

Committee on Energy and Commerce  
*Subcommittee on Commerce, Manufacturing, and Trade*  
2123 Rayburn House Office Building  
November 15, 2013, at 9:30 a.m.  
"Our Nation of Builders: Training the Builders of the Future"

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### SUMMARY

Wheeling High School is a Title I comprehensive high school with a STEM focus organized around career pathways. The school offers 24 advanced placement courses, industry certifications, and numerous dual-credit opportunities. Recognized as one of "America's Best High Schools" by national rankings, it houses a state-of-the-art manufacturing facility, hospital lab with senior care facility, a first-of-its-kind in a public high school nano-technology research lab, and currently we are developing a business incubator lab. Three key non-negotiable principles drove the work in the development of all pathways: 1) A sequence of courses that lead beyond high school; 2) External experiences that provide students a real world understanding of the career area such as an internship or problem based learning experience; and 3) An opportunity to earn college credit and/or an industry certification. The goal is for every student to graduate with a "Diploma Plus" and leave high school more competitive, with a career focus in mind. One of six comprehensive high schools in a district of 12,000 students, Wheeling became the district's first majority minority school in 2010. Today, 51 percent of its students are Hispanic and 45 percent identify as low income – up from 20 percent in 2002. Changing demographics meant we needed to change how we taught and how we engage students in order to make education relevant to their future.

## **WRITTEN TESTIMONY**

The High School Survey of Student Engagement, conducted by Indiana University, has surveyed now more than 350,000 students across 40 states, and found what parents of teenagers already know, they're bored. So, when Wheeling High School was redesigned as a comprehensive high school with a STEM focus, we wanted our school to be engaging by being relevant to our students in a way that prepared them for life beyond high school.

To engage students from the moment they enter Wheeling High School, our conversations changed. We didn't ask, what do you need to graduate? Rather, we asked, what do you want to do with your life? The answer to that question serves as the basis from which a school can embrace each student through the purposeful selection of electives within a career pathway, provide co-curricular activities that support it, and partner with local business to facilitate external experiences that inform, all before the student graduates high school.

By graduating students college and career ready, the choice is theirs to make. Whether the student transitions directly to a two or four year college, trade school, the military or begins a meaningful career out of high school and returns to school at a later date, the student is in control because they have options.

Three key non-negotiable principles drove the work in the development of these pathways: 1) A sequence of courses that lead beyond high school; 2) External experiences that provide students a real world understanding of career areas through internships or problem-based learning experiences; and 3) An opportunity to earn college credit and/or

an industry certification. Students graduate with a "Diploma Plus" and leave high school more competitive, already building his/her resume.

What does a "Diploma Plus" mean, and more importantly how does it impact students? Back in 2009, with a small team of industry partners that has grown to more than 30, the school opened a manufacturing facility to complement its Project Lead the Way engineering courses. With industry donations, equipment deeply discounted, Perkins funding, and district facility improvement dollars, a state of the art, national model program was founded. Students can earn dual college credit, industry certifications, and have access to substantive, real-world internship opportunities.

In examining the value of career pathways as an effective education model, we must understand how it impacts students. Let me tell you about Francisco. Francisco grew up in one of the "tougher" parts of town, known for its gangs and police presence. He got into his fair share of trouble throughout his time at school; all of the deans knew him by name. His teachers knew he was a smart student, but his path to graduation was far from assured. That is, until, Francisco discovered the school's manufacturing program, where something finally clicked.

Francisco worked extremely hard, staying after school at least three days a week to get one-on-one time on the machines. At the end of the class, Francisco took the MSSC and NIMS certification exams, earning entry-level credentials. It was this work ethic he developed that inspired many industry partners to give him an interview. He landed his first job at Holbrook Manufacturing in Wheeling. Since his graduation last December, after 4 1/2 years in high school, Francisco is regarded by Holbrook as a "model" employee. Today, Francisco is still thrilled about manufacturing. He was able to purchase his first car,

a health care plan, and has had multiple raises in his 6-month career. Francisco was proud to be able to contribute financially to his family, noting that he was actually making more than his mother, who was also struggling to support them. As of today, Francisco plans on saving enough money to attend the local community college and earn an Associates degree specializing in CNC Machining.

This is one of many real examples that illustrate the impact of engaging students in a career path of interest. It literally has the potential of changing the trajectory of a family for generations. Now, while some students enter high school at-risk, others may be successful academically but need direction in discovering and fostering their passion.

