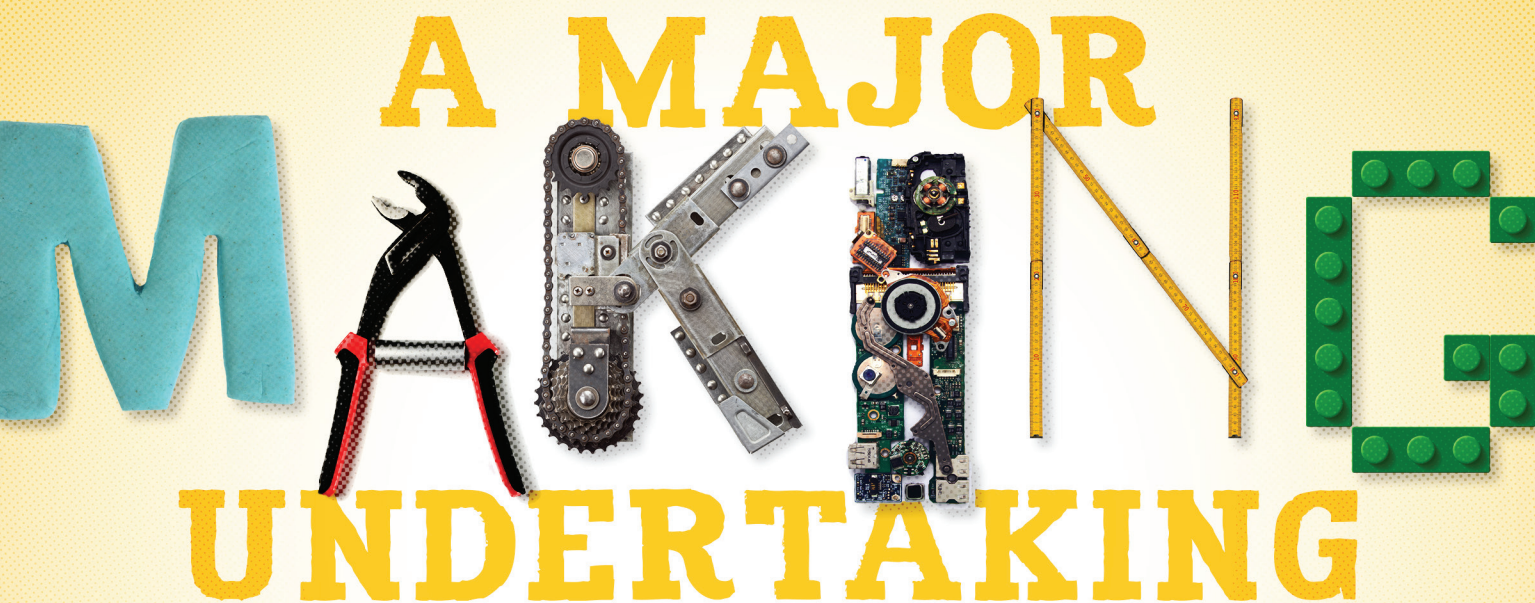


M A MAJOR MAKEING UNDER TAKING



A NEW LIBRARIAN TRANSFORMS A MIDDLE SCHOOL LIBRARY INTO A MAKERSPACE ALIGNED TO HIGH SCHOOL CAREER ENDORSEMENTS

Sheila F. Baker

bakers@uhcl.edu

Bonnie Alexander

balexander@pasadenaisd.org

Background/Rationale/ Introduction

SFB: The fundamental principle behind today's makerspace has been with us for quite some time. A century ago, educational reformer John Dewey wrote, "Give the pupils something to do, not something to learn; and the doing is of such a nature as to demand thinking... learning naturally results" (Dewey 1916, 181).

Learning in makerspaces involves doing, playing, thinking, experimenting, creating, collaborating, mentoring, inquiring, problem-solving, producing, inventing, designing, building, and sharing (Loertscher, Preddy, and Derry 2013). Whatever the character of a makerspace, all makerspaces have the same goal: to actively engage students in open-ended exploration and learning. To encompass

this learning, makerspaces have taken on many different personas in school libraries. Some librarians have begun their makerspaces in a small area of the library that consists of a table or two with shoeboxes of Legos, electrical circuitry, and play dough. Other makerspaces are embedded throughout the library and focus on STEM activities including coding, gaming, power tools, laser-cutting, and 3-D printers. Still others include makerspaces that spill beyond the library into the school's classrooms and include STEM, art, music, crafts, and, yes, those shoeboxes full of Legos and modeling clay and dough. One makerspace is not necessarily better than the other—they are just different.

