Ochs, 2018). As administrators and stakeholders work to address these areas of concern, their level of engagement can enhance parameters targeting their desired outcomes. For the sake of this article, the remaining contents will reference two Mississippi community colleges geographically located in the Mississippi Delta.

Institutional Driving Force

Coahoma Community College (CCC) and Mississippi Delta Community College (MDCC) are committed to helping students improve skills, increase knowledge, obtain personal enrichment, and earn a degree or certificate. Coahoma Community College's (2018b) commitment to providing "accessible, affordable, diverse and quality educational programs and services" is as evident as the MDCC (2018a) mission to provide "quality education through academic, career, technical, health sciences and workforce

> “Transitioning from high school to college or from a career to college can be academically challenging for some students. Saichaie and Morphew (2014) revealed that schools should set a goal to provide equal treatment and equal access, to ensure all students have the opportunity to pursue an education at any level.”

training programs. MDCC is dedicated to improving the community through intellectual, social, cultural, and recreational opportunities.”

These mission statements align with the colleges’ institutional goals and define their purpose, targeting access and success. Both institutions are geographically located in the Mississippi Delta. Both are committed to providing transfer programs, career and technical education programs, workforce training programs, and enrichment programs and activities. Each institution is also committed to establishing economic development to cultivate and sustain partnerships. Partnerships developed within the local community provide students with opportunities to enhance their academic, personal and professional success. The idea is that as students establish a professional network, they deepen the connection with their local community.

In its five-year strategic plan for fiscal years 2015–2020, CCC (2018a) established an objective to ensure the curriculum remains consistent with the industry’s needs, an objective it intends to achieve through cultivation and maintenance of industry partnerships. CCC projects that 80 percent of students in career and technical education programs will be placed in jobs in their field within one year of graduation. As a result, in 2017, Coahoma Community College students recorded 86,262 total workforce training contact hours; 113 CTE and allied health graduates found job placement in their fields; and there were 68 state/nationally recognized credentials earned (Coahoma Community College, 2018c). The strategic plan document from Mississippi Delta Community College (2018c) indicates a similar goal to identify and expand partnerships with various stakeholders. Their Report Card 2017 also illustrates success: 124,395 total workforce training contact hours, 196 placements of CTE and allied health graduates, and 38 state/nationally recognized credentials earned (Mississippi Delta Community College, 2018b).

Both institutions are committed to training workers, in order to enrich the lives of the community, by developing partnerships and providing students the opportunity to obtain hands-on experience that can contribute to their academic, personal and professional success. CCC and MDCC also offer students the opportunity to develop a professional network while participating in community activities. By fulfilling these roles, the colleges foster an environment that enables access and success.

Student Support Programs

The college student population is diverse in terms of preparedness (or lack thereof) for college-level coursework. Transitioning from high school to college or from a career to college can be academically challenging for some students. Saichaie and Morphew (2014) revealed that schools should set a goal to provide equal treatment and equal access, to ensure all students have the opportunity to pursue an education at any level. There are several reasons why students may be underprepared at the postsecondary level. Such justifications include inadequate instruction at the secondary level, low English language proficiency, learning disabilities, lack of motivation, and barriers associated with low socioeconomic status, race and ethnicity (Perin, 2013).

Although some students are underprepared for college, institutions must continue to access students’ needs and differences in order to provide appropriate services that will promote academic success.

When developing student support programs, administrators at senior-level institutions must take into account the demographic makeup, academic backgrounds and enrollment patterns (Eggleston & Laanan, 2001). An understanding of the bases that hinder or enhance academic performance will make clear the needs that must be addressed by offering student support programs.

It is paramount that students have access to student support services to assist them in overcoming barriers that can hinder degree completion and/or social mobility. Since both schools are committed to access, success, student learning and student development, it is imperative they continue to offer an array of services that support their institutional mission. Some of the support services both institutions offer include academic advising, counseling, tutoring and mentoring, all of which will motivate students to excel academically and become productive citizens in society. CCC and MDCC are driven to fulfill students' educational, employment, career, cultural and extracurricular needs. Thus, their mission suggests that students will achieve their academic, professional and personal goals.

Issues of Equity

Poverty in the Mississippi Delta impacts the economy and local communities. Mississippi faced reduced state funding for the community college system (Ochs, 2018) and though we are reluctant to fully fund it, education is the solution for citizens to thrive, and to meet the needs of the community and demands of the workforce. Education and training will lead to better individual benefits for students (e.g., increased employment opportunities, advanced educational opportunities, and personal and professional enhancement). These benefits strengthen the economy, communities, institutions and the workforce by increasing employment rates, tax revenue, civic engagement, and wages and earnings. We live in a time when funding and resources are diminishing; yet it is critical that, in order to improve graduation rates, adequate resources and personnel must be provided. Thus, the local communities in the Mississippi Delta will not thrive if the citizens are not educationally prepared to meet the needs to sustain them.

The trend of budget cuts and declining resources does not appear to be reversing (Pretlow & Wathington, 2012) for public education. The rising cost of tuition and the decline of state funding and financial aid assistance have left students and families struggling to decide how to pay for higher education (Bowen & McPherson, 2016). First, these financial situations are justified as an equity issue because the deficit causes some students to stop out before they ever begin their academic careers. Other students receive what seems to be enough financial aid but — due to placement in multiple and multilevel developmental education courses — tap out before they complete their associate degrees. Students invest thousands of dollars to obtain a college education; the return on their investment can be rewarding when they transition from the classroom to a career after graduation.

