Focusing on Maker Education in SD57

The Makered Mindset
"The central thesis is that students should engage in tinkering and making because they are powerful ways to learn"
Sylvia Libow Martinez and Gary Stager (2013)

"Making has been part of education but it is now gaining momentum as it becomes more focused, dedicated and intentional. It fosters blending creativity, inquiry, and kinesthetic learning. At all levels learners are developing skills and dispositions that contribute to success and personal expertise. The growth of creative thinking and independence is difficult to thoroughly define in a manner that fits all because we are unique, our learning paths distinct, and success for the individual varies greatly."

David V Loertscher, , Leslie Preddy, and Bill Derry (2013)

Like any change within a system, new adopters ask, "Who started this *Revolution*?" Well, there were no angry farmers with pitchforks or burning torches parading into the night in School District 57. Instead, there were pockets of hunches and innovation that collided with the maker mindset to support learning that became focused and intentional. (Johnson 2010)

The 2013-2014 question of the year after four administrators, Nevio Rossi -Harwin Elementary, Deb Kaban - Van Bien Elementary, Kirk Czechmeister -Heather Park Elementary and Monica Berra – District Learning Commons, introduced maker education and the uTEC Maker Model (Loertscher, Preddy and Derry 2013) was "What is maker education again?" The "again" was proof that principals and teachers had been walking around with the "hunch". So how do you describe maker education while walking to the car in twenty below? You don't have the most ideal circumstances. The idea of maker education was going to require vision that would need to be introduced, modeled, and encouraged by school leaders. Who better to bring woodwork, glue, paper airplanes, cooking, coding and all things maker into the school learning environment than learning commons teacher librarians and school principals? Our question became how do we support the culture of making and connect it to the BC Curriculum?

We knew that if this was going to be a shift in our school culture we would have to create an opportunity for teachers to participate in a plan that was collaborative and

growth oriented. Teachers in our district have been supporting collaborative learning through a district initiated opportunity that encourages teachers to apply as a team to answer an inquiry question. The Learning Team Grants (LTGs) are designed to release teachers to collaborate; a simple concept with wide spread results. In September 2014, three very unique learning team grants focusing on maker education fostered the messy collaborative educational environments to experiment and reflect to support personalized learning. Two of the LTGs were district wide and included learning commons teacher librarians and teachers from eleven schools. The third LTG engaged 15 educators from a single school. These three LTGs were teacher driven and provided ownership and resources necessary to create strong, trusting relationships that supported a dynamic learning culture. The LTGs created a learning environment where ideas and reflective practice could collide and reassemble. The unsure thinking became the catalyst for building and adoption. The lessons that were designed to empower learning by making were shared and adapted. The thinking was always moving and could not be harnessed in one direction, but the focus of learning by doing held the teams together. As the teams met, the borrowing and tinkering of ideas and lessons became the key to the collaborative growth plan. Barriers were looked at from different perspectives and the opportunity to problem solve allowed for greater collaboration. Just knowing that another member of your LTG team was experiencing the same frustration moved it from a barrier to a problem in progress. At the same time, the LTGs became a safe place to share success and build partnerships that enhanced each others' professional development. The LTGs supported challenge seekers in a cycle of thinking, learning, and making.

The three LTGs expanded on the ideas and framework of the uTEC Maker Model. The following is an example letter sent to parents of École Heather Park introducing the thinking behind the team's inquiry and key elements of maker education. This learning team included twelve teachers, the principal Kelly Johansen and the maker of all makers vice principal Kirk Czechmeister.

EXPLORATIONS

École Heather Park is once again offering an Explorations Program for all students in grades 4-7. This program will run on Thursday afternoons from April 2nd –June 4th 2015.

The Explorations program offers students targeted personalized learning opportunities based on their interests, and is framed around a

> "…trend that is pushing its way into more schools, the Maker Movement. The shift to "making" represents the perfect storm of new technological materials, expanded opportunities, learning through firsthand experience, and the basic human impulse to create. It offers the potential to make classrooms more child-centered: relevant and more sensitive to each child's remarkable capacity for intensity".

