May 2021 Volume 28, Issue 3

THE Teaching Librarian

The Magazine of the Ontario School Library Association
ISSN 1188679X

Exploring Cybersecurity in Learning Commons

PAGE 28

Storytelling in Math

Melissa Poremba uses books and stories to engage students in math and logic

PAGE 32

10 Tips to Support STEM

PAGE 16

Super Conference Highlights

PAGE 13

STEM @ your library

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THE
Teaching Librarian
Volume 28, Issue 3 May 2021 ISSN 1188679X

TingL Fixtures

6 The Editor's Notebook
Caroline Freibauer

7 President's Report
Maureen McGrath

8 The Buzz
Joanne Sallay

10 Meet the Author: Nicholas Eames
Angela Thompson

12 Our Post-Pandemic Future From Advocacy to Activism
Anita Brooks Kirkland

TingL Features

13 Ontario Library Association Super Conference Highlights
Mary Doyle and Caroline Freibauer

16 Ten Ways the Library Learning Commons Can Support STEM
Jess Oakman

18 The Business of Turning Students Into Global Citizens
Daniel Lumsden

20 Building Momentum Towards Tech-Enabled Futures in the Learning Commons
Heather McTavish

TingL Features

22 Teacher Creates a Different Kind of E3
Kasey Whalley with Brian Baquial

23 STEM Inspired: Wired Wednesdays a Hit with Students
Kasey Whalley

24 Coding Connections with the Library Learning Commons
Maureen McGrath

25 Trying to be a STEAM Teacher During a Pandemic
Trish Hurley

26 Cardboard STEAM Project Popular During Online Learning
Trish Hurley

27 Opening STEM Pathways For Everyone
Kimberly Senf

28 Use Learning Commons To Explore Cybersecurity
Tim King

32 STEAM: Story-Telling for Engagement and Authenticity in Math
Melissa Poremba

35 Curiosity Lures Science Teachers Into The Library Learning Commons
Caroline Freibauer

38 Building up STEAMM With Media Literacy
Diana Maliszewski

STEM @ your library

TingL
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Volume 28, Issue 3

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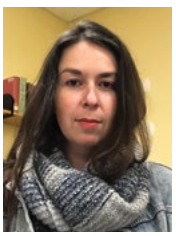

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TingL Mission

The Teaching Librarian

The Teaching Librarian (*TingL*) is the official magazine of the Ontario School Library Association (OSLA). It is published three times a year to support OSLA members in providing significant and effective library programs and services. *The Teaching Librarian* promotes library programs and curriculum development that furthers exemplary educational objectives. The magazine fosters effective collaboration within the school library community and provides a forum to share experience and expertise.

TingL References

The Teaching Librarian is a general magazine for OSLA members and not a scholarly journal. If your article does require citation of sources, please provide them within the text of your article or column with as much or as little bibliographic information as necessary for identification (e.g. book title, year). If you feel that the works you are citing require full identification, please provide a bibliography at the end of your piece, formatted according to the latest Chicago Manual of Style (16th edition) or APA Style.

TingL Editorial Board

TingL Submission Guidelines

Please Note: Themes are subject to change.

September 2021 V. 29, Issue 1	"Virtual @ your library" Deadline: May 31, 2021
January 2022 V. 29, Issue 2	"Innovation @ your library" Deadline: September 30, 2021
May 2022 V. 29, Issue 3	"Leadership @ your library" Deadline: January 31, 2022

Articles of 150-250 words, 500 words, or 800-1,300 words are welcome. Articles, when approved, should be accompanied by high quality images and/or graphics whenever possible. Text must be sent electronically, preferably in a Microsoft Word (or compatible) file. Images or graphics must be sent separately in a digital format, such as .jpeg, .png, .tiff, or .ai. The minimum resolution must be 1000 px at 150 dpi. With photos that contain a recognized individual, please secure the individual's permission in writing for the use of the photo. Photos taken at public events or crowd shots taken in a public place do not require permission from the subjects. All submissions are subject to editing for consistency, length, content, and style. Journalistic style is preferred. *The Teaching Librarian* adheres to Canadian Press Style. Articles must include the working title, name of author, and email address in the body of the text. OSLA reserves the right to use pictures in other OSLA publications unless permission is limited or denied at the time of publishing.

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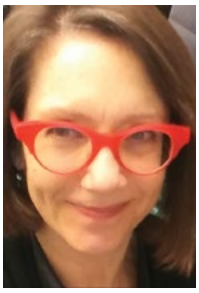
The Editor's **Notebook**



Caroline Freibauer

Stereotypes are a trap, stifling our thinking, fixing us in a time that no longer exists – if it ever did. Think about the notion that a woman's place is in the home, men don't make good nurses and Boomers are bad at technology.

As for libraries, many people still assume they are places meant to house books and employ middle-aged women with grey buns, whose main role is to shush anyone who makes even the slightest sound. When my daughter announced that she wanted to become a librarian, my mother thought it was a bad idea. "It sounds boring," she said.

The notion that libraries are solely focused on books and reading casts a stubborn shadow over the school library learning commons. Many still believe the main function of the learning commons, despite an emphasis on inquiry, maker spaces and new technologies, is book exchange and print literacy. Just as pervasive are the notions that teaching literacy is the responsibility of the high school English department and only a history teacher can properly guide students through the essay-writing process. That's why many assume that people with a background in English and history make the best school library staff. But, as you will see from the wide array of articles in this STEM @ your library edition of *The Teaching Librarian*, reality doesn't match the stereotype.

Many school library learning commons have become showcases for technology and we have pre-COVID-19 examples of this in the publication, including an article on how a Brampton high school partnered with the public library to showcase tech ("Building Momentum Towards Tech-Enabled Futures in the Learning Commons") and the public library. Meanwhile, another Brampton high school's computer science teacher has partnered with the library learning commons to highlight electronic passion projects created by students ("Teacher Creates a Different Kind of E3). Coding is becoming a common activity in the library learning commons and we have two pieces ("Coding Connections with the Library Learning Commons" and "Trying to be a STEAM Teacher During a Pandemic") explaining how the school library staff can partner with teachers to help embed it in the curriculum.

Tim King, a computer science teacher in Fergus, explains why he thinks teacher-librarians and other school library staff can be the best people to launch a cyber security competition team in a school. Read more about how he has helped coach some winning teams ("Use Learning Commons To Explore Cybersecurity") and how to get involved in the competition.

Melissa Poremba, a trained math teacher, has for many years been leading in the library learning commons at Hillfield Strathallan College in Hamilton. She explains in her article the many ways math and literature intersect ("STEAM: Story-Telling for Engagement and Authenticity in Math").

There was a time when I would have thought it rare to find a school library learning commons staff members with a background in STEM, such as Poremba. As I learned about more and more of them, I decided to find out how they were doing. You can read what I discovered in the article, "Curiosity Lures Science Teachers Into the Library Learning Commons."

Nearly all the articles in this edition chip away at the stereotype of school libraries and those who lead them. Even in the midst of the COVID-19 virus there is so much happening. My mom was wrong. It's not boring at all.

The Teaching Librarian is looking for contributors and editorial board members!

Interested in writing for *The Teaching Librarian*? Here are themes and submission deadlines for upcoming issues:

"Innovation @ your library" Deadline: September 30, 2021 **"Leadership @ your library" Deadline: January 31, 2022**

Or consider joining the editorial board! Contribute to issues, write and/or solicit articles, copy edit, and work together to produce three issues a year. For more information, contact the editor at: teachinglibrarian@outlook.com

President's **Report**

Maureen McGrath

STEAM More Important Than Ever

> **STEAM is the curriculum. As library professionals, we must not let restrictions stop us from knowing what is good for students. Let's help each other make the most of the time we have.**

Octo, quad, virtual, hybrid. All these variations of our current teaching realities represent the complicated year we are muddling through.

The changes to our day-to-day have put great strain on our feeling of effectiveness and, for some, restricted the ability to allow for creativity in the classroom; it just doesn't feel like there's time. How do you fit in everything in a 22-day octomester? Woven into this fabric is the feeling that students have somehow lost time; that they are behind, that they will not measure up to those before them.

With all this turmoil, it is hard to reconcile what previously may have been viewed as an extra. Where does STEAM fit in with all the pressures of getting through the curriculum? The easy answer is nowhere: there just isn't time. But the better answer is everywhere! Our kids need creative and challenging opportunities now more than ever.

There was much debate as "making" emerged as a trend embraced by libraries. Maker carts and maker labs were created as we promoted tinkering and innovation, mostly outside of the formal classroom environment. We honed the design process and made connections to stories, valuing the language, unplugged activities and the critical thinking that can be prized from seemingly simple tasks. Classroom integration took some time as we worked to convince our colleagues that making is a mindset, not an extra, and that work was far from over when the pandemic hit. How do you collaborate within school protocols, when kids can't leave their seats, and every little bit and loose part needs to be wiped and sanitized and quarantined?

What we do know is that divergent thinking and critical thinking skills are essential for our students on so many levels. We know STEM occupations are the jobs of the future as our society becomes increasingly globalized, more information based and technological. If you were able to attend this year's OLA Super Conference, you may have experienced the learning around STEAM that so many clever minds from the library sector shared; we are still doing the work and are adapting to all the changes thrown our way!

STEAM is the curriculum. As library professionals, we must not let restrictions stop us from knowing what is good for students. Let's help each other make the most of the time we have.

Support your colleagues by planning cross-curricular, inquiry-based projects that weave in science, technology, engineering and math, with a design focus.

The new K-8 math curriculum is a great opportunity to support classroom teachers as they deepen their knowledge and comfort level with coding. Cross-curricular planning and project-based learning are great models for virtual instruction.

Check out OSLA resources - Ontario Library Association (accessola.com) for resources on the student inquiry process. You can leverage your SLLC! Logic, questioning, problem-solving and innovation are the very skills with which we need to arm our students as we combat a global pandemic, turn our fears into solutions and face the days ahead.

We must offer our students these skills and attitudes so they can meet their future with confidence.

The Buzz

Interview with Reni Barlow, Executive Director of Youth Science Canada

This issue's focus – STEM @ Your Library – is not only exciting but extremely important.

The term STEM representing the fields of science, technology, engineering and mathematics has become quite the buzz word in education. The significance of exposing students to programs and activities to help them develop problem solving and critical thinking skills required for school and careers of the future has long been acknowledged.

If anything, the pandemic has elevated this relevance to an entirely new level, cultivating a curiosity to guide our country's next generation of innovators and leaders. As a result, parents and teachers are actively looking for additional opportunities to present to their students outside of traditional course curriculum, to reinforce an interest in STEM subjects.

For this reason, I was quite intrigued to learn about the non-profit organization, Youth Science Canada. It was timely with their signature event, the Canada-Wide Science Fair, our country's largest annual youth STEM event, taking place this May.

To learn more about Youth Science Canada and gain insights on how teacher-librarians can help students explore STEM education, I interviewed Reni Barlow, Executive Director of Youth Science Canada.

TingL: For some of us hearing about Youth Science Canada for the first time, please tell us about your organization.

Barlow: Youth Science Canada (YSC) fuels the curiosity of Canadian youth through science, technology, engineering and mathematics (STEM) projects. We challenge students (primarily in grades 7-12) to investigate scientific questions and develop innovative solutions related to current and future challenges including agriculture, fisheries and food; digital technology; disease and illness; energy; environment and climate change; health and wellness; and natural resources.

The results are astounding.

Roughly 500,000 K-12 students in Canada do STEM projects every year. YSC's network of community-based members hosts 25,000 at over 100 science fairs in every province and territory, where STEM professionals meet the young scientists and review their projects. They select the top 500 for the national finals—the Canada-Wide Science Fair (CWSF).

YSC also selects youth and projects to represent the country at international youth STEM competitions and events – our Team Canada program – and offers Smarter Science resources and workshops to help K-12 teachers integrate inquiry-based STEM activities and projects into their classroom.

What programs, workshops and opportunities are available throughout the school year for students, teachers, and parents?

YSC's primary focus is to engage Canadian youth through STEM projects. We are in the process of launching a new web site – mySTEMspace/monEspaceSTIM – to help students find a STEM-related question or problem that engages them and then support them through the development of a project. If students choose, they can enter their project in a school or regional STEM fair.

Since the introduction of our Smarter Science initiative in 2009, Youth Science Canada has delivered numerous professional education workshops across the country. School boards looking to schedule a workshop can contact Youth Science Canada at dominic.tremblay@youthscience.ca. More info on Smarter Science can be found on youthscience.ca.

Students across Canada are encouraged to take their STEM projects to the next level by participating in STEM fairs. These competitions include regional fairs and the Canada-Wide Science Fair (CWSF). Visit secure.youthscience.ca/fairlocator to find your nearest regional fair.

Joanne Sallay

Youth Science Canada recently launched a new podcast – Why to How: Adventures in STEM. The first episode featured Canadian inventor Ann Makosinski who started by doing simple projects at home and then gained international recognition for her hollow flashlight and e-drink inventions. The audio and video of the podcast are available on numerous podcasting platforms and Youth Science Canada's social media channels including YouTube, Facebook, Instagram and Twitter.

Please describe your Canada-Wide Science Fair and the changes to your flagship event due to the pandemic?

Canada-Wide Science Fair, the country's largest annual youth STEM event, will take place May 17 to 21, 100 per cent virtually, allowing all Canadians to visit the event.

The main showcase will be the Project Zone, which will feature over 400 outstanding and innovative STEM projects by Grade 7-12/Cégep students selected at the regional level across Canada. Each project will feature a synopsis and video. A group of about 250 STEM academics and professionals will evaluate the projects and select the top entries that will share in the awards, medals, and scholarships to be distributed at the virtual awards ceremony on May 20.