Think of your own college experience and how anxious you were to get to your major coursework. If we can connect the dots between what students are excited about in their future and the classes they take today, students are more engaged in class, more motivated to do the work, and more likely to challenge themselves with rigorous coursework such as honors or advanced placement.

We know that students who self-identify with a specific career in mind when leaving high school are 80 percent more likely than their counterparts to earn a certification or degree six years post high school. Think of what that 80 percent translates into in federal and state financial aid for students who enter college without some experience in their high school years to inform their choices. I've met countless individuals who share with me they began college in engineering only to realize they didn't know what an engineer actually did. I always respond, that's because you didn't go to Wheeling High School. Think about the number of students who enter college thinking they want to do one thing, only to decide a year or two in, they no longer want to pursue their original career pathway. Establishing

career pathways in high school exposes students to a wide-range of opportunities, allowing them to eliminate career options early on and experiencing them first hand prior to spending a single dollar on a college education.

Mallory entered the engineering/manufacturing program with a small spark of interest in how things are made. Her experiences in the PLTW Computer Integrated Manufacturing class, robot rumble challenge, and the opportunity to design and manufacture her ideas into reality led her into an internship at Swiss Precision Machining. Even as she currently attends the University of California pursuing a degree in Aeronautical Engineering, she still returned to Swiss Precision in the summers to work. Mallory recently told her former teacher at Wheeling High School: " It's honestly one of the greatest opportunities I've had. This summer I did a lot of price quoting and figured out the most efficient way to machine parts. I also got to go on the floor and help run machines."

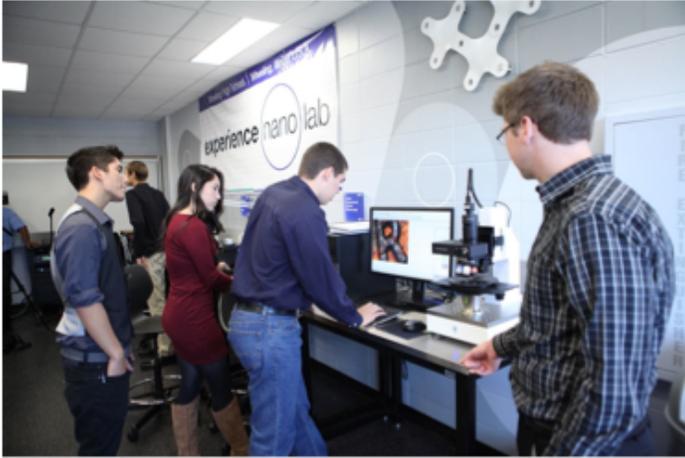
Today, Mallory boasts an internship with the Air Force Research Laboratories in California. She says, "I feel like the biggest reason why I got that job was because of the machining experience I had. My boss was very impressed with the opportunity that I had at Swiss and in the class."

So the goal at Wheeling High School is clear—to make high school relevant— that is why we house a state-of-the-art manufacturing facility, hospital lab with senior care facility, a nano-technology research lab, and currently developing a business incubator lab. And our goal for our students is simple—for each to maximize the value of their high school experience.

This work is **scalable**. Keep in mind, Wheeling High School is a non-selective Title I public school, with over half of the incoming freshman class identified at-risk and a school

poverty rate now at 45 percent. That means that more than 55 percent or more of the incoming students each year are reading and doing math at about a 5th grade level. Yet, in the last six years our enrollment in advanced placement has grown by 80 percent in 24 AP courses with more than 653 exams taken this past spring while maintaining an average pass rate over 80%. In spite of the challenges, national rankings in the last two years have recognized Wheeling as one of "America's Best High Schools." The school was one of the first to be recognized by the Society of Manufacturing Engineers Education Foundation as a national model for manufacturing and engineering education, with PRIME designation. School leaders must develop public-private partnerships that bring the outside world into the school, and give students authentic, real-world experiences to practice 21<sup>st</sup> century skills including teamwork, problem-solving, and utilizing technology.

By being responsive to the global economy and remaining flexible in the development and delivery of curriculum that is relevant to its students, public education can work for students such as Francisco and Mallory, and provide a direct access to fulfilling their American dream.



**Research & Development Pathway;  
NANO Technology Lab (2013)**

**Manufacturing/Engineering Pathway  
Advanced Manufacturing Lab (2009)**



**Health Science Pathway  
Hospital Lab (2010)**



**Business Pathway  
*UNDER CONSTRUCTION*  
Business Incubator Lab (2014)**

