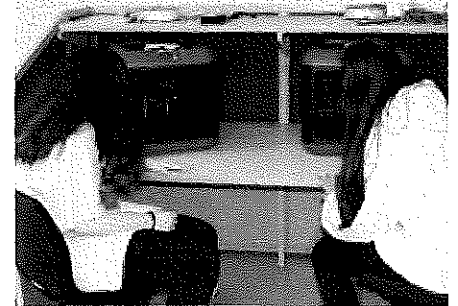


MECHANICSBURG MIDDLE SCHOOL

By: Zach J. Love, M.Ed., Cara Hersey, M.Ed., and Julianne Metz

PARADIGM SHIFT FROM TECHNOLOGY EDUCATION TO TECHNOLOGY AND ENGINEERING EDUCATION

It takes time, energy, fresh ideas, new faces, and a change in thinking to pivot a program from Technology Education to Technology and Engineering Education. At Mechanicsburg Middle School (MMS), located just outside of Harrisburg, these changes are evident to the students, community, and staff. Without the support of the administration and a grant through The Wildcat Foundation, these changes would have been more difficult to achieve.



PROGRAM FACELIFT

Our district is in the midst of a major curriculum overhaul and scheduling restructure at the middle level specifically. We recognized as educators of technology and engineering that our curriculum cannot stay stagnant—as the one constant with technology is change. We currently have the perfect combination of talent, growth mindset, and a passion for problem solving that will enable us to develop an effective technology and engineering middle school curriculum. When a curriculum rewrite is upon you and three new faces are leading the department at the middle school, good things are bound to happen.

Cara Hersey, the department coordinator, helped to spearhead this curriculum re-write. Cara teaches incoming sixth grade students in their first exposure to technology education. Her classes focus on what technology and engineering education is, as well as introducing the engineering design process that our department uses. Julianne Metz is a second-year teacher in charge of the seventh-grade students. During their seventh-grade experience students learn about structures, electricity, and problem solving. Zach Love is a third-year teacher who teaches eighth grade. The primary focus of eighth grade technology education is on material processes.

The curriculum rewrite process is cyclical and occurs formally once every six years in our district. Our district decided that it would embrace the backward design model that was created by Jay McTighe and the late Grant Wiggins. In the 2016–2017 school year, we were exposed to training by Jay McTighe to make sure that we were all following the appropriate process for developing our curriculum as outlined in the backward design model. We utilized five full day district in-service opportunities as well as other district collaborative time to complete the curriculum maps for both the middle and high school levels. The current school year will be used to develop cornerstone tasks, units, performance tasks, and assessments to be used in each course. Our goal is to have all maps and lessons ready for full implementation during the 2018–2019 school year.

As a starting point to the middle school schedule restructuring, administration approached department coordinators in the Fine and Applied Arts areas about going to look at other districts' middle school programs across the state. We were lucky to have all members invited to participate in several visitations. In monthly

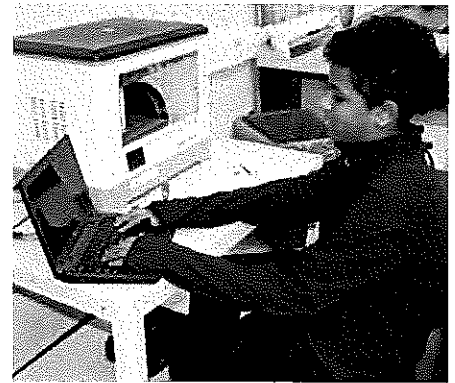
department meetings, discussions were held to come to a common vision for what we want our program to become. This allowed us as a department to see how each school district schedules and offers the fine and applied arts areas and more specifically technology and engineering courses. Through the Lancaster-Lebanon TEEAP region we were also able to visit three other school districts as part of our data collection. Each visit allowed us to meet with the teachers, administrators, and students for some question and answer sessions. These opportunities were not only beneficial to us but our administrators got to see the possibilities for our program. Our goal as a department was not to simply find an ideal program out there to copy, but instead to gather information from many sources and form a program that will work for the Mechanicsburg community, students, and staff. As a department, we used collaboration and professional development time to map out our vision for the program's new direction. A Google Doc was created to collaborate and share ideas to determine the future direction for the Mechanicsburg Area School District Technology and Engineering Department.