In addition to the Project Zone, STEM Expo, the largest youth STEM outreach event in Canada, will feature virtual exhibits with inspiring innovations, demonstrations, and opportunities in STEM. Cenovus Energy, Intact Financial Corporation, NSERC, numerous universities and other STEM leaders will exhibit their trailblazing programs to Canadian students and members of the public through presentations and virtual tours.

Can you share some success stories from alumni who have participated in your programs?

Dr. Roberta Bondar, astronaut, neurologist, physician, educator and photographer notes: "As a Grade 13 student, I participated in the city science fair in Toronto and then went on to represent my region at the Canada-Wide Science Fair. It was an experience that would ultimately define my life."

John Baker, founder and CEO of D2L participated in regional science fairs and the Canada-Wide Science Fair as a high school student.

Ann Makosinski, inventor, writer, *Time Magazine*, *Forbes Magazine* 30 Under 30, and *Entrepreneur Magazine*'s Young Millionaire, participated in regional science fairs, the Canada-Wide Science Fair, and represented Canada at the International Science and Engineering Fair as well as the Google Science Fair.

Adam Noble, Noblegen founder and CEO, won the Canada-Wide Science Fair 2013 Best Project Award and represented Canada at the International Science and Engineering Fair.

What advice do you have for Teacher-Librarians in how to incorporate STEM into student learning and school libraries?

We're all born curious, but by middle and high school students can be more focused on giving answers than asking questions. We tend to underestimate the capability of youth, their ideas, and their passion. Teacher-librarians can encourage students to pursue interesting questions and challenging problems that matter to them. Today's students have access to more information than ever, but they need help learning to identify trusted sources and go beyond the top five Google search results. Teacher-librarians can help ensure that students have the skills, opportunities, and encouragement to tackle any question or problem they choose. Visit our website for more information.

What is your hope for the future of STEM education in Canada?

We want every Canadian student – and especially teens – to stay curious, pursue questions and develop solutions to problems that interest them. Our goal is for them to experience the thrill of using STEM to help people or make the world a better place. Answers and solutions generate new questions and ideas; once the fire of curiosity is ignited, it is difficult to extinguish.

Meet the Author
Nicholas Eames

Nicholas Eames' Heartwyld (The Band) series blends fantasy, humour and rock 'n' roll in epic proportions. With two books under his belt and one on the way, Eames is an author to watch and follow.

Following is some insight gleaned from this up-and-coming talent during our brief interview.

TingL: How did you decide that writing fantasy was a career you wanted to pursue?

I blame Guy Gavriel Kay, who is my favourite author in the world (and also Canadian). His books—every one of them—break my heart in the best way possible. I was reading *Lord of Emperors*, the second book in a duology with heavy themes of art and legacy, when I decided I wanted to try and write something that affected someone the way his work affected me.

What is the most difficult part of the writing process for you?

Drafting, for sure. Some writers have colossal daily word counts and are great at getting their story down with the intention of fixing it up later. I, unfortunately, am awful at that. I tend to nitpick over every word, every sentence, every paragraph. On the bright side, when I turn in a draft (so far, at least) my agent and editors are impressed by how little work is required to polish it up.

Your two published works, *Kings of the Wyld* and *Bloody Rose*, redefine traditional fantasy tropes. Why does this appeal to you? Are there going to be other titles in this series?

Yes! There is a third book, called *Outlaw Empire*, on the way. As for the tropes, I think modern fantasy (since, say, 2000 or so) has been moving away from tropes, reinventing itself again and again with each wave of new writers. I wanted to write something that embraced those tropes I loved as a young reader, but presenting them in a way that felt fresh and funny. As many have said, a trope done badly is tough to swallow, but when handled with care they can be a great way to invoke nostalgia and a sense of wonder.

Not only do you share the written word, there is visual art and a soundtrack associated with your novels. Was this part of your creative process or aspects that were added after your work was completed?

The music was definitely part of the creative process. The books are inspired by specific eras of music ('70s, '80s and '90s, respectively), so I lived on a steady diet of music while writing them. Characters, scenes, weapons…almost everything is tied to music in some way. I've curated a playlist for each on Spotify that are more or less chronological "soundtracks" for each book so far.

The art, however, came after, and I feel so extraordinarily lucky that so many talented artists have used their time and energy to create art for The Band series. All of that—especially the covers by Richard Anderson—have been a huge inspiration to me since.

What role does collaboration play in your writing process? Do you have people you share your ideas with or whose opinions you value?

Great question! I'm not one of those writers who has a "my way or the highway" mentality. I'm fortunate to have a brother who loves to give feedback on my work, as well as a great

friend whose opinion on character, pacing, etc., I value greatly. They help a great deal when it comes to making the book as polished as can be before I send it off to the higher powers!

Also, my agent and editors have all been immensely helpful. With *Bloody Rose*, for instance, I had two editors (one in the UK and one in the US) who both offered suggestions to make the book better, and I'm hugely grateful for the insight and input of both!

Are you working on anything right now that you are willing to mention to *Teaching Librarian* readers?

Well, the third book in The Band series (*Outlaw Empire*) is coming together, albeit much slower than I'd like it to! I've got a few other ideas percolating, but nothing on (metaphorical) paper yet!

What issues are on your mind right now? Do you think these concerns will make an appearance in your writing (current projects)?

Oof! What issues aren't on my mind! And funny you should ask—since each book draws inspiration from a specific era of music, I've been listening to a lot of '90s music while writing *Outlaw Empire*. And tragically, a lot of that music, especially the early '90s hip-hop and anti-establishment bands, like Rage Against the Machine, were tackling issues that plague us to this very day. Poverty, inequality, racial prejudice, distrust of government and law enforcement – all of these elements feature heavily in the music of that era, so I hope to reflect that in my work while (somehow) keeping the story fast and fun. Wish me luck!

Any final words? Shoutouts?

If you care to, feel free to follow me on Instagram (@thebookofeames) or Twitter (@Nicholas_Eames). I very often share recommendations for books I've loved reading or listening to (yay for audiobooks!), as well as art or music fans have created based on by books. Also, the playlist for both books can be found on Spotify, curated by yours truly (thebookofeames).

Thanks for reading!

Anita Brooks Kirkland

Our Post-Pandemic Future
From Advocacy to Activism

One thing I've learned over many years is that school library advocacy is a long, hard slog. Advocacy is a process of developing credibility, relationships and understanding over time.

We are all responsible for advocacy. What we all do every day has an influence in the school, the district and the province.

Being an active advocate means:

- **Articulating the unique value proposition of the library learning commons –** If we want others to understand our impact we must be able to clearly articulate our unique contribution to student success;
- **Expanding your sphere of influence and building relationships –** The more we increase our sphere of influence through relationship-building, the more influence we will have about things that concern us;
- **Being strategic and accountable –** When school librarians lead learning through innovative practice, they gain credibility. That credibility is affirmed by sharing evidence of positive impact.

Over the past decade, sustained advocacy from OLA and OSLA has made a difference. Innovative practices in school libraries have made an impression. The library learning commons approach has captured other educators' imagination and support.

Yet all of that work over all of that time has been severely threatened by the pandemic. Teacher-librarians and library technicians have been reassigned, or their positions cut. Libraries are closed. Funding for resources has evaporated. The library has returned to its status as the "low-hanging fruit" when decision-makers are put in the unenviable position of dealing with the general crisis in education.

When years of progress are so threatened – when there is a significant disconnect between our core values and those of decision-makers – it is time to take a stand, be visible and be vocal.

Activism means to:

- **Draw on past advocacy successes –** Have a clear vision, draw on relationships, and focus on positive impact. Be professional, but be prepared to ask hard questions.
- **Take inspiration from your colleagues –** Recent editions of *The Teaching Librarian* and *Canadian School Libraries Journal* are full of leadership stories in the face of pandemic constraints.
- **Work together –** Concerned organizations are mobilizing at the provincial and national levels. School library professionals and their allies need to mobilize to address local conditions.

In the cacophony of concern about what the post-pandemic future may bring, we worry that we will be overlooked and our voices drowned out. If there was ever a time to be a library activist, it is now.

Your school library leadership is doing its best: heaven knows they've been at it for a long time. But devastating decisions are also being made at the local level, in your own sphere of influence.

It is a lot to ask educators to be activists now, when you are exhausted and discouraged. But our collective activism, asking the hard questions and refusing to be dismissed as that low-hanging fruit has to be the way forward. We are all counting on each other, now more than ever.

More Resources

Save School Libraries Coalition: linktr.ee/saveschoollibraries

CSL Statement on the Role of School Libraries During the Pandemic: bit.ly/CSL-pandemic-statement

OLA School Library Advocacy Resources: accessola.com/school-library-issues

CSL Journal: journal.canadianschoollibraries.ca

Ontario Library Association Super Conference Highlights

Mary Doyle and Caroline Freibauer

Ontario School Library Association Uses Conference To Launch A Focus On Diversity And Anti-Black Racism

A move to a completely virtual Super Conference is only one of many firsts highlighting the Ontario Library Association's meeting of "Clever Minds and Human Hearts" in February 2021.

The theme is lifted from a Jane Goodall quote advising that "it's only when our clever brain and human heart work together can we achieve true harmony." The Ontario School Library Association Council took that theme to heart by launching at the conference a focus on diversity and anti-Black racism with the first of three presentations with Dr. Andrew B. Campbell, an Ontario Institute of Studies in Education professor whose work centres on leadership, education policy and diversity.

In her introduction to the event, Maureen McGrath, OSLA council president, signaled that this was part of the council's decision to confront our personal biases and beliefs while committing to grow in our understanding of how we can do better as educators.

Framed in a question-and-answer format, members of OSLA council posed questions in a pre-recorded session, which Dr. ABC, a nickname he prefers, answered, drawing on his experience and expertise as an educator and an academic, as well as his engaging storytelling talent.

He began by outlining four ways to start the conversation about anti-Black racism in schools that are homogeneously white.

He suggested using:

- Current events, such as the death of George Floyd and storming of the United States Capitol building, which provide opportunities to lead rich discussion in the classroom.
- Major events, such as Black History Month, Orange Shirt Day, Pink Shirt Day, Red Dress Day, which create windows for teaching and learning. Dr. ABC acknowledged that some see Black History Month as tokenism, setting aside one month to put the spotlight on the achievements of Black people, but he also sees it as an invitation to celebrate these achievements.
- Book clubs, which permit staff and students to centre their conversations around a common book. But Dr. ABC advises that you should look for books written by Black voices and perhaps invite those authors to come to the school.
- Workshops can be a good conversation starter, Dr. ABC said. But they are just a starter.

Dr. ABC cautioned that many people attend a Black talk, read one book or attend a workshop and then cross that off their to-do list. "When you are ready to move on, do not move on by checking the boxes."

He said growing and learning must continue to create consistency. "The opposite of tokenism is consistency."

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He took that adage to heart in his own professional life. Even though he may give 50 presentations in a year, he maintained that he probably attends just as many to keep learning. "We have to engage in learning, and we have to engage in unlearning."

Dr. ABC challenged everyone not ready to stretch their thinking to be more flexible.

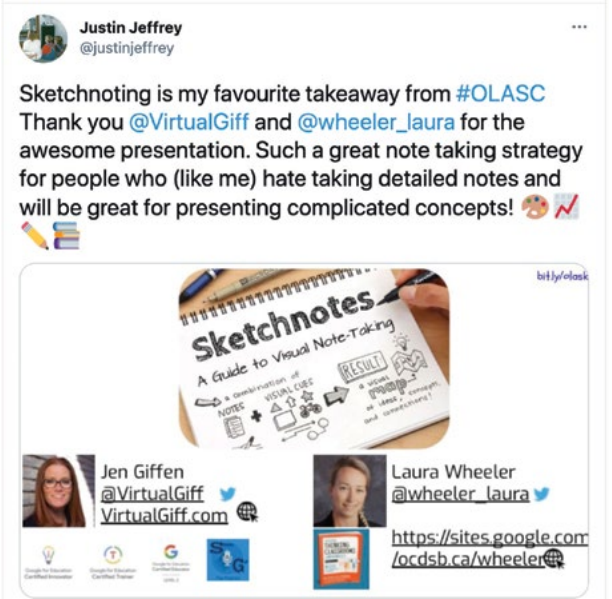
"To anyone out there listening, while you are being less flexible, a child is being marginalized. While you are being less flexible, a child's self-esteem is being affected. A child is not feeling loved. While you are being less flexible, a child's culture and history is being erased. While you are being less flexible, a child's dream is being deferred because a teacher, principal, librarian, educator has decided 'I don't need to do all of this'."

He reminded the participants in the session, which was streamed for a live audience during Super Conference, that it is not about us. "We chose a profession that says, 'I am going to look out for others'."

This session was one of many OSLA highlights at the super conference. All conference sessions will be available until August 2021 to anyone who registered. You can check it out at: olasuperconference.ca. If you would like to learn more about Dr. ABC and his work, check out his social media channels including his website: drabc.ca

In the Winter 2021 edition of *Canadian School Library Journal*, many of the school library sessions have been transformed into articles including an overview of the conference by Maureen McGrath and Cathy MacKechnie. Check it out at: journal.canadianschoollibraries.ca.

Since the conference was virtual this year, we decided to offer some of the flavour of the event by sharing some of the social media posts and part of the Recognition Reel created to replace the regular award process.



Heather McTavish
@mctavish_h

Replying to @ONLibraryAssoc

The live chats I have attended so far have been great! Super engaging and so many perspectives. One of the many highlights of this year's virtual conference so far! #librarygoldstar to #OLASC planners, presenters, and chat facilitators for keeping us connected and learning!