Source: http://www.scholastic.com/browse/article.jsp?id=3758336

At Heather Park, staff is specifically focusing the Explorations program on the uTEC Maker Model. This is a model that promotes…

1) Using (enjoying, sampling, engaging, playing)
2) Tinkering (playing, messing around, questioning, researching)
3) Experimenting (building, trying, failing, repurposing)
4) Creating (inventing, producing, entrepreneurship)

I invite parents/Guardians to read further on what Maker Ed and the uTEC Maker Model are all about at:

https://sites.google.com/site/utecmakermodel/

http://makered.org/

Here is a list of the Explorations students get to choose from.

Each student will be enrolled in 1 Exploration class.

1) Digital Photography and Video Editing, Mrs. Weisgarber
   - Grades 4-7
   - Learn how to create a video. We will be filming other Explorations Activities and interviewing students in those activities as one of the sources for our projects.

2) Model Airplanes, Mr. Czechmeister
   - Grades 4-7
   - Learn to build and paint a plastic model airplane. Reading and following instructions step by step is a key aspect of this workshop. Later, you will fly .049 gas String controlled airplanes on the big field and we will review the components of a Radio Control Airplane and an RC helicopter.

3) Computer Programming, Mr. Earle
   - Grades 4-7
   - Learn the basics of programming computers. Design your own computer game and challenge your friends.

4) Soapbox Cars, Mr. Pineault and Mrs. McCannon
   - Grades 6-7
   - Build a real Soapbox car out of wood and materials! You will work in teams of 4 and build a car that you can race on Heather Road when everyone is done.

5) “Transformers”, Mr. Laupitz.
   - Grades 4-5

- Tear down machines and make your own creations out of machines. See the samples from last year in the hallways upstairs. Students will also be involved in challenging others in designing and exploring real working machines with a variety of materials. Sure to be a lot of imaginative, educational, inventive FUN!

6) Baking, Mrs. Harms
   - Grades 4-7
   - Learn some of the basics of baking and enjoy eating what you make.

7) Hands On Engineering Projects, Mr. Edge
   - Grades 4-7
   - Build it, break it, float it, sink it, drop it, fix it, and improve it! Simple hands on projects to test your imagination.

8) Mars Colony, Mrs. Moulder
   - Grades 4-7
   - Have you heard that volunteers are being sought for a one way trip to Mars? What will the proposed Mars Colony look like? What will they need to survive? What are the challenges to life on Mars? Will you be a volunteer to go? Build a replica of the Mars Colony with your classmates and discover wonderful things about space travel and Mars.

9) Knitting, Mrs. Bracey
   - Grades 4-7
   - Learn how to knit using a round knitting loom. It's fun, easy, and faster than knitting with needles. Come create a project with us.

10) Band, Mr. Mulligan
   - Grades 6-7
   - Learn to play an instrument. Students will learn from scratch to play instruments like clarinet, trumpet, flute, bass guitar, percussion, or saxophone. No musical experience necessary. Last year the Heather Park Band

presented a thrilling final performance to "This too shall pass" by the band OK Go. Students will learn the basics of their instrument and learn to play together as a group

11) Tuff Little Mudders, Mrs. Attree & Mr. Millar

- Grades 4-7
- Fun games, activities and challenges designed to have students work cooperatively and use collaborative intelligence to solve problems in a competitive setting. This exploration course will help students build resiliency and a capacity for healthy competition. Games include Survivor, Mantracker in the woods, Greek Olympics, Roman Sentry Games and Heather Park's Tough Mudder Course. Come out, get active, work together, and get dirty!

12) Boot Camp, Mrs. Baltus

- Grades 4-7
- If you are interested in fitness or in maintaining your current level of fitness, then sign up for Boot Camp. There will be a variety of station activities... such as, lunges, tricep dips, squats, push-ups etc. This fast paced workout will be set to music and we will be using equipment such as, steppers, mats, and small weights. Materials needed: water bottle, gym strip, and runners.

13) Cardboard Creations, Mrs. Haugland

- Grades 4-7
- You would not believe what can be done with simple Cardboard! Create the most unusual items out of cardboard with your classmates. Examples include Play houses, garages for toys, boxes, doll-houses, and more.