Rising costs have made higher education unaffordable for students, and the debt crisis has become insurmountable. Debt is another concern because the guarantee for return on investment is uncertain or limited (Bowen & McPherson, 2016); but without some form of financial aid, the cost of tuition and other expenses would be unbearable for some students. Part-time students feel the burden, which causes them to pay more and accrue more debt as a result of a prolonged period of tuition payment. These facets can extend the time to degree completion.

For students (part-time or full-time) with multiple responsibilities, such as supporting family or full-time employment, a graduation delay becomes more problematic. Furthermore, if challenges arise, extended graduation time could cause students to drop out or stop out, permanently or temporarily. Although CCC and MDCC provide financial assistance to help students pay for college, the deficit is still too large for many. Thus, students will continue to need support and guidance regarding financial literacy so they can make the best decision regarding their financial investment.

Grants Awarded

Institutions face economic woes and political pressures to provide affordable and accessible pathways to education, driving them to seek additional funding sources to operate the institution and educate students. Some such opportunities are available to assist the institution and students at CCC and MDCC. In an effort to replicate a model of success, Coahoma Community College (2018d) became the recipient of an Achieving the Dream grant last year. Funded by the Bill and Melinda Gates Foundation, this grant aims to move students further and faster

at a lesser cost from remediation to graduation (Parcell, n.d.).

Further, and to assist with improving student engagement, Coahoma Community College (2018e) was awarded a $252,465 grant to implement a mobile campus app for students and faculty. In a press release from CCC (2018e), Campus Consortium Chairman Anjli Jain noted that the app provides an opportunity to increase digital capacity, which will assist with technological efforts and provide new tools to engage with students and faculty. This aids in work to ensure that CCC is providing access for students to engage fully in academic, social or extracurricular opportunities provided by the institution.

In 2017, Mississippi Delta Community College became the recipient of three grants totaling more than $1.1 million via the Career and Technical Education Challenge Grant. This grant provides funding for specific fields in workforce training programs within a college's service area that do not qualify for traditional workforce training funding (MDCC, 2018d). As Mississippi continues to thrive and advance, new initiatives and services may become available to provide continued support and assistance to community colleges in the Mississippi Delta. ■

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EQUITY IN ACTION — STORIES FROM THE FIELD

By Vera Jacobson

Introduction

Equity is not a stand-alone concept. It is not experienced as its own unique canon of knowledge. Rather, equity is a notion, a way of seeing and perceiving the world around us and paying attention to the people in it. Often, when conversations surface concerning equity in the classroom, participants come away inspired — for the moment — to go forth and "do" equitable practices in their classrooms. They often have good intentions but, upon returning to their teaching practice, their new knowledge and eager motivation take second to the realities of the moment. The bell rings. A mandatory meeting takes place; a student acts out and the momentum is lost. The teacher forgets about implementing any new strategies. Therefore, very little change occurs and the status quo prevails.

I was a classroom teacher for 23 years, so I speak from experience. I have written this article to inspire you to make real change in your students' lives, and to incorporate equity thinking into your pedagogical practice, whatever you teach. I will share my stories from the field, and how my thinking through the lens of equity has influenced my approach to teaching, learning and curriculum design.

The Academy

As department chair of the Business Technology Academy at Belmont, California's Carlmont High School for seven years, I embedded equity thinking throughout my practice as a teacher as well as a team leader. In California, small learning communities fall under the California Partnership Academy Grant, which focuses on so-called at-risk youth. I prefer not to use the term at-risk. Rather, I prefer non-academic; these students have struggled with the education system all their lives, believing they were not "good" students or were "bad" in the classroom.

Grit

If we are determined to provide economic opportunity for all students, employability skills are the most important skills we can teach. I should mention that I chose to work with socioeconomically disadvantaged students in my career. Why? Because I found them to be a rewarding, rough, loud, creative, gritty and eager-to-learn group. I love teaching and I prefer students be equally passionate about learning; I saw only opportunity in working with them. My students had been shoved around in the school system for their entire academic lives. They had been institutionalized to believe they were not "good" students, both academically and behaviorally, so they often exhibited negative, belligerent and downright hostile behaviors. I chose to see them in a different light.

While teaching an entrepreneurial education class, I witnessed the great potential non-academic students brought to the program. Their background and environment made them experts at problem-solving. Through the challenges they encountered and overcame, they had developed grit and become resilient, courageous risk takers.

One student shared her story with the class. Her family had hit hard times and was homeless. For a time, they lived under a bridge. Others in the class started teasing her, calling her "toad" for living under a bridge. Although she initially wanted to fight those teasing her, she chose to ignore them. She was surprised when I complimented her self-restraint and pointed out she had shown grit and built her resiliency skills — exactly what she would need to be an entrepreneur.

The BTI

A few years later, I had the opportunity to work on a team tasked with the creation of a linked learning program. Linked learning combines college-focused academics, rigorous technical education and work-based learning, and provides personalized student supports. Working with biotechnology teachers at Carlmont, and using my knowledge of small learning communities, we created the Biotechnology Institute (BTI). A year was spent planning and we were eager to recruit our first cohort. We planned to visit every ninth-grade science class to inform the students about this new opportunity. But something was not working: We were not capturing the attention of female students.

I stopped to think about what we could do differently. What were we not doing to encourage the girls to apply? At the next presentation, I stopped my pitch and said, "Now, boys, as much as I want you to think about applying to this amazing program, right now I'm only talking to the girls here. Girls, listen up!" I explained how the cohort would be structured, the interesting curriculum and the career focus. After doing this and specifically naming girls in the classrooms I visited, I began to see more girls' hands go up and more girls ask for applications.

