



Reinventing the High School Assessment

A Way to Measure What Matters Most

Introduction

A widening skills gap continues to threaten the U.S. economy, and despite a broad consensus that the U.S. education system is not preparing students for success in work and life, little progress has been made to revolutionize PreK-12 education. For the past 100 years, the education system has remained largely unchanged. Traditional, teacher-centric education persists as the norm, and student performance is still largely measured on rote memorization, perpetuating a “teaching to the test” culture.

Instead, students need access to real-world, problem-based, applied learning experiences that empower them to not only learn technical skills and subject-matter knowledge required to enter a field or further study, but also to gain the in-demand, transportable skills that employers across industries seek. These skills – including problem solving, critical and creative thinking, collaboration, communication, and ethical reasoning – are critical to students’ success later in life.

In fact, 92 percent of executives say such skills are equally important or more important than technical skills.ⁱ While thousands of schools across the country have implemented programs to better prepare students for the workforce, another significant hurdle remains: proving and identifying students’ competencies in these hard-to-measure areas. Not surprisingly, 89 percent of executives say they have a difficult time finding people who possess crucial skills like the ability to communicate clearly, solve problems, collaborate, and more.ⁱⁱ

With no clear or confident way to confirm these skills during the standard recruitment process, employers face continued challenges as they make talent decisions. Moreover, students who have worked hard to master these in-demand skills have had no reliable way to promote their strengths and signal that they’re well-prepared for college and careers – until now.

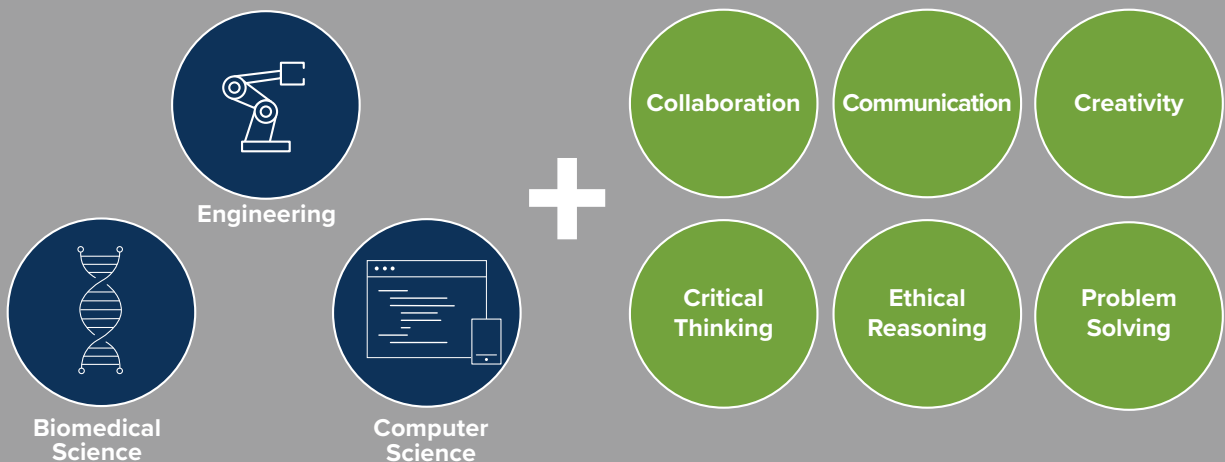
Measuring What Matters Most

For years, experts on secondary education have expressed that the current narrow practice of only testing subject-matter knowledge has not captured many of the important aspects of students' educational gains, nor has it given students, parents, or teachers information that has currency beyond a single moment or use.

Additionally, for higher education institutions, these tests do not measure the types of skills that truly differentiate students among the pool of applicants who vie for admission each year. While traditional assessments measure high schoolers' subject-matter knowledge, which has for years served as a proxy for college preparedness and has been criticized widely based on concerns for bias, they capture only a part of students' overall potential and are not always accurate predictors of students' success in college and beyond.

What's more, traditional assessments have failed to measure the in-demand skills that students need – and employers seek – as workplaces evolve. Employers say it has become increasingly difficult to find graduates who possess the skills necessary to be productive and successful employees. An estimated 60 percent of managers say graduates lack critical-thinking and problem-solving skills, 46 percent say graduates lack communication skills, and 36 percent say they lack teamwork skills.ⁱⁱⁱ Despite this reality, most students report that they are prepared for a career. In fact, 87 percent of graduates say they feel prepared for their job – but only half of hiring managers agree.^{iv}

The new PLTW Assessment measures both course-specific knowledge and in-demand, transportable skills.



