

If You Build It, They Will Come - Sharing Makerspace Bins @ Upper Grand District School Board

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Recently Upper Grand District School Board embarked upon a unique project to promote and inspire maker culture in our schools. A group of teacher-librarians and the supervisor of Library and Media Services worked together to create a collection of ready-to-go makerspace bins that are centrally purchased and can be borrowed by teachers for a three week loan period. A makerspace is a place where people can gather to create, invent, tinker, explore and discover using a variety of tools and materials. It is learning by doing. The makerspace bins give teachers the ability to create a pop-up makerspace in any library or classroom environment.

The seeds for the makerspace bin project were planted when David Loertscher and Carol Koechlin facilitated a *Knowledge Building in the Learning Commons Bootcamp* for all of the Upper Grand DSB teacher-librarians in May 2013. During this session David talked about 3D printing and the maker movement which started the wheels turning for many of our Teacher-Librarians as it was not something they had heard of before. In the fall of 2014 we had an opportunity to bring a smaller group of teacher librarians together to introduce the new Canadian Library Association document, *Leading Learning: Standards of Practice for School Library Learning Commons in Canada* (Canadian Library Association, 2014) and discuss how we can move towards a whole school approach to participatory learning. During breakout sessions one of the groups decided they wanted to explore makerspaces and the maker movement in their libraries but with further discussion realized they did not have the budget to purchase all of the supplies they needed to get it up and running in their school. There was also concerns about investing in products that students would not be interested in and about keeping the activities fresh which would require access to a number of different makerspace kits over the school year. We also recognized that makerspaces in schools are as unique as the school itself, no two makerspaces are the same and nor should they be. After spending some time problem solving the group came up with the idea to create a central library of maker bin resources with grade levels and curriculum connections that could be loaned out to teachers for a period of time. This central collection of makerspace bins would be housed and circulated from the Terry James Resource Centre - our board's central library and media centre. The project was financially supported by the supervisor of Library and Media Services with release time for researching products, creating a list of recommended purchases, and preparation of the bins and the additional resources. The central library also funded the purchase of all the products and bins.

Our initial meeting or "Think Tank about Makerspaces" involved first identifying our goals for this project. We decided that we wanted to increase student engagement and provide resources that encourage inquiry and questioning and involve exploration. It was very important to us that the makerspace bins inspire further learning including creating a connection to our existing library collections. We talked a great deal about

what to name the bins. Some suggestions included “wonder” bins, which connects more to the inquiry and questioning goal, or “spark” bins which makes you think of igniting further learning. We landed on the more commonly used “makerspace” bins because we felt it best represented all of the goals of our project. The group felt strongly that connecting the bins to the Ontario curriculum was crucial as this is a new idea for many teachers and administrators and they need to see how these resources enhance what they are already teaching. There is also a tendency to see making as a fun activity and not a learning activity and we hoped that linking the bins to the curriculum would help with this perception. We determined that the selected products should not need a lot of supervision to use and students should be able to engage with them in short bursts of time. At the same time we recognized that giving a complete lesson plan or step by step instructions in the bins would be against the ideology of the maker movement as we want to inspire problem solving and a tinkering mindset not conform to a typical teaching mentality. Once we have facilitated the conditions for students to conduct inquiries we want to step back and listen and give students time to explore the questions they are curious about and then support them as they create. Making is a wonderful way of documenting the thinking of the learner as you can see the finished product. We also agreed that makerspaces are only one part of the services offered by the library learning commons and not something that would take over the entire space although it is a perfect fit for this room in the school being the hub for asking questions and finding answers. Finally, we all agreed early on that classroom teachers would be allowed to borrow the central bins as well, they would not be reserved for library use only.

We were not aware of any other library or school board that had done this before so without a model or recommended list to work from so we looked to our community libraries and outside groups for inspiration. In order to prepare for creating our wish list a couple of group members attended the Toronto Reference Library Mini Maker Faire in the fall of 2014. One group member connected with Diyode Guelph, a local “Do it Yourself” workshop that provides space, tools and resources for makers in the Guelph community <http://www.diyode.com/>. Another member visited Innisfil Public Libraries Digital Media Lab and Hacker Lab/TinkerShop for inspiration and also the Perimeter Institute in Waterloo. We also read a number of articles and books on the maker movement in school libraries and ideas for makerspaces (Appendix B).

