

A person wearing a light blue shirt is operating a 3D printer. The printer is blue and black, with a clear protective enclosure. The person's hands are visible near the printer's base. The background is blurred, showing a classroom or workshop environment with various items on shelves.

# Learning Space Transformation

STEAM education and the Maker Movement are helping principals re-imagine the way schools look and teach.

By Jacie Maslyk



**G**one are the days of white-walled classrooms, desks in rows, and a lectern prominently displayed in front of the dusty chalkboard. Today's classrooms are vibrant spaces with unique furniture and unconventional learning nooks where students are creating, collaborating, and developing dispositions about the future that they will need in college, career, and beyond.

We are at a critical time in education as schools are returning to hands-on experiences, project-based learning, and authentic educational opportunities for young people. Educators are embracing the importance of problem-solving and innovation as a means to prepare students for the future. And schools are cultivating the environments that allow students to think critically and solve the unknown problems of tomorrow. They are accomplishing all this through STEAM education and the Maker Movement. In *STEAM Makers: Fostering Innovation and Creativity in the Elementary Classroom* (2016), I share the story of many school districts that are remaking learning by embracing the natural connection between STEAM and Maker education, what I call STEAM Maker learning.

### **Making the Connection**

Formerly science, technology, engineering, and math (STEM), we now recognize the importance of the "A" for the arts. STEAM allows for the creative connection for students who may be out-of-the-box thinkers. STEAM learning eliminates the isolated silos of content and involves students in an integrated way, whether exploring the math concepts within art or the relationship between engineering and new technologies.

With the DIY movement increasing in popularity, the Maker Movement also is finding its way into schools. Making is a creative process driven by interest. It is an opportunity to learn through hands-on, minds-on work that fosters curiosity, creativity, and innovation through messing, building, designing, hacking, and remaking. Many districts are designing makerspaces in classrooms, libraries, and community centers. When students learn the content and interconnected nature of STEAM subjects, they can apply that learning through experiences in Making. Sylvia Libow Martinez and Gary Stager, authors of *Invent to Learn: Making, Tinkering, and Engineering in the Classroom* (2013), call the new shift toward Making "the perfect storm" of new technological materials, expanded opportunities, learning through firsthand experience, and the basic human impulse to create.

### **Supporting the Transition**

Innovative programs are being added to school curricula, learning spaces are changing, and new materials are being explored in classrooms. As school principals, it is important to reflect on the ways that we provide leadership and support in this changing education environment.



First, give permission. With the accountability era still influencing education, many teachers may need reassurance that it's OK to take risks. Encourage teachers to try new instructional approaches such as STEAM and Making and explore ways to enhance the learning environment.

Next, model curiosity. As the lead learners in schools, principals must demonstrate for students and teachers the enthusiasm for new experiences. Demonstrate for those around you the excitement that comes with trying out new tech toys or new professional development experiences. Be willing to say, "I'm not sure how this will work, but let's try it together."



And finally, celebrate failures. Taking risks can be scary. As teachers try new instructional approaches or new configurations in their classrooms, school leaders can cheer them on by extending support and resources. STEAM Maker learning offers opportunities for students to try new things, design with multiple iterations, and experiment in new ways that may not succeed at first. Celebrating the progress that comes from our failures helps to develop a growth mindset.

As we refocus our schools with creativity and innovation in mind, several questions arise:

- How do our school environments support innovative practices?
- How do we cultivate the future-facing dispositions that will allow students to explore and pursue unknown problems and seek solutions?
- What pedagogical shifts are taking shape in our classrooms?

## Making It Happen

With the current transformation of learning spaces in classrooms across the country, school leaders must consider the instructional approaches used within the classroom. In schools that embrace STEAM Maker learning, direct instruction is replaced by design thinking and open-ended inquiry is used instead of scripted lessons. Traditional classroom spaces are transformed into lounges, workshops, makerspaces, and learning commons.

The 5 S's—space, stuff, storage, support, and sustainability—can guide the integration of STEAM and makerspaces and the potential of flexible learning environments to meet the needs of young learners.