CURRICULUM REVAMP

Common themes that we all agreed to embed into our new curriculum were: student choice, self-directed learning, and interdisciplinary collaboration. Student choice provides the opportunity for students to customize their learning experience through exploring their interests. In our school, a student's first exposure to technology and engineering education occurs during sixth grade. An exploratory first year gives the students an opportunity to spark their interest in problem solving through different areas of technology. These areas of technology range from graphic communication, prototyping, electronics, CAD, and material processing. This first experience includes a variety of technologies so students get a glimpse of all of the technology and engineering areas we have to offer in our district. Seventh grade provides the opportunity for students and staff to work on interdisciplinary projects. These projects are developed by the teachers to satisfy multiple standards through one project. Multiple classes are offered based around real world problems that must be solved through different areas of technology. In eighth grade, students

get to pick an area of technology that they wish to further explore as a possible career connection. Community members in industry or experts in a given field are invited to share their expertise. Students in this final year are expected to transfer this information to solve a design challenge or problem.

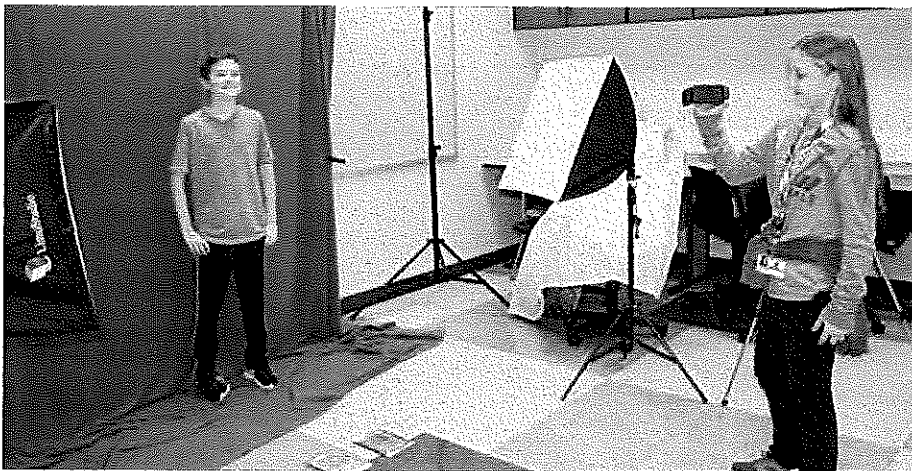
In conjunction with this curriculum revision, we have recently added an additional student work room that we fondly refer to as the "Innovation Station." This work area was made possible through a grant from The Wildcat Foundation. This space was designed to include resources and tools to address students' technology and engineering needs for problem based learning. The Innovation Station is intended to be a common collaborative space for all subject areas to use to complete projects and extend their classroom experiences. Some of the resources students will have access to in this room are—3D printers, a laser engraver, a vinyl cutter, screen printing, green screen, back drops, and cameras. Depending on space, the Family Consumer Science department may also add some sewing machines.



CONCLUSION

At this point, we are beginning to make the shift from Technology Education to Technology and Engineering Education, where students are expected to solve real world problems. Currently we are running a pilot project with eighth-grade students enrolled in Business and Computer, Family Consumer Science, and Technology and Engineering courses. This interdisciplinary, project based learning pilot will help us see the possibilities for future cross curricular experiences. The biggest obstacle that we are running into is coming up with a project that includes multiple standards from other curricular areas.

We anticipate that this shift in curriculum will allow us to both reach more female students as well as adapt the overall goals of the program. Statistically speaking we know there is a deficit of females entering and currently employed in the field of technology and engineering education. By embedding Miss Metz and Mrs. Hersey in the MMS program, we have adjusted the overall perception and connotation of our discipline. We are already hearing and seeing the fruits of this change through the positive relationships that students have formed with the new staff. In the coming years, we will be able to analyze how the addition of two female teachers at MMS have impacted numbers and demographics in our high school course offerings. ■



The Innovation Station was designed to include resources and tools to address students' technology and engineering needs for problem based learning. It was made possible through a grant from The Wildcat Foundation. The Wildcat Foundation is an independent non-profit, tax-exempt organization established to receive and allocate resources that will serve to enhance and to supplement the Mechanicsburg School District's educational programs.