5:50 PM · Feb 3, 2021 · Twitter Web App

MrsLyonsLibrary
@mrslyonslibrary

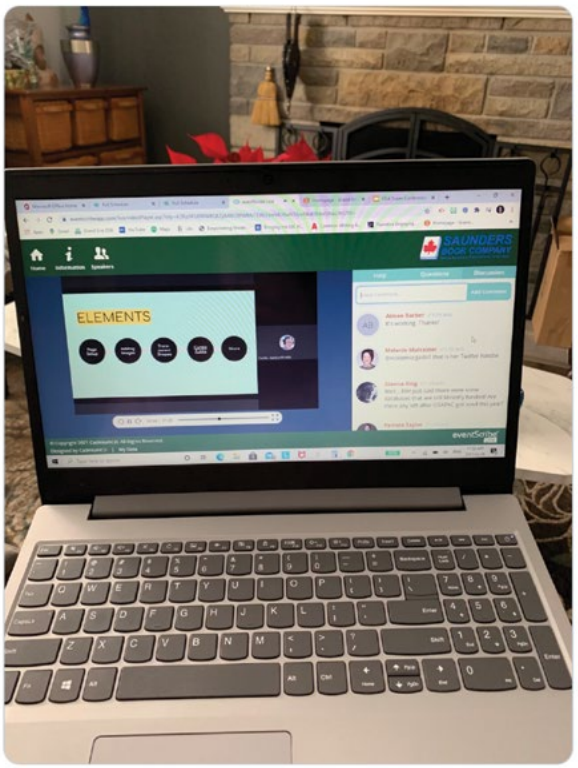
Thanks to everyone who joined in, added ideas to the Jamboard or the chat, or just basked in the community. We are #bettertogether. #librarygoldstar to @Citybrarian & @shelaghpaterson for sticking it out to the end with us. #OLASC @ONLibraryAssoc @oslacouncil

OSLA Council
@oslacouncil

A HUGE thank you to all the #OLASC conference planners and a special #LibraryGoldStar to @TL_Kate and @DawnTelfer our volunteer OSLA conference planning dynamic duo!!! What an incredible week of learning for us all! Congratulations to everyone!

Kate JohnsonMcGregor
@TL_Kate

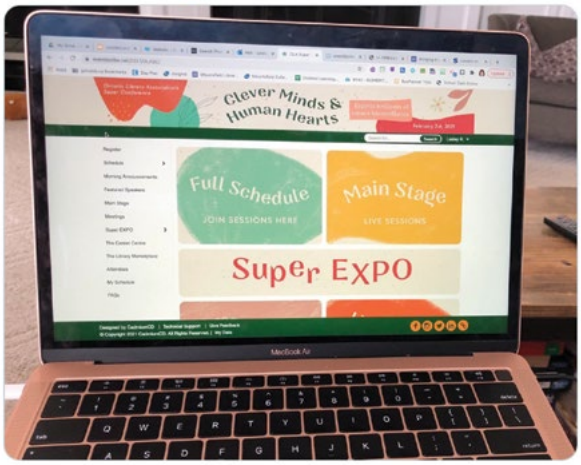
Learning so much about creating choice grids for #inquiry and #studentlearning from @tina_zita and @the_mulc #OLASC @oslacouncil #virtualconference #alwayslearning #saturdaylibrarian



11:36 AM · Feb 6, 2021 · Twitter for iPhone

Lesley Robertson
@mountsfieldLC

Spending Saturday navigating my first virtual conference. So grateful sessions are available for 6 months! Tips/ideas from many inspiring TL's. #OLASC #neverstoplearning



12:11 PM · Feb 6, 2021 from London, Ontario · Twitter for iPhone

MrsLyonsLibrary
@mrslyonslibrary

A #librarygoldstar to all the #ONSchoolLibraries (and beyond) professionals- TLs, libtechs, and edus spending their Saturday engaging in learning & discussion. 👏🏻👏🏻👏🏻 #OLASC @ONLibraryAssoc @oslacouncil

12:15 PM · Feb 6, 2021 · Twitter for iPhone

Tori 🟦🟧 The School Library Tech 🟧🟦
@ToriNeedsTea

#LibraryGoldStar to the amazing Lib Techs at #OCSB. They've all reimagined their services and helped keep the LC as the heart of the school - even when the physical space is closed! #MoreThanARoom #OLASC

12:07 PM · Feb 6, 2021 · Twitter for iPhone

MrsLyonsLibrary
@mrslyonslibrary

Shout out to @saundersbookco for all their support of school libraries. @oslacouncil #OLASC #librarygoldstar @ONLibraryAssoc

5:46 PM · Feb 5, 2021 · Twitter for iPhone

Read Into This
@into_read

Shout out to the #onted custodians who are working so hard to keep us all safe in the bricks and mortar spaces. #librarygoldstar #OLASC . @banana29 @Stephen_Hurley @nobleknits2 @mrslyonslibrary @voicEdcanada @ONLibraryAssoc @oslacouncil #ONSchoolLibraries

7:56 PM · Feb 3, 2021 · Twitter for iPhone

Ten Ways the Library Learning **Commons Can Support STEM**

In an age when library professionals must be about more than the books to reach students and teaching staff, supporting STEM education in the library learning commons can be a simple way in which to do so.

Here are 10 ways you can help support STEM in the LLC:

1. **Create a virtual library page with STEM resources:** The first way the library learning commons can support STEM education is by creating a virtual library page with online resources to share with students and staff. Popular platforms include using Libguides software or creating a Bitmoji library using Google Slides. This is also a fantastic way to reach any virtual students who aren't physically attending school, or students outside of school hours, as the resources can be accessed and used anywhere.

2. **Host a coding club:** Host a coding club in your library learning commons as another way to support STEM education. Possible resources/websites that could be used include: Micro:bit, Osmo, Ozobot, Beebots, Scratch, Tinkercad, etc. Students could be left to experiment with the different resources or be issued a weekly challenge for them to solve.

3. **Pair a read-aloud with a STEM challenge:** To support STEM education in your library learning commons, try pairing a read-aloud with a STEM challenge. You could facilitate creating dirt balls and exploring how plants grow while reading the 2020 Forest of Reading Blue Spruce nominee *Me, Toma and the Concrete Garden* by Andrew Larsen and Anne Villeneuve. Your students could be challenged to make a creation out of a box to coincide with the 2021 Blue Spruce nominee *Boxitects* by Kim Smith. You also could challenge your students to design and engineer a model of a tree fort after reading the 2020 Blue Spruce nominee *Better Tree Fort* by Jessica Scott Kerrin.

4. **Have Lego in your library learning commons:** If space permits, create a Lego wall or have a Lego cart that can be used both in your space and be borrowed to use in classrooms. Create carts with different building challenges to be housed on the cart or by the wall. Host a Lego club at recess. Challenge students to write secret coded messages using different blocks to represent each letter of the alphabet.

5. **Have STEM books in your collection:** This may seem obvious but having STEM books in your collection is possibly the simplest way to support STEM in your school. Some examples of fantastic books to offer include *Rosie Revere, Engineer* by Andrea Beatty, *The Boy Who Harnessed the Wind* by Brian Wheeler and William Kamkwamba, *How to Code a Sandcastle* by Josh Funk, *Maker Lab: 28 Super Cool Projects* by Jack Challoner, and *Women in Science: 50 Fearless Pioneers Who Changed the World* by Rachel Ignotofsky.

6. **Set up rotating STEM stations to support the curriculum:** Collaborate with another educator to set up stations in your library learning commons to support what a class is currently being taught. Try to include a station for each aspect of STEM, and as well items available in your library learning commons. For example, to support a Grade 2 class learning about the water cycle, there could be one station with a steam experiment to demonstrate how water turns into a gas, another with a short video demonstrating the water cycle, a third with books on the topic, and a fourth with laptops to let students explore online resources/databases.

7. **Host a recess STEM club:** This option can be as complicated, simple, high tech or low tech as desired. Try to offer an activity for each letter in STEM for students to choose from. You also can incorporate art and make it a STEAM club. In a school with a limited budget, activities can be as simple as challenging students to explore what they can build and do with math manipulatives, coloring sheets, etc.

8. **Host Scientist in the School:** If your school is hosting Scientist in the School or something similar, offer to host it in your space. Find out what is being taught, and display books on the subject so that interested students know the library learning commons offers resources on the topic. Alternately, offer to sign out books on the subject to the teacher for students to continue their inquiry after the activity is completed in their classroom.

9. **Bring math into school activities:** Is your school having a spirit day/week? Try challenging students to do the math to determine the percentage of students who participated. Break down those numbers. How many students participated per class? Per grade? Have the students create a graph display in the hallway. This option doubles as something to encourage students visually to participate in spirit activities. Another option is determining how many students attended on a snow day.

10. **Create a Rube Goldberg machine:** Challenge a class or the entire school to design a Rube Goldberg machine out of your library learning commons. These machines are fantastic. They incorporate all aspects of STEM, and are fun and engaging for students to learn about and try to create. To make it harder, you could also instruct students that they must use at least three different items from the space as part of it, not just the space itself. Once it has been designed and implemented, record a video of it playing out and post it to your school's social media platform(s)!

The Business of Turning Students Into Global Citizens

Daniel Lumsden

In a globally interconnected world, education in global citizenship is essential. It's the belief that we are all active and like-minded members of a dynamic, diverse network, both locally and across the globe. It is vital that students learn how their actions within their own communities can be far reaching, and that, in a globally connected world, we all have a social responsibility to act for the greater good of society.

In the business courses that I teach, a priority in the classroom curriculum is to create opportunities for students to boost their awareness of events that are happening around the world with the intent that they gain a broader understanding of the world around them and value their role in contributing to it. This will help them as they transition out of high school and into post-secondary school and the workforce. In these business courses, students can explore outside of the classroom and beyond the textbooks. They are introduced to multiple sectors in business each year through an interactive speaker series, learning from experts in fields such as accounting, business/corporate law, investment banking and marketing. I strive to bring in diverse speakers, so students can learn from multiple perspectives – viewpoints and experiences that I can't bring into the classroom and can't be found in their books. These opportunities help to contextualize what they are learning and make it relatable and relevant to the outside world.

Both personally and professionally, I appreciate informal education settings and the learning that comes from getting out in the world, interacting with the people and the environment around me. At my school, I introduced a business March break trip that takes students abroad to countries such as England, Italy, Spain and Hungary. These trips are about gaining a better understanding of other cultures and ways of living through sightseeing tours, coupled with presentations at local universities and their business departments and meeting with executive leaders from local and international businesses.

These are just a couple of examples that show how education can play a critical role in building and broadening a student's understanding of their world, and there are more opportunities to tap. Accounting teaches key technical skills that students need to know such as accounts payable

and receivable functions and forecasting and managing budgets. Soft skills are equally important. Skills like written and verbal communications, critical thinking, business knowledge and leadership all must be part of a well-rounded accounting course. The school library learning commons can be a resource to bring new knowledge to students through literature, storytelling, real-life accounts of the way business shapes global events, as well as memoirs by big thinkers and corporate leaders. Introducing business literature, selected by students, to the accounting course will provide another opportunity for students to learn from stories and real-life events in the business sector. Literature that comes to mind is *The Wealthy Barber*, *The Shoe Dog*, *Know Your Why*, and *The Seven Habits of Highly Effective People*. English courses have accelerated reading programs (ARP), and, while the accounting course will not be as extensive as the English course with regards to ARP, I find that getting students to read books associated with business helps them be more engaged in the course, and it will provide an opportunity to challenge their critical thinking skills within a co-operative group setting.

Another way the school library learning commons can support the school accounting program is through LibGuides – research pathfinders which help school library staff curate a collection of digital, Internet and print resources. School library staff can use LibGuides to help teach students who often do not know how to carry out proper research, a skill students will need if they move on to post-secondary education. LibGuides also will provide an opportunity to move away from the curriculum and challenge students with material that is outside the curriculum. Material that could be included in these LibGuides would consist of annual reports, financial statements, legal documents, and interviews with individuals related to the field of business. These LibGuides would be accessible via the library learning commons web site, for students to access any time, providing another touchpoint outside the classroom. Again, these LibGuides would be embedded into the curriculum and are a great tool to support experiential and active learning.

Another way the accounting program and the library can collaborate is through case studies. This content is already embedded in our curriculum through our DECA group and a partnership with a post-secondary institution. A case competition presented with the library learning commons will only enhance the experience of students and prepare them for DECA contests in the future. Case studies also help students with the following:

- Working together in a co-operative setting.
- Thinking critically.
- Thinking of creative, outside-of-the-box options and situations.
- Discussing in a small group setting.
- Learning a strategy which is used in post-secondary and real world situations.
- Making real world connections through plausible scenarios.

I have developed Design Thinking projects, where our students hack our school, and come up with an application (app), or website to find an improvement model. Students have access to a coach at Stanford University through monthly Zoom meetings. At the conclusion of the project, students present their findings in front of a panel of judges within the business industry. This project is unique because students have full control and accountability of their innovative ideas. This same concept could be applied to an assignment on a smaller scale with the library learning commons partnership.

Caroline Freibauer, the teacher-librarian at my school, and I are looking to implement these concepts as part of a partnership between the accounting program and the learning commons. This partnership is something students will certainly enjoy, as it includes active and co-operative learning assignments that will challenge their critical thinking skills.

Building Momentum Towards Tech-Enabled Futures in the Learning Commons

Heather McTavish

In 2018, when it was safe to gather in groups and host in-school events, Cardinal Léger Catholic Secondary School in Brampton, in partnership with the Brampton Public Library, hosted a Technology Showcase.

Hosted in the Cardinal Leger learning commons, the showcase offered students and faculty a chance to try emerging technologies and to sign up for a booth to show off tech-focused projects to the school community. In light of technology permeating culture in new and exciting ways every day, transforming the classroom and workplace, the showcase intended to help students develop technology fluency and gain essential skills for their futures in a non-intimidating, supportive and fun atmosphere.