The makerspace discussed here is further differentiated; this article provides insight into the transformation of a traditional middle school library into a makerspace that focuses on high school endorsements. This particular makerspace was created from the perspective of—and is the brainchild of—a new librarian in her first year of practice.

The Librarian

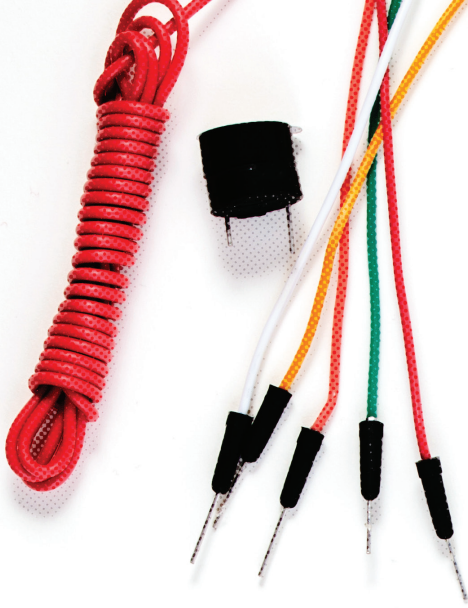
SFB: Bonnie Alexander is the librarian at Nelda Sullivan Middle School in Pasadena, Texas. She is a

former English teacher in the high school for which Sullivan is a feeder school and is currently working to complete her Master's degree in School Library and Information Science at the University of Houston-Clear Lake. After learning about the leadership role of the school librarian, as well as about the implementation and potential benefits of a makerspace, she combined her new knowledge with her working knowledge of Texas House Bill 5 to create a vision of an anticipated highly impactful makerspace.

BA: As I was researching the various STEM activities and how I could use them in my program, another idea started to formulate: to align the makerspace to the high school endorsements under which students would have to graduate. This approach to implementing the makerspace could give every student the opportunity to explore the various career pathways and, thus, transform the middle school library into a place where all students could come and explore.

SFB: House Bill 5, passed by the Texas Legislature in 2013, made substantial changes to restructure the state's graduation requirements, enabling students to earn endorse-

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ments in specific areas of study. The endorsement chosen guides a student's course selections to focus on a particular area of interest and career path. School districts are now required to ensure that each student, upon entering ninth grade, indicates which endorsement(s) the student intends to earn. The endorsements include:

- STEM (i.e., courses related to science, technology, engineering, math, computer science);
- Business and Industry (i.e., agriculture, finance, hospitality, manufacturing, marketing);
- Public Services (i.e., health science, human services, law, public safety and administration);
- Arts and Humanities (i.e., American Sign Language, fine arts, foreign languages, English, social studies); and
- Multidisciplinary Studies (specified combinations of the above endorsement areas) (Texas Association of School Administrators 2014).

The First Steps

Principal Approval

SFB: The first step in any project of this nature is to seek approval from the principal. Bonnie's principal, Kelly Cook-Costley, was serving her first year as a principal. She was enthusiastic about this new concept. With her principal's approval, Bonnie set out to implement a new and exciting concept of a school library where every single student in the building could find an interest. This experience enabled students to identify and claim an area of endorsement upon entering ninth grade, which would begin their journey toward their future career.

Solicit Colleagues' Expertise and Support

SFB: Transforming the library was a huge undertaking. Bonnie's first step was to confirm her understanding of the endorsements and the career paths they encompassed. She then visited the career, technology, and engineering classrooms on the high school's campus to learn more about them and to solicit any items the instructors would be willing to donate to her program. She felt it important to tap into the knowledge of teachers preparing students for life beyond high school. Teachers were eager to contribute items because the educators knew that the middle school students feeding into their school would enter high school already knowledgeable about the endorsement programs offered.

BA: I recommend soliciting others' ideas and support. When I did, I accumulated more donations than I had ever anticipated. High school teachers donated items and one teacher even purchased additional materials to add with her donations.

