How 3D PRINTING

Took One Arizona District to New Heights

By Keyera Mitchell

Technology is taking the world by storm and although cars-turned-crime-fighting-robots aren't quite reality, Western Maricopa Education Center (West-MEC) has been proactive in utilizing cutting edge tech tools on an innovative campus in its service of high school and adult career and technical education (CTE) students. In the north and west valley areas of Arizona, the district prides itself in utilizing technology in the classroom and connecting education with business practices.

West-MEC had an idea: to serve younger generations by providing them with hands-on learning opportunities and experience in high-demand industries. With that idea and a recognition that to find one's purpose can be difficult when opportunities are limited, the school launched satellite programs, expanding its educational reach and offering courses in a variety of industries, including health, beauty and wellness, craftsmanship, law, public safety & security, transportation and technology.

When presented with the chance, high school students are encouraged to think about their future. And suddenly, the sky's the limit. West-MEC has grown over the years and continues with a mission of "preparing students today for tomorrow's careers" and their vision of empowering all students to participate fully in the

economy by providing and enhancing career and technical education. For district teachers and staff, this happens with the aid of state-of-the-art equipment and tools and industry-standard curriculum across all campuses and virtual learning environments. But one in particular stands out, as West-MEC worked with a long-time staff member to create an innovative building that promises to present infinite possibilities for students who walk through the doors.

The Tech Guru's Playhouse

When students,educators and parents, alike, complain about the education system, those complaints center around the lack of curriculum focused on real-world application. But when it comes to CTE, our students are more likely to pursue postsecondary education and are then successful in matriculating to the workforce (About CTE , n.d.).

West-MEC provides high school students with a multitude of opportunities, while also divesting CTE of stigma and stereotype. The START campus at West-MEC is providing students with resources that transcend those in the average classroom. This campus is the home of the district's Coding program and a create lab where students can put their ideas into action. The campus is the epitome of every tech guru's playhouse, providing future coders with the tools to explore technological advancement.

Students of START at West-MEC are given the opportunity to network with industry representatives and gain that all-important, real-world experience with the offer of 3D printing services. Staff and students have used the device to create decorative models, but the printer served a bigger purpose when former student and intern Daucen Osborn teamed up with his principal to test new waters.

START at West-MEC Director and Principal Chris Cook believes that providing youth with tools that can broaden their knowledge and help them develop into professionals is vital in the furtherance of CTE programs:

"As a principal, our team collaborates to provide mentorship and hands-on learning experiences to our students," he said. " Whether it is introducing them to new technology or connecting them with industry experts, I believe that networking and broadening their skills provides them unique experiences that make them competitive in the future workforce."

Osborn has always had a passion for technology and when the opportunity arose to attend West-MEC, he did. Osborn enrolled into the district's coding program and used the 3D printer to create a number of models and to expand his knowledge and network. Inside the classroom he learned from his instructors about coding; and outside, he sought mentorship from his principal and other industry experts to help him diversify his skillset.

"I have been 3D modeling since sixth grade, stated Osborn. "I have a 3D printer at home, so I was excited to be able to do this as a part of my internship [with START at West-MEC]."

It is critical for students to explore career paths, so they can make an informed decision for their futures. As many as 50 percent of college students do not have a major in mind when they enroll in college and 75 percent of students change their major at least once before graduation (Freedman, 2013). CTE courses are a possible agent for changing these statistics. When high schoolers are able to explore different career pathways, and when they are educated with a balance of academics and job training, they are better equipped and, like Osborn, they might even jumpstart their careers.

Collaborating with Medical Assisting Program

One of Osborn's first projects involved the use of a 3D printer to create prototypes for the West-MEC Medical Assisting students. The students were looking to have models made for a competition and wanted to have something that would help them stand out from their competitors.

They came together to brainstorm ideas for different prototypes that were unique. Osborn worked alongside his peers to create a 3D model masterpiece that would leave a lasting impression. He created a back brace, hand and femur prosthetic prototypes. These 3D models came in handy — no pun intended; they won first place!

Osborn stated, "I had to start from scratch when it came to designing these prototypes. Unlike other designs I did not have a sketch that I could use to create these models, which made things challenging, but it was also a learning experience that I will never forget."