The outcome? Since the beginning of the program in 2015, 50 percent of students participating in BTI cohorts have been female. In this case, capturing the girls' attention grew out of my awareness of a need to make the program a success for all students.

CTE for All

My colleague likes to use a term she co-opted from Disney, "blue sky dreaming": Anything is possible under the big, blue sky. My blue sky dream is to develop a model that promotes career and technical education for all; beginning in elementary school and through high school, we could teach financial literacy, entrepreneurship and career readiness curricula. Speakers at several conferences I have attended mentioned this concept, so I cannot claim it as my own. I also borrowed this thinking from Junior Achievement, which has been doing this work since 1919, with a global outreach to 130 countries. The foundation of their success lies in their delivery, employing community and business volunteers. CTE for All curriculum involves self-reflective practice that helps students explore who they are, what they like and what they don't like — specifically designed for longitudinal growth as they progress through school.

Conclusion

Educators can, and should, provide equitable education for all our citizens. It is our responsibility to help nurture each and every student who comes to the classroom so all have a fair chance to discover their place on the planet. Teachers have the power in the classroom to ensure this occurs. But teachers also must learn to practice an equitable mindset daily, with every class and every child. My intent here was to share a few examples of how I did that. Did I succeed?

If I check in with myself daily to see how well I remembered to practice equity in my actions with every student, then I am able to develop some sense of how successful I have been in the classroom, and how successful I might be in motivating other teachers. ■

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IMPROVING POSTSECONDARY OUTCOMES FOR LOW-SES STUDENTS WITH CTE

By Kevin R. Johnson Sr. & Randy Hendricks

THE DEMOGRAPHICS OF THE TYPICAL AMERICAN STUDENT HAVE CHANGED THE LANDSCAPE OF education, which has educators and policymakers searching for a solution to current academic challenges (Musu-Gillette et al., 2017). With changes that stem from an increase in immigration and a widening wealth disparity, the average American household must maintain two incomes to fulfill middle class dreams, or even just to get by. In addition, the effects of globalization have resulted in the elimination of many entry-level positions that were once available (Osterman, Kochan, Locke, & Piore, 2002). These trends have significant ramifications, as researchers discovered that "income inequality perpetuates lower social mobility" (Corak, 2017, p. 69) through deficiencies in social and cultural capital. While such resources are not the sole determining factor or variable that predicts student success, the increasing number of U.S. students living in poverty poses challenges for educators across the country.

The percentage of students classified as of low socioeconomic status (SES) — determined by several factors, which include race, gender, ethnicity and economic status of the family — has increased throughout the United States (APA Task Force on Socioeconomic Status, 2007). According to Bidwell (2015), the number of students from low-SES homes nationally has steadily increased, from 32 percent in 1989 to over 50 percent today. Social class, including access to socioeconomic resources, impacts the choices available to individuals throughout the lifespan (Comer, 1978; Heppner & Scott, 2004; Kliman, 1998; Kliman & Madsen, 2005). These basic facts underline the challenges facing the education system in the 21st century. "Students from working and lower class backgrounds undergo unique challenges relative to entering and completing middle class centered educational programs and joining a middle class oriented profession" (McDowell, Brow, Cullen, & Duyn, 2013, pg. 72).

> "The urgency of the situation is magnified considering that "overall postsecondary participation rates have increased and little progress has been made in ameliorating socioeconomic disparities in postsecondary outcomes." But CTE pathways available to low-SES students at the secondary level can have a positive effect on academic performance."

The Role of CTE

Career and technical education (CTE) provides a viable pathway to success for this increasing student population. The urgency of the situation is magnified considering that "overall postsecondary participation rates have increased significantly over time and little progress has been made in ameliorating socioeconomic disparities in postsecondary outcomes" (Giani, 2015, p. 106).

The struggles of low-SES students in the United States' education system are not new; researchers have conducted numerous studies on the topic, and the issue has only been exacerbated in recent years. But CTE pathways available to low-SES students at the secondary level can have a positive effect on academic performance. Educators and policymakers have suggested that every student can benefit from exposure to career and technical education and the related pathways and opportunities. Researchers have indicated that students from low socioeconomic backgrounds often are not given access to information about high-demand fields, especially if their parents' employment was not in these areas.

Proponents of CTE argue that, with early and frequent exposure to programs of study — in health science; business; agriculture, food and natural resources; computer/information sciences; and science, technology, engineering and math (STEM) — the effects relegated by socioeconomic status can be mitigated (Gordon, 2014). Given the current emphasis on high-demand employment fields, educators and policymakers should take an expanded view of desirable postsecondary outcomes for low-SES students to include workforce entry in high-demand fields and attendance at technical schools and career and technology centers that offer industry certifications.

Closing the Gap

The effects of socioeconomic status on academic success in the U.S. educational system increases as the number of students identified in this category continues to increase.

Data from the National Center for Education Statistics (NCES) show that, in 1975, the gap in college enrollment between low-income and high-income high school graduates was approximately 29 percent (34.7 vs. 63.7 percent). By 2011, the enrollment rate of low-income graduates had increased to 52.1 percent, but a concomitant increase in the enrollment of high-income students to 82.3 percent resulted in the gap actually widening instead of narrowing over this time period (Giani, 2015, p. 106).

