

The Why of Makerspaces

by Dr. Lisa Gonzales



In the 15 years that the maker movement has existed, it has produced hands-on, creative exploration environments in elementary, middle, and high schools worldwide in the form of makerspaces.

A makerspace is an area where students can work collaboratively or individually—building, exploring, and sharing with a variety of tools and materials. The materials can range from complex machines like 3D printers, hot glue guns, and sewing machines to simple tools like cardboard boxes, glue, and construction paper. The spaces are built on the mindset that students take a set of materials and craft them into new objects with a different purpose.

What Skills Do Makerspaces Address?

The strengths of makerspaces include encouraging creativity, developing collaboration skills, and breeding innovation and critical thinking. Imagine walking into a room with LEGOs turned into robots, hand tools transforming wood into imaginary creatures, and craft corners alive with painters and knitters. The students are highly engaged and are working side-by-side and in groups to build, experiment, and invent. For the last 10 years, districts have professed goals around the 4C's of creativity, collaboration, communication, and critical thinking. The design of makerspaces allows students to focus on all four skills, often simultaneously.

What Does the Research Say?

EdWeek reviewed published literature on makerspaces in 2016 and concluded a number of benefits, including that they:

- Democratize learning and level the playing field, especially around diversity of gender and ethnicity
- Prompt critical thinking
- Develop a student's interest in learning and an identity as a learner
- Encourage students to draw not just on their own skills and experiences, but the assets of others
- Emphasize trial and error, which pushes students to deepen their exploration

Last spring, Lisa Blank, Director of STEM Programs in the Watertown City School District, had an administrator approach her in one of our makerspaces. Pointing out a 5th grade student, the administrator said, "That student can't yet count to 100. We're planning to put him in a resource class next year, but he was the first to build his robot!" Makerspaces are able to challenge students of all strength levels and can empower those who thrive in a nontraditional setting.

So Where Do You Start?

Makerspaces start with a space to house the "stuff," so first identify the location. Then do a preview run, making sure the items in the space are appropriate for the grade levels accessing it. Be flexible with your expectations and seek help from parents and the community for contributions.

Jana Rogers, assessment coordinator for Jefferson-Lewis BOCES, explained that you don't need to start with expensive materials. "We started fairly low tech and have been working to upgrade and add in more and more tools and equipment over the years." Blanca Castillo-Alves, Administrator of Charter Schools for the Los Angeles USD, started with a staff discussion. "I prompted staff with discussion points, such as how would we design a space for rotation, what was our shared vision, and how could we be flexible to see projects evolve and ideas flourish?"



Makerspaces allow students to express their learning through feats of art and engineering.

Photos provided by Dr. Lisa Gonzales

Think Outside the Box

As the makerspace catches on, consider adding a second location, as Mansfield ISD Assistant Principal Victoria Webster suggests. "The low tech lab is our messy space. Our learners can paint, sew, saw, drill, make anything that doesn't require a computer, camera, VR headset. Our high tech fab lab is where 3D printing, robots, photography, and video editing takes place."

There is no single correct approach. Christine Vespe, Superintendent in the Shamong Township School District, dedicated an area for a fifth to eighth grade space "focusing more on guided activities such as gingerbread house designs or engineering elevators to lift pumpkins." Coordinator of Elementary Science at Baltimore County Public Schools Eric Cromwell started with substituting making for traditional projects. "We relaunched our STEM Fair as a Maker Faire, and then added product presentations to incorporate drama as students marketed and pitched their ideas to judges in a Shark Tank format."

Shifting culture and practice isn't easy. But the nature of the maker movement is possible with a clear vision and goals that are shared by even a small group at a school. Whether a makerspace is schoolwide or maker-based activities are incorporated in every classroom, the learning can take place just about anywhere. Ready? Set? Tinker!

Dr. Lisa Gonzales is Assistant Superintendent of Educational Services in the Dublin Unified School District and President of the Association of California School Administrators. She started designing makerspaces years ago in her school district as a cadre member of the Technology Information Center for Administrative Leadership (TICAL).