

Build Iowa's Future Design Challenge

Iowa Dream and Design Challenge: Pella High School Students Grades 9-12

“Advanced Manufacturing Lab for the Pella High School Career Academy”

Jobs in manufacturing are in high demand and are expected to continue expanding with over 215,000 people in Iowa employed in the manufacturing field. Seeing the need for preparing students for local, high-demand manufacturing careers, The Career Academy of Pella (built in 2015) was created for job-based learning and advanced education, but does not offer much work-based manufacturing experience, which is important for the local industries. The creation of an advanced manufacturing lab would provide experience and exposure to different job opportunities, and create a realistic environment for students to learn. Advanced manufacturing is a potential career choice for students looking to enter the workforce immediately after graduation or following the completion of an apprenticeship program. However, most students do not have access to these types of programs. An advanced manufacturing lab would give students the opportunity to experience hands-on learning and gather information on the job while exploring high tech careers.

Pella's economy relies heavily on manufacturing, with several large manufacturing companies, including Vermeer Corporation, Pella Corporation, Precision Pulley & Idler, Lely, Ring-O-Matic, and LDJ Manufacturing. These companies will require more employees to keep up with the high demand for their products. An advanced manufacturing lab in the Pella High School could inspire the next generation of future

employees to join these corporations. This lab could help students see the importance of what they are learning and its application in the real world.

We began exploring the need for an advanced manufacturing lab by collecting feedback and input for our project from leaders in our community such as the Mayor of Pella, leaders of industry, Pella High School's Principal, and the City Administrator. The Director of Work-Based Learning in Marion county, Teri Vos said, "Marion County ranks in the top two percent of counties in the United States for the percentage of jobs in manufacturing, with over 7,500 manufacturing jobs in a county of just over 33,000 people." This statistic shows how Marion County excels in manufacturing and a new lab would be crucial to the success of the local corporations in the future. All of the leaders we contacted said they believed that this lab would be viable.

Our team began researching other manufacturing labs to begin the design layout. The proposed Advanced Manufacturing lab would use a storage area in the back of the Industrial Technology lab in the school district's Career Academy. The design accommodates safety guidelines, such as a second exit, advanced manufacturing equipment (which includes robotics, automation cells, 3-D printers, CNC machines), and a plan to provide electricity for the equipment in the lab. The total cost analysis for the lab was divided into two phases based on our research of past school district funding and grant applications. The expenses for the first phase of the project was estimated at \$69,450 and the second phase was estimated at \$30,115.

As students of the Principles of Engineering class at Pella High School, the "Build Iowa's Future Design Challenge" provided us a chance to learn about teamwork, innovation, and the application of project management skills which allowed us to get into

the shoes of an engineer or project manager. As a group, this project gave us opportunities to apply critical thinking, set clear goals and deadlines, establish individual roles, engage in collaborative discussions, utilize group decision making, and ensure consensus through adaptability skills. Specifically, the design team used brainstorming and creative thinking in designing the floor plan for the lab while the cost analysis team used investigative research, mathematics and accounting skills.

In conclusion, Doug Hundt, President of Industrial for Vermeer Corporation outlined the connection that this project would have on the community and school district by saying, “The advanced manufacturing lab would be a catalyst for the education and development of the future workforce. The lab would give students exposure to the career opportunities in advanced manufacturing as an option to their future education and career choice beyond high school.”

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