Joint Testimony of
Dave Lord, Bradley Pyle, and Jordan Lealos
Kettering High School Master Teacher and Alumni

Before the House Finance
Subcommittee on Primary and Secondary Education

Hearing on
Project Lead The Way Programs
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Mr. Dave Lord:

Members of the Committee,

My name is Dave Lord, and I am the engineering instructor at Kettering Fairmont High School. I am pleased to speak with you today about the importance of science, technology, engineering, and math education—what you probably already know as STEM education. Specifically, we would like to talk about Project Lead The Way—a nonprofit education organization that I am very proud to partner with. From Kindergarten all the way through High School, Project Lead The Way helps students develop skills in the fields of computer science, engineering, and biomedical science.

The life-changing opportunities that students have through these important courses is hard to do justice without seeing it in person. But we have seen amazing results. I could explain further how important my Project Lead The Way (PLTW) program is to students in Kettering, but instead, I have invited a couple of my former students to explain. Brad Pyle and Jordan Lealos were students in my class 5 to 6 years ago and they would like to

share their story with you. And I am very proud to introduce them to you as the accomplished professionals that they are today.

Bradley Pyle and Jordan Lealos:

Hello, my name is Bradley Pyle I am currently a Mechanical Engineering Student at the University of Cincinnati, graduating this May.

Hello, my name is Jordan Lealos, and I am currently an Aerospace Engineering Student at the University of Cincinnati. We are both former students of Mr. David Lord at Kettering Fairmont High School within the Project Lead the Way Engineering program.

We started on a college track and took general education classes including Advanced Placement courses in high school.

I enrolled in AP courses for physics and calculus my senior year. Due to the college credit I received, I was able to reduce my degree by one year, to a four-year program.

I was also involved in the advanced placement courses throughout my senior year including physics, calculus, and statistics. These courses helped prepare me for the typical college course structure.

We also began searching for colleges that offered engineering programs.

I always had the mindset of attending a four-year university that would lead to a career within the engineering discipline. My grandfather, a retired engineer with The Boeing Company, along with other relatives, influenced my interest in the engineering field. Throughout my junior and sophomore years of schooling, I focused on finding the right engineering program by visiting colleges such as Purdue University, Ohio State, and the University of Cincinnati. After much deliberation with my family & friends, I felt like I found the right fit to attend the University of Cincinnati, where I was accepted into the Aerospace Engineering program.

While in my junior and senior years, I started to visit and apply for different engineering programs. I visited Wright State University and the University of Cincinnati, and chose UC due to their co-op program.

We both enrolled into the Project Lead The Way Engineering program as juniors and started taking PLTW courses for Introduction to Engineering Design (IED), Principles of Engineering (POE), and Computer Integrated Manufacturing (CIM).

Intro to Engineering Design course:

Introduction to Engineering Design was our first experience with Computer Aided Design (CAD). The course started with 2D hand drawing and ended up with 3D computer models. We learned about different modeling techniques and the impacts

different manufacturing methods have on how a part is modeled. The course ended with a group design project that was modeled in CAD and prototyped as a group.

Principles of Engineering course:

Principles of Engineering was based around the concepts of material properties and understanding the engineering process. This was Jordan and I's first exposure to the engineering process and the principles used.

Computer Integrated Manufacturing course:

The Project Lead The Way Computer Integrated Manufacturing course was an introduction to robotics and controls. We learned how to program assemblies and robotic arms to perform tasks similar to an automation process. This class was a mix of hands on learning and traditional, presentation style learning.

As seniors, we scheduled the following courses involving the PLTW Program: a Civil Engineering Technologies course through Sinclair Community College and a Six Sigma: Green Belt Certification Course.

The senior level curriculum for Project Lead the Way allowed us to have instructors from the local community college come to our high school and instruct us on coursework involving Civil Engineering Technology and Six Sigma: Green belt certification. These courses allowed us to have an insight into each respective field while providing us with college credit at the same time. While being enrolled in these courses

we had the opportunity to also work on our Engineering Design and Development Capstone course.

All of the Project Lead The Way courses helped us learn and develop real-world skills that have allowed us to innovate and create.

One example stands out above the rest. During our capstone course, we were approached with a problem: how to make the oil cap for a Cessna 172 aircraft (a small prop aircraft that has a Lycoming 0-360 engine) loosen easier for pilots. Oil cap removal is required to remove the dipstick from the engine for pre-flight checks, however, pressure could sometimes build up due to the heat of the engine and other conditions where the dipstick may not loosen properly.

Brad and I researched ways on how to create a device that would solve this problem and then we reached out to local industries such as Bastech Incorporated, a 3D printing company located in Dayton, Ohio, and Sinclair Community College, for mentorship. Through our partnerships, we were able to devise a solution to the problem and developed a device to loosen the oil cap that would require less torque for the user.

We used our knowledge from the program and applied FEA to the model of the device to see where the stress would be applied and adjusted the material from being a 3D ABS-plastic to a plastic injected molded part, which was more cost-efficient and easier to produce. Then we presented our findings at the 2013, Sinclair Tech Prep Showcase - Miami Valley Tech Prep Consortium. Our team competed against local schools and our

project won first place in the Manufacturing Design & Development category for the Engineering & Science Technologies pathway. Eventually, we sought a patent application and received coverage by the local news.

We are certain that the Project Lead The Way courses helped inspire us to pursue and succeed in STEM majors at the university level.

And we have brought this PLTW mindset into college at the University of Cincinnati. For example, POE was very similar to my college Solid Mechanics course, and many aspects of the course were mirrored using algebra instead of calculus.

The PLTW program has helped me in the work place as well as at university. In my industry co-op and current part-time work experiences, the oil cap removal device—our capstone project—has helped by allowing me to better understand how to plan and implement projects. CIM has directly helped give me the foundation of building controls and processes that I use at work.

I follow the same engineering methodology while scheduling projects for different programs while on co-op. My prior insight from the Project Lead The Way program allowed me to gain insight to what I use on co-op on a daily basis.

Of course, we could not have done any of this without those who care about and invest in us, especially our family and teachers like Mr. Lord. And because of our experience at Project Lead The Way, we have had many

more opportunities and we are very excited about the professional careers that soon await us.

Mr. Dave Lord:

After Jordan and Brad graduated, the job of mass production of the tool was passed on to the next group of seniors. Two additional students took on the project to determine how best to manufacture the tool. Using what they had previously learned in engineering class, they contacted a manufacturer and mentor, designed and made a mold, and had 100 parts produced. We now sell the tools locally and the students' oil cap removal tool is now even being advertised in Sporty's pilot magazine for international sales.

Every day I have the privilege of seeing students who are engaged, inspired, and empowered because of Project Lead The Way courses. As you heard from Brad and Jordan today, there is no question that their experiences in high school helped lead them to pursue and succeed in their post-secondary interests. And I believe that is what education is all about.

We would appreciate your support so that more K-12 students across Ohio can have the same learning experiences that Jordan and Brad have had.

Thank you for the opportunity to present to you today, and we are happy to answer any questions.