To ensure success for this project we decided that we needed to invest in a variety of makerspace bins to fit with as many different grade levels and curriculum areas as possible. We decided at first to only purchase one copy of each product and then monitor the usage and add copies of popular bins early on. We did not want people to be waiting long to borrow them or be turned away and then never try again. At the same time we did not want to spend money on resources that would not be used. We agreed that we needed to purchase products that were high tech, low tech and no tech and that cover all of the STEAM areas (Science, Technology, Engineering, Arts & Math) and grade levels - although primarily our bins are most suitable for grades K-8. We also recognized that in purchasing we needed to stay away from consumable products as it would be difficult for the central library to manage the costs associated with continually

replacing parts. We wanted the finished kits to be as complete as possible and ready to use with a full list of contents included. Every makerspace bin includes prompt cards for teachers, prompt cards for students, provocations and challenges, extension activities, instructions for use including links to Youtube videos (where relevant), connections to the curriculum and subject and grade levels. We did not purchase any mobile devices for the kits that require devices because our schools have chromebooks, tablets and laptops that could be allocated for using the bins. We made sure that we noted this information in the catalogue record so that teachers are aware of this when they are booking the bins and are prepared. Another concern for our group was safety for our students so some products were left out of the final purchase list if we could not ensure that they would be safe for all ages. For example we decided against the unique 3Doodler Pens which would be great for making 3D art as they come with a safety warning that they are not a toy for children (14+ only) because they have a metal tip that can get as hot as 240C. It would be difficult for us to ensure they were only used for students over age fourteen.

The market for maker products has exploded in the past year. When we started researching for this project we had to dig deep into suppliers catalogues in print and online to find the products we were looking for. A great deal of time was spent researching, reading reviews, talking to suppliers and deciding on a final list of products to purchase. Now many of our school board suppliers have created catalogues or websites to specifically market their STEAM resources. Our startup budget for purchasing the products for the bins was \$5000. The cost for supply teachers to cover release time for the group members to meet was over and above this amount. This budget covered the cost to create 35 bins (Appendix A). The bins are fully searchable and available to be booked through our online booking system. They circulate for a three week loan period. At the time of writing we have had the bins available for three months and we have had 165 checkouts and there are currently 177 bookings for the rest of the school year. A number of the bins have been particularly popular so we have added extra copies - for example the Magformers and LittleBits. We have also purchased a few new products - Dot & Dash, Lego Mindstorms, Ball of Whacks and X-Ball, and a LittleBits Space kit. We have had a couple of opportunities to promote the makerspace bins in our school board which has helped us get the word out to the system. We presented them first to our teacher-librarians at our Spring 2015 Ideashop and facilitated a maker faire at the Upper Grand DSB Learning Fair in August 2015 where we were able to showcase all of the bins and resources. In addition to our online catalogue we also created a makerspace bins website that has been getting a lot of traffic that includes more information on makerspaces, inquiry and other related topics [Makerspace Kits @ TJRC \(website\)](#). At Ideashop and Learning Fair we handed out business cards with QR codes to give easy access to the website. We also have a pdf document with full information about the bins available [.Makerspace Kits @ TJRC \(pdf\)](#). We use our Terry James Resource Centre Twitter account to regularly promote new kits and we have noticed that some of our teachers actively promote the bins through their classroom and library Twitter feeds.

Although the centralized purchase of makerspace bins is an unique way of providing equitable access to makerspace resources there are a few management issues to be aware of. Many of the products have breakable parts and small pieces that can be easily lost. We tried to only purchase products that allow you to purchase replacement parts but this is not an option for every product. It is wonderful that the bins are heavily booked but this also means that people need to be cognizant of returning them on time so they can be delivered to the next person and that does not always happen. We also should have purchased more copies of the more popular items from the beginning as some teachers have been turned away and may not try again. In retrospect it may be better to start with less variety of products and buy multiple copies of each.