Introducing a New Type of Classroom Assessment

In recognizing the value of these skills as the real currency in the modern job market, Project Lead The Way (PLTW) has developed a first-of-its-kind assessment that measures both subject-matter knowledge and mastery of in-demand, transportable skills in an objective, standardized way that adheres to industry standards and best practices. The new End-of-Course (EoC) Assessment captures the breadth and depth of PLTW classroom learning and provides students a new way to showcase their potential.

To ensure the assessment measures what's most critical to students' lifelong career success, PLTW formed a coalition of secondary educators, higher education representatives, and industry experts – collectively, the PLTW Test Advisory Panel – to identify the course-specific knowledge and transportable skills that should be measured by the new assessment. They also provided recommendations on which item types meaningfully demonstrate mastery of these competencies.

With insights from the coalition, PLTW created a design plan for the new assessment, identifying which knowledge and skills would have value across education and industry sectors, and create student currency in the classroom, college, and beyond. In addition to course-specific subject-matter knowledge, the new EoC Assessment now measures:

- Creativity
- Critical thinking
- Problem solving
- Collaboration
- Communication
- Ethical reasoning and mindset

“If we value it, we must assess it. We can't leave [these] skills to just the classroom experience; we must also assess these skills,” said panelist R.D. Parpart, a team lead for ArcelorMittal's Steelworker for the Future program in northern Indiana.

Innovative items provide the foundation for measuring students' transportable skills. Through the use of simulations, video stimuli, situational judgment items, and more, the new EoC Assessment measures a broader range of knowledge, skills, and cognitive abilities that have traditionally been difficult to measure through a standardized, objective assessment. Using innovative items, the PLTW Assessment delivers a dynamic experience that resembles the hands-on learning context of the PLTW classroom.

The assessment provides a more authentic testing experience for students, as innovative items involve the use of activities similar to those that students perform throughout the course, allowing them to apply what they've learned in a more realistic context. With more inquiry-based and interactive items, the assessment creates increased validity of student performance by eliminating successful guessing. Additionally, it provides teachers greater insights on areas of instruction that need improvement in order to prepare students for college and careers.



The PLTW Test Advisory Panel: Bringing Together Experts in Education and Industry

Leaders in secondary education, higher education, and industry converged in January 2018 to discuss and identify what information should be measured on a test that would have meaning across all three sectors and would have clear and tangible value for students.

The PLTW Test Advisory Panel of 38 experts provided recommendations on the degree to which the knowledge and skills that are identified in PLTW Frameworks should be represented on the summative EoC Assessment.

Facilitated by nationally recognized psychometricians who serve on the PLTW Technical Advisory Committee, the panel included deans, faculty members, hiring managers, engineers, CEOs, technology architects, research scientists, data engineers, and more from Vanderbilt University, Duke University, Texas A&M University, the U.S. Department of Labor Office of Apprenticeship, NASA's Minnesota Space Grant Consortium, KC STEM Alliance, FedEx Express, John Deere, Eli Lilly, Salesforce, Sanford Research, and others, as well as PLTW schools across the country.

Over two days, participants gathered into cross-functional groups aligned to PLTW's three pathways – computer science, engineering, and biomedical science – as well as the transportable skills that industry experts, higher education representatives, and secondary education teachers recognize as critical for success in each of these spheres. They identified:

1. The content and career skills that are most essential for students to master from each of the PLTW courses;
2. Which of the content and skills should be included within a test in order for the resulting score to have the most powerful meaning to industry and higher education entities to whom a student may present the score;
3. The degree of representation of those identified subject-matter areas and skills on the assessment (e.g., how much of the test is focused on measuring a particular skill or content); and
4. The types of test items that would measure those skills and content knowledge in a way that seemed authentic and meaningful to the members (e.g., multiple-step multiple choice, simulations, situational judgment, technology-enhanced, or others).

The result is a new type of classroom assessment that measures what's most critical to students' lifelong career success.

Beginning in the 2018-19 school year, PLTW students will take the new EoC Assessment that has been designed with the insights and validation from experts in secondary education, higher education, and industry.