SFB: After collecting and organizing the donations, Bonnie created an outline for connecting items and activities to the endorsements. She proposed the outline to her principal who approved approximately \$2,200 to purchase additional items. Her principal expressed the belief that this expenditure was minimal for a program that had the potential to engage every student on the campus.

The endorsements naturally align themselves with student coursework. This alignment benefits the school librarian as it leads to a natural collaboration between the librarian and the content-area teachers. For example, Bonnie needed much

guidance in how to use the 3-D printer, so she collaborated with the computer science teacher.

BA: The important lesson here? When implementing new programs unending support can often be found within your own school. You must step out of your comfort zone and be willing to model the same behavior expected from students: create your own personal learning communities and learn from one another.

Promoting the Program

SFB: Though Bonnie, her principal, and the teachers were supportive of this new makerspace, they knew the importance of gaining the support of the community's stakeholders. During parent night, Bonnie informed parents and students about the makerspace, career paths, and how the activities were related to the various career paths.

BA: The parents seemed impressed, especially with the activities related to engineering and computer science. I work in a school in a low socioeconomic area and many of the opportunities we are providing include expensive kits that a family may not have the opportunity to purchase. So, in turn, their children do not necessarily get to cultivate these particular interests as could students in a more affluent area.

SFB: Being at a newly built school, Bonnie was able to take advantage of walkthroughs by associate superintendents, board members, and even the superintendent. Bonnie directed visitors through the makerspace, explaining how the activities were related to the career endorsements and how students participated.

BA: I did find out later that one of the visitors was actually the engineer for the building and his team. Remember, one never knows where a connection can be made and the possible relevance later.

Monitoring Student Achievement

SFB: Data collection pertaining to student achievement is just beginning. The ultimate goal is to increase state assessment scores. Student tracking software collects data on student usage of the library and the numbers of students participating in the makerspace. Previous state testing focused on literary texts and narrative compositions. In the past, English/Language Arts scores ranged in the 80th and 90th percentile. These scores plummeted dramatically upon implementation of a new state assessment, which focuses on expository and persuasive writing. As a result, students need to increase their ability to read informational texts. In the school library student achievement is currently measured by assessing students' mastery of information obtained while reading instructional manuals that provide information essential to students' operating and manipulating various items in the makerspace.

BA: The classroom teachers and I endeavor to raise test scores through activities in the makerspace that require students to critically read, interpret directions, and problem-solve for the purpose of using and operating items in the makerspace. Students are often quick to ask how to use something, and I am just as quick to ask about their understanding of the directions. The goal is for these students to problem-solve on their own and ask for support when they come up against barriers.

What We've Learned

SFB: The results of Bonnie's hard work in implementing this makerspace are clear. Students clamor to get to the library. Bonnie believes this is because the space was created and is specifically tailored to meet the needs of each of the students.

BA: They have the opportunity to explore their own interests and decide the activities where they will participate. Students who thought they would never have any interest in certain fields will actually try them out and find that a particular field of study was not what they thought and in some cases, find they actually enjoy it. I have seen this happen a lot with the engineering activities.

Challenges

SFB: Bonnie learned very quickly that there were more students than she alone could manage. Having over one hundred students in the school library each morning—though gratifying—led to chaos. Classroom management took precedence over her responsibility as an instructional coach in the makerspace.

BA: The number of students wanting to participate each morning outweighed safety as students were barreling up the stairs and running down the hallway to get to the library first. While this is an awesome problem to have in the context of a library program, I needed to find a way to accommodate all students while giving each student a high-quality experience in the makerspace. I designated days for specific endorsements and activities and limited the number of students in the library each morning.

Bonnie and support staff not only manage the makerspace, they serve as role models for the community of learners.

SFB: After consulting with her principal, Bonnie received additional support staff to help in the library each morning.

Successes

SFB: Activities in the makerspace are gender neutral. Students are willing to explore all activities. Girls and boys are participating in equal numbers in engineering activities; and boys are learning to crochet and create jewelry pieces.

Students are taking pride in their work. Pride is often necessary for validation and confirmation of one's work and continued success. This taking pride in their accomplishments indicates that students are actually feeling invested in the activities and taking ownership of the makerspace.