The showcase, which took place over the two lunch periods, attracted more than 70 students interested in the hands-on displays. Brampton library, which has a robust makerspace program, brought some of its roving makerspace equipment, including Arduinos, Makey Makeys, multiple 3D printers and Google Cardboard to demonstrate CoSpaces virtual worlds. Leger's robotics class contributed student booths showing off different projects from remote-controlled robots to student-developed games and controlled lighted circuits. Students in the kinesiology class also participated, demonstrating the use of 3D printing to develop prosthetic limbs and the use of Adriunos to make them functional.

Leading up to the showcase, Brampton library's digital literacy and makerspace librarian and the Four Corners branch librarian delivered a series of four technology workshops in the Léger learning commons over several months. The workshops on TinkerCAD and 3D Printing, Building Virtual Worlds in CoSpaces, Creative Circuitry, and Building an App in MIT App Inventor, offered students a chance to make the most of the Technology Showcase and build excitement and momentum towards the event. The workshops provided students with a unique opportunity to experiment with emerging technologies to demonstrate course-related learning in new and creative ways. Teachers who signed up their classes for the workshops were encouraged to modify existing assignments by incorporating these new technologies to enable students to create projects to showcase. The invitation to participate in the workshops and the Technology Showcase provided teachers with several examples of how students could use the workshops' technologies to show their curriculum-related learning for various assignments.

Overall, the workshops and the showcase were successful, with workshops reaching two classes each. Students who attended reported that they learned something new that they would like to incorporate into their assignments. However, since different classes participated in the workshops, there was not as much momentum towards the showcase as might have happened had the workshops been offered to all students on their lunches who would sign up based on interest.

Moving forward, working more closely with teachers to secure buy-in to modify assignments would prove beneficial. The program might better acquire teachers and sustain student interest by continuing to offer the workshops and the showcase on an annual basis.

Regardless, this tech-focused program provided students with the opportunity to engage with technologies critical to their economic futures and Léger a chance to build a stronger connection with the Brampton library.

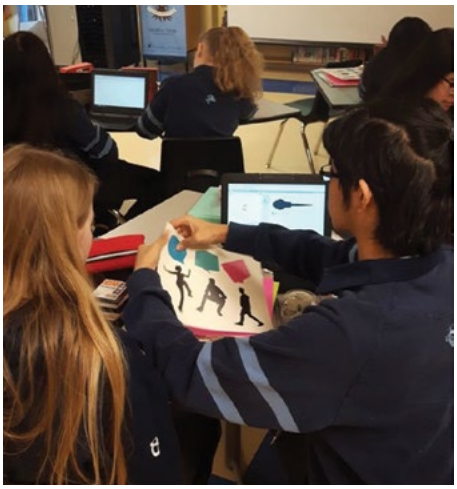
Assignment	Description	Ideas for Incorporating Tech
Surveillance Photograph Theme Assignment ENG 4U	As part of the Critical Media Literacy unit, you will be responsible for taking a photo that captures the theme of surveillance.	Instead of taking a photo, create a Virtual Reality that captures the theme of surveillance. Learn how at our workshop on December 19th.
Classroom Design GLE (Learning Strategies)	Design a classroom or learning space that is ideal for your unique learning needs.	Make learning fun by creating a gaming app for your ideal classroom. Learn how at our workshop in March.
Creating a Canadian Grade 10 History	Create a fictional historical identity and represent the figures throughout the decades.	Create a 3D tableau or figurine and print it on the 3D Printer in the Learning Commons. Learn how at our workshop on November 28th.

Examples of assignment modifications provided to teachers by the Brampton Library

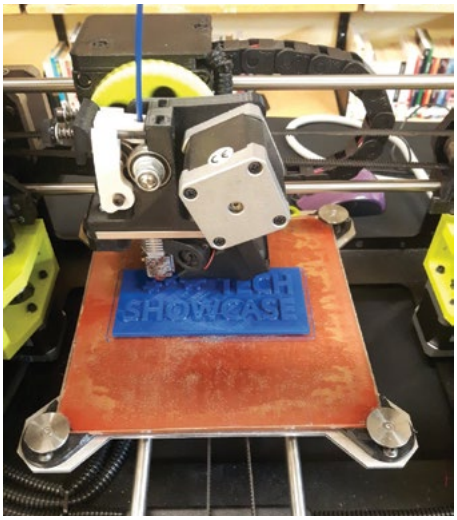
Resources:

tinkercad.com
cospaces.io/edu
appinventor.mit.edu
makeymakey.com

Technology Showcase poster designed by Digital Arts student

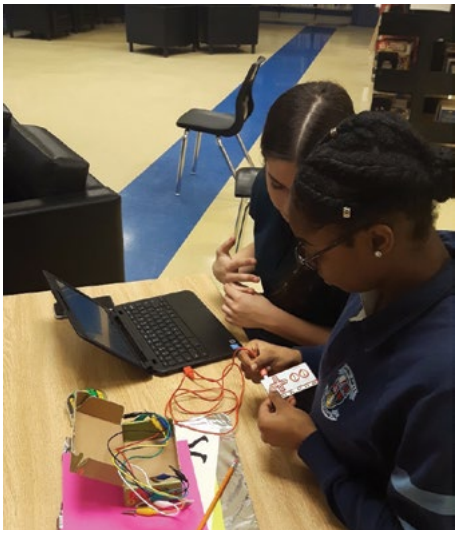


Creative Circuitry Workshop

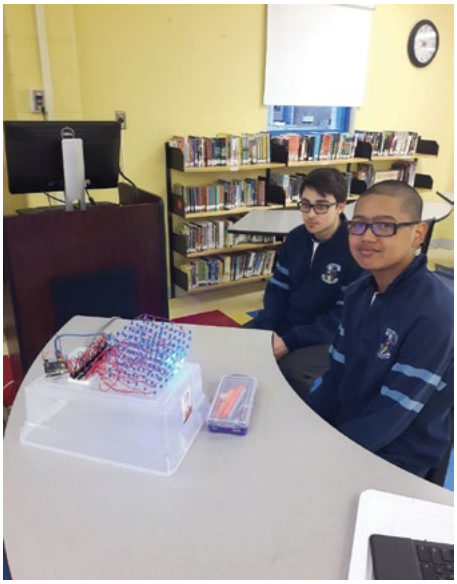


Makerbot 3D printer on display.

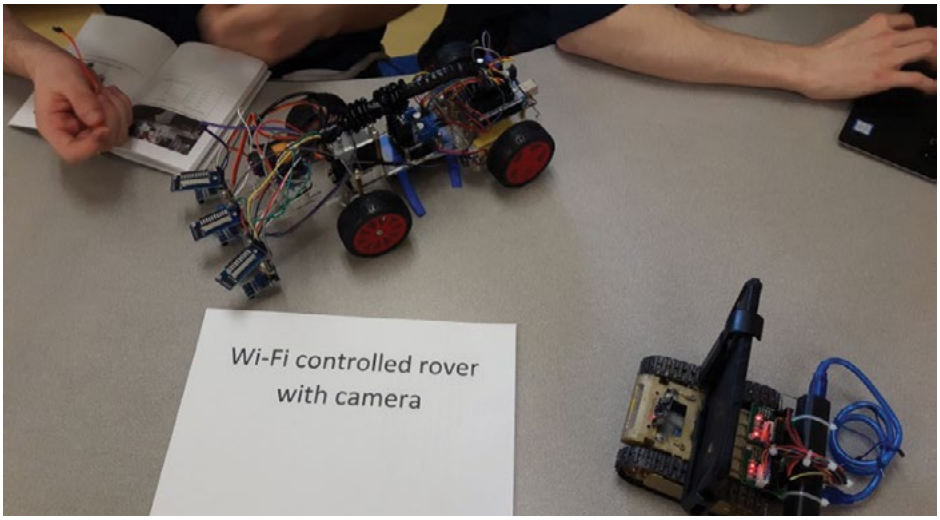
Students show various technologies at the Technology Showcase.



Students use Makey Makey kits to make interactive sound displays in the Creative Circuitry Workshop.



Students show off lighted circuits.



Robotics student booth to show off remote-controlled rover with a camera.

Kasey Whalley with Brian Baquial

Teacher Creates
A Different Kind of E3

One of the biggest electronic entertainment trade shows in the world, Electronic Entertainment Expo (E3), brings together some of the most prominent names in entertainment technology.

Game developers and publishing houses, independent programmers and hardware and software manufacturers gather in the Los Angeles Convention Center each May to showcase their newest work and emerging technologies.

In the days before COVID-19 precautions, this expo inspired Brian Baquial, the computer science teacher at Brampton's Notre Dame Catholic Secondary School, to create a similar event for his Grades 10, 11 and 12 classes, which he opened to all students.

To run the event, he needed a space that could accommodate his students *and* all of their work. Baquial teamed up with the library to create the entertaining, engaging and highly attended E3@ND.

Hosting this event takes co-ordination and planning, but it has been one of the most well-attended events in our library.

The largest consideration we, from a library standpoint, take into account is *space*. We are lucky to have a large lower area, often set up with group tables and study carrels.

Baquial brings his class to the library and together we make a plan to show where each student will set up. Some students may require only a bit of floor space to showcase their robotic car, while others set up their game on a laptop in a study carrel or projected onto our large pull-down screens. We are careful to create walkways and gathering spaces around each of the stations, and tape down any cords that may be in the way. Each student sets up their station with signage and information to encourage other students to come by and experience their work.

During the event, the library is a vibrant collaborative and engaged space that encourages students to play, talk and learn. Students become experts in the software, hardware, or program they have used, allowing peer-to-peer education to thrive. "Every year I am surprised as to how great some of these projects are," said Baquial. Some students even spend their own money to create a project they are proud to show off.

The work the students do is remarkable. Mentored by Baquial, the Grade 12s use their entire semester to develop a project from beginning to end. He keeps it open-ended, allowing students to create something they are interested in and more likely to finish. Students can create a game, an app, some sort of hardware or software project with Raspberry Pi or Arduino, or a robotics project. Students are presented a variety of technology through the course, which gives them the freedom to choose something about which they are passionate.

Students not only discover more about a new technology, but Baquial also encourages inquiry-based learning strategies. Students are taught how to do research and problem-solve by using internet forums, help sites and general searches.

The inquiry-based research is underpinned by lessons on credible sources taught by the teacher-librarian to all Grade 9 and 10 students. This ensures students are empowered to create a technology-based project that they are confident in displaying to the larger student population. It also means that other students can interact with this hard work, and are able to see themselves potentially creating something just as engaging. Baquial encourages this. One aim of E3@ND is to allow senior students to show younger ones what they can create in a computer science class, hoping some will choose to take his class during their high school career.

The library is honoured to host the event, and our staff always participate – even if we are not especially skilled at any of the games or do not understand the program language the project was created with.

Collaborating with Baquial allows the library to function as a multimodal space, where peer-to-peer learning and engagement can happen, collaboration is encouraged and STEM disciplines can flourish.

Kasey Whalley

STEM Inspired:
Wired Wednesdays a Hit with Students

Creating displays is one of the great joys of working in a high school library.

Collaborating with the teacher-librarian, getting input from the students and building from our previous displays allow our library staff to ensure our main display is clear, relevant and engaging.

Last year, we decided to include interactive elements to accompany our more traditional book display. We wanted to create something that students could interact with and learn from. Our Wired Wednesdays were born.

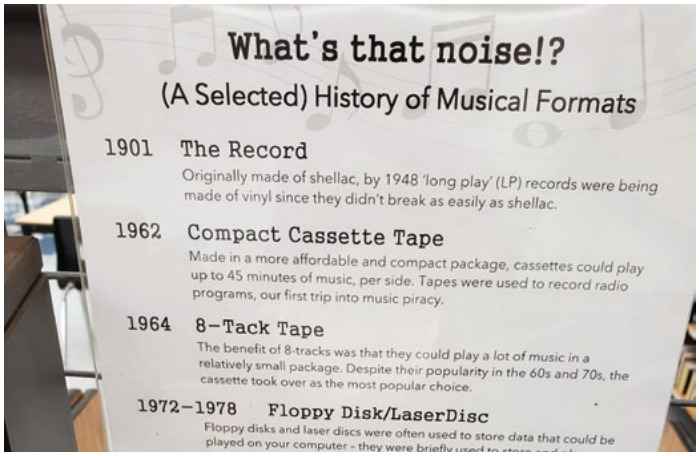
The idea is to bring together technology "artifacts" from days gone by, and display these relics with books about the history of, or changes in, the related industry. With old gaming consoles, music formats and computer tech gathering dust, our library staff took inspiration from items we had available. We also reached out to our school board information technology department to source some items.

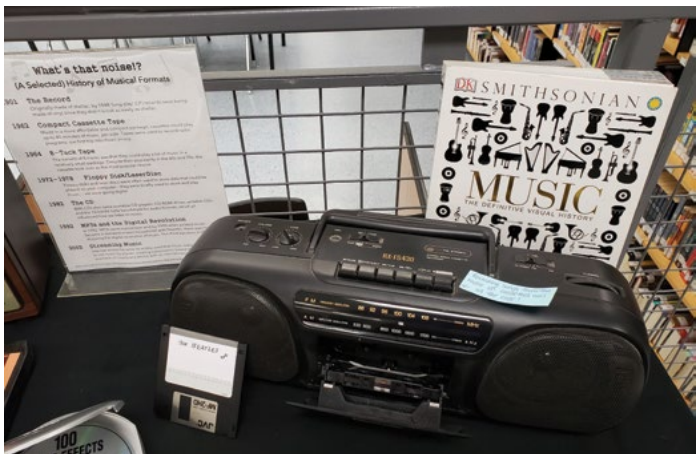
The display changed every two weeks or monthly, depending on when students were no longer interacting with the items. Since our schedule was flexible, we would make announcements on the preceding Monday and Tuesday before the change on Wednesday. And we would host a lunchtime game to encourage students to visit the new display.

Our History of Music Formats and History of the Keyboard displays were huge hits. Many students would come back often to talk about the items or to read the accompanying books we had on display.