"The aspiration to attend college is nearly universal among American youth, yet the fulfillment of such desires is much more limited" (Bragg, Kim, & Barnett, 2006, pg. 5). College access combines several different factors: "how low- and middle-income families pay college costs, how students traditionally underrepresented in higher education overcome discrimination and social disadvantage, and how well high school graduates are prepared for college-level work" (Bragg, Kim, & Barnett, 2006, p. 5). Extracted from available research, the data on social disadvantages emphasizes the need to have an academic pathway that links secondary to postsecondary institutions in order to mediate access barriers (Bragg, Kim, & Barnett, 2006).

College participation is not the only measure of postsecondary success; however, many research studies use college entrance and access as the leading measurement of student academic success. "In 1973, 32 percent of the jobs created in the United States did not require a high school degree; by 2007, that figure was 11 percent" (Stipanovic, Lewis, & Stringfield, 2012, p. 81). The literature indicates that industry leaders increasingly require that students enter the labor force with skills. The development and proliferation of industry certifications made available to secondary students, easing access and entry to high-demand, high-wage career fields, is an important academic outcome due to the relatively low number of students that complete a postsecondary degree: only 40 percent of 25–35-year-olds in 2012 (Stipanovic, Lewis, & Stringfield, 2012).

Supporting Matriculation

Extensive research has also been conducted to determine the effects of socioeconomic status on persistence in higher education and postsecondary outcomes once students have entered an institution. The data represents an access point or critical milestone in the progression of low-SES students and how the lack of social mobility affects those outcomes (Giani, 2015). The limited research, conducted on the secondary academic progression of low-SES students and successful academic pathways to increase postsecondary outcomes, provides an opportunity to expand the available knowledge base. The use of available longitudinal data beginning at the secondary level seems appropriate considering that "socioeconomic

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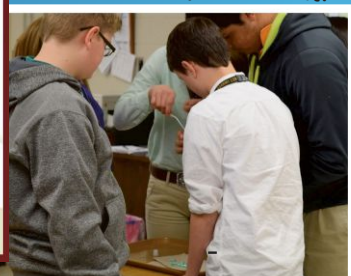

"I have grown as a person and have learned things that I am using in the real world today. Since I am in the stages of becoming an adult, this lesson is really helping me get a strong grip of the world that is ahead of me. I can honestly say that I am ready!"

Post-Secondary

"I am prepared to enter the workforce. I know I am going to be successful!"

background is more influential at earlier stages in the educational process but declines in significance as one moves on to later transitions" (Giani, 2015, p. 107). A systematic approach for evaluating the CTE programs of study as an academic pathway is essential to determining if CTE is effective in assuaging the effects of low socioeconomic status.

CTE "is one of the largest change efforts currently underway in the American secondary and postsecondary education" (Stipanovic, Lewis, and Stringfield, 2012, p. 80). CTE investments by federal, state and local governments, along with the additional commitment of funds by school districts, are intended to provide students with multiple academic pathways to success. As efforts increase to improve "access to and success in college through enhanced alignment and improved curricula," researchers have indicated that this pathway alone does not "necessarily translate into successful outcomes" (Bragg, Kim, & Barnett, 2006, p. 6).

The general perception of CTE has changed in recent years. Most common in the past were wood, metal and auto shop programs for students perceived as less academically inclined (Gentry, Peters, & Mann, 2007). Today CTE includes a variety of fields: architecture, interior design, engineering, computer maintenance, health science and graphic design. The pedagogical strategies used in CTE courses are consistent with those used in college preparation courses, including learning through inquiry, hands-on learning, and process skills development, with each significant standard linked to a real-world application (Gentry, Powers, & Mann, 2007). A difficult task is underway for CTE educators as they inform the public, parents and even fellow educators on the ways in which CTE program participation can prepare students for success after secondary education; but that work must be done. ■

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YOUR VOTE, YOUR VOICE

ACTE Board Election Results

The Association for Career and Technical Education (ACTE) is pleased to announce the election results for new members of the organization's board of directors:

- **Doug Major, President-elect**
  Major is the superintendent/CEO for Meridian Technology Center in Stillwater, Oklahoma. His one-year term will begin in July 2019, and will be followed by one-year terms as president and past president, respectively.
- **Annika Russell-Manke, Business Education Division Vice President**
  Russell-Manke is an accounting/business management instructor for Mitchell Technical Institute in Mitchell, South Dakota. She will serve a three-year term beginning July 2019.
- **Carol Werhan, Family and Consumer Science Education Division Vice President**
  Werhan is an assistant clinical professor/FCS teacher educator at Purdue University in West Lafayette, Indiana. She will serve a three-year term beginning July 2019.
- **Rachael Mann, New and Related Services Division Vice President**
  Mann is a professional development specialist for West-MEC in Glendale, Arizona. She will serve a three-year term beginning July 2019.
- **Chaney Mosley, Region II Vice President**
  Mosley is an assistant professor of agricultural education for Middle Tennessee State University in Murfreesboro, Tennessee. He will serve a three-year term beginning July 2019.
- **Carrie Scheiderer, Region I Vice President-elect**
  Scheiderer is the chief administrator for Central Region Tech Prep/Central Ohio Technical College in Newark, Ohio. She will serve a three-year term beginning July 2020.
- **Ross White, Region IV Vice President-elect**
  White is the assistant principal and director of career and technical education for Siloam Springs School District in Siloam Springs, Arkansas. He will serve a three-year term beginning July 2020.