Empowering Students with a Tool to Prove their Potential

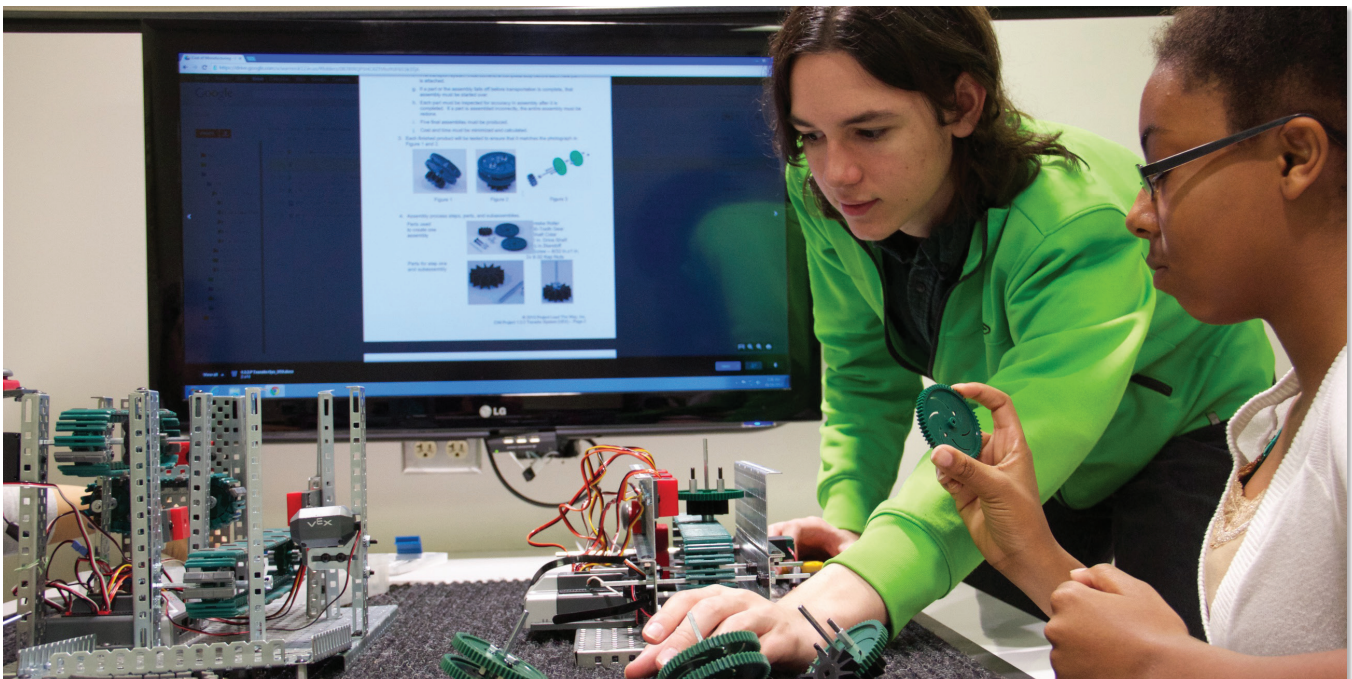
In a rapidly changing economy, students with in-demand, transportable skills – including problem solving, critical and creative thinking, collaboration, communication, and ethical reasoning – are most likely to thrive throughout their education and careers. But until now, high school tests have not provided institutions of higher education or employers information necessary to confirm graduates’ competencies in these areas.

Beginning in the 2018-19 school year, high school students who take the PLTW EoC Assessment will receive a score report highlighting their subject-matter knowledge and mastery of transportable skills. This score report will not only help students better prepare themselves for college and career, but it will also offer them unique opportunities only available to PLTW students. Once they receive their score report, students will be able to send it to higher education institutions and employers, who may use the report for admissions, scholarships, dual credit opportunities, campus experiences, internships, apprenticeships, industry certifications, and more.

With access to key information provided in the score report, students can see which skills they’ve mastered, and where they need to improve. Likewise, colleges and employers can identify which students have the knowledge and skills needed to succeed in school and beyond.

Nearly 400,000 PLTW students across the country will take the new EoC Assessment during the 2018-19 school year, and an estimated 450,000 students are projected to take the assessment in 2019-20.

“Our purpose is not to prepare students for college, but to prepare them for a career and a life of economic prosperity,” says PLTW President and Chief Executive Officer Dr. Vince Bertram. “When we think about those skills – the ability to problem-solve, to think critically, to communicate, to collaborate – we really haven’t had a way to signal those skills to future employers. The new PLTW Assessment will allow us to do that.”



Revolutionizing PreK-12 Education

To prepare students for lifelong career success in current and future economies, the very fundamentals of PreK-12 education must be collectively rethought. The education system must move away from traditional, outdated teaching models toward new, interdisciplinary learning experiences designed to empower students with a broad set of in-demand, transportable skills.

As the economy evolves and labor market demands shift, these skills will make workers resilient to changes in the economic landscape and help to bridge the nation's widening skills gap. This will prove to be increasingly important as Generation Z – the largest single population segment, comprising more than a quarter (26 percent)⁹ of the U.S. population – is poised to overtake the workforce in the coming years.