This addition of an interactive space directly beside our more traditional book display meant that students were more aware of the main display, more willing and comfortable picking up books from any of our displays, and generally more engaged with the library staff.

We were able to talk with students about the (sometimes vast) changes in technology, the impact these changes have had on their lives and the influence technology has had in the global community, all while handling items that made these concepts real and relatable.





Coding Connections with the Library Learning Commons

Maureen McGrath

Though the timing was questionable — released at the end of the school year in the middle of a pandemic — the new math curriculum is a long-awaited tool for librarians.

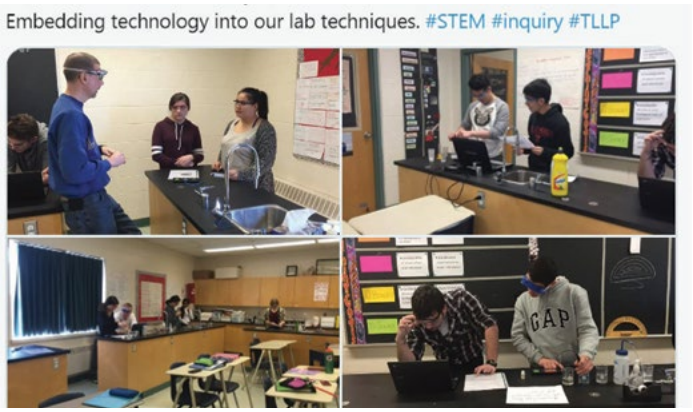
For years, we have been touting coding as an essential skill for all students, citing global competencies and the 4 Cs, but it has always been regarded as an "extra." Now that it is embedded in the curriculum, we have official support for a skill we have long considered important.

We began our coding journey at my high school in the Algonquin and Catholic District School Board, more than six years ago. In my frustrated quest to convince secondary teachers that coding could be an asset to their curriculum goals, I began by reaching out to my colleagues in school library commons across our board. We all were facing the same dilemma: teachers would send their kids down to the learning commons for workshops, or we would go into classrooms, but the coding stopped there. There was no follow up, or integration of coding skills into math or science classrooms. How could we change that? We needed a plan!

My first step was to secure some funding, which I was able to do through our central staff innovation leads. This would provide supply coverage for time to meet and run workshops, as well as money to purchase technology. I then asked each teacher-librarian to find at least two math or science teachers who might be willing to join us for some learning. As co-learners, all members of the group could determine our destinations so we could travel the road together.

When we began, with the combination of teacher-librarians and teachers, we had a team of about 15 educators. We met initially to set our goals for the group: we were going to dive into learning more about coding and make connections with Grade 9 math and science curriculum. If we did this, we were convinced that our students would benefit by improving their coding and computational thinking skills.

For our next session together, we invited the Mobile Maker Team from University of Ontario Institute of Technology to run a full-day workshop for us. They brought bins of tech and we played with Scratch coding, Micro:bit, Spheros, Lego Mindstorms and AR books.



Just taking the time to play was fantastic. So often in the library learning commons we bring the students in to play, and the teachers disappear into their computers, or are managing the room and so do not get the hands on experience. This focus on being the learner was a gift, and to do it with other educators of their same subject was invaluable. Conversations naturally emerged around the why and the where of these tools in their classrooms.

Our final session together revolved around incorporating some of these tools and experiences into existing science and math units. We homed in on the curriculum expectations and found the natural fit for this work. With the funding given to us, we were able to purchase the tech that the teachers deemed useful for their course content: Spheros, Micro:bit, makey makeys and Lego robotics. The teacher-librarians then created kits which each of us store in our three libraries and developed a sharing system to allow borrowing between schools when larger sets are required. The learning was amazing, but what was more exciting was the collaboration. We forged relationships between science and math departments across schools and built trust between the teacher-librarians and those departments, where teachers now see us as an asset to student learning.

The new Grade 9 math curriculum will "solve" the question of where coding fits, with coding expectations built in as a strand. However new challenges will arise for many math teachers not confident with their own understanding of coding. There is an opportunity for teacher-librarians as co- learners and collaborators to share the knowledge they have been building for years. I encourage you to take on this journey!

Trying to be a STEAM Teacher During a Pandemic

Trish Hurley

With all the safety regulations surrounding COVID-19, including social distancing and the sharing of materials, my job, like all teachers' jobs, became much harder this year.

The STEAM Lab in my school, which is also the library, is closed. It has become a storage room for extra furniture that had to be shipped out of classrooms to create more space. The idea of building, using loose parts, sharing scissors, glue guns and moving around the lab to select materials from different bins is long forgotten. I, for one, hope that it's just for this year.

Meantime, instead of throwing in the towel, I, like all teachers around the world, had to come up with new ways to implement programming. In my case, I had to find new ways to implement STEAM within the classrooms. One of my answers was SCRATCH.

I teach many classes. This year, I work heavily with the Grade 4s and 5s. As coding has become a new official part of the math curriculum, the teachers and I got together to co-plan. What we came up with was, at first, a little scary, certainly glitchy and, at times, frustrating. But, in the end, it was creative, interesting, exciting and fun for the students. Everyone showed resilience and it's a project we will most definitely map out for the next school year.

We focused on science: Grade 4, Light and Sound, and Grade 5, Properties of Matter. The students created a quiz-show game to explain what they learned in science. Then they got to share their game with others and allow them to play. Students had to have at least five questions and keep a question count. For each answer, there had to be a reaction, like movement, light or sound. The project began with watching a few YouTube tutorials, including stopping and starting the videos many times to explain, read, question and discuss the coding with the students. These students already had some experience coding.

We created one main class (it can take up to 48 hours to secure a SCRATCH account), and then sub-classes were made for each specific class. Each student was able to access the class (this sometimes required some trouble shooting, renaming conventions, and working in the hallway for better connectivity to the program), and create their own game. One small caution, as the students create accounts, ensure you are following your board's naming conventions.

Even though as teachers we were a little apprehensive about this project, the "ins" and "outs" of the technical pieces of SCRATCH, the students persevered. We had four gaming examples for them to follow — again, explanatory videos found on YouTube helped them. In some cases, students followed the coding exactly as they saw in the video. It was at this point that we added the extra "catch." With each answer given by the quiz taker, a sound effect, movement or light had to be coded (characters doing cartwheels, or sounds like "correct" were common). This ensured that the students could read and understand the code, even if they copied it directly from the video provided, as they had to edit it to add their "catch." This "catch" created the new coding (for those that copied the example directly). Like any writing project, the students showed us rough drafts (to correct spelling, and to ensure the criteria was followed). Suggestions for improvement were made, and the end result was three entire classes who showed not only their coding knowledge, but their researched science questions for their specific curriculum.

For some, coding is old hat. They have been doing it for years and it's easy. For others, it is new and daunting. My suggestion for those needing either a refresher or some help is to watch some YouTube videos, reach out to staff or within the board, or even your PLN for a little help.

Trust your students – they often know the answers and can help each other. Don't be afraid to say to your students that you don't know the answer. Put specific questions out to the class – there is usually a keen student who "knows." Model for students how to find an answer. If you don't have a student in the class who can help, try another class. Could you do coding buddies? Could you find the answer on the Internet?

Cardboard STEAM Project Popular During Online Learning

Trish Hurley

The winter announcement by the Ontario government that schools were going online was met with some angst.

I usually have school maker projects connected to the Global Goals or Forest of Reading. As this year is different, my maker projects are on hiatus.

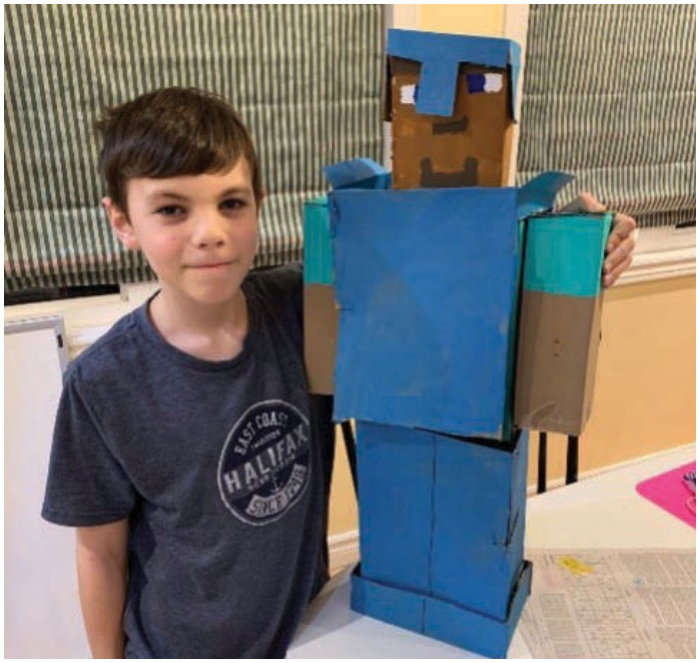
It was decided students would do online projects, similar to what I might ask of them at school. They did them at home with the materials they had. We specifically asked students not to ask family members to buy materials at a craft store.

We did two projects, which went through the engineering and design process. The students had to imagine, ask, plan, build, improve and present. Each project began with a discussion, some videos for inspiration and a slide show, including learning goals, timelines and success criteria.

We decided on this approach for numerous reasons.

First, we felt the students needed a break from being online. Students had to check in, and we were always online to answer questions but we allowed them to walk away from their screens and use their creative skills to build. The second reason we did these projects was because we couldn't do them in school this year. It was nice to allow the students to build, create, and present their projects, while never taking them to school.

A popular project, the Cardboard Build can mean a variety of things. In this case, students were encouraged to build anything they wanted out of cardboard from their recycle bin. I wanted to keep the project open-ended. The slide-deck I created included numerous ideas or categories (a game, a useful thing, a toy). We discussed types of cardboard, ways to fasten cardboard (cardboard attachment techniques are worth looking up and discussing before a build) and we watched a super cardboard maker discuss the creativity behind building and show some unique and incredible cardboard projects (from a double decker bus to a way to connect race-car tracks). For this project, I asked these junior students to use rulers to measure and consider using multiple ways to attach cardboard. With that in mind, the sky was the limit.



Grade 4 student, Rowan Steele, created a Minecraft character, "Steve" and outfitted him with slide-on armour (picture two).

(Permission granted to use these pictures from his mom, Zoe Steele)

Students came up with an idea, drew their plan, gathered materials, asked, when necessary, when necessary asked for parental help (using box cutters, glue guns) and created their masterpieces. Although some students painted their projects, they were not required to. The thinking, designing, perseverance and mathematics that went into these projects were incredible. Upon completion, each child then did an online "show and tell" and presented their project orally to the class. The end results ranged from a Minecraft character to a usable chair and night table to a giant helicopter.

Opening STEM Pathways For Everyone

Kimberly Senf

As librarians, we've been working towards improving and modernizing our STEM collections for years.

We've been at the forefront of makerspace culture. Many of us have collaborated with science and math departments on inquiry projects. Yet, there's an additional way to promote STEM within our schools and our libraries, which is raising awareness of organizations that are working towards creating a space for diverse youth voices in STEM.

Many organizations have been created with the aim of ensuring that the STEM fields of science, technology, engineering and mathematics are pathways that are open to under-represented youth. Some are national, while others are focused on local initiatives, but all are operating with the objective of levelling the playing field so that all students can see themselves in a STEM profession later in life.

The list below includes just a few of the many organizations that have been created with this purpose as their driving force:

- **Rise in STEM** is an organization aimed at empowering Black youth to enhance their technical skills and ensure they are ready to take on the opportunities in today's digital world. Their target demographic is Black, African and Caribbean youth in the Greater Toronto Area. Their initiatives involve summer workshops for students, as well as mentorship by professionals that can serve as role models for young people thinking about careers in STEM, or those that are interested in improving their tech skills. Website: riseinstem.ca

- **hEr VOLUTION**'s tagline is "inspiring girls to embrace STEM careers," which they do by matching underserved youth, in particular young women, with leaders in STEM fields. They offer a four-week program called STEMing Up for female students, aged 14 to 17, to get hands-on experience working with technology, learning to code and helping to solve real-world problems. Doina Oncel, CEO of hEr VOLUTION, can see the efforts of those involved with the organization paying off. This past year alone, five young women involved with the organization received National Centre for Women and Information Technology awards. Through mentorship and programs, "young women are introduced to design thinking, coding skills, analytical thinking, and business and leadership skills," says Oncel. "Once they have completed their program with us, they are ready for their post-secondary education and a career in computer science, business, and related fields." Website: hervolution.org

- **Black ESTEEM (Entrepreneurs, Scientists, Technicians, Engineers, Economists and Mathematicians)** is a non-profit organization aimed at empowering young Black women in Ontario to consider STEM interests. Their programming initiatives focus on the pillars of mentorship, empowerment and training for girls, aged 10 to 13. Beyond science and technology skills, Black ESTEEM is creating a space for young women to take on leadership and innovation opportunities that might not otherwise be available. With the pandemic, they have shifted their focus to offer a remote STEM learning program and are in the process of developing a podcast that will be released this year. Website: blackesteem.org

Beyond the three organizations mentioned above, there are numerous others doing similar work around diversifying STEM for youth in Ontario and across Canada. They include:

- **Girls Who Code**: Offers a variety of programs with a focus on teaching coding to girls. Website: girlswhocode.com

- **Black Boys Code**: Offers workshops that teach young Black men technology and digital skills. Website: blackboyscode.ca

- **See It Be It STEM It**: Raises awareness and empowers women to consider their interests in STEM. Website: seeitbeitstemit.com

- **Actua:** Indigenous Youth in STEM engages youth to build their skills in STEM and the National Girls Program continues to break down barriers related to women in STEM. Website: actua.ca

Tim King

Use Learning Commons To Explore Cybersecurity

The trend in recent years of libraries evolving into learning commons puts these once paper resource focused centres of learning into a unique position when exploring emerging digital fields of study.