Moving forward with this project we have created a shared document for suggestions for purchase for next school year. We will continue to purchase additional copies of popular items. We also will continue to promote the makerspace bins through social media and our website and look for new opportunities to share them with Upper Grand staff eg. new teachers, administrators, etc. We can support the program through the central library budget for now but we are looking at ways to get additional funding as the need continues to increase. We would like to purchase a centralized class set of android tablets or iPads that could be loaned out to supplement the devices already in our schools and work with the makerspace bins that need technology e.g. robotics. We also see a need to purchase bins for all schools to keep. Possible options for funding are CODE and the board innovation fund. We are looking forward to an new opportunity to build capacity around makerspaces with our board's new Learning Connections project funded by the Ministry of Education. Ten schools in our district have been chosen to participate in a project titled "*Coding Collaboration: Connecting Curriculum through the Library Learning Commons*" which will focus on how the library learning commons (and the teacher-librarians who oversee them) can be leveraged to develop and support integrated inquiry based learning experiences using the technological resources that are available in their makerspaces (robotics and coding) that connect back to the classroom and the greater school community. This unique project which will be starting in 2016 should provide more research data to support our use of makerspaces including best practices of how to manage them in a library learning commons setting.

Please click the following link to access a slideshow that shows how the makerspace bins are being used in one of our schools - Spencer Avenue Elementary School, Orangeville ON.

<https://docs.google.com/presentation/d/1PfuvrhToCTZmn5IZIL9LaXwh9ir4uEujxvNRFnl eQFA/edit?usp=sharing>

Appendix A - Makerspace Bins

Magnetic Sand
Sorting Circles
Green Screen Time Machine
Building Blocks
Snap Circuits - Light & Sound
Snap Circuits - Alternative Energy*
Animation Station
Drawbots
Energy Conversion*
Electricity Introduction
Makey Makey
Cubelets
LittleBits Student Set*
Magna Tiles*
What's Inside*
Animals
Laser Tag with Mirrors
Keva Contraptions*
Sphero
Word Construction
Fractions of Food
Light it Up!
A Closer Look
Magnetic Wonders*
MOSS Robot
Colour Our World*
Bugs and More Bugs*
Simple Machines*
Racing on Ramps*
Straws and Connectors*
Optical Illusions*
Magformers*
KNEX Organisms and Lifestyles
Make Music from Anything
Light Table Explorations*

***=most popular**

Appendix B - Selected Websites and Resources

Abram, Stephen. 2015. "Real makerspaces in school libraries". *Internet@Schools*.

Bagley, C. 2014. *Makerspaces: Top trailblazing projects*. ALA TechSource.

Canadian Library Association (CLA). 2014. *Leading Learning: Standards Of Practice For School Library Learning Commons In Canada*. Ottawa, ON: Canadian Library Association. Available: <http://clatoolbox.ca/casl/slic/lisop.html>

Hamilton, M., & Schmidt, D. 2015. *Make it here: Inciting creativity and innovation in your library*. Libraries Unlimited.

Hatch, Mark. 2014. *The Maker movement manifesto: Rules for innovation in the new world of crafters, hackers, and tinkerers*. McGraw Hill Education.

Kurti, R. Steven Kurti. "The philosophy of educational makerspaces: Part 1 of making an educational makerspace." *Teacher Librarian* 1 June 2014.

Loertscher, David V. Preddy. "Makerspaces in the school library learning commons and the UTEC maker model." *Teacher Librarian* 1 Dec. 2013.

Makerspace Team. 2013. *Makerspace Playbook: School Edition*. Maker Media.

Martinez, Sylvia Libow, and Gary Stager. 2013. *Invent to learn: Making, tinkering, and engineering in the classroom*. Torrance, Calif.: Constructing Modern Knowledge.

Preddy, L. 2013. *School library makerspaces: Grades 6-12*. Libraries Unlimited.

Wilkinson, K., & Petrich, M. 2013. *The art of tinkering: Meet 150 makers working at the intersection of art, science & technology*. Weldon Owen.

Other

Evolution of our discussion and end results - First Meeting - "Think Tank about Makerspaces"https://docs.google.com/a/ugcloud.ca/document/d/1_TQOWxTneLmSK9RlgIxDWHcWI0fIUzbUvSDE-ttTJLQ/edit?usp=sharing

Investigation of products - Pinterest, internet searchhttps://docs.google.com/a/ugcloud.ca/document/d/1W2A8Maf7hPp90A3LCX_pPm9R-HUGHgDayzj20qREPRY/edit?usp=sharing