14) Art Using Natural Media, Mrs. Pomeroy

- Grades 4-7
- In this Explorations course, students will be encouraged to take the time to enjoy what nature has to offer and become aware of their surroundings. They will use this awareness to find and use natural materials to create artwork. Students will go on a nature scavenger hunt, explore trails surrounding

Heather Park, create outdoor mandalas, research outdoor artists, create, and photograph their own unique outdoor art pieces. Let's reconnect with the natural world!

The second LTG, Social Emotional Learning and Self-Regulation Supported by MakerEd, included four learning commons teacher librarians Leanne Berry (Heritage Elementary), Michelle Labonte (Quinson Elementary), Jessica Bonin (Spruceland Traditional), Andrea Brown (College Heights Elementary) and teacher Jennifer Waughtal Goldstein (Harwin Elementary). Jennifer's teaching position was to infuse making into social and emotional learning.

The third LTG, *Programming: MakerEd*, brought together learning commons teacher librarian Joseph Jeffery (Polaris Montessori), French immersion classroom teacher Cliff Waldie, high school teacher Jerry Bleecker, and a member of the SETBC team, Scott McKay. All three teams presented their work at a planned celebration of learning organized by our Learning Innovations Department. The repeated message was that *making is engaging, and creating requires thinking and constructivism by teachers and students*. Those attending the session encouraged the teams to share their journey so that others could build on their ideas and momentum. Beginning in May 2015, the learning commons teacher librarians made the professional step out of their school spaces and began to share what they had learned with others in their LTGs.

Presentations by SD57 Learning Common Teacher Librarians to Support Maker Education

May 2015 Beyond Hope (The Prince George Public Library & North Central Library Federation)

- Jessica Bonin MINECRAFT: Digging into a world of creativity

- Looking for a fun and interactive way to get students hooked? Minecraft has taken over young minds, and we need to embrace this amazing opportunity for learning! In this hands on workshop, you will take home ideas and lessons that incorporate Minecraft into various parts of the curriculum, using digital media, as well as crafts and projects. There will also be information provided to run a successful after school program with ideas for large-scale events. Let's have fun learning about creepers, zombies, and how to mine for a “diamond “of ideas.

August 2015 British Columbia Teacher Librarian Summer Institute: Makerspaces

- Monica Berra, Jessica Bonin, Leanne Berry, Michelle Labonte, Maria Weisgarber, Joseph Jeffery and Keynote Lisa Domeier De Suarez (SD36 Surrey)
- In Prince George, Lisa Domeier De Suarez and Monica Berra led us through an exciting and varied sharing session about makerspaces. They were joined by five SD57 Prince George teacher-librarians, Jessica Bonin, Leanne Berry, Michelle Labonte, Maria Weisgarber and Joseph Jeffery, who presented on their makerspace learning. In the afternoon, we were introduced to the Two Rivers Gallery MakerLab space and tools, and had a demonstration and Q&A of their laser cutter/engraver and 3D printed. Next, we got "hands-on" and tried out a maker activity involving gears and simple mechanical assembly and explored the Makey-Makey platform.
- Materials: Lisa's slides (.key) | Monica's slides (.pptx) | Joseph's slides + coding lesson plans Jessica's Minecraft Prezi + handout | Leanne and Michelle's lesson ideas handout | Maria's Maker Education Explorations slides (ppt) + text + handouts 1 2 3 | Art Gallery materials

September 2015 Prince George Mini Maker Faire

- The District Learning Commons joined the Prince George Mini Maker Faire steering committee in October 2014.
- Monica Berra and Beth Wilcox (Southridge Elementary), Karen Frederisckson (SD59 - Pease River South), and Felisha Martin (Future Goals - EverFi) hosted a booth “Not A Stick”. #PGMakerFaire

October 2015 British Columbia Teacher Librarian Association Conference

- Jessica Bonin – Minecraft: Building Your Own Path
- Looking for a fun and interactive way to get students hooked? Minecraft has taken over young minds, and we need to embrace this amazing opportunity for learning! In this hands on workshop, you will take home ideas and lessons that incorporate Minecraft into various parts of the curriculum, using digital media, as well as crafts and projects. There will also be information provided to run a successful after school program with ideas for large-scale events. Let's have fun learning about creepers, zombies, and how to mine for a “diamond “of ideas.