Working with West-MEC Medical Assisting students gave Osborn valuable experience: working with clientele and how to use critical thinking skills to ensure the best results for his customer's satisfaction.

"As a principal and a mentor, I knew Daucen would be able to collaborate with his peers to develop their vision and with a little guidance he was able to discover new talents that will serve him well in the future," said Cook.

The investment in a variety of technology tools at START has helped students

gain independence; collaborate and work cohesively on projects; and build leadership skills. Introducing relevant technology in the classroom helps students transition from teenagers to adults with skills in high-demand industries.

Real-World Application Meets Industry Standards

During the 2015–16 school year, West-MEC started the process of building their fifth campus in Surprise, Arizona. One of the subcontractors for the project, SPS+ Architects, reached out to START at West-MEC Principal Cook to inquire about the creation of a 3D model of their project.

Cook felt that this would be a great opportunity for Osborn to work with industry representatives. Osborn was up for the challenge and put all of his effort into meeting the needs of his new customers. He worked with the contractor and district administration to create a model of the new campus to be presented at a governing board meeting. Even though this meant use of a new software (Rhino 3D Cad Sketch), Osborn rose to the challenge and helped make the SPS+ Architects staff's vision come to life.

The project involved an original design and then modifications upon the client's request: removing furniture from the mockup and thickening the walls to create a more lifelike design. Total, Osborn printed five buildings for the new

Mark Davenport from SPS+ Architects admires Daucen Osborn's 3D model.

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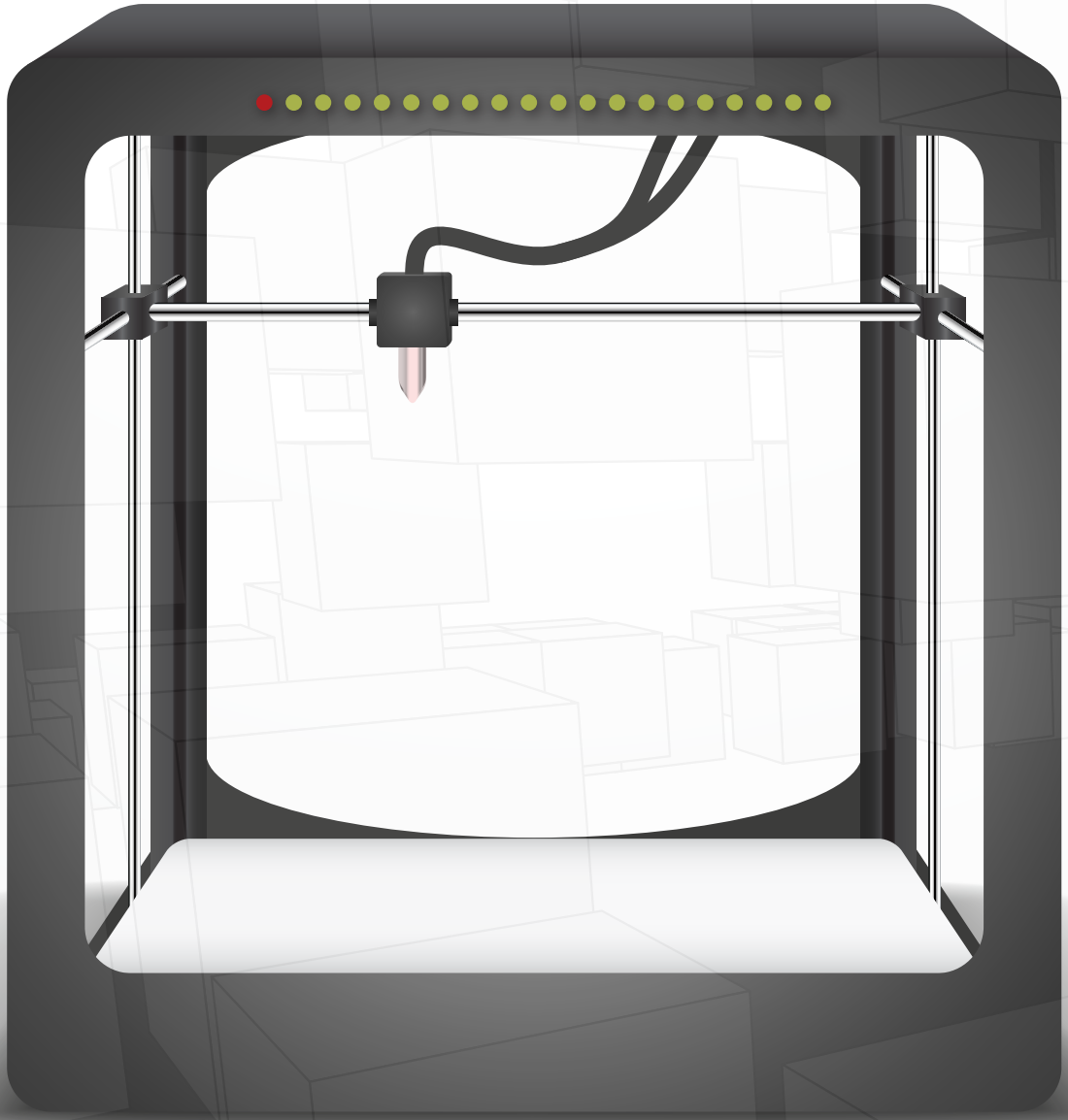