“There has to be such an urgency around this work. This is an economic issue as well as a national security issue, and from a student perspective, this is at the core of economic prosperity.”

– Vince Bertram, CEO of PLTW

Not only must the education system teach the skills that matter most, but it must also measure them and provide employers and higher education institutions a method for evaluating and validating students' knowledge and skills. This practice of measuring subject-matter knowledge and transportable skills – although revolutionary in the secondary education sector – has long served as a reliable way to indicate student competency and performance in various industries. For instance, the health care profession assesses medical residents and students based on their competence in patient care, professionalism, medical knowledge, communication and interpersonal skills, practice-based learning and improvement, and systems-based practice.

In much the same way, high school assessments must capture a broader and more comprehensive overview of students' strengths, offering meaningful results that create increased value for students, educators, and employers. Together with these stakeholders, the education system must re-evaluate the way it measures performance to ensure students have the skills they need for lifelong career success.

By teaching the skills that matter most, and replacing existing, narrow metrics of student achievement with an advanced measure like PLTW's new EoC Assessment, students will have a way to prove their potential, employers will be able to hire the best talent, and PreK-12 schools will become more accountable for equipping students with the skills most critical to their success.

“There has to be such an urgency around this work,” Bertram says. “This is an economic issue as well as a national security issue, and from a student perspective, this is at the core of economic prosperity.”



“ My PLTW classes nurtured me to think beyond the normal scope and challenged me to think critically.”

– Senior PLTW student

The PLTW Experience

Through PLTW’s pathways in computer science, engineering, and biomedical science, PreK-12 students engage in hands-on, real-world activities, projects, and problems that help them understand how the knowledge and skills they develop in the classroom may be applied in everyday life.

Whether designing a car safety belt, programming a robot that can remove hazardous materials from a disaster site, or learning to defend data in today’s complex cyberworld, PLTW students work collaboratively to develop solutions to important real-world challenges.

Through PLTW coursework, students demonstrate creativity, overcome setbacks, build teamwork skills, use tools and technology of the workplace, and practice documentation techniques reflective of those in the professional setting. In the process, they gain subject-matter knowledge as well as technical and transportable skills.



For more than 20 years, PLTW has been providing transformative learning experiences, empowering students to develop the knowledge and skills critical to their lifelong career success. With collaboration from industry experts, university partners, and PLTW teachers across the country, PLTW develops curriculum frameworks that identify learning objectives aligned to the skills employers desire.

Once PLTW Frameworks are established, the team develops a detailed learning map that includes six key elements:

- Transformative student learning experiences that empower students to develop problem-solving, critical- and creative-thinking, collaboration, communication, and ethical-reasoning skills
- Research-backed activity-, project-, problem-based (APB) instructional approach
- Relevant curriculum informed by industry and higher education
- Teachers trained as expert facilitators who guide outcomes by establishing an environment conducive to inquiry, creativity, and deeper learning
- Engaging, hands-on content coupled with advanced technology that encourages real-world exploration and application
- Meaningful feedback and assessment

This learning map supports PLTW’s belief that the knowledge and skills students learn should prepare them not just for college or a specific job, but for the many challenges they will face throughout their lives.

Project Lead The Way (PLTW) is a nonprofit organization that provides a transformative learning experience for PreK-12* students and teachers across the U.S. PLTW empowers students to develop in-demand, transportable knowledge and skills through pathways in computer science, engineering, and biomedical science. PLTW's teacher training and resources support teachers as they engage their students in real-world learning. Learn more at pltw.org.

ⁱDavidson, Kate. "Employers Find 'Soft Skills' Like Critical Thinking in Short Supply." The Wall Street Journal, 30 Aug. 2016, www.jobspartnership.org/wp-content/uploads/2017/02/Employers-Find-Soft-Skills-Like-Critical-thinking-in-Short-Supply-WSJ.pdf

ⁱⁱDavidson, Kate. "Employers Find 'Soft Skills' Like Critical Thinking in Short Supply."

ⁱⁱⁱPayscale and Future Workplace, "2016 Workforce-Skills Preparedness Report," May 17, 2016, <http://www.payscale.com/data-packages/job-skills>.

^{iv}Payscale and Future Workplace, "2016 Workforce-Skills Preparedness Report."

^v*The Nielsen Total Audience Report: Q1 2017*. Nielsen, 12 July 2017, www.nielsen.com/us/en/insights/reports/2017/the-nielsen-total-audience-report-q1-2017.html.

**PreK modules will be available in the 2019-20 school year.*