Many learning commons have adopted digital literacy as a primary function, though one area that still eludes the vast majority of educators in Canada is cybersecurity.

You've probably stopped reading because that word puts "the fear" into most educators. I've been presenting on cybersecurity in the classroom for the past three years and find most educators can't disappear fast enough. Combining digital technologies which few people feel truly fluent in with a field of study that includes crime, warfare and propaganda, usually has most educators running for the hills, but I'm here to tell you that it isn't nearly as scary as you might think.

I worked in information technology for almost 15 years before becoming a teacher. I now teach computer technology at Centre Wellington District High School in Fergus, Ont., but few schools provide deep-dive curriculum into cyber skills.

One reason I left teaching English for computer technology was that it is ever changing so I knew I'd never have to teach the same book or lesson year in and year out. I know I'm a bit of a unicorn when it comes to technology in education. Finding teachers qualified to teach technology is difficult, but education has come to depend on our digitally networked world as much as any other industry and we need to get a handle on best practices, or we put student learning at risk.

How We Got Started In CyberTitan

In 2017, in my never-ending effort to keep up with my rapidly mutating subject matter, I convinced four of my seniors to sign up for the inaugural year of CyberTitan: the Canadian Student CyberSecurity Competition. This competition piggybacks on the U.S. Air Force Association's CyberPatriot competition, which had been up and running for a decade at that point.

My time in IT was before cloud-based computing. So, many of the networks I built and maintained were old-school local area ones, but the world has moved on, as many educators are well aware. These days, a computer is functionally useless

without network connectivity. We even provide computers (Chromebooks) to students now that only work with network connectivity. Our connected eco-system of technology brings with it great benefits, but also persistent dangers. It's those dangers we're obliged to understand and teach fluency in if we're going to base student learning on cloud-based, networked learning platforms.

CyberPatriot typically runs in three rounds, each six hours long. This cyber-marathon has students working through infected and sabotaged operating systems, such as Windows 10, Windows Server and Linux, removing malware and solving configuration problems that make the systems vulnerable. It sounds like it's very technically challenging, but it feels more like detective work. One of my CyberTitans this year said it's more about being able to research effectively and efficiently than it is about being a computer whiz. Who can you think of who would be able to coach students in effective and efficient research?

Our first year in CyberPatriot came at us hard and fast. Round 1 felt like stepping into the ring with Mike Tyson. Round 2 was even harder but we were starting to get the hang of it and, by the final State Round in January, we came out of it feeling as if we had some idea what we were doing. We were then stunned by an email from the Information and Communications Technology Council of Canada (ICTC), which runs CyberTitan, inviting us to the inaugural CyberTitan national finals in Fredericton, N.B.

Nationals were an astonishing experience. Three of my team members had never before been on a plane or left Ontario. And, when we got there, the competition was being run next to one of the largest cybersecurity conferences in Canada.

I had lunch with the general in charge of the Canadian Security Establishment. That evening I discovered I was having a drink with the head of Homeland Security for the United States. Throughout the conference, which ranged in scope from how to protect your corporate network to international intelligence and cyber-espionage, a series of exhausted professional cybersecurity experts crossed the stage begging educators to focus on this subject as every Western country is at least a decade behind in terms of capacity and capability.

It was an unnerving few days realizing that the now digitally managed critical infrastructure we depend on is almost entirely undefended.

We did well in the competition considering our background, finishing fifth in Canada ahead of half the teams there. Our little, composite rural school could be competitive in this competition because it's not all about funding and special programs for super-students. It's about tackling problems and researching solutions in a collaborative and focused way. Don't sweat the technical side; that comes with experience. None of us knew what we were doing six months earlier either.

I first came across ICTC when I was researching job statistics for my students going into information and communication technology pathways, which is how I discovered CyberTitan. ICTC is predominantly a research organization that collects data to help the federal government make decisions that will make Canada more competitive in the challenging global digital economy. However, ICTC also has an educational outreach that, in addition to running CyberTitan, also runs the fantastic FIT program that offers students recognition in emerging digital fields that are often underappreciated or ignored in education.

Equity and Competition

At the 2018 national finals in Fredericton, during a team photo, I happened to be standing next to Sandra Saric, the director of education for ICTC. She said under her breath: "Where are all the girls?"

Teams can be up to six students. I could find only four willing to try. There were few if any girls in my computer technology classes, especially at the senior level.

But the next year we had volunteers and we fielded three teams of six, including an all-female one from my junior classes that I convinced to give it a try (the gender stereotyping really kicks in after they've been in high school for a while). That team of mostly Grade 10 girls was surprised at the backhanded sexism they faced in the school and decided to call themselves the Terabytches (a terabyte is a large amount of memory in computing, and they spun it to push back against the you're-just-a-girlism that they constantly faced). I've done everything I can to support that choice though it has created tension when some find the name inappropriate. But when sexism is endemic in an industry, you're not going to overcome it by catering to gender stereotypes.

All the seniors from the year before had graduated so we all started from scratch again, but this time I had some idea of what was coming. Watching how the girls tackled the intensity of those six-hour marathon sessions was enlightening. While the boys would often ignore each other or even argue over an approach, the girls would step back, agree to an approach and then try it; they took collaboration and communication to the next level.

continued on page 30

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Over the course of the competition, all our teams improved. Our junior team missed nationals by a single place, which boded well for the future. I was once again amazed to get another email from ICTC congratulating us on being the first top-all-female finalist team in Canada. So, we were going to nationals again, this time in Ottawa.

Cybersecurity is an extremely male-dominated profession. There has been a lot of effort to change this but back then it was estimated that fewer than 10 per cent of the workforce was female. The girls' success prompted a lot of media attention, but it was the almost constant static of sexism that really frustrated me as their coach. When we got to nationals, one of the first things they heard from a member of an all-male team was: "You're lucky you're pretty, because you suck at this."

Our competitive senior teams have never been all-male since the Terabytches in 2019. In fact, both of our most recent senior teams have had female captains, who have been the linchpins in securing us national finalist spots with some of the highest Cisco networking scores in the country. Cybersecurity might seem like a big, scary subject to get into, but there are many aspects based purely on male bravado. Don't fall for the insecure tough-guy talk. There is nothing dangerous about cybersecurity. That is just hype from insecure men.

Hang on, you're asking, isn't this *The Teaching Librarian*? How is this relevant to the library learning commons? Well, many learning commons are hosting school clubs and academic teams these days. Running a CyberTitan team would be a fantastic fit because it's such a research focused competition.

The challenging bit is getting the technology you need to run the competition, but your biggest fans will be your board IT department which is desperately hoping that we can raise digital fluency because users are always the weakest point in any network. More cyber-aware students and staff mean a more secure and functional network for everyone. Some boards are trying to push this cyber-safe angle from their IT departments but the technical staff in those roles aren't communicators by trade and have trouble engaging staff and students with the scary world of cyber. In any school, which teachers are the ones most experienced with introducing staff and students to new material? The teacher-librarians – along with any other school library staff! Who better to work with a student team researching an emerging field of study than a teacher-librarian?

CyberTitan runs a middle-school division, as well as the high school division. ICTC has been developing state-of-the-art web-based cyber-challenges that you can even try on simple devices, such as Chromebooks. So, the technical barriers are always coming down. While you still need a Windows-based machine to do the CyberPatriot competition, that may soon change. And, meantime, board IT will have desktops that no one wants any more while everyone is rushing into an insecure Cloud.

Last year, Krista Sarginson, an elementary teacher in Manotick, Ont., started a team at her school. In its first year, this team worked its way up to second place in Canada. Sarginson will be the first to tell you that IT is not her background. But with mentoring and support (both happily provided by ICTC and CyberPatriot if you want it), your students can work with industry professionals to learn the technical side. In Sarginson's case, her local board IT was also eager to help.

Because of the nature and timing of the competition, CyberTitan is something any student could participate in regardless of socio-economic status or academic stream. Our senior national finalist team this year is one-third autistic, half have IEPs and one-third of the students are applied stream; this isn't just a competition for quantitative analysts. CyberTitan isn't a competition that demands the economic privilege that allows for after-school games and practices and prohibits the students who must go to work after school from participating. It's also versatile enough to go virtual if you happen to be in a pandemic (not that that's likely).

What Does Competing in CyberTitan/Cyberpatriot Feel Like?

What does a CyberTitan/CyberPatriot round feel like? We get together at 8:30 in the morning and I encourage students to bring snacks (hackers need snacks). We've gone over our classroom computers and made sure everything is updated and ready. I've downloaded images onto USB memory keys for each team. We turn on the images at 9 a.m. and then we have six hours to try to solve as many problems as we can in each of the three images.

Our student success teacher has kindly provided us with lunches the past two seasons. If you've ever wondered how pizza can be converted into cybersecurity solutions, you need wonder no more. The focus and effort these students pour into this is unbelievable and put the lie to the ageist idea that kids these days can't concentrate on anything. For six straight hours, our computer lab looks like a scene out of a Jason Bourne movie. It's intense! CyberPatriot provides live scoring from thousands of teams from all over the world. So, teams are often in point-by-point battles with teams from the U.K., U.S,, Japan, Taiwan, Germany, Saudi Arabia and many other countries.

What are these images? A virtual image is a simulated computer that runs inside a window. Whatever happens in that image disappears when you close the window so there is no risk of infection from computer viruses. This means you can open a really compromised computer teeming with viruses

and malware without any fear of damaging anything. Students open these nasty virtual machine images and proceed to diagnose and repair them. The level of digital fluency that students generate from this process is astounding. I'll often see them looking up viruses or researching system settings on the fly before trying a solution – and the system encourages trial and error. If it all goes wrong, you can always reboot the image and start over. Suddenly, the Windows operating system students have been using for years is something they understand and can tinker with. It's akin to someone who has driven a car their entire life but never once opened the hood. After CyberTitan, students feel like PC mechanics.

This digital fluency spreads. Many of my CyberTitans have gone on to mentor younger students through co-op placements and specialist high skills majors learning fairs in our board. That influence has resulted in a steady growth of not only our teams but also digital fluency in our school. Before COVID-19 hit, we were running four teams of 24 students! Even after COVID-19, we were still the only school team operating and have just finished our fourth and most successful season yet. We've been doing this long enough now that I'm seeing students who are graduating into post-secondary programs in cybersecurity and immediately finding work. The latest estimates suggest that millions of cyber jobs are going unfilled worldwide due to a lack of experienced operators; the demand for students with cyber-skills is extreme.

Your learning commons could play a vital role not only in opening desperately needed pathways to students, but also improving digital fluency in your schools. While many of my CyberTitans are now interested in cyber careers, I have others that are aiming for neurosurgery, digital arts and even non-STEM fields who find the experience invaluable. One student taking graphic design in Niagara told me he's now the default IT fix-it guy in his dorm. Another is working in his family business where he was able to prevent serious damage to their retail side by stopping cyber-attacks that have crippled others. Even for those students not choosing cyber, having a CyberTitan background impresses post-secondary entrance reviewers and offers students an edge in a competitive world because they are displaying the kind of digital knowhow that so many others lack.

Staff in the library learning commons have a deep understanding and experience with research. The comprehension of new subjects puts them in a unique position to not only support digital literacy, but also to create a vibrant center for new learning in your school. Don't be afraid of the big bad cyber-wolf; it's all bark and no bite. There are numerous industry and government organizations who are ready to do backflips to help you engage with cyber in an exciting and meaningful way. With COVID-19 we've faced a rapid shift to online learning that makes understanding the cybersecurity that underpins it even more important. Take the plunge, get in touch with ICTC and start planning a CyberTitan team for your school next year. Your students will love it and the benefits are many.

Cyber Competition Links and Details

For general and media CyberTitan inquiries you can contact the Information and Communications Technology Council (ICTC) by phone at 1-613-237-8551, ext. 154, or 152 or via email at: cybertitan@ictc-ctic.ca.

CyberTitan: cybertitan.ca

Supported by the Canadian Security Establishment (which includes the armed forces and numerous federal agencies). This is a "live" hands-on technical competition where students get to secure hacked and infected images in a dynamic, simulated environment. It lets them try on the role of cybersecurity operator in a very real way. There also is a network security piece that brings with it free access to Cisco's worldwide, over 10 million student strong Netacademy. This state-of-the-art LMS offers you current courses in a multitude of languages in subjects ranging from ICT and networking to entrepreneurship and, yes, cybersecurity!

CANHACKS: dmz.ryerson.ca/canhack

Run by Ryerson University and sponsored by RBC, this competition is very engaging and runs like an online game. For students interested in mathematics and computer science, it's a great way to get into cyber and works well in partnership with the other two offerings.

The Canadian Cyber Defense Challenge:
cyberdefencechallenge.ca

A brilliant "live" event in Winnipeg that has been open virtually for the past few years. Students get live video feeds of drama students enacting cyber-crimes and then must find clues and solve problems. At the end of the day the teams present their diagnosis of the situation to non-technical and actual CEOs and VPs from the sponsoring corporations. This focus on communication and the wide range of clues given make this a very engaging and exciting day for students.

This year, Centre Wellington District High School, a medium-sized composite school literally surrounded by farm fields in Fergus, Ont., is returning to the CyberTitan National Finals for the fourth consecutive year. This time two teams have made it! The first thing the students from Toronto, Fredericton, Winnipeg, Edmonton and Vancouver always say is: "Fergus, where's that?"

STEAM: Story-Telling for Engagement and Authenticity in Math

Melissa Poremba

My story begins about 15 years ago, when my husband was teaching secondary school math. He came home enraged that the school had implemented a Drop Everything And Read (DEAR) program where, each week, he would be required to allot 15 minutes per class to allow students to read for pleasure.