Additionally, the vice president-elect whose election occurred last year will join the board as vice president in July 2019. **Lisa Stange** will assume the position of vice president for Region III.

Engage and Advocate for CTE

National Policy Seminar (NPS) is just around the corner and we are excited to be at the forefront of career and technical education (CTE)! Whether you're a seasoned advocate or a first-timer to Capitol Hill, now more than ever is an essential time to engage! With several new Members of Congress, there are significant opportunities to build on the momentum of recent CTE policy advancements. Happening this **March 25–27** in Arlington, Virginia, NPS will give you the tools to shape the future of CTE with:

- Policy and advocacy how-to sessions to help you continue to strengthen support for CTE
- Dedicated time on Capitol Hill to meet with legislators and advocate for your CTE programs
- A half-day Perkins V symposium offering practical guidance as we move from reauthorization to state and local implementation
- New pre-conference programming on **March 24** offering an introductory overview on Perkins and the Higher Education Act

There's still time to engage in CTE advocacy efforts — visit **www.acteonline.org/nps** for the complete agenda and to register!

VISION Keynoters Address Trends Shaping the Future of CTE

A must-attend event for educators, business leaders and industry representatives, ACTE's CareerTech VISION, happening **December 4–7** in Anaheim, California, brings together thousands of attendees to address the full range of issues facing CTE professionals. This year's event features keynote speakers showcasing insider insights into future career fields on Earth and in space.

As VISION's opening general session speaker, NASA veteran Dr. Garrett Reisman will share insights on the future of human spaceflight and high-demand career fields in space and on Earth. During his experience as an astronaut, including a 95-day mission on the International Space Station, Reisman performed three space walks, operated the Space Station Robot Arm and was a flight engineer aboard the space shuttle. While at NASA, Reisman also served as an aquanaut on NEEMO V, living on the bottom of the sea in the Aquarius deep underwater habitat for two weeks.

Closing general session speaker Marcia L. Tate, Ed.D., is an acclaimed educational consultant, having taught more than 500,000 administrators, teachers, parents, and business and community leaders throughout the world. During her 30-year career with the DeKalb County School System in Decatur, Georgia, she has been a classroom teacher, reading specialist, language arts coordinator and staff development executive director. As author of eight best-sellers, Tate will share her expertise for inspiring and motivating students to cultivate and contribute their gifts to their communities and nation's economy.

Registration will open in early March and early bird rates are available through July 12. Visit **www.careertechvision.com** to learn more.

Best Practices for CTE Administrators Heads to Sunny Tucson

This year's Best Practices and Innovations in CTE Conference, co-hosted by ACTE and NCLA this **September 25–27**, offers career and technical education administrators and leaders the opportunity to network and exchange the latest innovations with informed education experts from across the nation. Taking place at the Westin La Paloma Resort & Spa in Tucson, Arizona, Best Practices registration opens in early March. Learn more at **www.acteonline.org/bestpractices**.

Follow ACTE on Instagram

We're ready to conquer social media in 2019 with a brand new Instagram account! Follow us on our new and official Instagram page @actecareertech1. Look out for news, updates and exciting announcements on the platform this year! **#CareerTechEd**

March 2019 Advertisers

PARALEGAL

By Susan Reese

PARALEGALS ASSIST LAWYERS AND HELP THEM PREPARE FOR MEETINGS, HEARINGS AND TRIALS. Their duties may include research and investigation of facts using public records and the internet; cataloging and organizing printed and electronic documents; maintaining files, drafting correspondence, obtaining affidavits and statements; and calling clients and other lawyers to arrange meetings, interviews and depositions. They may also assist lawyers during trials by taking notes and reviewing transcripts.

The Workplace

The vast majority of paralegals work for attorneys and firms offering legal services, but they may also find employment in local, state and federal government, or for finance and insurance companies.

Education

Although some employers may prefer that their paralegals have bachelor's degrees, most paralegals have an associate degree or a certificate in paralegal studies. There are a number of community colleges and technical schools across the country that offer two-year degree and/or certificate programs for those wishing to become paralegals. These programs may have received approval by the American Bar Association.

Earnings

According to the *Occupational Outlook Handbook* (2018), a publication of the U.S. Department of Labor's Bureau of Labor Statistics, in May 2017 the median annual wage for paralegals was $50,410, with the highest 10 percent earning more than $81,180.

Job Outlook

The Bureau of Labor Statistics goes on to project that employment among paralegals will grow approximately 15 percent from 2016 to 2026. Much of this growth is attributed to a need by law firms to increase efficiency, reduce costs, and respond to their clients' demands for less expensive legal services. Although paralegals' hours are billed to clients, their hourly rate is much lower than that of lawyers.

EXPLORE MORE

For more information about the career of paralegal and the education and training it requires, here are some resources to explore.

American Alliance of Paralegals Inc.
www.aapipara.org

American Bar Association
www.americanbar.org

National Association of Legal Assistants
www.nala.org

National Association for Legal Professionals
www.nals.org

National Federation of Paralegal Associations
www.paralegals.org

SCHOOL SPOTLIGHT

NORTH HENNEPIN COMMUNITY COLLEGE

SINCE ITS FOUNDING IN 1966, NORTH HENNEPIN COMMUNITY COLLEGE (NHCC) HAS GROWN TO BE one of the largest and most diverse community colleges in Minnesota. As part of the Minnesota State system of 30 colleges and seven universities with 54 campuses throughout the state, NHCC (2017) is able to offer its students "opportunity without limits, learning without end and achievement beyond expectation."