All stakeholders indicate by their actions that they have taken ownership of the makerspace. Students are respectful of items in the makerspace and demonstrate their understanding that the items are collective property. Teachers donate and volunteer their time to teach students various activities. Parents and community partners also contribute through volunteer time and donations.

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BA: The students see other staff members and me trying new activities alongside students, a circumstance that allows us to work through obstacles with students. Trying new activities along with students also gives us the opportunity to encourage perseverance in accomplishing common goals.

Future Goals

SFB: Bonnie plans to add future spaces based on emerging technologies identified through AASL's Best Tools for Teaching & Learning <www.ala.org/aasl/standards/best> and information she gathers from other resources, such as Nikki Robertson's blog, *The Absolutely True Adventures of a High School Librarian*. Similarly, Bonnie will use information and ideas gained from her current coursework in the library science program, magazine and journal articles, and collaboration with the computer science teacher. Bonnie also plans to support student needs and requests.

BA: I recently realized that many of my students cannot read what I write in cursive. Though for many this may seem as if I am going back in time, I disagree. I think not being able to read cursive writing puts this future workforce at a huge disadvantage in the business world, so I plan to add a station in my makerspace where I rectify this situation. In addition, students often know about the next big thing before I do, so I also consider their requests when it comes to adding items to the makerspace. They make their suggestions; I research each

suggested item, figure out how it fits in the program, how I will implement it, and then I work on securing the funds.

SFB: Grant writing and advocacy are at the top of Bonnie's "to do" list. In her initial year as a school librarian, Bonnie was awarded two grants, one for \$4,600 and one for \$3,000. The money will go toward the purchase of a program that personalizes reading for students and additional items for each endorsement area.

BA: Maintaining and adding to the makerspace will require continued efforts to secure funds. I recently entered a contest that would showcase our program. This contest offers a grand prize of \$60,000 dollars for schools implementing innovative programs to the benefit of their students. The biggest benefit to competing in these types of contests is exposure for your library program. This is a national contest where a video of your program goes live on the Internet for others to view and vote. Entering this contest has given our program a stage in terms of the entire district, the community, and the world beyond. Who knows where it can lead?

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SFB: Bonnie also believes it is important to display student creations in the library. She will continue to highlight as much student work as space permits. Displaying student work is beneficial: students take pride in their work, and student work products serve as examples to show others what is possible. Student displays are also a great way to highlight what is happening in the school library.

In the future, data collection will include the key competencies that students need for recognition as ideal candidates for jobs. These competencies include cognitive skills such as critical thinking, decision-making, program-solving, knowledge application, and creativity; the interpersonal skills of communication, collaboration, leadership, and global and cultural awareness; and intrapersonal skills like ethics, self-direction, motivation, and responsibility.

Conclusion

SFB: It can be quite an undertaking for any librarian wishing to transition the library to include a makerspace integrated with the library's mission. Incorporating activities that are aligned to curriculum standards may prove challenging. Finding resources to help fund activities may also be difficult. However, Bonnie, a new school librarian, has shown that it is worth the risk, time, and money to transform the library.

BA: For the benefit of my students, I am changing the face of the traditional library, which I believe is outdated and no longer has a place in this 21st-century world because it may inadvertently exclude some students. I am creating a space that fits all students' needs, making it relevant and meaningful to their futures as these current students are exposed to a world my generation only dreamed about. Different circumstances demand different means. An important concept to consider when one is grooming students for the future is the famous quote often attributed to Albert Einstein: "Insanity: doing the same thing over and over again and expecting different results."

SFB: While the endorsements mentioned earlier refer only to requirements for students in Texas schools, they certainly suggest a foundation for the next generation of school libraries across the nation in their efforts to implement makerspaces that engage all students in spaces that, in John Dewey's words written over one hundred years ago, "demand thinking" and where "learning naturally results."



Sheila F. Baker, PhD, is an assistant professor and program coordinator of the School Library and Information

Science Program at the University of Houston-Clear Lake.



Bonnie Alexander, a former English teacher, is the school librarian at Nelda Sullivan Middle School in Pasadena,

Texas. She is currently working to complete her Master's degree in School Library and Information Science at the University of Houston-Clear Lake.

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