I'll spare you his diatribe, as it involved some unsavoury language, but basically his position was that reading books is the realm of English teachers and librarians, and when they started teaching quadratics, he would start letting kids read novels in his math class.

So many teachers and students see math as a discrete entity separate from their everyday lives. Worse, many will say that they don't like math or aren't good at it. This is typically because students think that the purpose of math class is to get the single correct answer to an abstract numerical question in the fastest amount of time possible. But math isn't just computation and numbers. According to Charlie Epps, fictional mathematician in the TV show *Numb3rs*, "Math is more than formulas or equations; it's logic, it's rationality, it's using your mind to solve the biggest mysteries we know."

I believe that school libraries are the perfect place to help students embrace this paradigm shift in their view of mathematics in order to discover the beauty, the wonder and the creativity of this discipline. In the school library, students can confirm that math is relevant to their everyday lives, and they can experience its connections to other fields of study. The stories they discover in the school library and the time spent considering them can help to make math more accessible, more relevant, and, most important, more human. If the purpose of reading is to develop empathy and understanding, then the school library is the perfect place to use story-telling for engagement and authenticity in math. (Yes, I just hijacked the STEAM acronym!). Typically, teacher-librarians do not teach reading but rather the enjoyment of reading. Similarly, teacher-librarians do not have to teach math but we can inspire students to be curious about it and to appreciate it. As we are not restricted by the demands of the curriculum for fast, accurate answers, we can offer students the luxury of noticing and wondering about mathematics encountered in fiction and nonfiction alike.

While it is easier to identify the math when numbers and counting are involved, chances are that when any character in a story is "figuring something out," they are using mathematical concepts because, at its core, math is logic. In Chapter 16 of *Harry Potter and the Philosopher's Stone*, Harry, Ron and Hermione are confronted with the puzzle of the seven bottles. This logic puzzle is the essence of mathematics. What makes this an excellent example is that Hermione doesn't articulate her thinking, so it is a good problem for students to consider.

Stories can provide an excellent opportunity for students to experience "math words" in everyday contexts. Connections between same/equal, grow/add, lose/subtract, increase/multiply, and share/divide are natural and can improve students' number sense. When a character has two cats and one dog and we explain that they have three pets, we are teaching the same concept required when seeking a common denominator to add fractions. If someone in a story is shopping, organizing, travelling, predicting, estimating, categorizing, sorting, grouping, measuring, building, or looking for patterns, then they are using skills essential to understanding math. While there are many books on the beauty of math and its many occurrences in nature, a book doesn't have to be entirely about mosaics, tessellations, fractals, origami, fractals, or the Fibonacci sequence to justify taking a moment to point out the mathematical connections. We should capitalize on any opportunity to capture the imagination of students to make a link, visualize a connection, or spark their interest in math. The bonus is that all our typical techniques of noticing, wondering, predicting and reflecting are just as essential in story-telling as they are in developing skill in mathematics.

The most rewarding moments come when the students start to notice these math-in-action vignettes on their own and bring them to the attention of the whole class!

In that we also serve the teachers in our schools, teacher-librarians can assist them in locating age and stage appropriate materials that combine math with stories, whether they are fiction or nonfiction. Whether they are searching for books that introduce a topic, assist in teaching the concept, or expand on the subject, we can direct them to the many lists,

articles, and readers' advisory tools aimed at supporting math instruction through literature. (See side bar.) I am fortunate to have a colleague who is as interested in math narratives as I am so we can exchange recommendations to share with students. Drawing attention to a line such as "some infinities are bigger than other infinities" from John Green's *The Fault in Our Stars*, or Wilbur's reaction to the notion of "less than nothing" in *Charlotte's Web*, can spark great discussion. Pointing out that the title story in Alice Munro's *Too Much Happiness* is linked to mathematics can send students on numerous tangents (pardon the pun!).

One cautionary note is to be wary of materials where the math seems too forced, the situation too contrived, or the problem too abstract. By using stories, we are hoping that students will experience math in authentic scenarios. We all remember what happens when math teachers try to create their own stories–yes, the dreaded word problems that students often find artificial and irrelevant.

While looking for books celebrating mathematics, we also must ensure that all those in our community are represented. When I was studying, the core text on the history of math was E. T. Bell's *Men of Mathematics*. And, yes, the men were all white Europeans. Considering the lens through which much of history was recorded, we need to impress upon our students that, when history gives us numbers, we must consider who was doing the counting and why. The literature has come a long way in recognizing the contributions of all genders, races and ethnicities and our collections should reflect this.

When seeking histories and biographies related to mathematics, there are typically succinct summaries of famous contributions to the discipline but, perhaps more important to share with students, are the failures and frustrations encountered along the way.

Due to COVID-19, I now split my time between the school library and helping students with math. I am disheartened by the number of students paralyzed with fear because they "don't know how to get the answer." They think that every solution is clear cut, with a single correct answer. I often relate the story of Hamilton-born John Mighton, who was able to pass first-year calculus only through the power of the bell curve but still went on to earn a PhD in mathematics at the University of Toronto, found JUMP Math, write three books on math and win two Governor General's Literary Awards for Drama. Students afraid of "failing" don't understand that "doing math" means being persistent, inventive, mentally flexible and willing to experiment in trying different approaches. My son, who studies math at the graduate level, was surprised to find in my old textbooks the Four-Colour Conjecture, which, having been officially proved, is now the Four-Colour Theorem. According to my son, the mathematicians who finally proved it had to be at least as creative as Tolkien. For students so inclined, they should know that the Millennium Problems posed in 2000 are still awaiting proof, with $1 million US promised to the discoverers of correct solutions.

continued on page 34

You've Got This!

I am confident that all teacher-librarians have the knowledge and skills to utilize story-telling for engaging and authentic math. To get the creative juices flowing, this is a list of some of my favourite resources:

For those in elementary schools, the best single source is probably *Deepening Student's Mathematical Understanding with Children's Literature* by E.E. Monroe, T.A. Young, D.S. Fuentes, & O.H. Dial of the National Council of Teachers of Mathematics (2018).

A nice summary of the main principles can be found in Storytelling and Mathematics by S. Retson, I. Blakeney, & J. Stevens, available from wordpress.oise.utoronto.ca/robertson/files/2019/04/Storytelling-and-Math.pdf

The Mathical Book Prize (www.mathicalbooks.org**) is an annual award for fiction and nonfiction books that inspire children of all ages to see math in the world around them.**

Mathematical Fiction (kasmana.people.cofc.edu/MATHFICT/default.html**) has a robust search function that can be narrowed by medium, topic, genre, and motif, and rates items based on mathematical content and literary quality.**

Maths Through Stories (mathsthroughstories.org**) is a great resource for parents and educators interested in teaching and learning mathematics through stories and creative writing.**

For a different approach, consider *Narrative-First Approach: Teaching Mathematics Through Picture Story Books* by T. Russo & J. Russo available through eric.ed.gov**.**

If the goal is to address math anxiety, consider *Using Children's Literature to Teach Mathematics; An Effective Vehicle in a STEM World* by J.M. Furner, available through eric.ed.gov**.**

Teachers interested in an academic consideration of the subject should consult *Teaching Mathematics as Storytelling* by R. Zazkis & P. Liljedahl of Simon Fraser University, although it can be difficult to obtain without good database access.

Sidebar continued on page 34

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I understand that some teacher-librarians may be hesitant, believing that they don't know enough traditional math content. Remember, our goal is not to teach the math, but to inspire students to appreciate it. We can relate short anecdotes to inspire further investigation or we can pose questions that, if we don't already know the answer, we can model how to research to discover it. This is particularly important now as many students are embarking on personalized, inquiry-based projects that are frequently interdisciplinary.

I love the question as to whether math is invented or discovered, which segues nicely into why so many mathematicians are philosophers. Do students know that, while there is no Nobel Prize in mathematics, many mathematicians have received a Nobel Prize in other disciplines? Do they know about the Canadian connection to the Fields Medal, which is considered by some to be the math equivalent? Were these renowned mathematicians trying to solve a specific problem or were they simply wondering about something for which we have yet to find a concrete application? Can you help students discover the link between the author of *Alice in Wonderland* and the original Wikipedia logo? Is it ultimately harmful that those who are good at math are stereotyped in many novels as geeky, bespectacled, introverts?

In the digital humanities, data-mining techniques are applied to written works for analysis, but the most insightful information comes from acknowledging the context; in other words, the story involved behind the numbers. Much has been learned about the writings of Shakespeare, Tolkien and Agatha Christie by data scientists. Researchers at the University of Vermont have used computational tools to define six narrative arcs in fiction. Kurt Vonnegut wrote his master's thesis on the shape of stories. It is amazing how much can be learned through and about mathematics without actually learning any new mathematics!

Indeed, this linking of math to other disciplines is another way the school library is perfectly situated to support this type of inquiry as it combines all genres and areas of study. Teacher-librarians have the skills and resources to guide students and staff in appreciating the natural beauty, creativity, wonder, usefulness, and insight offered by the study of mathematics. We can help them see the humanity of the discipline. We simply need to approach it as we do all literature: with a desire to inspire, to spark curiosity, and model the process of further inquiry.

And that is what I did for my husband–I helped him embrace the DEAR program as an opportunity to enrich his students' learning and appreciation of math by helping him to build a collection of relevant books–of stories–both fiction and nonfiction. Due to the positive reception by his students, he actually incorporated a weekly 'math story-time' where he read math-related picture books aloud. In other words, the end of my story was really just the beginning.

You've Got This! (continued)

Dr. Ann LeSage of Ontario Tech University has created *Criteria for Selecting Children's Picture Books for Teaching Mathematics*, available at childrensliteratureandmath.weebly.com/uploads/1/9/2/1/19219865/criteria-for-selecting-childrens-books_lesage_2011.pdf**.**

With respect to inclusivity and diversity in math, I like the work on Indigenous storytelling and math available at Simon Fraser University's Math Catcher (mathcatcher.irmacs.sfu.ca/stories**), the free mathematician profile cards available from Amplify Math (**amplify.com/programs/amplify-math**), tweets from Mathematically Gifted and Black (@MathGiftedBlack), and articles by or about Dr. Chris Matthews (perhaps start with** qcaa.qld.edu.au/about/k-12-policies/aboriginal-torres-strait-islander-perspectives/resources/mathematics-storytelling**)**

While they are older, I still find the stories in any math books by Theoni Pappas to be interesting and entertaining.

On social media, I follow Sunil Singh (@Mathgarden) who pens many short articles on the virtues of storytelling in math class.

I am anxious to review the books from TERC's Storytelling Math project as described by M. Kliman atterc.edu/storytelling-math**.**

Caroline Freibauer

Curiosity Lures Science Teachers Into **The Library Learning Commons**

Carlo Fusco is an environmentalist, a biologist, a chemistry teacher and a former head of science with a passion for technology. But when he watched a former math teacher colleague take over the school library learning commons, he knew that he wanted to take on the role of teacher-librarian.

The Waterloo Collegiate Institute teacher stepped into the position more than six years ago when the teacher-librarian at his high school retired. And he has enjoyed every minute since.

"I love it!" said Fusco, who enjoys working with both teachers and students.

"For a lot of students, the library is a safe place where it is okay to be smart," he said. "And I get to work with teachers to develop new lessons and explore new ideas."

Fusco is one of many teacher-librarians in schools across the province who have been able to leverage their STEM expertise to support inquiry, foster literacy across disciplines and, in many instances, become technology leaders.

Although he still teaches traditional lessons around plagiarism, copyright and digital citizenship, Fusco also rolled out a one-to-one device program at his school and keeps his shelves stocked with interesting books about the quirky side of science.

"When I go book buying, I look for books that humanize science," he said. "Science is not a closed thing that only trained people can do."

And when he teams up with teachers, Fusco often will cover the more technical side of a lesson, explaining to students how to make and edit a video or providing podcasting workshops for teachers.

"Part of our job is having the time to learn new things and share," said Fusco, who shares his expertise beyond the walls of his school at provincial conferences.

Brandon Tait's fascination with education technology and his interest in seeing what students can do with it, led the science

and math high school teacher to become a technology leader at Cedarbrae Collegiate Institute in Scarborough. He was practically working two jobs between regular duties in biology and physics classes and the time spent helping teachers navigate online platforms, such as Moodle and Google.

"I was getting worked to the bone," Tait said. "So, we had the idea that I could get some library periods where I could promote ed tech and work with teachers one-on-one to develop their expertise and enhance their teaching and learning experiences.

"It just so happened that the current teacher-librarian was retiring so the stars aligned, and I became the full-time teacher-librarian at Cedarbrae. I was a little panic stricken that first September morning sitting in the library alone, thinking: 'OK, now what?"

That feeling didn't last long. Tait launched many initiatives, including transforming the physical space to make it more appealing, winning "School of the Future" prizes, running a robotics team, making a fitness space for yoga and exercise equipment, and organizing a climate change summit as a Grade 10 culminating activity, which saw his school host student groups from across the city. He helped develop a STEM program with a multi-disciplinary team of teachers, which has Grade 9

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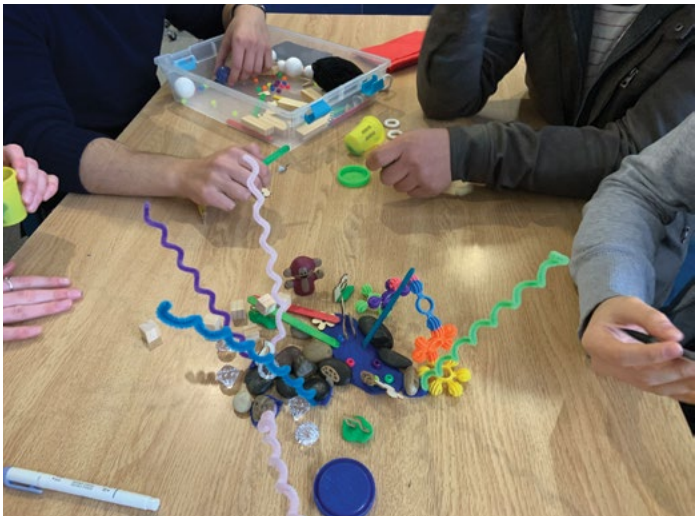

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students enrolled in a non-rotating timetable granting them an English, math, science, and business credit.