Today, NHCC serves more than 10,000 students and offers more than 60 degree and certificate programs. At its on-campus University Center, NHCC also offers several bachelor's degree programs through its university partners, which include Bemidji State University, Metropolitan State University, Southwest Minnesota State University and Saint Cloud State University.

High school sophomores, juniors and seniors also have the opportunity to start their postsecondary education through NHCC. Through the concurrent enrollment program, they can earn college credits by taking college-level courses taught by high school teachers who are mentored by NHCC faculty. As another option, the early/middle college program at NHCC allows students who are currently enrolled in a partnered alternative learning center the opportunity to earn credit toward a high school diploma and an associate degree.

The paralegal program at NHCC, approved by the American Bar Association, offers an associate degree as well as a certificate option. Associate degree-seeking students take general education courses that include public speaking, writing, American government and politics, psychology, and logic. Among the program courses are Introduction to Law and Paralegal Studies; Computer Applications in the Legal Profession; Litigation I and II; and Legal Research and Writing I and II.

There is also a legal studies seminar and internship that emphasizes practical skill development. The course is designed with in-class experience as well as 150 hours of internship experience, under the supervision of an attorney or experienced paralegal, in a private or public law office, corporate or government legal department, or other appropriate law-related setting.

The elective credit choices to complete the degree include topics such as family law, criminal law, intellectual property, alternative dispute resolution, torts and personal injury law, contracts and business organizations, and wills, trusts and estate administration.

The courses in the NHCC paralegal program are offered primarily in the evening, making it convenient for working adults, including those who may already be working in the paralegal field but are looking for ways to enhance their skills as well as their opportunities for advancement.

Upon completion of the NHCC paralegal program, graduates should have an understanding of the sources of law, legal procedures and operation of legal systems, and they should be well prepared to work as paralegals in law offices, government or corporations if they opt to go directly into the workplace. However, if they wish to continue their postsecondary education, they also have the option for articulation into bachelor's degree programs at Metropolitan State University, Hamline University or Concordia University.

With education and training provided by programs such as the one at North Hennepin Community College, paralegals are well positioned to assist their employers in increasing the success of their organizations. Moreover, with the strong job growth projected for paralegals over the next decade, graduates of these programs can assure their own success in a long-term career in the legal service profession.

For more information about North Hennepin Community College and its paralegal program, visit ***www.nhcc.edu****.* ■

Susan Reese is a *Techniques* contributing writer. Email her at susan@printmanagementinc.com.

REFERENCES

North Hennepin Community College. (2017). About NHCC. Retrieved from https://nhcc.edu/about-nhcc.

U.S. Department of Labor, Bureau of Labor Statistics. (2018). *Occupational Outlook Handbook*. Retrieved from www.bls.gov/ooh.

A Bright Future for the Misfits

By Chance Solem-Pfeifer

"THE FUTURE BELONGS TO THE MISFITS."

That's the slogan author, speaker and Find Your Grind co-founder Mike Smith tours the country sharing with students and educators. The axiom is one part motivational: It encourages kids to step outside their comfort zones and claim their places in this world. But another, perhaps more crucial, resonance for preteens and teenagers is one of reassurance; that is to say: "It's okay. Your future success and happiness aren't determined by how well you fit in during high school."

At Find Your Grind, "misfit" carries zero negative connotation. It's an acknowledgment of our inherent individuality. When we say "the future belongs to the misfits," we're reminding young people not to be emotionally or intellectually paralyzed by the weight of what they don't yet know. Instead, embrace what you know better than anyone — yourself.

Find Your Grind

So here's a puzzling question: How close is the average 15-year-old to the person they'll be at 30? You could mount a compelling argument either way. On the one hand, teenagers are still rapidly developing in their beliefs, emotions, mannerisms and abilities to think critically. There are infinite meaningful factors that can influence who they become.

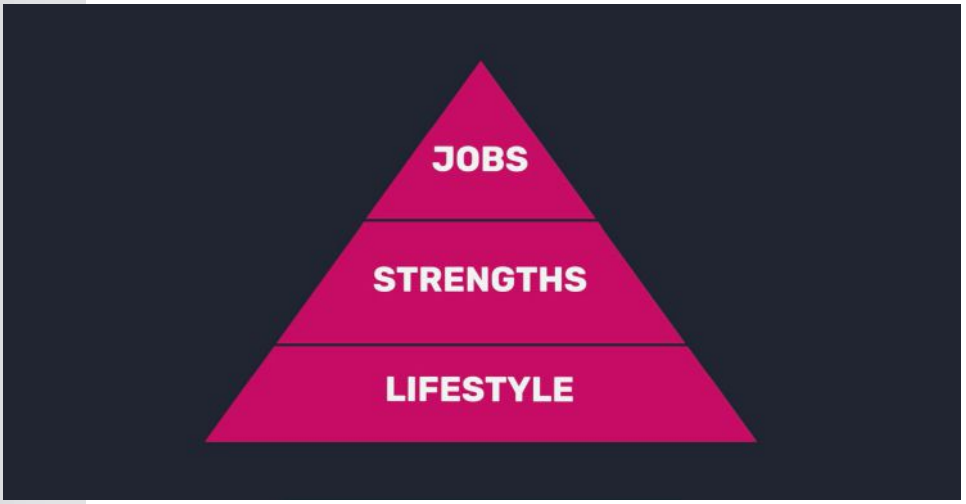
Then there's another way of looking at the question. In all likelihood, the larger set of values, interests and temperaments you hold at 15 will mold, or at least significantly foreshadow, who you'll be as an adult.

