Automotive Technology Research

Our approach to research in automotive technology is two-fold. First, we want to ensure that students are getting to experience a project they are interested in. Second, we want to be answering our 3 primary research questions:

1. What is the impact of exposure to advanced automotive technologies through student-designed projects, on high school students?

2. How can student-led projects intersect with traditional curriculum in automotive technology programs?

3. What types of experiences can we co-design with students to give them exposure to the 'real world' work going on in automotive tech outside the classroom?

The process begins by meeting with students and their teachers to brainstorm ideas for an automotive build project that is intriguing to the group. Student voice is a huge component for our work across all subjects, so we go out to speak with students several times throughout the year. These discussions take place in a structured interview format to ask them about their learning and progress. The interviews are designed not only to help us determine whether or not the project was a success and created value for students but also to help us find ways to improve the program for future students.

Our first interviews helped us to understand the students and their backgrounds. The questions focused on their choice to enroll in the class, work outside of the classroom, motivations to work with auto tech and future career plans. The mid and post-interviews were fine-tuned to take a closer look at our three primary questions, ask if the students had concerns about their project, and listen to their reflections on the program in general.

Below, are the major questions that we chose to explore with quotes from the students that described their experience.

1. What is the impact of exposure to advanced automotive technologies on high school students?

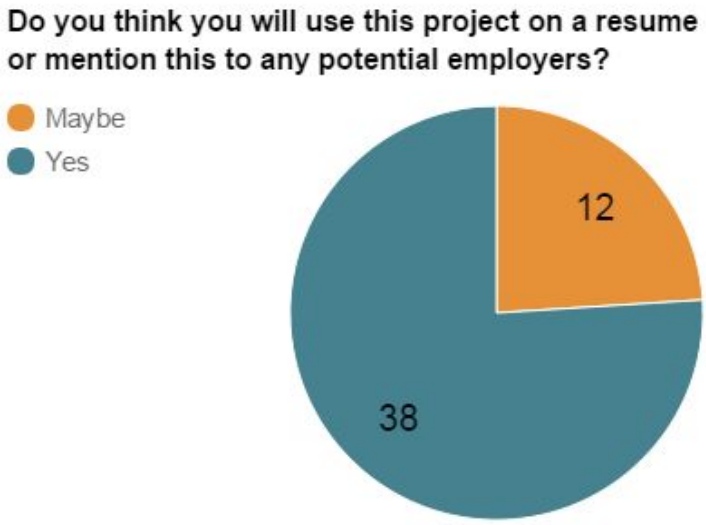
High school students in automotive technology don't often have the opportunity to work with recently emerging technologies, such as electric motors. Students today will work with this tech in the future, so we feel it is relevant and important to explore both how and why this hands-on work might impact their future careers.

From our initial interviews, it was clear that the students recognized the shift in the automotive industry towards hybrids, electric vehicles, and automated driverless vehicles. Many students were hesitant and anxious to work with electric vehicles, and they saw this as an important opportunity to familiarize themselves with technology that is becoming such a large part of the automotive industry.

"The electric motor, it's the way of the future. We used to not learn that stuff in this class, but, because of this project, now we do."

"I would be excited to work with an electric car, and then after work on a gas car, so I can compare the two and figure out which way I want my career to go."

As a Career and Technical Education (CTE) course, we knew that many of these students would be going into the automotive industry as a career. We found that a majority of the students across both programs would reference this project on a resume.



Of the 50 students that we interviewed, 38 said that they would either use this project on a resume, mention it to potential employers, or that they had already used this project on a resume. The other 12 students were categorized as "Maybe" as their answers included variations of "probably" and "possibly" with most responses pending the job that they were applying to.

"It's already on my resume. I listed the auto tech and some of the things we were working on in class."

We also found that 75% of these students in the automotive programs we work with want to pursue careers in an automotive or automotive-related field. The other 25% had no intention to pursue an automotive career. Some students were attending it to gain the skills to

2. How can student-led projects intersect with traditional curriculum in automotive technology programs?

Automotive tech curriculum typically follows a traditional set of concepts and skills. We wondered if adding an element of student choice-based projects could both augment the curriculum as well as integrate additional components relevant to the industry to help better prepare students for careers.

At both Northshore and Meadowdale, these projects had a significant impact on the courses' regular automotive curriculum. We found that when students had more ownership over their project through helping design it, they were more connected to what they were working on.

"I get to work on a Model T, which is something not a lot of people can say they can do."

"I love it. This class has expanded since this project. I'm used to a more basic learning experience, it's new and I like it."

"We get to build a car from the ground up. It's two different experiences: learning about it, and then actually doing it."

3. What types of experiences can we co-design with students to give them exposure to the 'real world' work going on in automotive tech?

Getting students outside of the automotive workshop and into the real world may give them a host of benefits. Face-to-face time with professionals in the automotive industry may highlight possible pathways to successful careers and expand student

understanding of the automotive industry. We are curious what types of experiences might spark student passion and interest.

Over the weekend of April 29th, 2016, students from our automotive technology program were given the opportunity apply for a special field trip to Mazda Raceway Laguna Seca and Canepa. The trip put students face-to-face with professionals and gave them a chance to ask questions of experts in a live setting.

At Laguna Seca, the students were able to connect with Don Kitch Jr., Team Manager for Team Seattle - The Heart of Racing . The Heart of Racing is a guild created to raise money for pediatric cardiac care through Seattle Children's Hospital. Amongst the stress and immense work behind a race weekend, The Heart of Racing team was still kind enough to show off their modified Porsche 911 GT3 racer to the students and most importantly, took the time out of their busy schedule to speak with the students. Specifically, the students got their questions answered by the Team Manager, Race Strategist, Lead Engineer, Data Systems and Telemetry Lead, Drivers, and a Fabricator. These led to some great conversations and was clear in their reflection on the event:

"This experience was exactly what I wanted because it showed me how to get into the racing industry and what type of education I'll have to have to be successful in the environment of racing."

"The most influential professional I met was the racing engineer. Being in a position that requires a complete understanding of the car and the forces around it, it surprised me he had never gotten a degree in that study. It's a great example of working your way up the ladder and learning as you go."

When we told Mark Greene, host of Cars Yeah we were going to Laguna Seca he told us, "if you are near Laguna Seca, you have to see Canepa." Luckily, we were able to get in contact with John Ficarra who took us on an extensive tour of this 70,000 square foot automotive facility. Canepa is not simply a showroom for automotive perfection, it is also a museum of racecar history and one of the finest restoration shops in the world.

"It was great getting to listen to the history of the cars in the museum while also learning more about the restoration industry and how to get into the business."

"Talking about the history of racing and how mechanics had to create smart strategies or devices to cut off seconds of their lap times. Discussing these inventions made talking to Canepa professionals the most exciting part of this trip."

"I think it is important that foundry10 keep doing these events in order to show students what they can do as a career in their future."

These two programs were a great success for the students, educators, and all of the professionals involved. Moving forward, we are curious to see how the passion and interest in these two projects can continue to be sustainable for future classes. Additionally, we hope to provide new creative opportunities to impact the lives of more auto tech students and teachers.