"Yes, there are uncounted research and inquiry-based projects, but there is so much more," said Tait.

Many of the colleagues he was most comfortable with were in the math and science departments. They were the teachers most willing to take risks on unproven and untried teaching methods. One of his first successful projects involved teaching Grade 9s about electricity. Tait brought in some coding and had students create gadgets with Arduino microcontrollers.

"Thankfully, I had enough cred with the science department that we tried it and it was awesome," said Tait, who continues to facilitate authentic inquiry and project-based learning in the library learning commons. "I think coming from a science – the questions are more important than the answers – mentality is very helpful for all."

He acknowledged that, even though his library learning commons is "unquestionably more STEMified," that there may be other gaps in program delivery that might best be handled by someone with a different skill set.

"In an ideal world, you would have the library staffed by a multidisciplinary team who can each bring a different set of strengths and energy into the equation," said Tait. "I had the joy of working with a colleague in the library last year who was English and social science qualified, and it was an amazing experience. We both appreciated each other's expertise, complemented each other's skill sets, and elevated the library game to an awesome level."

Jen Taylor, the teacher-librarian at Sir John A. Macdonald Secondary School, teams up with science and physics teacher David Vrolyk, who has one section in the library. Technology was the gateway into the library learning commons for Vrolyk, who helped roll out the school's one-to-one Chromebook project, which was run out of the library. When a teacher-librarian section became available, it made sense for him to try it.

"My science background comes with a curiosity," said Vrolyk. "But one of my favourite parts of being in the library is helping students who say they don't like reading find a good book."

Taylor, the main teacher-librarian at the Waterloo school, has an English and drama background but during one of her first assignments in a school library learning commons she collaborated on an inquiry project with the health-care teacher, which involved diagnosing an illness through role play.

"I think teacher-librarians today have to be STEM and STEAM teachers, regardless of their past teaching experience," said Taylor.

"As much as we can, we must be all things to all students and teachers, and we have to be open to learning alongside them when we find ourselves in unknown territory. That can be a challenge but it's also the greatest joy of the TL role."

Taylor certainly seems up to the task. In the eight years since becoming a TL, she has collaborated with colleagues, guided students through innovation and research and developed a culturally responsive collection for the entire school.

Most significantly, she redesigned the space – which included weeding more than 9,000 titles – to provide room for collaboration, quiet study, social interaction and even performance. She brought in a projector, a new sound system, a screen for large group presentations and eventually added a makerspace.

All of this set the stage for the implementation of the Highlander iLab incubator course, which allows students to take ideas from inception to final pitch working with community partners, including the University of Waterloo, Laurier University, Communitech, Vidyard. It's a multi-credit course for Grade 11 and 12 students that includes English and interdisciplinary studies focused on identifying and finding ways to resolve problems in the community. Taylor works with the two iLab teachers to assist the 40 to 60 students working and collaborating in the learning commons.

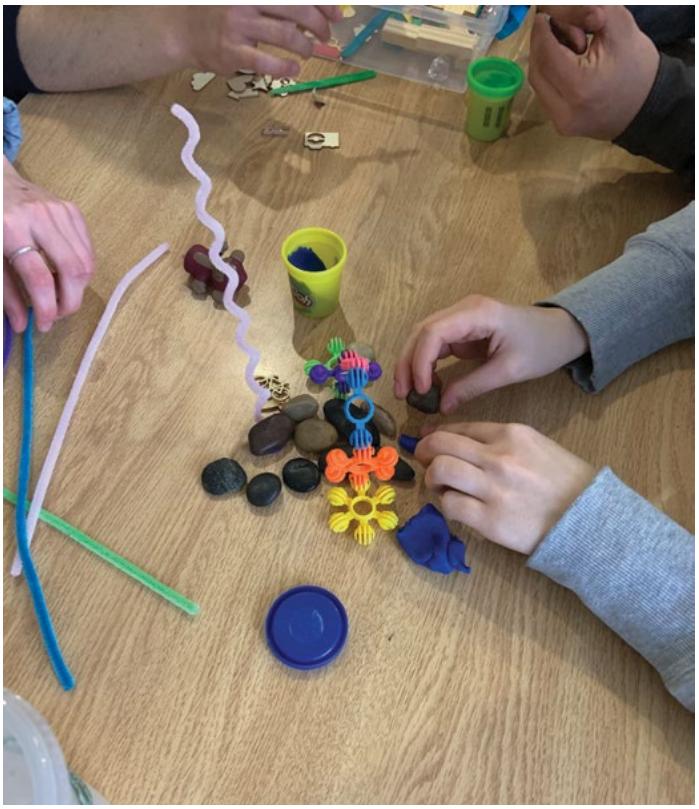
"We have had guest speakers, such as Larry Smith from the University of Waterloo's Problem Lab, talk about problem analysis and we held team-taught workshops on Design Thinking and Iteration," said Taylor.

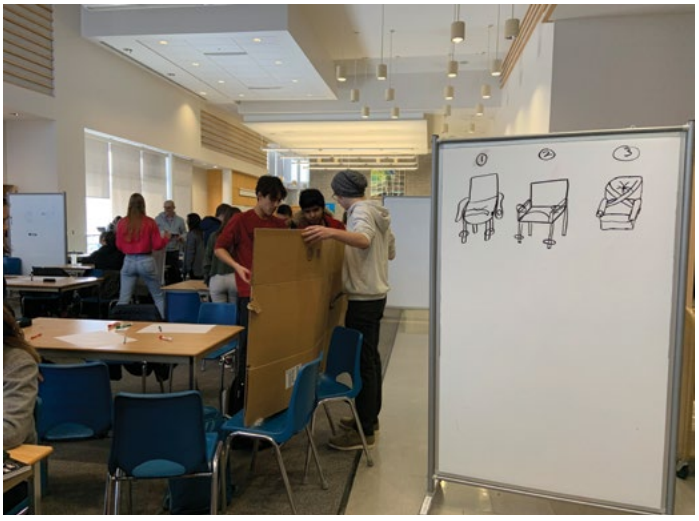
Looking back at her accomplishments in the library learning commons, Taylor said she is grateful to her school's administration, which allowed her "to take some risks and try to create a space that allows for the growth and creative collaboration of a whole school community."

Jen Currie, a veteran high school science teacher with the Algonquin and Lakeshore Catholic District School Board, was asked to join the board's learning commons team after participating in a collaborative inquiry at three schools that involved science teachers and teacher-librarians. "That connection helped me see the value in having a science/math teacher in the learning commons."

During her four years in the library learning commons, Currie is proud of the way she can help students learn with an inquiry-based lens, while, at the same time, assisting teachers on this path, too. Incorporating coding, robotics and virtual reality also has been an excellent experience.

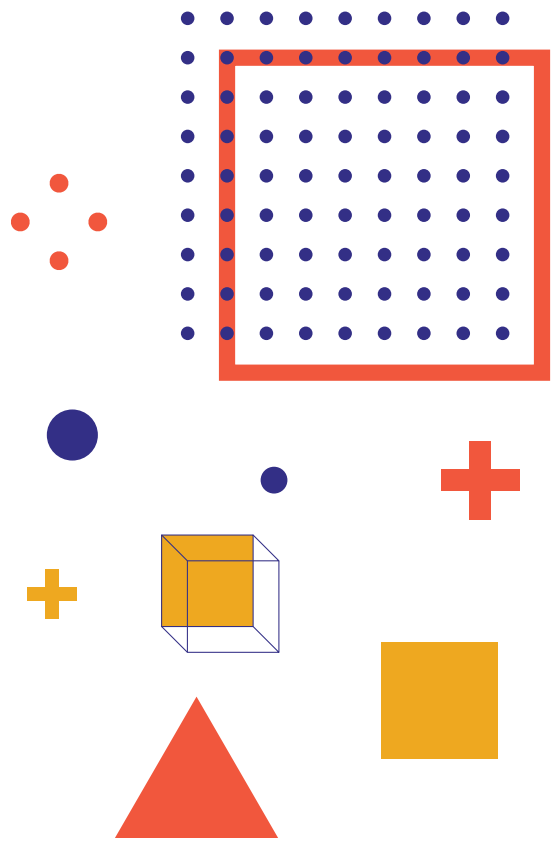
"STEM teachers bring a different perspective to the table," said Currie, who sees herself as part of an interdisciplinary team. "I may approach things differently, which allows us to collaborate on projects and use our talents in different ways."





Building Up STEAMM With Media Literacy

Diana Maliszewski



Libraries of all shapes and sizes have incorporated STEAM and MakerSpace activities into their programming. Robots and Lego walls reside alongside books and magazines.

Building challenges are commonplace and STEAM carts can be purchased from many vendors. How might library professionals enliven existing programs to continue to keep them relevant and avoid STEAM becoming a past fad?

During the OLA Super Conference 2021, I had the privilege of presenting a talk entitled, "Add Another M: Incorporating Media Literacy into STEAM Explorations."

The goals were to review some important foundational concepts for STEAM and media literacy, and to provide several ideas, prompts and questions that library practitioners could use to make their STEAM tasks full of critical thinking and even more meaningful. If you registered for Super Conference, you can still experience the presentation (and others from this virtual conference) until August 2021. Meantime, here is a written highlight reel.

STEAM tasks often follow the Engineer Design Process, the "E" in the acronym. Depending on your source, there can be different steps to follow. One of the simplest is to Ask > Imagine > Plan > Test > Improve. It isn't enough to use technology. It involves wondering, considering, prototyping and revising while involving technology, as well as science and math concepts.

According to the article "How Stem Became Steam" (nymetroparents.com/article/how-stem-became-steam), it was author and artist John Maeda who first suggested altering the acronym in 2013. The article argues that:

- The arts were always an integral part of STEM
- Arts makes STEM topics more engaging, especially for math-phobic people
- Hands-on tasks reinforce concepts
- Arts incorporation connects STEM to the real world
- The arts promote creative problem solving and a willingness to make mistakes
- The arts make STEM less intimidating

Media literacy follows the path of the arts, and should be integrated for many of the same reasons. But media literacy also infuses STEAM tasks with critical thinking and even more relevance.

We are all media consumers and many of us are also media producers. It is no longer an either-or; people today can be "prosumers," simultaneously consuming and producing media texts. We are so immersed in media that we can become unaware of the impact, as fish do not notice the water in which they swim. This is why is it important to consider media literacy when STEAMing things up.

According to the Association for Media Literacy, there are Eight Key Concepts of Media Literacy. They are:

- Media construct reality;
- Media construct versions of reality;
- Audiences negotiate meaning;
- Media have economic implications*;
- Media communicate values messages*;
- Media communicate political and social messages*;
- Form and content are closely related in each medium*;
- And each medium has a unique esthetic form.

The starred concepts resonate strongly when applied to STEAM situations. As long as the facilitator of the experiences tries not to label media texts as "good" or "bad," but rather "interesting" and rely on questions instead of judgments, there can be some deep conversations to be had as students plot and build and redesign.

For instance, here are questions one might consider if participants were creating walls:

- What might be the difference between fences and walls?
- Why and how might walls contain different meanings for the builders and those affected by them?
- How might walls symbolize oppression? Democracy? Power?
- How might materials and design affect the meaning and use of a wall?
- How and why might walls produce a range of effects and responses?
- What kinds of walls keep things in?
- What kinds of walls keep things out?
- What stories use walls as symbols?
- What do they symbolize?
- Why are walls constructed?
- What is the purpose of a wall and how is it used? (e.g., office dividers, in a house, a school- by grade).
- Does a wall always represent separation? When might a wall be needed? (e.g., privacy, safety)
- Whose point of view is valued or represented, or taken into consideration, when constructing a wall?
- What famous walls exist? (e.g. the Great Wall of China, Berlin Wall).
- What values are represented in famous/well known walls around the world?
- Why did Donald Trump build a wall?
- Why did Joe Biden halt the wall?

The wonderful thing is that there are many great books that can provoke some of these conversations. They can be read before, during or after hands-on STEAM work.

It's another reason why incorporating media just makes sense in school library learning commons.

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UPCOMING OLA EVENTS

We're working on a great line-up of virtual events from full-day conferences to one-hour webinars in the coming months. All members get special member rates.

Digital Odyssey

June 7 | 10:00 am – 5:15 pm EST | Member Price $75

Adapt your libraries' online services in an accessible way, featuring speakers from the disabilities community and an expert on user experience design and accessibility.

OCULA Summer Conference

July 7 | 9:30 am – 4:00 pm EST | Member Price $75

This conference will provide the library community the opportunity to reflect and commemorate this past year and to share talents, curiosities, skills, and unique obsessions beyond the library.

Annual Institute on the Library as Place

July 12, 13, and 14

This conference will focus on the innovative solutions and problem solving efforts of libraries during the pandemic and explore how these efforts can inform the planning of library spaces in the future.

Other Events and Webinars

Super Conference 2022: Call for Proposals will open August 9.

Education Institute: Attend hour-long webinars throughout the year, each $45 for members. If you're interested in an annual subscription for your staff, contact with Destiny Laldeo, OLA's Training and Education Specialist, at dlaldeo@accessola.com, for more info and custom pricing.

#ONLibChats: FREE to all current members, #ONLibChats are an informal space for library people to connect, ask questions, and share knowledge directly. Visit accessola.com/onlibchat.

Forest of Reading: Stay tuned for virtual events happening throughout the summer, featuring Canadian authors and illustrators!

For more information, please visit
accessola.com