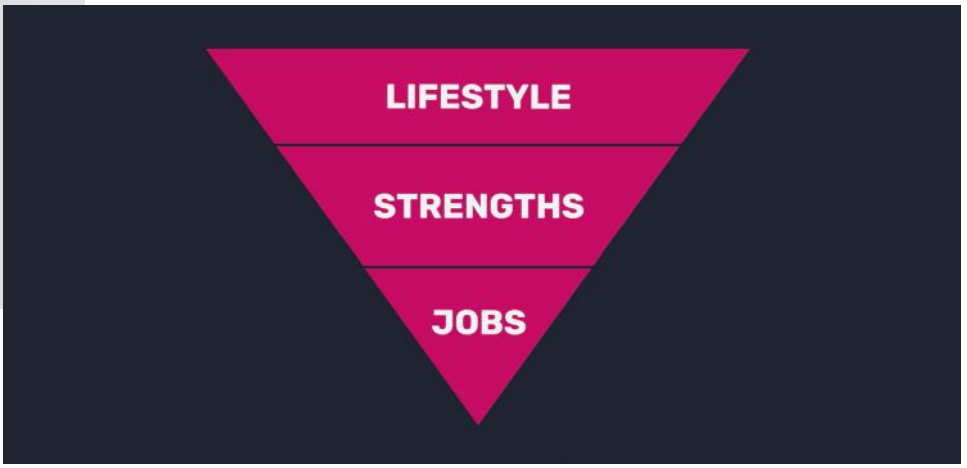
That's where Find Your Grind curriculum comes in. Kids are told, every day, that their unique passion can't be a job. But in a world being radically transformed by technology and global connectivity, who's to say whether that's really true? Find Your Grind is illuminating the ever-evolving world lifestyles and careers today's young people have to look forward to, and assisting educators in helping them get there.

To that end, the Find Your Grind Lifestyle Assessment is an ideal place for students to start thinking about their future selves. The survey matches takers with various lifestyles — healer, entertainer, connector, maker, and many more — that correspond with their answers to simple, self-reflective questions. Organized on FindYourGrind.com are comprehensive career profiles and interviews with professionals that fall within those lifestyle categories.

The Funnel vs. the Pyramid

This approach may seem like it runs counter to conventional wisdom about career counseling for youth, but again, let's look at the bigger picture. The standard method of life planning involves choosing an ideal career. With a professional end goal in mind, we often prescribe a trajectory to our youth: first, the right high school clubs, then the right college, then the appropriate major, the right summer internships, and then perhaps more higher education. That long, resumé-paved road is all to acquire the skills and talents necessary to land a job students were asked to pick for themselves in high school. Finally and ideally,





the student graduates and starts a great job; they're living the life they'd hoped.

Let's call that The Pyramid Method. Jobs at the top, strengths in the middle, lifestyles at the base. Find Your Grind offers a distinct alternative — invert the pyramid.

Make it a funnel, a funnel in which the broadest segment — lifestyle — is the wide, welcoming door at the top. Consider who you are, what lifestyle you want, what brings your life meaning. Then, translate that knowledge into the strengths and skills that will be relevant across an entire genre of future careers.

This method advocates for hard work, make no mistake, but it also accounts for discovery being essential to the education process. If this all feels a bit New Age, then let's consider a question of efficiency and resources.

One of the prohibitive factors young people face to professional success is massive student debt. For many students, the pyramid feeds into a system that's chewing them up and spitting them out when they're unable to predict what their careers should be. It's a critical waste of time and money that could be spent honing the evergreen skills and strengths a young person already knows are authentic to who they are.

Rather than a teenager asking how she can get a job as an actuary by age 24, shouldn't she be asking herself if she's an analyzer? Myriad careers and skills can result from the realization that she's naturally careful, reflective and well-suited to processing information.

The Misfit Educator

This paradigm shift has to start somewhere. The person who will benefit most from the funnel, and be most hampered by the pyramid, is our friend the misfit — that young person who looks around at the systems of the world and says, "But that doesn't exactly make sense to me."

It takes a misfit educator to reach a misfit student. Young people need the perspective and guidance of teachers, counselors and administrators who understand the world of education contains multitudes. People, personalities and ideas, and there's no prescriptive answer for sending a young adult out into the world to lead their best life.

Maybe we're talking about you, who realizes every student is different and the only one-size-fits-all approach is one that actually acknowledges all sizes. Maybe you're an educator who's still working on their own lifestyle and adding uncommon passions or hobbies that trickle into teaching. You understand what it is to not be traditional in your job; you're an educator who classifies on the Find Your Grind Assessment as a humanitarian, or a creator, or a connector, and the powerful work done in the classroom or counseling office stems from those strengths, not the other way around.

Students who think a little bit differently need mentors who do the same.

