MAKER, TINKER, HACKER?
ACTIVE LEARNING SPACES
IN K-12 LIBRARIES

By Margaret Sullivan

WHAT MAKES A CREATIVE SPACE?
I have enjoyed one space in my life that was a maker-, tinker-, and hackerspace all rolled into one. In grade school the hacker component did not exist, but by high school it had surfaced, and in my adult life, complex tools became pervasive. Some I brought with me, and some large pieces were housed in the shop. My maker/tinker/hackerspace world was the theater.

I am going to use theater as an analogy for a K-12 library because they are both creative spaces where curiosity, playfulness, intense thinking, and unique problem-solving can occur. For me it always started with a blank, dark stage and written words. When you sit in the dark, asking yourself questions and exploring different answers, a new world starts to take shape. Who are these characters? Why is their story important? What are the most important pieces of the story? Where did the story take place? What are key details that I need to explore? How will I show it to the audience? What qualities am I looking for in the actors? And why did this place in time change them?

It starts with a space to think, room to create, tools, and a decision about who to invite into this massive collaborative project. My projects took at least six weeks to complete, often longer. Prior to starting the project, I would spend a month asking and answering my questions, doing research into the characters and the setting, producing a schedule and assembling my initial team of collaborators. Finally, we would move into the extremely large, creative, flexible space with access to digital and tactile tools and make something in 3D with meaning and beauty to share with hundreds of people. Can this also be said about your school library?

An active makerspace in the library is like a stage. It is a planning space, a creative space, a collaboration space, and ultimately a performance space. The school library can expand beyond a space to develop questions and find answers in a two dimensional format. Inviting students to explore their questions and demonstrate knowledge in multiple formats through hands-on learning is a gateway to engaging every student in a 3D learning environment. The process requires that you mix your traditional print resources, new digital resources, technology tools, and an assortment of ever changing “stuff” in a large, unbreakable space that can adapt to student learning endeavors.

Let’s assume for the purposes of this story your library program has already embraced open inquiry. Your students have hundreds of questions, their curiosity is electric, they want to learn, and you have a rich selection of resources for them to explore. They have access to mentors and experts either in person or online. You have already developed a great curriculum script for success. It is extremely important to remember the set is only one piece and it is a fairly minor piece if the script is poor and actors don’t know how to act. You need a pedagogy that demands active, engaged learning first.

ARE YOU READY TO PULL UP SOME CARPET?
A stage is a huge open space that can be easily adapted for the experience at hand. A space that large is not going to be available in the library, but not to worry. The size of the space is not as important as the flexibility of the space, the resources brought into the space, and the space’s ability to encourage playful creativity. I have even worked in a small black box with dramatic effect. Consider the following questions: Can a student move from critically thinking about a question into inventing an answer with his hands? Can a student jump up with an idea, move to a workstation with a tablet or book in hand and engage with tools to build a model? Can a team find a spot to create and share their work spontaneously?

Makerspaces within a school library can be as simple as dropping a basket of “supplies” on a designated table. Although that is not necessarily the most effective way to launch your space, it is a step in the right direction. As long as you are not telling students what to make with the supplies, you have stepped into the makerspace world. Having access to a couple dozen baskets, each containing different supplies, is a bigger step. Having durable work surface tables that students can move, mobile stools rolling across an easy to clean floor, permanent tools interspersed with unique ones brought in periodically along with marker boards, displays, and bold, encouraging graphics adds so many steps, you may actually start to dance.
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CREATING YOUR MAKERSPACE
Carts of tactile resources, like cutting tools, textiles, paper, adhesives, binding, and sewing paraphernalia, plus a wide selection of art supplies, are essential. For a comprehensive list of tools and supplies, read Makerspace Playbook, School Edition for ideas (http://makerspace.com/makerspace-playbook). Accumulating the carts for all these bits and pieces of creative material may require a critical review of the carts currently storing obsolete AV equipment or reference books. Book trucks, media carts, and mobile cabinets were all designed to roll easily and move over door thresholds. They can easily be converted for service in the makerspace. Weeding through storage carts and bins to free them up, or better yet, allowing students to scavenge through them for creative inspiration, might yield the bins you will need to hold supplies. If you do need new carts and storage bins, look at traditional library products, but also check out early childhood and industrial products for unique solutions. Carts and cabinets with work surface tops can become storage and mobile workstations all in one.

Enrich the maker experience by partnering with classroom teachers to expand the project-based curriculum. The added tools and supplies, plus a wide selection of art supplies, are essential. For a comprehensive list of tools and supplies, read Makerspace Playbook, School Edition for ideas (http://makerspace.com/makerspace-playbook). Accumulating the carts for all these bits and pieces of creative material may require a critical review of the carts currently storing obsolete AV equipment or reference books. Book trucks, media carts, and mobile cabinets were all designed to roll easily and move over door thresholds. They can easily be converted for service in the makerspace. Weeding through storage carts and bins to free them up, or better yet, allowing students to scavenge through them for creative inspiration, might yield the bins you will need to hold supplies. If you do need new carts and storage bins, look at traditional library products, but also check out early childhood and industrial products for unique solutions. Carts and cabinets with work surface tops can become storage and mobile workstations all in one.

Wild and Wonderful Tinkering
Tinkering, like making, can be the source of engaging, wild projects in the library. I think of tinkering as starting with a dismantling experience, then making something uniquely different. The questions, the research, the access to experts are all still a prelude to hands-on exploration, but tinkering requires locating the right object of destruction. For example, I once found a mechanic willing to remove the rear axle of a junk car with me so we could use it to build a revolving set piece. Don't discourage a learning project because finding the right expert or the right object seems impossible. It is amazing what happens when students start exploring and asking questions.

TOOLS FOR MAKERSPACES
During the making process on stage there is the ability to paint, rig, and assemble. You can use hand tools like hammers, drills, and small jigsaws on stage. When I think about transferring that imaginary stage into a school library space, I differentiate what can be done on stage (within the library) and what should be done in the scene shop. I often think of a hackerspace like the scene shop. The tools get bigger, more complex, requiring more supervision and instruction. Can you afford 3D printers, vinyl, or laser cutters or CNC machines? If you can afford them and the supplies they require, then think seriously about where they will be located, who will use them, and what level of training is required. A hackerspace with high end design software driving computerized equipment may need to be a community resource located for convenient access during evening hours. A partnership with the technical education department, allowing students to work on their projects in either the library or the tech lab, should be considered.

SHINING A SPOTLIGHT!
The last piece of the makerspace/stage analogy is presentation. Do you have display space? Can you literally put a spotlight on students’ work? Can students present or share their projects to applause and constructive critique? Sharing can be done in person or digitally. Roll the carts, tables, and shelving out of the way and like Andy Hardy spontaneously exclaim, “Let’s have a show!” Another option is to capture student work digitally and incorporate it into your school website or show it on classroom and library monitors. Whether it is the collaborative team or an individual, sharing is an important part of the makerspace experience. It inspires other students. Ideas are leveraged and spun into new ideas, and when student presentations include a humorous chronicle of failures leading up to a final solution, other students look forward to their own journey. With each successful project, learners build the confidence to tackle even more complicated questions. All you have to do is give students the right space, direct them in the art of open inquiry, and take a front row seat to marvel at what they make.

Works Cited

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