**Space.** The shared learning that happens when students engage in flexible and collaborative spaces fosters a sense of community. Dedicated makerspaces, as well as general classrooms, need to be adaptable to allow for multiple learning activities. A variety of zones should exist within learner-centered classrooms, including:

- **Collaboration zone**—This area includes small-group workspaces with opportunities for students to discuss interests and work on projects. Many educators have changed the idea of the traditional classroom space and moved toward a learning studio or workshop approach with shared materials and room for collaborating.
- **Instruction zone**—Accessible areas are needed in this zone for large-group instruction with tables, desks, or an open seating area. Teachers and students can facilitate learning in this area.
- **Presentation zone**—In this zone, places are designated for students to present to their peers. Some schools have designed platforms, atriums, and unique areas where large groups can gather. Other schools have taken the idea of a presentation zone and moved it outside to outdoor classroom spaces, courtyards, and discovery gardens.
- **Independent zone**—Separated spaces and areas for students to work on their own are included in this zone. Creating nooks for independent study, reflection, quiet reading, or research should also be represented within classrooms and makerspaces.

Some schools have designed colorful, inviting learning spaces for students. Others have

completely transformed school libraries, adding flexible furniture and innovative tools that give students a choice in what they want to learn. Some schools, however, aren't fortunate to have a dedicated learning space and must consider alternatives; maker carts are one solution and can come in many shapes and sizes.

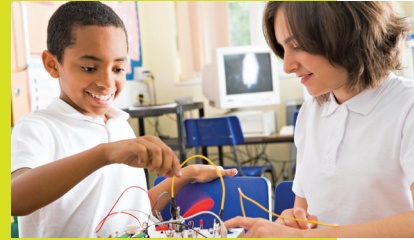
Here are a few suggestions for repurposing learning spaces:

- Add color to the walls, including a bright green wall for green screen opportunities;
- Integrate interactive learning opportunities—Lego walls, Aurasma bulletin boards, and tinkering stations are ways for students to explore new ideas while connecting with content;
- Cover desks, tables, or walls with whiteboard paint to create writable spaces for planning and collaboration;
- Explore flexible seating options, such as crate seats, couches, stability balls, bean bag chairs, coffee tables, stools, lawn chairs, wobble seats, standing desks, yoga mats, tents, and tires; and
- Display authentic student work, including bold artwork, 3-D models, recycled sculptures, or class blogs. Use technology to showcase student work online as well.

**Stuff.** Materials in a makerspace can range from toilet paper rolls to 3-D printers. Schools need to determine their focus. If you want to focus on tinkering and upcycling, then you can request neighborhood donations and use recyclable, low-cost materials. If your school wants to focus on digital fabrication and include more tech-related gadgets, then you'll need to create a plan for purchasing and housing those materials.

Learning spaces for STEAM Maker education can include commercial items such as Legos, K'Nex, Snap Circuits, and other kits, which can be used to give students experience with hands-on tinkering. Other tech tools, like Sphero, BeeBots, and Dash and Dot, can introduce students to coding and robotics in fun and engaging ways.

**Storage.** If STEAM Maker learning is thriving in your school, then you already understand the importance of storage. When we opened our new makerspace in Hopewell Memorial Junior High School, we were inundated with donations from parents, teachers, and community members. From large donations of wood and huge cardboard boxes to smaller items such as buttons, beads, and nails—everything needed a place.



We repurposed an old library card catalogue to hold small items in each labeled drawer. Tool chests, rolling carts, and pegboards make helpful storage solutions, as do bins, cans, and buckets to hold general supplies such as pencils, scissors, and markers.

**Support and Sustainability.** As districts implement STEAM and Making, reflect on the supports needed to sustain this learning over time. Grants and partnerships are great ways to propel your STEAM Maker ideas forward. Think about how you will pursue staffing, professional development, material resources, and funding.

Flexible ways to schedule staff, hands-on professional development options, and creative funding will require innovative principal leadership.

### Refocusing Your Leadership

The intersection between STEAM and Making creates powerful learning opportunities that have implications for the changing classroom spaces in our schools. The student-centered nature of STEAM Maker learning requires classrooms and makerspaces that are comfortable, collaborative, and inspiring. The one-size-fits-all classroom no longer makes sense.

Schools and districts are experiencing many benefits from transforming their learning spaces and embracing STEAM and Making. In my former role as the principal at Crafton Elementary School in Pittsburgh, we began implementing STEAM Maker learning in 2010. Not only did we see an increase in overall student engagement in our classrooms, but we also observed increases in state assessments, particularly in English-language Arts. Districts are also experiencing stronger community relationships as a result of STEAM and Making.

As we re-imagine schools that embrace creativity and innovation, refocus your leadership on the ways that we can remake learning for our young makers and innovators of tomorrow. 📌

**Jacie Maslyk** is assistant superintendent of Hopewell Area School District in Pennsylvania.



### REFLECT ON THIS

The future-facing dispositions that students will need to pursue unknown problems and seek solutions are:

- Flexibility,
- Empathy,
- Perseverance,
- Curiosity, and
- Collaborative spirit.