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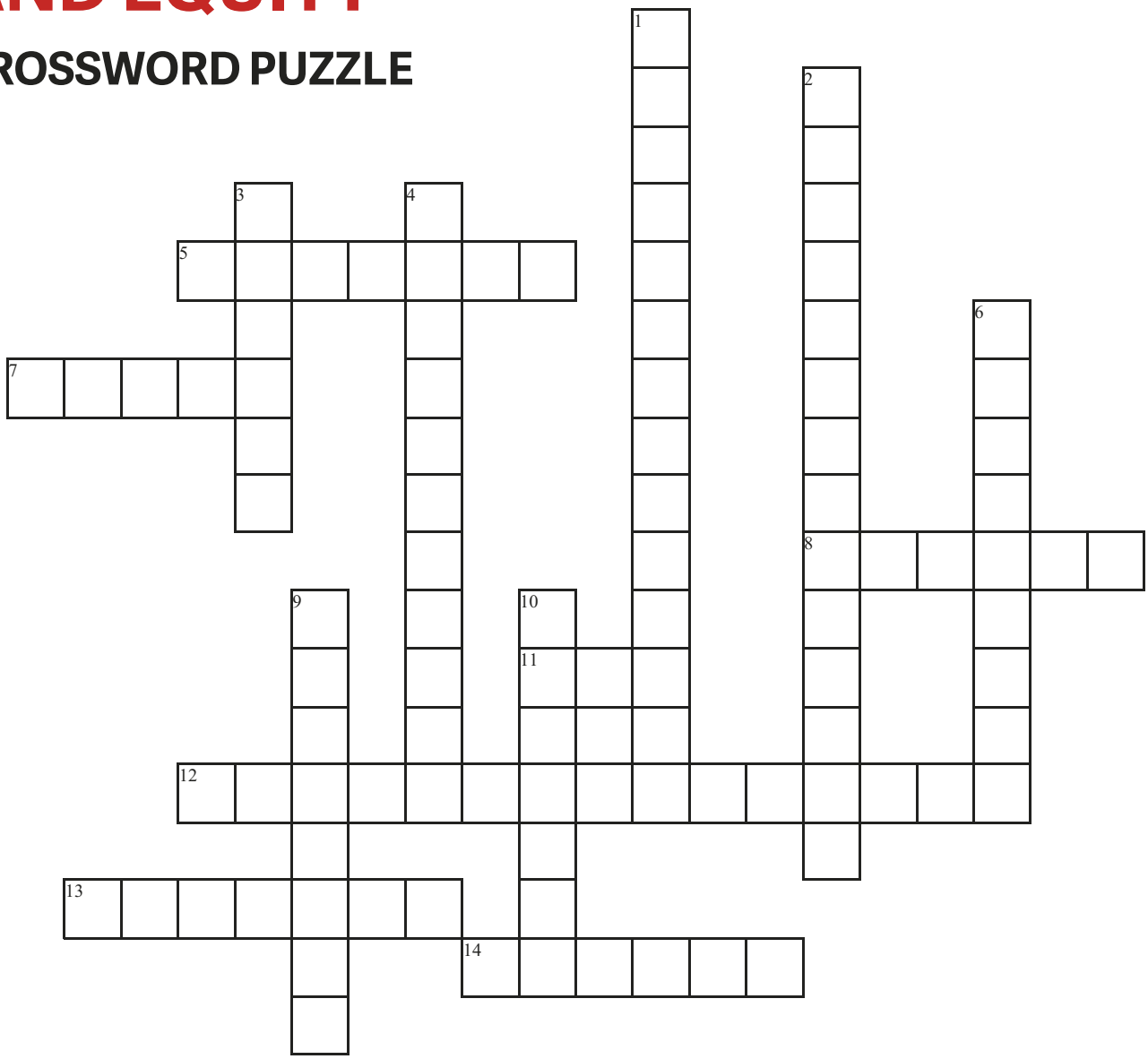

Across

5. Community college that was a 2018 recipient of the Achieving the Dream grant

7. National Center for Women & Information Technology

8. A set of specific criteria for grading

11. The certification exam taken and passed by 82 percent of Darrell Wattley's students in 2017

12. Like academic advising, counseling, tutoring and mentoring, these can motivate students to excel

13. H.R. 2353, the Strengthening Career and Technical Education for the 21st Century Act

14. Imagine It, _____ It, Make It: A rebranded series of manufacturing classes at Heritage High School in Vancouver, Washington

Down

1. 10 program curricula designed by SREB to "prepare high school students for industry and postsecondary credentials and degrees and exciting careers"

2. An equity-boosting classroom strategy

3. WeeCat Industries mascot, a baby wildcat

4. The first Latina elected to the U.S. Senate

6. The product designed, manufactured and gifted by Washington high school students

9. A process developed by researchers at the University of Kentucky to help special education teachers provide access to the general education standards

10. Defined as "of or connected with the sense of touch"

ACTE's CareerTech

VISION 2019

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Featured Keynote Speakers

Garrett Reisman

Professor of Astronautical Engineering, University of Southern California

Senior Advisor, SpaceX

Former NASA Astronaut

Marcia L. Tate

Educational Consultant, Developing Minds, Inc.

Bestselling Author

VISION 2019 Highlights

- **300+ concurrent learning sessions** covering the complete spectrum of secondary and postsecondary CTE
- **CareerTech Expo** with live demonstrations and interactive exhibitor workshops
- **Career Pavilion** providing essential resources on several CTE career pathways
- **Wednesday workshops and tours** offering insights into focused topics and CTE programming
- **The ACTE Excellence Awards Banquet**, a heartwarming gathering of passionate CTE professionals and supporters
- **STEM is CTE Symposium** addressing access and diversity issues on Wednesday, December 4

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Early Bird Registration Opens March 1!

Register by July 12 to secure the most affordable way to attend VISION!

VISION and CareerTech Expo	Early Bird (by 7/12)	Advance (7/13–10/25)	Regular (after 10/25)
ACTE Member	$395	$445	$525
Non-member	$585	$645	$695

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