- Leanne Berry and Michelle Labonte – LowTech/No Tech Maker Education in the Library
- Our session is designed to help teachers bring maker education into their classrooms and learning commons with a connection to literature. Our lessons involve recycled or dollar store materials so are low cost lessons.

- Maria Weisgarber - Getting Started with Digital Photography and Video Creation
- Introduce your students to the basics of digital photography – picture format and size, flash, colour, distance, angle, panning, horizon and rule of thirds. Create short video clips. Use Windows MovieMaker to make a simple video

November 2015 IT4K12 ERAC

- Joseph Jeffery (Polaris Montessori) From Tweeters to Team: Our Coding Journey
- This presentation is focused on how our team went from a group of like-minded tweeters in our district to a team focused on creating a maker education curriculum around coding for use within our district. Our journey also included the use of Google Docs and other online apps to collaborate and run the curriculum in two parallel schools, reflecting and sharing with each other the results of our lessons.

- Jessica Bonin – Minecraft: Building Your Own Path

- Looking for a fun and interactive way to get students hooked? Minecraft has taken over young minds, and we need to embrace this amazing opportunity for learning! In this hands on workshop, you will take home ideas and lessons that incorporate Minecraft into various parts of the curriculum, using digital media, as well as crafts and projects. There will also be information provided to run a successful after school program with ideas for large-scale events. Let's have fun learning about creepers, zombies, and how to mine for a “diamond “of ideas.

After two years, SD57 is building on the cycle of small, successful experiments that has resulted in very specific school programs. Harwin Elementary has created a position for a maker teacher to support social and emotional learning for high risk students. Heather Park Elementary is celebrating making in a 10 week cycle of maker education. Kirk Czchmeister is bringing his experience from Heather Park to Buckhorn and Hixon. Kelly Road Secondary has created a grade 8 course entitled Maker Education. Schools are in the process of creating space and opportunities for maker education. Kelly Road Secondary, Edgewood, Quinson Blackburn, Glenview, Hart Highlands, Harwin, Heather Park, Heritage, Morfeee, Nusdeh Yoh, Pineview, Polaris, Southridge, Spruceland have identified specific actions as a school to support making in the learning commons. In the maker mindset we are embracing the opportunity to give students ownership of their own learning as they problem solve and explore possibility thinking. It is with a constructivist approach that we are actively and intentionally creating flexible, learner centered learning spaces to support maker education with purpose and relevance.

Website: Building Student Success – BC’s New Curriculum

Learner at the center: BC’s renewed provincial curriculum places learners at the center of the learning landscape, and encourage motivation, curiosity and active engagement. Renewed provincial curriculum is inclusive of all learners – it addresses the needs of diverse learners in various contexts, allow for personalization and creative approaches and enables student to take increased responsibility for their learning.

Flexible: A goal of the renewed provincial curriculum is to provide teachers and schools with greater opportunity to exercise professional judgement in creating flexible learning environments and in using creative approaches to teaching, learning and

assessment. Such approaches take into account the place and cultures of the students as well as the great variety of technology available to them.

Habits of Mind “Habits of mind” are characteristics of intelligence or sets of behaviours people engage in when they are confronted with problems.

Constructivism: Constructivism is a theory of learning that posits the learning occurs as students are actively involved in a process of meaning and knowledge construction as opposed to passively receiving information. Constructivism views learners as actively constructing their own knowledge and understanding of the world through experience and reflection. Constructivist approaches to instruction include experiential, inquiry-based, project based and other form of active learning.

Johnson, Steven. *Where Good Ideas Come From: The Natural History of Innovation*. New York: Riverhead Books, 2010.

Loertscher, David, Leslie Preddy, and Bill Derry. "Makerspaces in the School Library Learning Commons and the UTEC Maker Model." *Teacher Librarian* 41, no. 2 (2013): 48-51

Martinez, Sylvia Libow, and Gary Stager. *Invent to Learn: Making, Tinkering, and Engineering in the Classroom*. Torrance, Calif.: Constructing Modern Knowledge Press, 2013.