campus, where each took more than a day to produce.

Osborn stated, "The smallest building took 18 hours to print and the largest building took up to 52 hours. It was a process to get these items printed so I had to work on the project for SPS+ Architects right away."

After printing the building models, Osborn glued them all together and molded them on foam core, which had a layout of an aerial rendering of the roads and parking area for the campus. SPS+ Architect staff were very impressed with the young coder's work and the governing board was, as well. The 3D model was displayed at the Northwest Campus Groundbreaking Ceremony in October 2016.

"It made me feel good that I was able to help make something so important. The staff members from the architect company gave me their cards and let me know to reach out if I ever needed anything," said Osborn.

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The Gift that Keeps Giving

To continue to break the stereotypes that revolve around CTE, relevant career pathways must be introduced to students in their younger years, thus nurturing interest and demonstrating to parents the benefits of these programs.

START at West-MEC believes in giving back to the community and providing opportunities for youth. The district hosts summer camps at their facility for elementary students, so they can get a head start on the future. In the summer of 2017, Osborn had the privilege of leading a 3D printing camp for students aged 10–13. A popular camp for participants, even the instructor took away something valuable.

"I love seeing how excited they get about learning how to make 3D models," said Osborn. "When I was setting up the lab one morning I could see their little faces peeking through the window to see if the models they created had been printed yet. I love that I can help those who are just as passionate as I am."

Enrolled students worked with Tinker Cad software to create a series of 3D models; Osborn taught them how to create blueprints electronically and by using Legos. Over the course of the two-day summer camp, the students created name plates and boats, and benefitted from the expertise of West-MEC's very own 3D printing professional. Summer camps like these are showing parents and kids the different career options available and demonstrating the importance of hard work, dedication and brains when taking these programs.

The Big Picture Broadens the American Dream

Throughout his two years at West-MEC, Osborn has worked on a variety of 3D printing projects and gained knowledge from many industry professionals. While a participant in the coding program at West-MEC, he maintained a 4.5 GPA at Shadow Ridge High School where he spent his mornings focusing on academics.

Daucen Osborn is living proof that CTE, and technology education in particular, makes a positive difference in the lives of all students. Although, he initially came to START at West-MEC for coding, his now widened skillset encompasses 3D printing, vinyl cutting, graphic design, heat pressing, laser cutting and UV printing.

"West-MEC has significantly broadened my career paths. I don't know where I would be without it. I worked with big companies and gained a lot of experience," stated Osborn.

The recent high school graduate is currently attending Arizona State University, where he is an intern for CompuGroup Medical to expand his technology skills and live his dream of a career in coding.

CTE serves as an economic engine that provides individuals with the necessary skills to live their own "American Dream." West-MEC is just one of many schools that make these opportunities possible. Daucen Osborn is an exceptional example of how CTE works in the favor of students across the nation. ■

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REFERENCES

Association for Career and Technical Education. (n.d.). About CTE. Retrieved from https://www.acteonline.org/aboutcte/#.WYSc9dPytBw.

Freedman, L. (2013). The developmental disconnect in choosing a major: Why institutions should prohibit choice until second year. *The Mentor*. Retrieved from https://dus.psu.edu/mentor/2013/06/disconnect-choosing-major/.